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**The impacts of gentrification on contemporary segregation patterns
of postsocialist cities: case study of Tallinn**

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Abstract

The impacts of gentrification on contemporary segregation patterns of postsocialist cities: case study of Tallinn

The objective of the master's thesis is to explain the postsocialist city sociospatial transformations by examining the effects of gentrification and displacement on socioeconomic, ethnic and age segregation in Tallinn. To achieve this, individual level Estonian census data from 1989, 2000 and 2011, as well as register data from 2020 were used. Occupation groups were applied as proxy for socioeconomic status. The study area was the inner city of Tallinn. The analysis was structured by identification of gentrification and displacement, evaluation of residential mobility activity, assessment of housing characteristics, and calculation of segregation using location quotients.

The results show that 8 neighbourhoods across the inner city of Tallinn have witnessed gentrification between 1989 and 2011, and both classic and new-build gentrification have emerged. There has been significant segregation of the low socioeconomic class, the Russian and the elderly population. The impacts of gentrification are the most pronounced in the segregation of low socioeconomic status residents in the new-build gentrification neighbourhoods, and the overall segregation of elderly population during gentrification. The spatial pattern of gentrification and segregation in Tallinn signifies the postsocialist period, with a tendency towards the edges of the inner city.

Keywords: neighbourhood change, inner city, displacement, residential mobility

CERCS Code: S230 - Social geography

Annotatsioon

Gentrifikatsiooni mõju tänapäevastele segregatsioonimustritele postsotsialistlikes linnades Tallinna näitel

Selle magistritöö eesmärk oli seletada sotsiaalaruümilisi muutusi postsotsialistlikus linnas uurides gentrifikatsiooni mõjusid ning sotsiaalmajandusliku, rahvusliku ning vanuselise segregatsiooni paiknemist Tallinnas. Selle saavutamiseks kasutati Eesti 1989., 2000. ja 2011. aasta rahvaloendusandmeid ning 2020. aasta registriandmeid. Sotsiaalmajandusliku staatuse saamiseks oli kasutatud hõiveseisundi grupe. Uurimisalaks oli Tallinna siselinn. Analüüsi keskmeks olid gentrifikatsiooni ning paiknemise identifikaatorid, elukohamobiilsuse ja eluaseme karakteristikute määramine, ning segregatsiooni arvutamine, kasutades asukoha koefitsiente.

Tulemused näitavad, et kaheksas naabruskonnas Tallinna siselinnas on toimunud gentrifikatsiooni protsessid, kus tulid esile nii klassikaline kui ka uusehitiste gentrifikatsioon. Märgatav segregatsioon on toimunud madalamas sotsiaalmajanduslikus klassis, venekeelse elanikkonna ning vanemaealiste seas. Gentrifikatsiooni mõjud tulevad enim esile madalama sotsiaalmajandusliku staatusega rahvastiku segregatsioonis uusehitiste gentrifikatsiooni naabruskondades ning üldine segregatsioon vanemaealiste gentrifikatsiooniprotsessi käigus. Gentrifikatsiooni ja segregatsiooni ruumiline muster Tallinnas väljendab post-sotsialistlikku perioodi ning kaldub siselinna äärealadele.

Märksõnad: naabruskonna muutus, siselinn, väljatõrjumine, elukohamobiilsus

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Introduction

Gentrification in the residential dimension describes upgrading of the social class of a particular area, usually in the city, which is experienced through improvements in the area's housing stock (Wyly 2015, Cocola-Gant 2019). In parallel with gentrification, displacement occurs, which is the result of induced pressure for long-term residents to move out of the area (Cocola-Gant 2019). Meanwhile, segregation describes spatial separation between two or more social groups, which can be assessed through various dimensions (Massey et al. 2009), with the two more common ones being ethnic and socioeconomic (Musterd, van Kempen 2009). With segregation also understood as the spatial measure of inequalities in urban residential sphere (Marcinčzak et al. 2016), it is closely linked to the process of gentrification and its effect of displacement. Together, these processes are reflected in transformations of the urban sociospatial setup.

While Chelcea et al. (2015) already argued that the gentrification research forgets about the displaced and does not sufficiently connect to the understanding of segregation, Kubeš and Kovács (2020) have found the lack of connection between gentrification and segregation to be a particularly significant gap in the research of postsocialist gentrification. Therefore, this master's thesis will make a step towards filling the research gap.

Tallinn experienced a wave of in-migration from the socialist republics during the socialist period, which created a dual ethnic social composition and which was also expressed in the form of ethnic segregation (Tammaru et al. 2016a). Followed by a rapid transition to market conditions in urban housing governance (Tammaru et al. 2016a), the scope for gentrification was created. This context was considered as particularly revealing for increased understanding of the postsocialist city sociospatial processes, therefore this thesis focuses on the case of Tallinn.

With these considerations, the objective of the thesis is set as follows: to explain the postsocialist city sociospatial transformations by examining the effects of gentrification and displacement on socioeconomic, ethnic and age segregation in Tallinn. To fulfil the objective, three research questions are proposed:

1. Which neighbourhoods of Tallinn have gentrified?
2. What are the segregation dynamics in the gentrified neighbourhoods?
3. How can the postsocialist context be applied to explain the gentrification and segregation patterns in Tallinn?

The research questions are answered using Estonian census and register data, aggregated from the individual level to the neighbourhood level. The methodology applied is an operationalization of Atkinson's (2000) gentrification and displacement methodological framework, while the segregation levels are calculated in the form of location quotients, which allow to identify concentrations of a particular social group in particular neighbourhoods (Brown, Chung 2006). The period of analysis for gentrification is 1989 to 2011, while segregation is analyzed through two time periods – between 1989 and 2011, and between 2011 until 2020. The study area is the inner city of Tallinn, in line with Freeman's (2005) criteria for gentrifiable areas.

The thesis consists of four chapters. The first chapter is an overview of the concepts of gentrification and segregation and how they have been understood in various contexts, including in Tallinn. This chapter also includes an overview of the approaches for measuring these

sociospatial phenomena. In the second chapter, the data and methodology of the thesis are introduced. In the following chapter, the results are presented, providing answers to research questions number 1 and 2. The final chapter is a discussion of the results, with an emphasis on the third research question. It also includes discussion of the methodology applied and conclusions of the thesis.

1. Theoretical overview

1.1 Gentrification

Gentrification can broadly be described as an upward shift of class in certain urban areas (Wyly 2015). Viewing the classic theory of gentrification, it can be seen as an extension to urban regeneration, where relatively run-down areas of the city in or near its core are transformed through housing stock upgrades (Cocola-Gant 2019). The outcome of this process is displacement of long-term residents, which is an expression of social exclusion and is typically understood as forced residential mobility to another area (Cocola-Gant 2019). However, other forms of displacement can be distinguished. Exclusionary displacement is the situation where a household is no more able to move to a gentrified area which would have been suitable for its needs in the area's pre-gentrification state, while displacement pressure describes changes in neighbourhood amenities and social structure which do not match the means and values of the longer-term residents, in which case decrease in sense of community and quality of life are a result (Marcuse 1985; Cocola-Gant 2019). Displacement is the essential feature of gentrification, as some forms of gentrification do not involve gentrifiers as new residents but only as actors in the particular urban space transformations, yet the displacement still remains (Gentile 2018).

Therefore, it can be gathered that gentrification deals with sociospatial inequalities. While Cocola-Gant (2019) argues that gentrification causes urban inequalities, others have suggested that gentrification results in reduced social inequalities, as the population composition becomes more mixed (Marciniczak et al. 2016). Perceived validity of this characteristic has been underlying the urban policies which promote gentrification as a tool for urban improvement, stating that mixed residential status will be beneficial for all residents, while the exclusionary and displacement consequences, intrinsic to gentrification, are left in the background (Cocola-Gant 2019).

Two directive forces of gentrification have been proposed: firstly, urban inhabitant as consumer preferences for being in high access of modern urban living and associated amenities. Such lifestyle choice can also serve as a status signifier (Wyly 2015). In this scenario, well-located, under-maintained urban areas are targeted for regeneration and consequential sale, more often than rental, of high quality housing (Cocola-Gant 2019). The other driving force of gentrification is the accumulation and reproduction of capital by moving it across space, also known as supply-based gentrification. Here, rent gaps are a crucial tool, which describe the difference between the current and the potential rent of a plot of land (Smith 1979). When the rent gap is sufficiently wide for a redevelopment to bring a profit, the conditions for gentrification have been established (Smith 1979). As this form of gentrification has been increasingly recognized as a successful mechanism for capital flows, private developers have taken a leading role in driving the gentrification processes (Cocola-Gant 2019).

No matter which strategy explains the reasoning behind particular manifestations of gentrification, it does not necessarily have to result from transformation of existing housing stock, as newbuild gentrification is evolving. It is a real estate development activity where apartment buildings are constructed on vacant plots or specifically brownfield sites, and which tend to replicate the features of classic gentrification to attract the interest of real estate buyers (Davidson, Lees 2005). In this case, a conducive environment for social or indirect displacement is created (Davidson, Lees 2005; Mezentsev et al. 2019). However, the dimension of physical displacement can apply to newbuild

gentrification when it is strongly driven by supply side motives, which is particularly the case in postsocialist context (Holm et al. 2015).

The classic understanding of gentrification stems from processes in Anglophone world, particularly London and cities of the United States (Cocola-Gant 2019). Lately however, academics are turning their sights towards planetary gentrification, where the process of gentrification is taking on significantly different forms across the world, based on the common feature of competitiveness and supported by global capital flows (Wyly 2015). Such developments have been allowed by the rise of universal neoliberal policies (Cocola-Gant 2019). Arguments are made that gentrification theories are superimposed by Global North (Wyly 2015). In line with these arguments, Maloutas (2012) asserts that the concept of gentrification is so much attached to its origin in the Anglophone urban and sociopolitical setting, particularly the operation of neoliberal policies, that it is rendered inapplicable to understandings of urban sociospatial transformations outside this context. This has been recognized as an issue in postsocialist urban studies - the influence of theories stemming from the Western-centric worldview has been too strong, as processes in postsocialist urban space are intrinsically different (Sjöberg 2014). In a practical sense, Maloutas (2012) proposes that for research outside of the academic core of Anglophone world it is beneficial to compare the context of the study in question with the original context of the key concepts used. Gentile (2018) builds on this argument through the example of urban transformations in Eastern Europe, contending that neither the classic gentrification theories, nor the planetary shift are fit to explain local manifestations of gentrification, and that these should not simply provide case studies for well established gentrification theories, but instead, they can inform the wider gentrification thought.

Gentile (2018) also argues against the rent gap exploitation being the key driver of gentrification. This view is supported by Wyly (2015), who suggests that a shift from capitalism purely in terms of financial assets to a cognitive-cultural capitalism is taking place, where the class structure is strengthened by tech-based knowledge creation. Thus, real estate and land markets are not sufficient to explain the realities of gentrification (Wyly 2015). In fact, gentrification may as well be but one form of planetary urbanization, rather than a phenomenon which helps to explain urban sociospatial structures per se (Wyly 2015). However, for understanding of gentrification at neighbourhood level, the planetary view holds little value, and demand-supply relations, ethnocultural values and urban physical structure remain most meaningful (Wyly 2015). Maloutas (2012) argues that gentrification is confounded with urban regeneration processes and practices, as attempts are made to remove the concept of gentrification from the context in which it was conceived and to limit its linkage to aesthetic and social aspects, while maintaining the dominance of neoliberal relations in the practical manifestations.

1.1.1 Postsocialist gentrification

The postsocialist context offers a particular perspective on the issue of gentrification. Privatisation and restitution, which happened across the postsocialist space, defined the newly-formed housing ownership structure (Lux et al. 2012). The framework of restitution allowed the return of historical buildings to the families of the owners of the buildings pre-socialist period, and where the previous owners could not be identified, privatisation of individual dwelling units was offered to sitting

tenants (Lux et al. 2012). The fact that restitution transferred the ownership of a building to a single person or entity meant that such buildings were much more favourable for gentrification and displacement over regular privatisation (Sýkora 2005). Combined, the implementation of these policies created a numerous group of owner-occupiers (Lux et al. 2012). As the financial barrier of entry into the ownership market was close to none during the privatisation process, those who were left out of the process at the time and younger residents would be much more vulnerable in the housing market (Kährik 2000). However, these changes did not immediately translate into widespread gentrification, with only limited effects on the urban sociospatial fabric in the 1990s (Kovács et al. 2013; Jakóbczyk-Gryszkiewicz et al. 2017). A combination of factors, including the clarification of legal framework, urban policy and finally - the improving reputation of the inner city and private investment ability - supported postsocialist gentrification and created the necessary conditions for its increased magnitude over the last two decades (Kovács et al. 2013; Jakóbczyk-Gryszkiewicz et al. 2017).

