Gentrification in Oslo's Inner East

A spatial analysis, 1992 to 2008

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1. Introduction

Changes to the socioeconomic composition of residents in Oslo's Inner East have become increasingly apparent over the course of the last few years. 'Gentrification', a word in common usage in cities such as New York, London and Sydney, is not a word that has crept into everyday language in Oslo. Yet one only has to mention Grünerløkka or Kampen to an Oslo resident in explaining the concept, the transformation of a previously working class neighbourhood to a predominantly middle class one, and a nod of comprehension follows.

As early as the early 1980s Wessel (1983) found evidence of gentrification in the Inner East. Since then the literature has expanded to include various accounts and interpretations of the process with a specific focus on this area, particularly within the last decade (see for example Sæter and Ruud 2005, Aspen 2005, Huse 2010). A common characteristic of these studies has been an emphasis on qualitative accounts. They have been successful in giving a voice to actors on both sides of the gentrification divide, both those who have witnessed their neighbourhoods changing and those at the forefront of those changes, the local politicians and the people moving in. On the basis of these accounts there can be little disagreement that the area is going through a significant phase of change. What this thesis aims to do is fill a gap in our knowledge of gentrification in the area by taking a quantitative approach in mapping out the changes in socioeconomic composition that have taken place over the last two decades. By doing so it can be determined whether the process has developed evenly throughout the area, or whether it has been particularly predominant in certain pockets, yet absent or occurring at a slower pace in others.

For the first time the use of data on the basis of census tracts will enable a closer analysis of the phenomenon in Oslo than has been achieved previously. The analysis will be in the form of a GIS analysis, mapping changes to the socioeconomic status of tracts at various time intervals during the period 1992 to 2008. The data is based on a complete sample population of residents aged 30-39, with register data for income and education available for each year.

Analysis on the geographic level of the census tract can be important in gaining an insight into the contextual peculiarities of the Oslo experience of gentrification. Aspects of gentrification and the middle class in-migrants tend to dominate