While inner cities had experienced physical and reputational deterioration in the socialist period, there were significant internal variations, which supports the notion that particular neighbourhoods would have been the frontrunners in the postsocialist urban transformation process (Sýkora 2005). Considering the strong onset of market determinants, it was unlikely that the most deprived neighbourhoods would have participated in the first wave of postsocialist gentrification, as they could not support rent gap fulfilment (Sýkora 2005). Indeed, the first neighbourhoods to experience gentrification were those which had been well regarded already in the socialist period (Górczyńska 2017).

These processes have been expressed in a variety of forms across the postsocialist urban realm. In Bucharest, for example, supply-side actors were quick to recognize the potential of the inner city's reputation and to search for ways to commodify the housing stock, which would then serve as the basis for gentrification to emerge (Chelcea et al. 2015). To this extent, the newly-established housing and property right policies and the forms in which they were dealt with in Bucharest are specific to the postsocialist city (Chelcea et al. 2015). In a study of Warsaw, Górczyńska (2017) found differences in residential choices between potential gentrifiers with high economic capital and those with high cultural capital. This was most notable from the centrality and concentration of residents working in the arts, culture and science sectors.

In postsocialist European countries, gentrification is often coupled with residential mobility away from housing estates by higher socioeconomic class members (Marcinčzak et al. 2016). Therefore, at the same time, processes of upgrading and decay leave their mark on the urban sociospatial structure (Marcinčzak et al. 2016). Gentrification is also paralleled by wider societal processes which reflect themselves in changes in household composition (Chelcea et al. 2015). Still, despite the great variety of postsocialist urban transformations, where contemporary practices have taken over the relevance from socialist legacies, gentrification holds its value in postsocialist urban studies, as the concept usefully bridges capital, space and social structures (Bernt 2016).

1.1.2 Measuring gentrification

Several methodological approaches for gentrification studies have been developed in the US. Wylie and Hammel (2004) propose identification of the inner city as the potential gentrification area due to a shared trend of disinvestment occurring in the urban core across US cities. They used historical census data to identify districts with income levels below the city median. This methodological step was followed by a combination of discourse analysis and extensive fieldwork to detect where gentrification has taken place, with a focus on housing characteristics. Freeman (2005) also used census data to differentiate between neighbourhood level factors which define gentrification potential - location in the inner city, below median income and below average new housing stock in the reference year - and actual gentrification, measured by increase in housing price and educational attainment.

Atkinson (2000) used census data to study gentrification and displacement in London. The study included analysing the extent of moves from areas evaluated as prone to gentrification in comparison to the rest of the city. Gentrification was defined as higher than average increase in professionalisation of residents, or those representing higher socioeconomic occupation groups. This effect was contrasted to decrease in vulnerable group population, most notably consisting of working class and unskilled labour, unemployed, elderly and private rental households. This defined displacement. The underlying logic to understand whether displacement occurs is to distinguish between voluntary moves and those caused by economic pressures (Atkinson 2000).

Access to a long-term longitudinal dataset of individual residential location and financial situation across constant areal units provides a suitable framework for investigating general trends of displacement (Easton et al. 2020). In addition, a finer and more uniform resolution of data aggregation is preferred to avoid misidentification of displacement pressure hotspots (Easton et al. 2020). The lack of attunement between the census spatial units and the often fragmented spatialities of gentrification as emerging on the ground has to be recognized (Heidkamp, Lucas 2006). Atkinson (2000) solved this constraint by reaggregating the spatial entities used in the analysis from official boroughs to socioeconomically relevant units. Considering the complex nature and generally slow pace of gentrification processes, any measurement of gentrification areas in a city would also benefit from a multi-factor approach (Easton et al. 2020). However, Atkinson (2000) used only occupation groups as an indicator of gentrification, while Vigdor et al. (2002) focused on the educational attainment.

Therefore, gentrification has revealed itself as a process where social and physical transformations exert various pressures on the existing sociospatial condition of an urban area. The context of widespread housing tenure change and depreciated inner cities boosted the prospects for gentrification to be carried out in postsocialist cities. As a spatiotemporal process, gentrification is a good fit for quantitative methodologies which are based on census data. The next subchapter will consider the related sociospatial phenomenon - segregation.

1.2 Segregation

Segregation is characterized by spatial separation between different social groups (Massey et al. 2009). A single group is considered segregated when it is concentrated in particular areas yet underrepresented in others (van Kempen, Özüekren 1998). Although segregation by itself is a neutral phenomenon (van Kempen, Özüekren 1998), when applied to the residential sphere, segregation in urban space is understood to represent the extent of social inequalities, which in turn is an indicator of societal wellbeing (Oka, Wong 2019). Two of the key dimensions of segregation are socioeconomic status and ethnicity, which are often tightly linked (Musterd, van Kempen 2009).

In the 21st century, socioeconomic segregation has been increasing across urban Europe, particularly in Eastern Europe (Marciniczak et al. 2016). The most notable cause of such trend has been stepping away from welfare systems and following the neoliberal policy setup, a result of globalized economic structures (Marciniczak et al. 2016). Socioeconomic inequalities would already be in place before they are manifested in uneven residential distribution between social groups (Marciniczak et al. 2016). This is particularly the case in the context of rising disparities in the access to the housing market (Nijman, Wei 2020). Segregation effects may furthermore be delayed by spatial inertia (Marciniczak et al. 2015). In the European context, there are strong links between income inequality and socioeconomic segregation, the latter of which follows by approximately one decade (Tammaru et al. 2020).

In European cities, the ethnic composition of neighbourhood residents is more equally distributed than in US counterparts, and this is even more true in Eastern Europe (Musterd, van Kempen 2009). Across contexts, there is certain reasoning behind both choice and constraint-based understanding of residential locations of ethnic minorities in cities, who furthermore have to operate in conditions set by a multiplicity of stakeholders (van Kempen, Özüekren 1998; Musterd, van Kempen 2009). There are also specific housing conditions which characterize urban ethnic minorities in Western Europe, with ethnic minority prevalence in the rental housing sector (Musterd, van Kempen 2009), where they may be discriminated by the owners when selecting tenants (van Kempen, Özüekren 1998). As for housing quality, housing estates built post-World War II have often targeted ethnic minority tenants, yet these buildings provide decent housing conditions (Musterd, van Kempen 2009). However, ethnic segregation is not limited to the sociospatial distribution of households, and whilst residential segregation is the most convenient form of segregation from a research methodology perspective, it is unable to cover the whole spectrum of ethnic segregation (van Ham, Tammaru 2016).

Residential mobility plays a key role in the identification of segregation processes and their spatiotemporal patterns (Bolt, van Kempen 2010). but high levels of segregation further limit the residential mobility options of residents with low socioeconomic status (Nieuwenhuis et al. 2020). However, unlike gentrification, spatial segregation does not deal strictly with residential mobility; much of the segregation can be attributed to *in situ* social mobility, describing changes in the permanent residents' characteristics (Bailey et al. 2017). The effects of dramatic neighbourhood change due to residential mobility may indeed be overestimated, as results from a comparative study of the Netherlands, Sweden, the UK and Estonia show that about half of the intra-urban moves take place to neighbourhoods with only slight differences in their socioeconomic profile (Nieuwenhuis et al. 2020).

The potential negative influence of segregation is a reoccurring topic in policymaking, where mixed neighbourhoods are sought as the aim (Musterd 2005). The argument is that when segregation keeps increasing and materializes itself in the urban fabric through excluded neighbourhoods, disintegration of urban societies may take place, leading to further threats to the physical structure of the city (Marciniczak et al. 2016). Still, it may be misleading to consider segregation as an explanatory concept for problematic sociospatial relationships, thus wrongly implying that social mix is universally a better choice (Maloutas 2018). The very concept of segregation, Maloutas (2012) argues, is embedded in the context it was developed - Chicago School and its concern for contrasting spatialities between racial groups in the US.

1.2.1 Measuring segregation

The quantification of segregation has been a topic of interest over many decades, with the first most prominent advance in this field of research being the development of two-group indices in the 1950s (Feitosa et al. 2007). In a classic study of segregation theory, Massey and Denton (1988) propose five dimensions of segregation. Two of these - evenness and exposure - focus on the social composition, while the three others - concentration, centralization and clustering - emphasise the spatial variables. Brown and Chung (2006) advance this grouping by contrasting evenness with concentration and exposure with centralization.

Evenness describes a situation where there is an equal proportion of minority members relative to majority members across the urban space, and it is measured by dissimilarity index. Its values are in the range from 0 to 1, representing the proportion of minority group residents who would need to relocate from areas of high minority population density to achieve even population distribution (Massey, Denton 1988). A similar methodological option - a form of index of dissimilarity - is index of segregation, where the correlation between the socio-demographic variable and distance is measured (Marciniczak et al. 2016).

Exposure is the potential of interaction in urban spatial entities between members of different groups, expressed as the likelihood of residing in the same urban area. Thus, this dimension considers the experience of segregation by urban dwellers. The measurements of exposure are interaction and isolation indices, with values in the range from 0 to 1, and they account for the size of the group in question (Massey, Denton 1988).

In general, the segregation calculation methods based on the dimension of evenness are preferred over interaction or isolation indices (Musterd, van Kempen 2009). It has also been established that longitudinal studies are the most suitable research design for investigating sociospatial segregation (Bolt, van Kempen 2010). Bailey et al. (2017) analyse the neighbourhood level segregation trends of Amsterdam and the Hague by dividing the neighbourhoods according to the categories of 'polarising', when a segregated neighbourhood has become more segregated, and 'reordering', when a trend appears towards a residential composition which is more socially mixed.

Meanwhile, the spatial scale of data also influences the extent of measured segregation, as studies in microscale would typically reveal a more fragmented sociospatial landscape of the city (Jaczewska, Grzegorzczak 2017). For this purpose, local segregation indices are necessary to locate the patterns of segregation within city, and they support visualisation (Feitosa et al. 2007).

Location quotient in particular has more recently emerged as a measurement of segregation which best represents local variations (Tammaru et al. 2016a). Location quotient is calculated as follows:

$$QL = (x_i / t_i) / (X / T) \quad (\text{Eq. 1})$$

where x_i is the population of particular group in spatial unit i , t_i is the total population in spatial unit i , X is the population of particular group in the whole study area, and T is the total population in the whole study area (Brown, Chung 2006; Apparicio et al. 2013). As location quotient is an assessment of social group's representation at an individual spatial unit level, without considering the effect of neighbouring units, it is understood as a measure of concentration (Brown, Chung 2006). The location quotient method is widely used not only for analysis of segregation (Brown, Chung 2006, Valatka et al. 2016), but also in studies with focus on gentrification (Górczyńska 2017).

Thus, segregation is more than an indicator of unequal population distribution; it is a complex phenomenon which links into questions of society, economics and housing, and which is therefore highly contested. While many indices have been developed to measure segregation, for distinguishing sociospatial variations at the local scale, location quotient is a highly applicable measurement.

1.3 The links between gentrification and segregation

The influence of gentrification on segregation is not straightforward. A gentrifying area is likely to become less segregated initially, but the longer-term social dynamics tend to turn this trend around and may even bring the neighbourhood to a higher degree of segregation than before gentrification (Maloutas 2004; Bailey et al. 2017). While Marcińczak et al. (2013) emphasise that this perspective originates from the Western cities, such a trajectory has been specifically referred to as the 'paradox of post-socialist gentrification' (Sýkora 2009). However, the lowering levels of segregation in the beginning phase of gentrification may be a sign of polarization, rather than social mix (Sýkora 2009).

Several case studies reveal some of the likely effects of segregation from gentrification. In Vilnius, gentrification has been linked to professionalization, and the inner city as a whole was found to be a zone of segregation, as the increase of higher socioeconomic status residents is matched by decrease of the lower socioeconomic groups (Valatka et al. 2016). Stockholm's housing stock experienced a significant turnover of residents after tenure conversion from public or private rental to private ownership, with pronounced gentrification effects (Andersson, Magnusson Turner 2014). Limited income in particular was found to be a strong determinant for the likelihood to move out, while higher education levels and younger age represent the average in-mover, ultimately creating a segregated sociospatial landscape (Andersson, Magnusson Turner 2014). Still, despite both gentrification and segregation being well established concepts and expressions of sociospatial transformations, the research which considers their interaction is somewhat limited.

1.4 Gentrification and segregation in Tallinn

In the socialist period, Russian-speaking population had privileged access to apartments in the newly-built housing estates of Tallinn, thus driving residential segregation along the lines of ethnicity (Leetmaa et al. 2015), as Estonians mostly continued to reside in the pre-war buildings of the inner city (Mägi et al. 2016). After socialist era, restitution in Tallinn served as a catalyst for real estate development, as the restituted properties were mostly located in the inner city, which had regained its reputation as a desirable living area (Sýkora, Bouzarovski 2012). Restitution did not affect the inner city housing in a widespread, uniform manner; instead, certain clusters emerged (Sýkora 2005), with approximately 3% of the total housing stock of Tallinn being subject to restitution process (Kährik, Kõre 2013).

In the context of Estonian urban fabric, wooden houses are considered to be a housing typology particularly susceptible to gentrification processes (Hess 2011; Nutt et al. 2013). The wooden house districts adjacent to the core of Tallinn were built for the newly-arrived workers of the industrializing city from the second part of the 19th century (Tammaru et al. 2016a). Two districts with a significant wooden house proportion and which have been considered hotspots of gentrification are Kalamaja and Pelgulinn (Ruoppila 2006; Tammaru et al. 2016b). The district of Põhja-Tallinn, which includes Kalamaja and Pelgulinn, had fallen out of favour in the socialist period and therefore became a problematic area, both in terms of the poor housing quality and the social environment (Korcelli-Olejniczak and Tammaru, 2019). This meant that when housing became a market good in Estonia, the housing prices in these districts were affordable, ensuring the conditions for gentrification (Tammaru et al. 2016b). However, like in most postsocialist countries, the upgrading tempo of wooden housing was limited in the 1990s and up to early 2000s (Kährik 2002).

Another district which has been recognized as a location of gentrification in Tallinn is Kadriorg, which contains a mixture of stone and wooden housing (Sýkora 2005). The reputation of this district has endured through times (Sýkora 2005; Ruoppila 2006). Combined with the better structural quality of the stone buildings, Kadriorg became the first target of interest in Tallinn for upgrading of existing housing stock, which led to changes in the residential composition and thus - gentrification (Sýkora 2005).

From a comparative study of 13 European capital cities, Marcińczak et al. (2016) found that the most pronounced segregation growth from 2001 to 2011 has happened in Tallinn. These were spatial manifestations of the income inequalities which had found their place through the dismantling of the welfare system in the 1990s (Nieuwenhuis et al. 2020), yet their roots are found in long-standing ethnic disparities (Marcińczak et al. 2016). It is Estonians who have obtained a more privileged position in the labour market and thus have more actively engaged in residential mobility, which suggests that in Tallinn, socioeconomic segregation also drives ethnic segregation, between which an overlap has emerged in postsocialist Estonia (Leetmaa et al. 2015). However, the income inequality between top and bottom income groups in Estonia has strongly decreased in the first decade of the 2000s (Marcińczak et al. 2016), which may suggest an expected decrease in segregation at the city scale.

Polarization rather than social mix had been the prevailing neighbourhood sociospatial composition in the early postsocialist period in Tallinn, despite general trends in Central and

Eastern Europe suggesting otherwise (Marcinćzak et al. 2015). This phenomenon was not associated with high levels of residential mobility (Marcinćzak et al. 2015). With gentrification evolving in Tallinn, the gentrifying neighbourhoods have also been found to be of a polarizing social composition (Kährik et al. 2015). In a qualitative study of the social structure of Põhja-Tallinn, Korcelli-Olejniczak and Tammaru (2019) found that gentrification is in fact the primary driver of social polarisation of the district. The neighbourhoods of Tallinn which have shown a pattern of continuous gentrification have directed the adjacent neighbourhoods to a similar trend (Kährik et al. 2015). More recently, opposite of what is expected in a context of high sociospatial inequalities, the population of Estonia shows high levels of residential mobility (Nieuwenhuis et al. 2020). Particularly susceptible to change of residence are the inhabitants with low socioeconomic status, who have ended up in even less desirable neighbourhoods (Nieuwenhuis et al. 2020).

While privatization, restitution and the general trend towards transformations of the inner city in Tallinn resemble the processes elsewhere in postsocialist Europe, the dual-ethnic composition and wooden housing stock are two features which stand out, while previous findings regarding social composition and residential mobility suggest that Tallinn is experiencing such sociospatial shifts which would not be predicted in a comparable context. Thus, Tallinn sets the scene for a rather revealing study of the postsocialist gentrification and segregation interconnections.

2. Data and methods

2.1 Study area

The study area is the inner city of Tallinn (Figure 1). Inner cities are deemed as the urban areas where gentrification and related sociospatial transformations are manifested, not only in the wider theoretical context (Freeman 2005) but also empirically, in the postsocialist territory (Kährik et al. 2015). Therefore, there were strong grounds to limit the study area to the inner city. The delineation of the inner city applied in this study follows previous delineation by the Centre for Migration and Urban Studies, University of Tartu (Tammaru et al. 2016a).

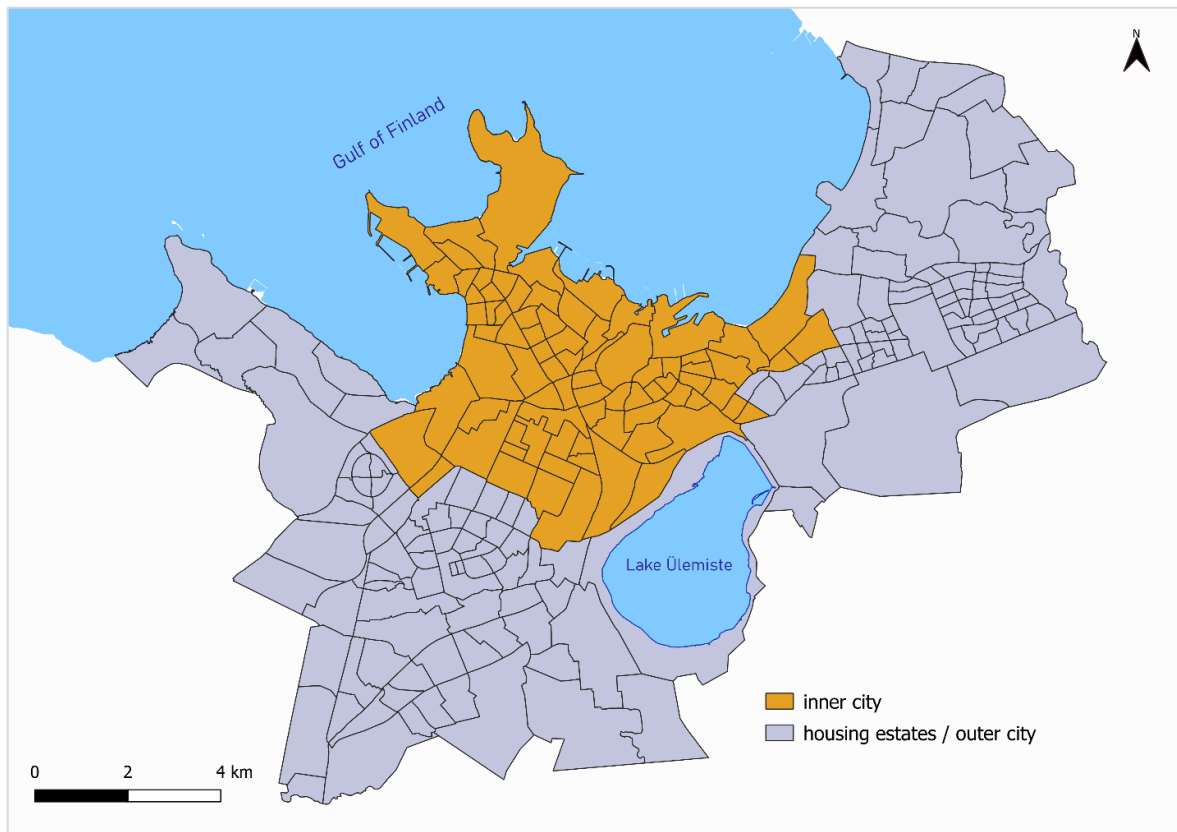


Figure 1. Tallinn's neighbourhoods and the inner city.

2.2 Data

The Estonian population census data from 1989, 2000 and 2011 was used, provided by Statistics Estonia. It was accessed at individual level, containing information about all residents of Estonia in the respective years. The relevant variables for this study were the age, ethnicity and occupation group of the residents, their residential location at neighbourhood level, as well as housing characteristics. The three datasets have been harmonized, meaning that the variables match one another across the census years and thus can be used for a longitudinal study. In the 1989 census dataset however, occupation data was only collected from a random sample of 25% of the population.

To bring the temporal scale of the study closer to the present, population register data from 2020 was used. The required variables match the census data. However, the housing data from 2020 was not made available.

Two shapefiles of urban spatial units were used. First of them contained 230 neighbourhoods of Tallinn - custom spatial units, which have been previously delineated by the Centre for Migration and Urban Studies, University of Tartu. The second shapefile contained spatial data of yet smaller, 543 units, as well as attribute information of the urban zone to which each unit belongs to – inner city, housing estates or outer city, which were also selected based on the methodology by the Centre for Migration and Urban Studies. After joining the layers and validating the join, 80 of the 230 neighbourhoods were confirmed as inner city. For visualisation purposes, a shapefile of Estonian waterbodies was obtained in the form of open data from the Estonian Land Board (Land Board 2021).

2.3 Methodological outline

The individual data from the census and the population register was aggregated at neighbourhood level in the form of frequency tables. For age and ethnic groups, additional categorization was done (Table 1). The groups were constant across the data years, except for occupation groups in 1989, which do not exactly match the official ISCO-88 categories (Table 1) and whose frequencies were multiplied by four to be comparable with the other datasets. Housing characteristics of the residents were also aggregated in broader groups in a neighbourhood level frequency table (Table 2). The data was accessed and aggregated in SPSS.

Table 1. Age, occupation and ethnic groups.

Age	Occupation (ISCO-88)	Occupation (1989)	Ethnic
0-9	Working-age (15-64) population	Working-age (15-64) population	Estonians
10-19	Armed forces (0)	Admin and managerial	Russians
20-29	Senior officials and managers (1)	Professional and technical	others
30-39	Professionals (2)	Clerical and related	
40-49	Technicians and associate professionals (3)	Sales	
50-59	Clerks (4)	Farming and forestry	
60-69	Service and sales workers (5)	Production and related	
70-79	Skilled agricultural (6)	Service	
80+	Craft and trades workers (7)		
	Plant and machine operators (8)		
	Elementary occupations (9)		

Table 2. Housing groups.

Housing type	Year of construction
Apartment building	1945 or earlier
Private house	1946-1990
Small residential building	1991 or later
Non-residential building with dwellings	Uncompleted building

The data was then analysed in Microsoft Excel. Firstly, potential gentrification areas were identified. This was achieved following Atkinson's (2000) method, who was identifying gentrification areas as those with higher than average increase of residents of high socioeconomic status. Occupation categories with ISCO codes 1 and 2 were combined in the high socioeconomic status group, in line with the methodology applied by Tammaru et al. (2016a). For 1989, the groups "admin and managerial" and "professional and technical" were considered to be equivalent to ISCO codes 1 and 2.

Based on Freeman's (2005) criteria of potentially gentrifying neighbourhoods, mean values of the share of high socioeconomic status residents were calculated for the inner city and the rest of the city from 1989 to 2011, to confirm whether inner city neighbourhoods are the target area of potential gentrification in the context of the postsocialist city of Tallinn. Neighbourhoods with a population of less than 100 in the respective year were withdrawn from the calculations.

For each of the neighbourhoods, the share of high socioeconomic status residents from the working-age population of the neighbourhood in 1989 and 2011 was calculated, thus accounting also for professionally inactive population groups. Those neighbourhoods whose share of high socioeconomic status residents was lower than the inner city average in 1989 and higher in 2011 were considered as potential gentrification neighbourhoods. It must be noted that gentrification is a continuous process, and gentrification processes were likely to be present in these or other neighbourhoods after 2011; however, to evaluate the impacts which have followed gentrification, the year of 2011 was selected as the final point of reference.

As the gentrification process has an associated outcome - displacement, the next steps of the analysis were implemented to validate the previously identified potential gentrification areas. Potential displacement at neighbourhood level was measured by the decrease in the share of low socioeconomic status population from working-age population between 1989 and 2011. The occupation groups matching this criteria consisted of ISCO codes 5 to 9, assumed as equivalent to groups "sales", "farming and forestry", "production and related" and "service" in 1989.

To increase the confidence in that the potential displacement measured in Tallinn inner city is linked to gentrification, similar methodological steps were reproduced as for the gentrification analysis. The inner city average share of low socioeconomic status residents in 1989 and 2011 and its percentage point change was calculated and compared to that of the rest of the city. The same calculations were done for the potential gentrification neighbourhoods identified in the first stage of the analysis. To confirm a neighbourhood as potential gentrification neighbourhood due to its displacement characteristics, its share of low socioeconomic status residents needed to be higher than the inner city average in 1989 and lower than the inner city average in 2011. In this regard,

Atkinson's (2000) method was closely followed, although he was using multiple variables to measure displacement, some of which were not available in the Estonian census and the population register datasets.

The next stage of analysis was implemented to confirm whether the respective increases and decreases in socioeconomic status of the neighbourhood's residents have been brought about by residential mobility, in which case a strong association to gentrification and displacement can be established, or whether the neighbourhood has experienced more internal social mobility, with changes in the long-term residents' socioeconomic status. This analysis was done with the census data of 2000 and 2011, as this timeframe roughly coincides with what is found to be the first stage of active gentrification in postsocialist countries (Kovács et al. 2013). Individual data were again aggregated at neighbourhood level and a frequency table was obtained, which included the number of out-movers from the neighbourhood between 2000 and 2011, the number of in-movers to the neighbourhood over the same period, and sitting residents - those who were residing in the same neighbourhood in 2000 and 2011. In these calculations, only residents who had an entry in the population register in both 2000 and 2011 were included.

If the migration activity of a neighbourhood which was previously identified as a potential gentrification neighbourhood was higher than the average within the inner city, it was confirmed as a gentrified neighbourhood. The mean ratio of in-movers and out-movers was calculated for the inner city and gentrified neighbourhoods, relative to the number of stationary residents. As such, a 100% ratio would indicate that the number of in-movers, or out-movers, matches the number of stationary residents.

The following methodological step was an assessment of the neighbourhood housing stock. By including this assessment in the analytical workflow, the physical dimension of gentrification was covered, and in this way, a stronger connection between gentrification processes and segregation trajectories can be ensured. The neighbourhood housing stock assessment was done quantitatively. The quantitative neighbourhood change was based on housing data from 2011. The gentrification neighbourhood ratios were calculated for residents living in apartments and similarly – for residents living in pre-war (before 1946), socialist period (1946-1990) and new-built housing (after 1990). For the year of construction, the inner city average was also calculated, to assess the gentrification neighbourhood housing stock relative to the inner city. The inner city average calculation and the following comparison of gentrified neighbourhoods was deemed unnecessary regarding the share of residents in apartments due to the high number of inner city neighbourhoods with a distinct majority of apartment buildings from the total housing stock.

The final analysis was concerned with identifying socioeconomic, ethnic and age segregation patterns during the gentrification period considered in this thesis (1989-2011) and following it (2011-2020) for the gentrified neighbourhoods. The method applied was location quotients, with values of 0,85 or below at any given year considered as an under-representation of a specific group and values of 1,2 and above – as over-representation. These values were selected following the methodological guidelines by Brown and Chung (2006). Both over- and under-represented groups were considered to be segregated. The results were categorized based on the last change of segregation status, if there was one, and whether it happened during gentrification (between 1989 and 2011) or after gentrification (between 2011 and 2020). The specific categories were:

- segregation throughout - the neighbourhood was segregated in the same way (over- or under-representation) in 1989, 2011 and 2020;
- segregated during gentrification (from over-/under-representation) - the neighbourhood was segregated in terms of over- or under-representation in 1989 but was segregated in the opposite way in 2011 and 2020;
- segregated during gentrification - the neighbourhood was not segregated in 1989 but was segregated in 2011, and remained segregated in 2020;
- segregated after gentrification - the neighbourhood was not segregated in 2011 but was segregated in 2020;
- desegregated during gentrification - the neighbourhood was segregated in 1989 but was not segregated in 2011, and remained unsegregated in 2020;
- desegregated after gentrification - the neighbourhood was segregated in 2011 but was not segregated in 2020.
- no segregation - the neighbourhood was neither segregated in 1989, nor in 2011 or 2020.

For each type of segregation, two groups were assessed: for socioeconomic segregation, residents with high and with low socioeconomic status; for ethnic segregation, residents of Estonian and of Russian ethnicity; for age segregation, young adults (20-39), who are the most likely in-mover category during gentrification, and the elderly (60+). The values of location quotient were calculated using Geo-Segregation Analyzer (Apparicio et al. 2013). Location quotient maps, alongside all other cartographic material, were prepared using QGIS 3.16.5-Hannover.

3. Results

3.1 Gentrification of high socioeconomic status residents

The inner city of Tallinn has seen an increase of 1,9 percentage points in the share of high socioeconomic status residents between 1989 and 2011, while an opposite and a more significant shift in the residential composition has happened across other neighbourhoods of the city, with a decrease of 5,7 percentage points in the share of high socioeconomic status residents (Table 3). This confirms that in the context of Tallinn, the inner city is the likely gentrification target area. Across the inner city, there are 13 neighbourhoods where the representation of high socioeconomic status residents has shifted from below average to above average, suggesting a process of gentrification and therefore being designated as potential gentrification neighbourhoods at this stage (Table 4).

Table 3. The share of high socioeconomic status residents from the working-age population in inner city and the rest of the city in 1989 and 2011.

	Share in 1989 (%)	Share in 2011 (%)	Change (pp)
Inner city	25,8	27,7	+1,9
Rest of the city	30,5	24,8	-5,7

Table 4. Potential gentrification neighbourhoods in Tallinn, based on share of high socioeconomic status residents from working-age population in 1989 and 2011.

Neighbourhood	Share in 1989 (%)	Share in 2011 (%)	Change (pp)
Kalamaja N	18,9	31,7	+12,8
Kalamaja E	16,3	35,8	+19,4
Kalamaja S	17,4	32,5	+15,0
Kalamaja W	21,8	34,1	+12,3
Pelgulinn	24,0	29,5	+5,6
Pelgulinn	24,6	28,5	+3,9
Kadriorg	24,3	42,3	+18,0
Kitseküla	21,9	29,1	+7,2
Luite	21,4	36,0	+14,7
Mustjõe	22,4	31,6	+9,2
Torupilli	22,4	30,1	+7,7
Veerenni	24,5	40,8	+16,3
Lilleküla 5	21,0	31,0	+10,0

3.2 Displacement of low socioeconomic status residents

While throughout the city the share of low socioeconomic status residents from 1989 to 2011 has decreased, change in the residential composition has been more significant in the inner city (-24 percentage points), compared to -16,3 percentage points in the rest of the city (Table 5). To a certain extent, this validates the claim that gentrification as a process which is manifesting itself in the inner city is associated with displacement.

From the 13 potential gentrification neighbourhoods, 9 of them have moved from an above average to below average share of low socioeconomic status residents over the time period (Table 6). These neighbourhoods are thus confirmed as potential gentrification neighbourhoods, as they point to a character of displacement.

Table 5. The share of low socioeconomic status residents from the working-age population in inner city and the rest of the city in 1989 and 2011.

	Share in 1989 (%)	Share in 2011 (%)	Change (pp)
Inner city	53,1	29,1	-24,0
Rest of the city	48,3	32,0	-16,3

Table 6. The displacement characteristics of potential gentrification neighbourhoods, based on share of low socioeconomic status residents from working-age population in 1989 and 2011 (confirmed potential gentrification neighbourhoods coloured in).

Neighbourhood	Share in 1989 (%)	Share in 2011 (%)	Change (pp)
Kalamaja N	93,3	28,4	-65,0
Kalamaja E	83,9	20,1	-63,8
Kalamaja S	66,2	27,7	-38,5
Kalamaja W	82,2	23,6	-58,5
Pelgulinn	58,7	29,7	-29,0
Pelgulinn	50,0	30,7	-19,3
Kadriorg	71,0	10,1	-60,9
Kitseküla	55,5	23,7	-31,8
Luite	52,9	20,7	-32,2
Mustjõe	55,7	22,5	-33,1
Torupilli	56,5	27,0	-29,4
Veerenni	35,9	16,5	-19,4
Lilleküla 5	61,4	27,4	-34,0

3.3 Residential mobility in potential gentrification neighbourhoods

The majority of potential gentrification neighbourhoods - 8 out of 9 - have seen higher migration activity than the inner city average from 2000 to 2011, both for in-movers and out-movers (Table 7; Table 8). These results strongly suggest that the sociospatial transformations of these neighbourhoods can be explained more by the gentrification process, rather than internal socioeconomic status changes of the permanent residents. Two parts of Kalamaja, Torupilli and Lilleküla 5 have in fact seen more out-movers (Table 7; Table 8). Thus, all potential gentrification neighbourhoods except Mustjõe are identified as gentrified neighbourhoods (Figure 2).

Table 7. Mean ratio of movers and stationary residents between 2000 and 2011 in the inner city.

	Ratio (%)
In-movers (2011)	135,6
Out-movers (2000)	125,3

Table 8. Ratio of in-movers to and out-movers from the neighbourhood against stationary residents of the potential gentrification neighbourhoods (neighbourhoods with significant migration activity coloured in).

Neighbourhood	In-movers (%)	Out-movers (%)
Kalamaja N	184,5	201,3
Kalamaja E	191,6	150,2
Kalamaja S	178,9	188,4
Kalamaja W	246,5	221,0
Kadriorg	402,7	143,2
Kitseküla	221,0	131,4
Mustjõe	61,5	49,7
Torupilli	190,3	217,1
Lilleküla 5	172,8	198,3

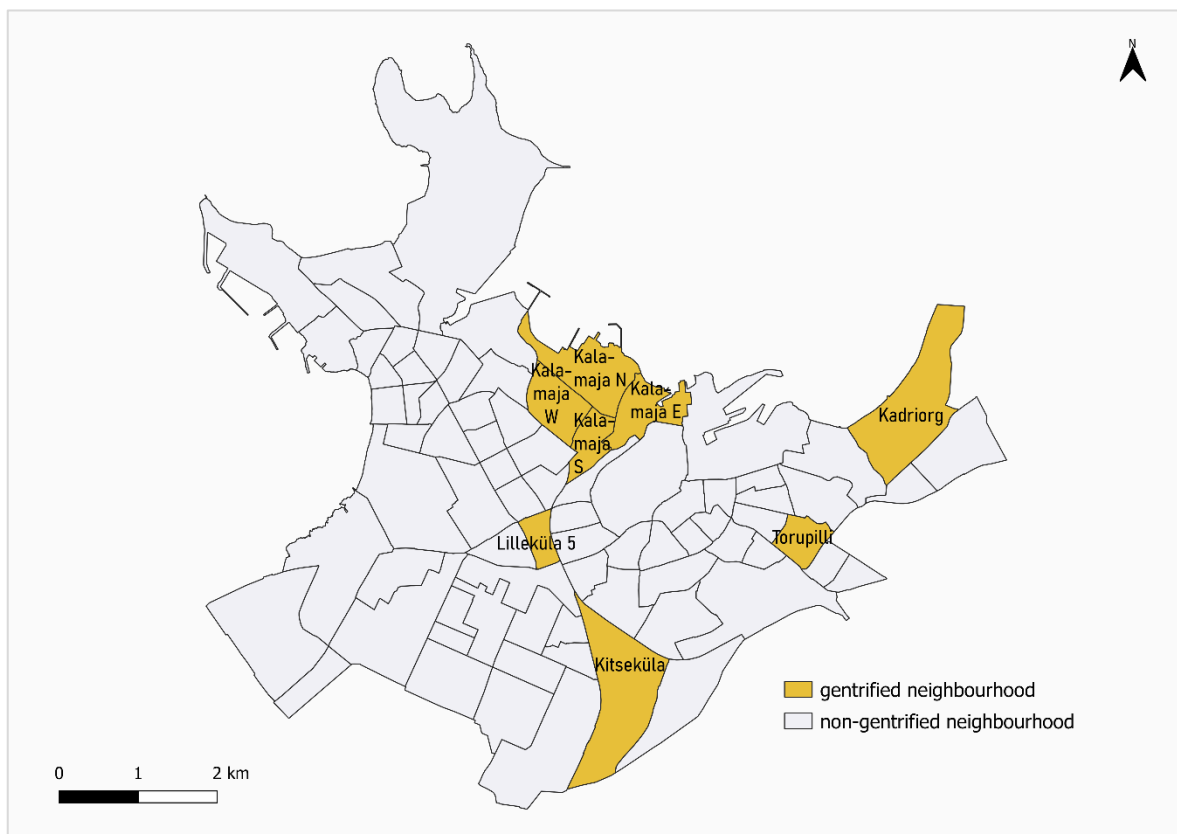


Figure 2. Gentrified neighbourhoods in Tallinn's inner city.

3.4 Housing pattern in gentrified neighbourhoods

Most of the gentrified neighbourhoods of Tallinn share the characteristic of extremely high number of apartment units from the total housing stock (ranging from 95,9% to 98,7% of the neighbourhood residents), with a certain exception being Kadriorg, which had a lower share of 81,0% of its residents living in apartment buildings in 2011 (Table 9). A more striking finding is the prevalence of pre-war and new-built housing in the gentrified neighbourhoods (Table 10; Table 11). For 5 out of 8 of the gentrified neighbourhoods, the majority of the housing stock is from the pre-war period, with the respective share for each of the neighbourhoods being approximately 3 times higher than in the inner city on average (Table 10; Table 11). In terms of housing characteristics, these neighbourhoods appear to fall within the classic gentrification paradigm (Figure 3). In Kadriorg and Kitseküla, where the share of pre-war housing stock is below average for the inner city, there has been significant amount of new construction - more than twice the inner city average for Kitseküla, more than 5 times the inner city average in Kadriorg. With the addition of Kalamaja E, which has a less significant but still above average share of pre-war housing and twice the construction activity from the 1990s, these neighbourhoods can be classified as new-build gentrification areas (Figure 3). At the same time, it can be said that neighbourhoods with a high prevalence of socialist period housing were not transformed by gentrification and displacement processes before 2011.

Table 9. Share of residents in apartment buildings
in the gentrified neighbourhoods in 2011.

Neighbourhood	Share (%)
Kalamaja N	97,3
Kalamaja E	97,9
Kalamaja S	97,4
Kalamaja W	98,5
Kadriorg	81,0
Kitseküla	95,9
Torupilli	98,7
Lilleküla 5	97,7

Table 10. Average share of residents by the age of the housing stock
across the inner city neighbourhoods in 2011.

Pre-war (pre-1946) (%)	New-build (post-1990) (%)	Pre-war + new-build (%)
27,9	13,9	40,8

Table 11. Share of residents by the age of the housing stock in the gentrified neighbourhoods in 2011.

Neighbourhood	Pre-war (%)	New-build (%)	Pre-war + new-build (%)
Kalamaja N	81,6	13,5	95,1
Kalamaja E	46,2	28,2	74,4
Kalamaja S	83,8	2,0	85,7
Kalamaja W	79,6	8,0	87,6
Kadriorg	14,8	74,9	89,7
Kitseküla	24,7	31,4	56,1
Torupilli	75,9	4,9	80,8
Lilleküla 5	91,6	3,9	95,4

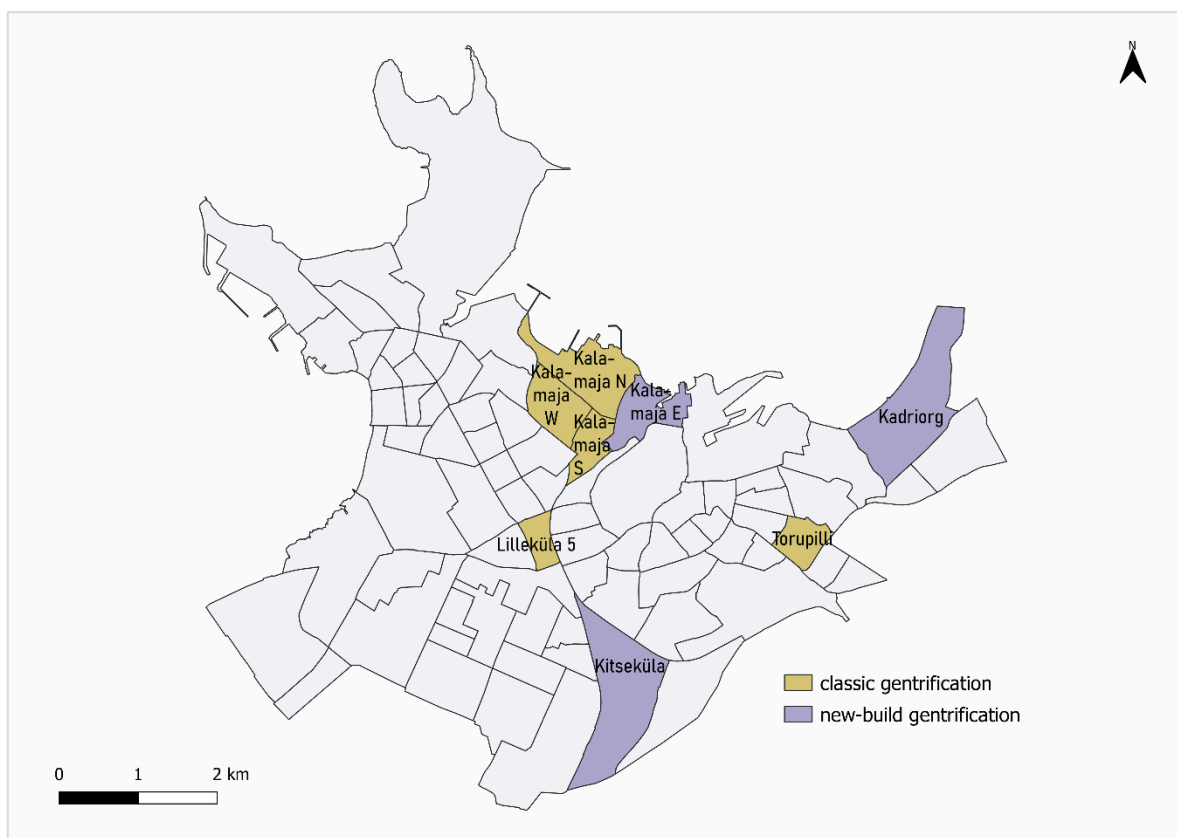


Figure 3. Gentrified neighbourhoods in Tallinn by type of gentrification.

3.5 Segregation in gentrified neighbourhoods

3.5.1 Socioeconomic segregation

Five out of eight of the gentrified neighbourhoods were under-represented by high socioeconomic status residents in 1989 (Table 12). By 2011, the trend had switched to 3 neighbourhoods being over-represented by such residents, and by 2020, another neighbourhood was experiencing the same residential division. Meanwhile, five neighbourhoods started the longitudinal study period with an over-representation of residents with low socioeconomic status (Table 12). As the neighbourhoods underwent gentrification, in 2011 half of the neighbourhoods were under-represented by low socioeconomic status residents, and this trend largely continued after the gentrification period of this study, as only one neighbourhood remained unsegregated in 2020.

The three most southern neighbourhoods - Kitseküla, Lilleküla 5 and Torupilli - have either avoided segregation of high socioeconomic status residents or have desegregated in this measure (Figure 4). In Kalamaja, mixed trends of segregation and desegregation emerged, while in Kadriorg, the gentrification process was paralled by over-representation of high socioeconomic status residents (Figure 4).

Low socioeconomic status residents have remained unsegregated throughout the gentrification process and following it only in Lilleküla 5 (Figure 5). The rest of the neighbourhoods segregated after 1989, without a clear spatial pattern in terms of timing. However, all 4 neighbourhoods which had a segregation of high socioeconomic status residents in 2020 - 3 parts of Kalamaja and Kadriorg - witnessed segregation of low socioeconomic status residents at the same period as the neighbourhoods became over-represented by high socioeconomic status residents, only in Kadriorg, the segregation in the lower socioeconomic levels has been more extreme than in the higher socioeconomic levels, as the neighbourhood experienced a shift from over- to under-representation during gentrification.

Table 12. Location quotients of high and low socioeconomic status residents in gentrified neighbourhoods of Tallinn.

Neighbourhood	high, 1989	high, 2011	high, 2020	low, 1989	low, 2011	low, 2020
Kalamaja N	0,74	1,14	1,36	1,75	0,97	0,68
Kalamaja E	0,64	1,29	1,33	1,57	0,69	0,59
Kalamaja S	0,68	1,17	1,26	1,24	0,95	0,83
Kalamaja W	0,85	1,23	1,19	1,54	0,81	0,85
Kadriorg	0,95	1,53	1,26	1,33	0,35	0,40
Kitseküla	0,86	1,05	1,12	1,04	0,81	0,78
Torupilli	0,88	1,09	1,14	1,06	0,93	0,74
Lilleküla 5	0,82	1,12	1,05	1,15	0,94	0,95

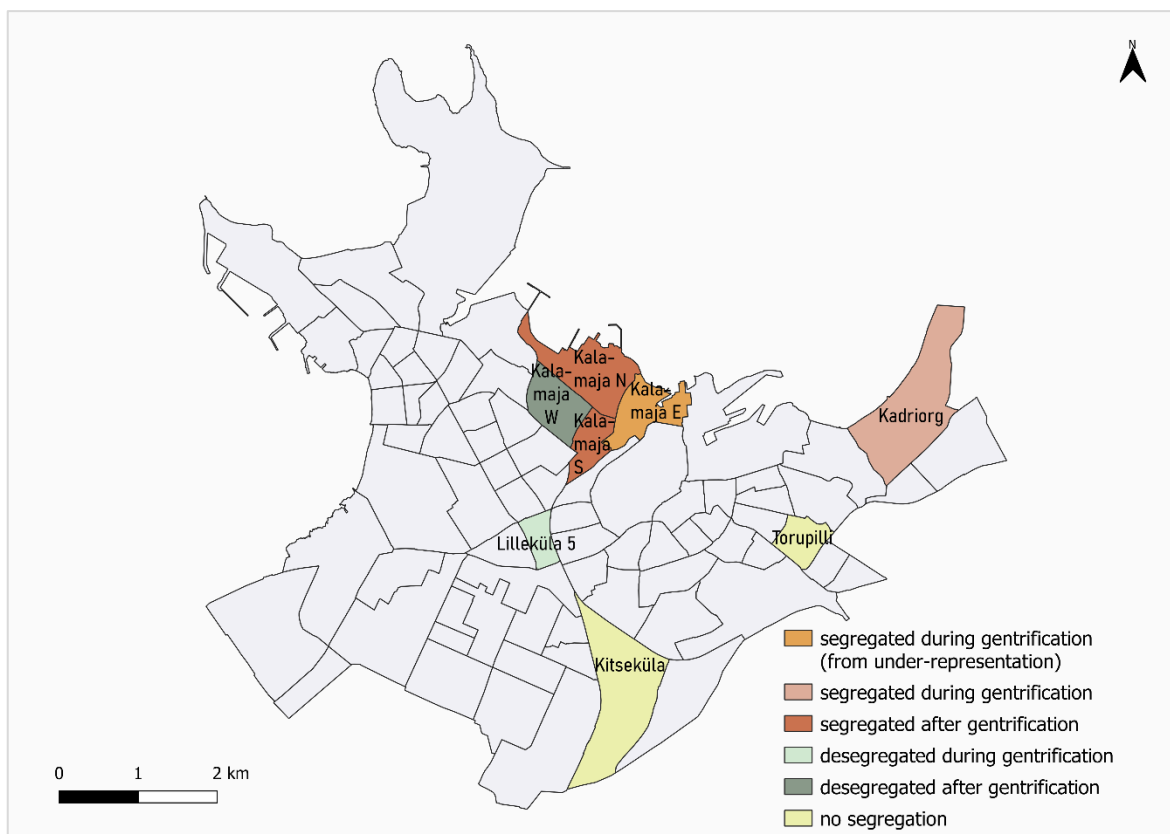


Figure 4. Segregation of high socioeconomic status residents in gentrified neighbourhoods of Tallinn.

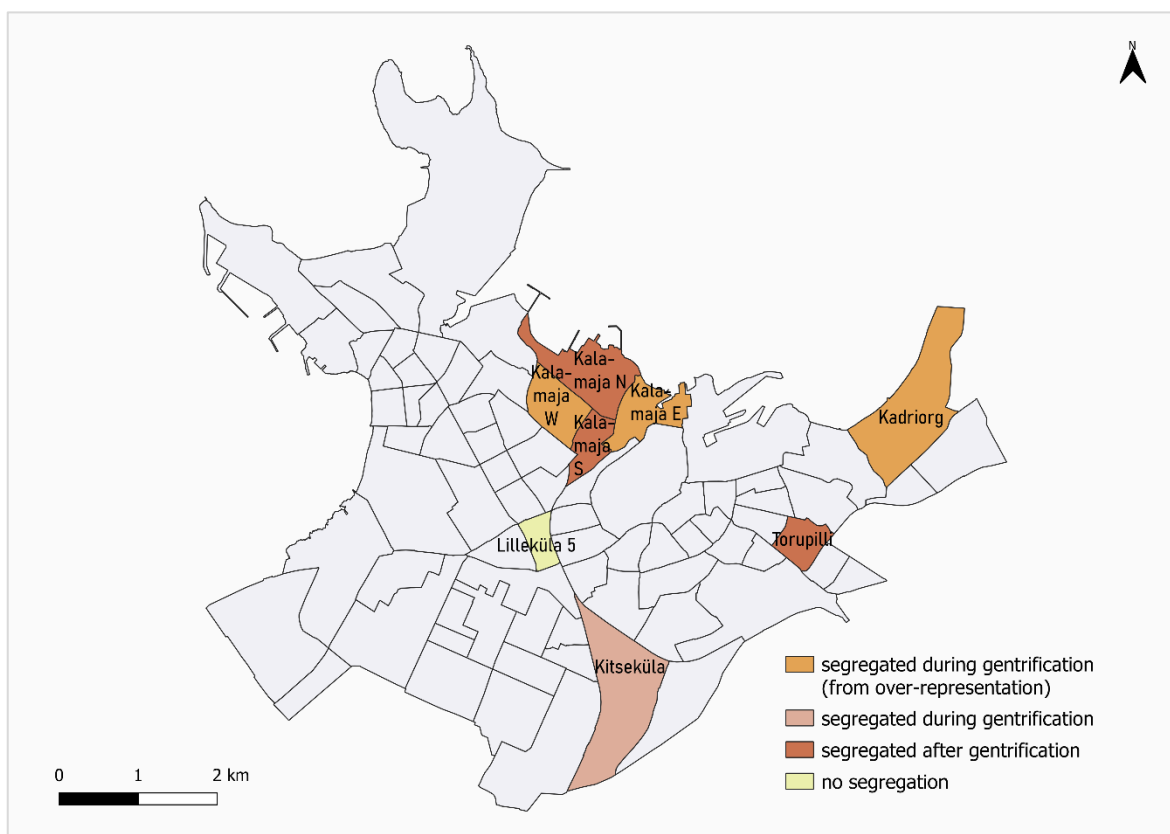


Figure 5. Segregation of low socioeconomic status residents in gentrified neighbourhoods of Tallinn.

3.5.2 Ethnic segregation

The majority of the neighbourhoods - six - had an over-representation of Estonians in 1989 (Table 13). This was the same in 2011 and 2020. However, in 1989, there was one neighbourhood with segregation of Estonians due to under-representation, while in 2011 and 2020, two neighbourhoods were not segregated.

Similarly, in 1989 only in two neighbourhoods the representation of Russian residents could be considered as not segregated (Table 13). As the gentrification process progressed, all neighbourhoods saw very significant under-representations of Russians, with the highest location quotient value in 2011 being 0,63. By 2020, the trend had only been noticeably turned around in Kadriorg, which is the only neighbourhood where the Russian population is not segregated anymore.

The spatiotemporal distribution of segregation of both Estonians (Figure 6) and Russians (Figure 7) reveals that the most significant changes in the segregation form have taken place at the coastline of the Gulf of Finland – in two neighbourhoods of Kalamaja, as well as Kadriorg. In Kadriorg, Estonians were desegregated before Russians, while in Kalamaja, the changes took place during gentrification. For Kalamaja E, a desegregation of Estonians was paralled by segregation of Russians, while in Kalamaja N, both ethnicities have become segregated.

Table 13. Location quotients of residents of Estonian and Russian ethnicity in gentrified neighbourhoods of Tallinn.

Neighbourhood	Estonians 1989	Estonians 2011	Estonians 2020	Russians 1989	Russians 2011	Russians 2020
Kalamaja N	1,16	1,32	1,30	0,90	0,44	0,40
Kalamaja E	0,74	1,18	1,19	1,08	0,60	0,51
Kalamaja S	1,23	1,29	1,34	0,80	0,49	0,42
Kalamaja W	1,29	1,33	1,33	0,78	0,44	0,42
Kadriorg	1,25	1,18	0,96	0,75	0,63	0,97
Kitseküla	1,21	1,26	1,24	0,83	0,53	0,58
Torupilli	1,57	1,34	1,28	0,52	0,39	0,44
Lilleküla 5	1,68	1,46	1,44	0,40	0,23	0,26

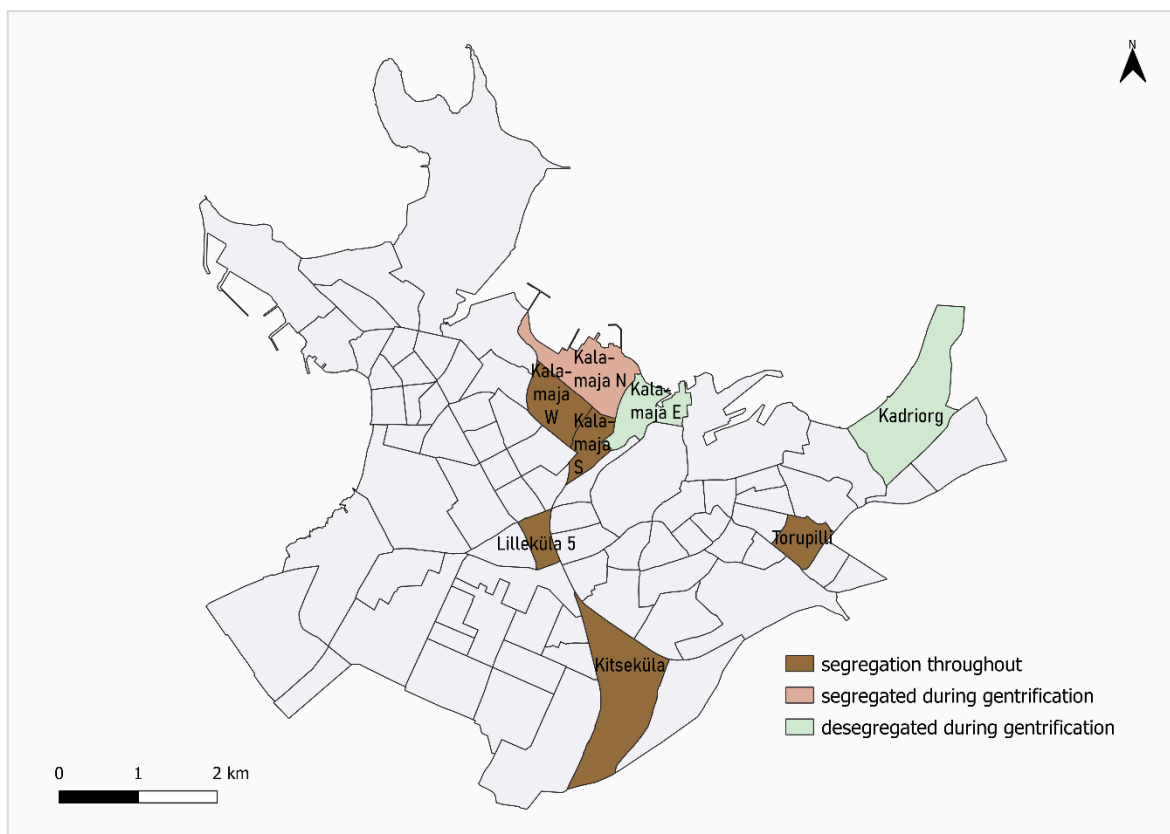


Figure 6. Segregation of residents of Estonian ethnicity in gentrified neighbourhoods of Tallinn.

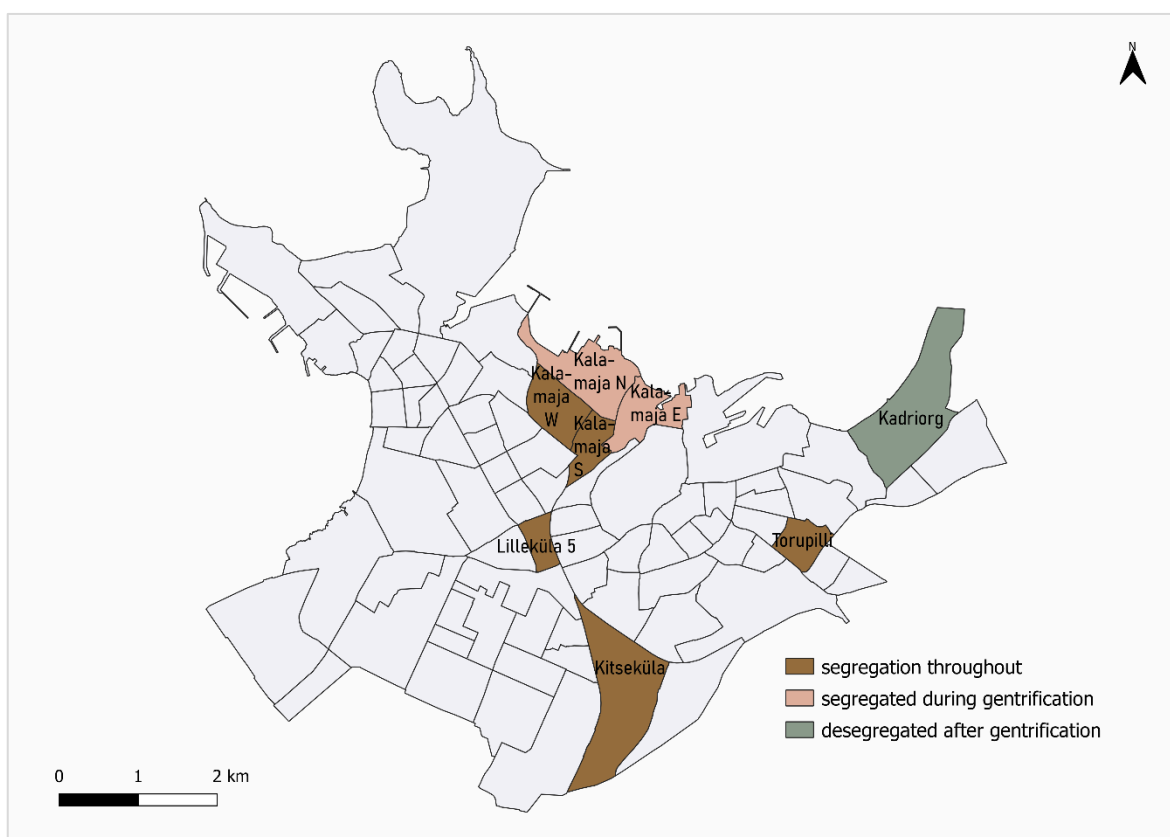


Figure 7. Segregation of residents of Russian ethnicity in gentrified neighbourhoods of Tallinn.

3.5.3 Age segregation

Before gentrification, the age segregation landscape was rather mixed. There was one neighbourhood with an over-representation and one neighbourhood with an under-representation of young adults (Table 14). In the elderly category, over-representation was more pronounced. This was followed by an overall increase in the presence of young adults across most of the neighbourhoods, although the representation did not necessarily reach or stabilize in the segregated category. These processes were paralleled by a strong trend towards under-representation of the elderly. Four neighbourhoods went from over-representation to under-representation of the elderly population during the period of gentrification of this study, but changes in the segregation status of the elderly happened in this period also for other neighbourhoods.

In terms of spatiotemporal trends, Lilleküla 5 stands out as the only neighbourhood which has seen a desegregation of both age groups (Figure 8; Figure 9). In all four parts of Kalamaja the most recent shift in segregation status for young adults has been that of desegregation, although for Kalamaja S it has happened earlier - during gentrification. Kalamaja W and E were in the opposite parts of elderly age segregation in 1989, but by 2011, all parts of Kalamaja had an under-representation of the elderly population, and like most of the gentrified neighbourhoods, this characteristic remained unchanged in 2020.

Table 14. Location quotients of young adult (20-39) and elderly (60+) age groups in gentrified neighbourhoods of Tallinn.

Neighbourhood	young adults, 1989	young adults, 2011	young adults, 2020	elderly, 1989	elderly, 2011	elderly, 2020
Kalamaja N	1,09	1,20	1,15	1,03	0,66	0,55
Kalamaja E	1,53	1,24	1,12	0,81	0,70	0,52
Kalamaja S	1,20	1,17	0,99	0,97	0,75	0,78
Kalamaja W	0,99	1,29	1,17	1,25	0,59	0,66
Kadriorg	0,90	1,01	1,10	1,33	0,67	0,83
Kitseküla	0,94	1,30	1,24	1,35	0,74	0,78
Torupilli	0,93	1,17	1,24	1,26	0,82	0,77
Lilleküla 5	0,85	1,15	1,11	1,51	0,86	0,99

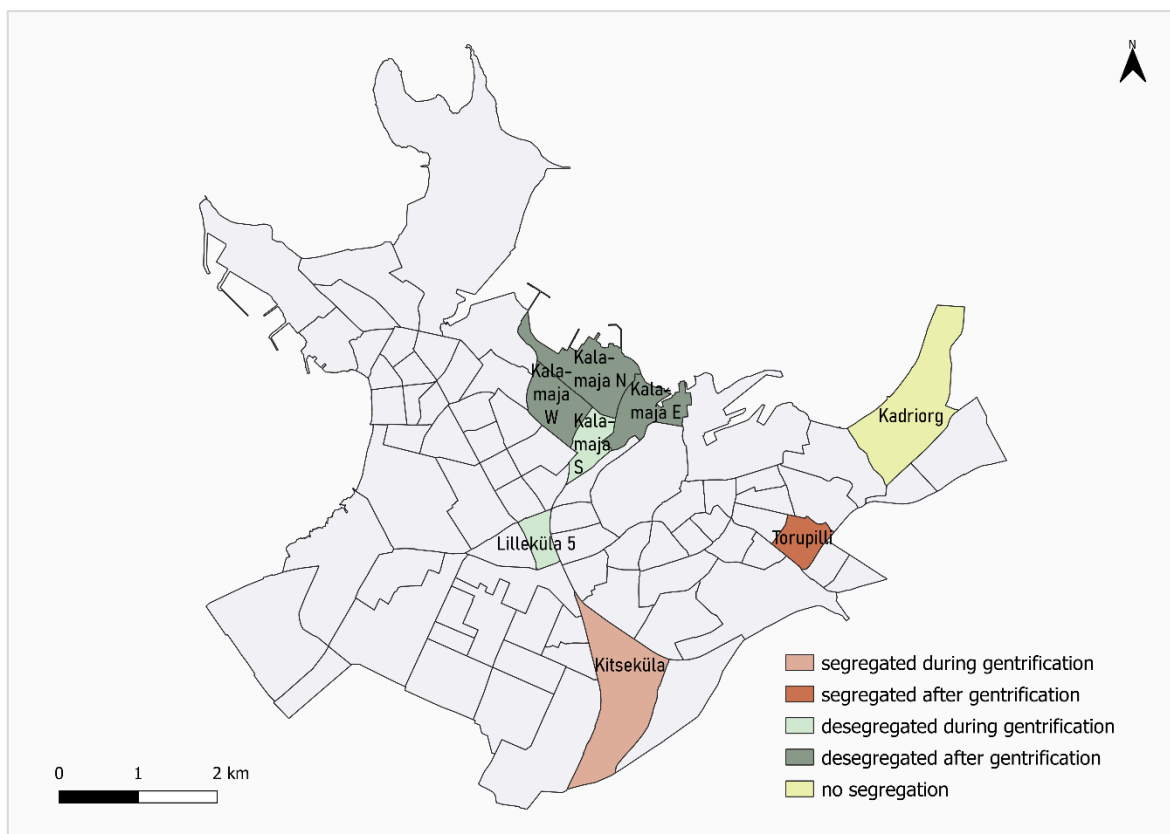


Figure 8. Segregation of residents - young adults (20-39) - in gentrified neighbourhoods of Tallinn.

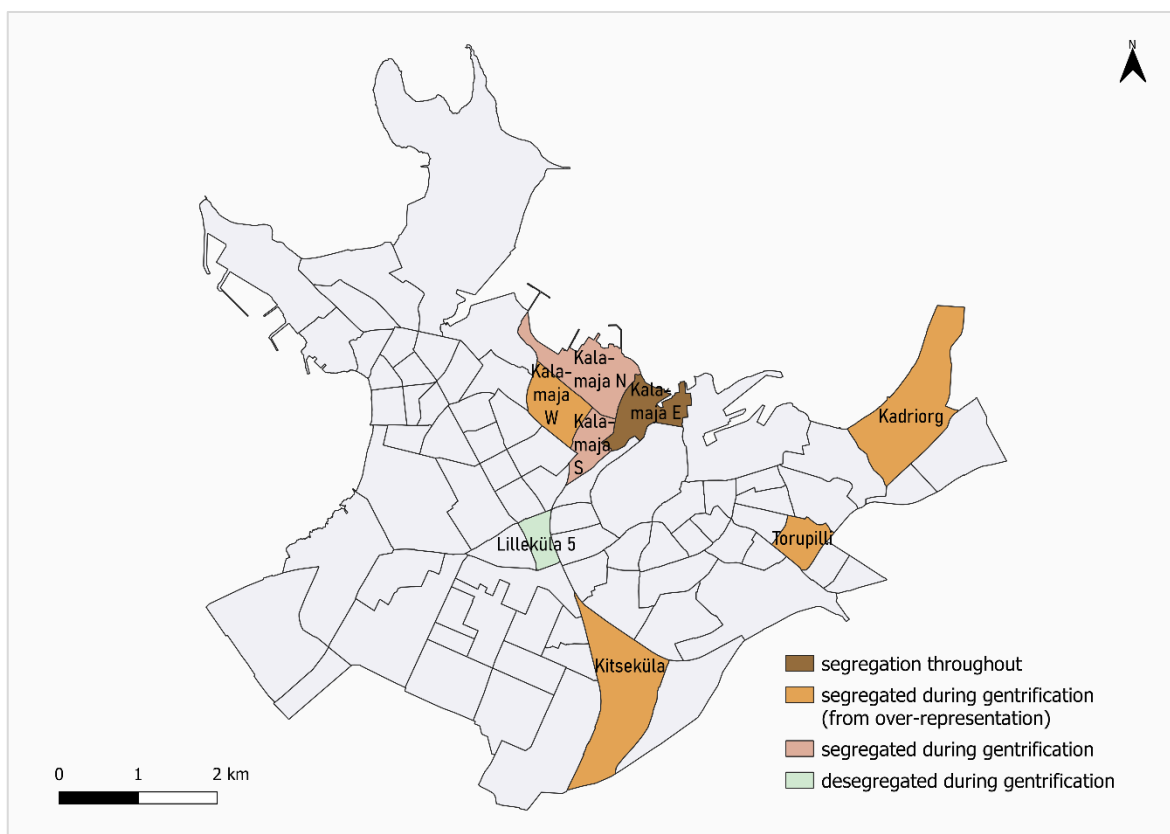


Figure 9. Segregation of elderly (60+) residents in gentrified neighbourhoods of Tallinn.

4. Discussion

The results of the thesis show that, after having identified the gentrification and displacement patterns based on socioeconomic status as an indicator, gentrified neighbourhoods have witnessed notable segregation across the dimensions of socioeconomic status, ethnicity and age for the social groups susceptible to displacement. The exact effects are multifaceted, as none of the neighbourhoods was segregated in all dimensions in 2020, and there are marked differences in the segregation dynamics between categories.

Lilleküla 5, the only neighbourhood not connected to the edges of the inner city directly or via adjacent gentrified neighbourhoods, is experiencing the least segregation across the categories of ethnicity, age and socioeconomic class. Thus, the neighbourhoods at the edges of the inner city, including where the edge is the coast of the Gulf of Finland, are not only the main gentrification spaces, but are also witnessing the associated effects of segregation most directly, albeit not necessarily to a high extent.

When considering the spatiotemporal patterns of classic and new-build gentrification, the segregation of low socioeconomic status residents which started in new-build gentrification neighbourhoods during the period of active gentrification highlights the displacement effects. The displacement is likely to be a result of direct pressure - increase in price of the existing housing stock, or even its demolition, as the out-mover dynamic at neighbourhood level did not suggest residential mobility of such an extent which would be triggered by additional indirect displacement factors. This remains the case even when accounting for the fact that, as would be expected, there are more in-movers than out-movers in the new-build gentrification neighbourhoods. In addition, the Estonian residents of new-build gentrification neighbourhoods have desegregated or are relatively weakly segregated, although these neighbourhoods still cannot be called socially mixed from the ethnic perspective, as the segregation levels of Russians are high in the new-build gentrification neighbourhoods of Kitseküla and Kalamaja E. Still, a slight preference amongst Estonians with high income towards inner city living in neighbourhoods with historic housing stock can be detected.

While within the methodological framework of this thesis displacement was considered as out-migration of low socioeconomic status residents, the segregation dynamics of Russians and the elderly point to a similar impact of gentrification for these social groups, with more pronounced levels of under-representation when compared to the levels of over-representation for the in-mover - gentrifier group of high socioeconomic status residents and for the likely in-mover - gentrifier groups - Estonians and young adults. Thus, considering the exclusionary dimension of displacement (Marcuse 1985), in the context of postsocialist Tallinn gentrification can be said to have strong accumulative effects on segregation, and from the social perspective, displacement is more transformative than incoming gentrification.

Contrary to Sýkora (2005) and Górczyńska (2017), who argued for a certain type of neighbourhood to be susceptible to first-wave gentrification in the postsocialist city, there is reasonable diversity in the gentrification landscape of Tallinn - not only Kalamaja and Kadriorg with varied housing typologies have gentrified, but also neighbourhoods which have not been referred to in previous literature of gentrification - Lilleküla 5, Torupilli and Kitseküla. Certain common trends can be identified from these three neighbourhoods. They have had a lack of segregation of high

socioeconomic status residents longer than the rest of gentrified neighbourhoods, and they all have had high levels of ethnic segregation since the beginning of the postsocialist period. While these findings would suggest that for these neighbourhoods, the effects of gentrification on segregation are less pronounced, a further question may be raised - whether these neighbourhoods have indeed witnessed gentrification, or is it another sociospatial phenomenon.

Pelgulinn has been previously described as a gentrification neighbourhood (Ruoppila 2006; Tammaru et al. 2016b), yet it did not meet the displacement criteria of the current study, despite the results indicating an increase in the socioeconomic level of the neighbourhood's residents. This suggests that Pelgulinn maintained its social diversity for longer than the comparable Kalamaja, and while it is possible that displacement in Pelgulinn increased in the years following 2011, the gentrification outcomes would be more varied than previously suggested.

Tuvikene (2016), taking the example of Tallinn, proposes the concept of anti-continuity in postsocialism, seeing it primarily as a shift in governance mechanisms towards the private sector activities, if it is initiated as a deliberate counteraction against socialist practices which prioritized the public sphere. With this in mind, the geographies of gentrification and segregation in Tallinn should be read predominantly from a real estate market perspective, driven by the relationship of supply and demand. However, the effects of gentrification on segregation are not driven exclusively by the state of housing. Kährik et al. (2016) found that environmental quality influences the particular choice of an inner city area for new residents. In the northern part, a likely factor is the proximity to the Baltic Sea, the access to which was strictly limited in the socialist era (Tammaru et al. 2016b). In this regard, another dimension of postsocialist anti-continuities (Tuvikene 2016) may be seen as a significant driving force of the sociospatial transformation processes as they pan out in Tallinn.

When considering the methodology of this study, using only one variable may appear insufficient for identifying the patterns of such complex processes as gentrification and displacement, at least not with high certainty. To address these concerns, it is worth revisiting Atkinson's (2000) methods. While he did use a single variable for gentrification analysis, it was multiple variables for the displacement analysis. Two of the other variables proposed by Atkinson (2000) for identifying displacement - ethnicity and age - were included in the segregation analysis of this thesis. After establishing that the potential gentrification neighbourhoods are locations of active residential dynamics, it can be argued that segregation as over-representation can be linked to gentrification, while under-representation - to displacement. This allows to shift additional, non-socioeconomic variables between the analysis of displacement and segregation.

However, socioeconomic variable was used in both gentrification and segregation analysis, including for the same time period of 1989 to 2011. This was done as the framework of gentrification analysis did not consider the deviation from the average, while for segregation, the border values for over- and under-representation were a certain distance from the even population distribution of 1. This distinction brought its merits when analysing a city with notable social divides, as Tallinn is, but it would not have worked for a socially more just city.

Following Ruoppila's (2006) guidelines for researching gentrification in Tallinn, the methodology of the current thesis allowed to provide an understanding of social residential change as it has happened in Tallinn in the postsocialist period, but it misses two dimensions. First of those is

contextual analysis of real estate activities. This was only partially mitigated by the inclusion of housing stock characteristics, which allowed to identify the new construction activity, but did not reveal the extent of pre-war housing reconstruction. The preferable dataset would be a longitudinal dataset of real estate prices; however, considering the available data, the occupation groups are well delineated by ISCO categories, therefore there are strong reasons to believe that aggregated occupation groups are a good proxy for income, which in turn reflects real estate prices.

The other aspect missing in this thesis from Ruoppila's (2006) suggestions is the personal perspectives of the residents. Focus on the calculation of residential dynamics may suggest an incomplete picture of displacement, as direct displacement implies a causal relation between immigration and outmigration, which can only be confidently inferred from contextual data (Easton et al. 2020). Thus, inclusion of qualitative methods, such as interviews, as also done in previous studies which have been concerned with gentrification in Tallinn (Tammaru et al. 2016b), would allow to build upon the results presented here.

This study has shown that reasonably reliable findings on gentrification, displacement and segregation can be made with rather few variables, based on individual level census and register data. In particular, the strong association between displacement and segregation introduces a dimension which is worth further consideration - not only in postsocialist urban studies, but also in the field of urban planning. While it is far-fetched to propose specific practical recommendations from this fully quantitative, neighbourhood scale study, the results suggest that there may be negative externalities arising due to the high levels of displacement-based segregation. Amongst policymakers, it may go unnoticed behind gentrification as a manifestation of development. Thus, in the case of postsocialist Tallinn, allowing unchecked gentrification would likely continue to bring more threats than benefits to the social fabric of the city.

Summary

The objective of the thesis was to explain the postsocialist city sociospatial transformations by examining the effects of gentrification and displacement on socioeconomic, ethnic and age segregation in Tallinn. The results indicate that 8 inner city neighbourhoods of Tallinn have gentrified between 1989 and 2011. While the direct effects of gentrification on segregation are not particularly strong, the segregation patterns of low socioeconomic status residents, Russians and the elderly suggest that there is an escalated effect of displacement on segregation. The most immediate changes affected the elderly population, who became under-represented in most of the neighbourhoods already during the gentrification period of this study. The typological differences between classic gentrification and new-build gentrification neighbourhoods also point to variations in their sociospatial dynamics, most notably from the segregation of low socioeconomic status residents in parallel with the gentrification process, as well as the desegregation or low levels of segregation of Estonians. Considering the strong role of real estate actors in postsocialist conditions, the geographies of gentrification and segregation can be explained by the interaction of housing and environmental factors in the formation of real estate activities. This understanding particularly fits the gentrification of coastal neighbourhoods of Kalamaja and Kadriorg. While gentrification and segregation patterns were successfully identified with quantitative methodology, the lack of context from other perspectives did not allow to sufficiently understand the drivers and consequences of these processes and to connect those to the postsocialist practices.

Gentrifikatsiooni mõju tänapäevastele segregatsioonimustritele postsotsialistlikes linnades Tallinna näitel

Jānis Zālīte

Kokkuvõte

Magistritöö uuris gentrifikatsiooni ja segregatsiooni vahelisi seoseid sotsiaalruumilisel paiknemisel. Nähtuste vahelised seosed on varasemalt linnauuringutes mainitud, kuid seda ebapiisavalt (Chelcea et al. 2015; Kubeš, Kovács 2020). Tallinn kui linn, kus sotsialistlikud rahvastikupoliitikad tekitasid sotsiaalruumiliselt keeleliselt jaotatud struktuuri, ning mis kiiresti asendus 1990ndatel neoliberaalsete poliitikatega (Tammaru et al. 2016a), on sobilik et uurida linnalisi protsesse postsotsialistliku ruumi kontekstis.

Töö eesmärk on seletada postsotsialistliku linna sotsiaalruumilisi muutusi, uurides gentrifikatsiooni ja rahvusliku, sotsiaalmajandusliku ja vanuselise segregatsiooni paiknemist Tallinnas. Esitati järgmised uurimisküsimused:

1. Millised Tallinna naabruskonnad on gentrifitseerunud?
2. Millised on segregatsiooni dünaamikad gentrifitseerunud linnaosades?
3. Kuidas saab postsotsialistlikku konteksti kaudu seletada gentrifikatsiooni ja segregatsiooni mustreid Tallinnas?

Gentrifikatsiooni on defineeritud kui seisuse ülespoole liikumist kindlates linnalistes piirkondades (Wyly 2015). See protsess on kõrvutatud praeguste elanike väljatõrjumisega (Cocola-Gant 2019). Gentrifikatsiooni mõiste loodi, et seletada linnalisi protsesse inglisekeelses maailmas (Cocola-Gant 2019). Kuid hiljuti on akadeemilise diskursuse keskmes olnud globaalse gentrifikatsiooni idee, mis näeb gentrifikatsiooni kui globaalset protsessi kindlate lokaalsete erisustega (Wyly 2015). Kuigi postsotsialistliku konteksti iseärasused on tõstatanud küsimusi gentrifikatsiooni kontseptsiooni õigsuses postsotsialistlikud maailmas, pakub gentrifikatsioon pigem universaalselt väärtuslikku perspektiivi kapitali, ruumi ja ühiskonna vaheliste suhete uurimisel (Bernt 2016).

Eluasemesegregatsioon on sotsiaalsete ebavõrduste ruumiline meede (Oka, Wong 2019). Elukohamobiilsus võib olla oluline segregatsiooniprotsesside kujunemisel (Bolt, van Kempen 2010). Erinevalt gentrifikatsioonist ei arvesta ruumiline segregatsioon ainult elukohamobiilsuse mõjusid vaid ka *in situ* sotsiaalselt mobiilsust (Bailey et al. 2017).

Empiirilise analüüsi sihtpiirkond oli Tallinna siselinn – kokku 80 naabruskonda. Kasutatud oli Statistikaameti 1989., 2000. ja 2011. aasta rahvaloenduste ning 2020. aasta registri andmeid. Tegu on individuaalandmetega iga Eesti elaniku kohta, mis olid selle uurimistöö jaoks agregeeritud naabruskonna tasemele. Vaadeldavad tunnused olid ametirühm, rahvus, elanike vanus ja elamu tüüp ning ehitusaasta. Andmed olid harmoniseeritud, mis tähendab, et need olid kohe läbi aastate võrreldavad ning ainult 1989. aasta loenduse andmed nõudsid väiksemaid lisaettevalmistusi.

Metoodiline töö koosnes mitmest osast. Kui oli teada, et sotsiaalmajandusliku staatuse muutus siselinnas sarnaneb gentrifikatsioonile (Freeman 2005), kasutati Atkinsoni (2000) professionaalsuse meetodit, et selgitada välja potentsiaalselt gentrifitseerunud naabruskonnad. ISCO klassid 1 ja 2 valiti kui professionaalse hõive ehk kõrgemate ametite esindajateks. Elanike väljatõrjumise analüüsi kaasati naabruskonnad, mis näitasid olulist professionaliseerumist aastatel 1989 kuni 2011. Analüüsiks kasutati lihtsustatud versiooni Atkinsoni (2000) metoodikast, mõõtes

väljatõrjumist kui olulist madalama sotsiaalmajandusliku staatusega elanike vähenemist aastatel 1989 kuni 2011, kasutades madala sotsiaalmajandusliku staatuse määramiseks ISCO ametialaseid rühmi 5 kuni 9. Kinnitamaks, kas potentsiaalsetes gentrifikatsiooni ja väljatõrjutuse naabruskondades on tõepoolest toimunud suureskaalaline selektiivne ränne, mitte lihtsalt sisemine sotsiaalne liikuvus, tehti elukohamobiilsuse analüüs, mille järgi määrati gentrifitseerunuteks naabruskonnad, kus on märgatavalt suur hulk sisse- ja väljakolijad gentrifikatsiooni kõige aktiivsemal perioodil, aastatel 2000-2011. Taoline analüütiline osa oli teostatud ka Atkinsoni (2000) uurimuses. Seejärel vaadati eluaset iseloomustavaid tunnuseid 2011. aastal, mis andis võimaluse kategoriseerida naabruskondi kogetud gentrifikatsioonitüübi järgi klassikalisteks või uusehitiste omaks. Viimaks tehti segregatsiooni analüüs sotsiaalmajandusliku, rahvuse ning vanuse kategooriates. Arvutati asukoha koefitsiendid, et mõõta üle- ja alaesindatust kindlates sotsiaalsetes gruppides 1989., 2011. ja 2020. aastal ning vaadelda nende aastate vahelist dünaamikat (Brown, Chung 2006). Selle töö jaoks käsitleti perioodi 1989-2011 kui gentrifikatsiooni perioodi ning aastaid 2011-2020 kui gentrifikatsioonile järgnevat perioodi. Mitmed analüüsi tulemused on töös esitatud kaartide kujul.

Tulemused näitavad et kuigi 13 Tallinna siselinna naabruskondadest saab defineerida kui potentsiaalselt gentrifitseeruvaid piirkondi, siis ainult 8 neist on kogenud ka piisavalt väljatõrjutust ja elukohamobiilsust, et neid klassifitseerida gentrifitseerunud naabruskonnaks. Kolmes neist - Kadriorg, Kitseküla ja Ida-Kalamaja - elamustruktuurid vihjavad, et uusehitiste gentrifikatsioon on domineerivam, kuigi 5 teist naabruskonda - 3 Kalamaja osa, Torupilli ja Lilleküla 5 - on kogenud klassikalise gentrifikatsiooni vormi, põhinedes märkimisväärselt sõjaeelisel elamufondil.

Uurimisalustest sotsiaalsetest gruppides olid kõige enam segregeerunud madala sotsiaalmajandusliku staatusega elanikud, venelased ning vanemaealised, ainult üks gentrifitseerunud naabruskond ei olnud 2020. aastal ühegi nende näitaja järgi segregeerunud. Noored, kes on tõenäolisemalt gentrifikatsiooni protsessis peamised sissekolijad, pole enamikes piirkondades ülesindatud - kuues naabruskonnas kaheksast ei olnud noorte segregatsiooni.

Gentrifikatsiooni kõige otsesemad mõjud segregatsiooni dünaamikatele on näha vanemaealiste segregatsioonis juba gentrifikatsiooni perioodil. Uusehitiste gentrifikatsiooni naabruskonnad toovad esile madala sotsiaalmajandusliku staatusega elanike väljatõrjumise, kuna see osa rahvastikust oli segregeerunud varem kui enamikes teistes naabruskondades. Kuid eluaset kirjeldavad näitajad pole tõenäoliselt ainsad selgitavad faktorid gentrifikatsiooni ja segregatsiooni kirjeldamiseks postsotsialistlikus Tallinnas - kõik peale ühe gentrifitseerunud piirkonna paiknesid siselinna äärealadel, viidates teatud keskkonnategurite mõjudele. Mõnes mõttes võivad gentrifikatsiooni ja segregatsioonimustrid olla postsotsialistliku järjepidevusetuse tulemus (Tuvikene 2016), mis peegeldub elukohavalikutes.

Kuigi töö metoodiline osa võimaldas seletada postsotsialistlikke sotsiaalaruümilisi muutusi Tallinna siselinnas kvantitatiivsest küljest, siis seosed gentrifikatsiooni, väljatõrjutuse ja segregatsiooni vahel on piisavalt nüansirikkad, et vajaksid tulevastes uuringutes põhjalikumat kontseptuaalset analüüsi. Seda saab kõige paremini saavutada kvalitatiivseid meetodeid kasutades.

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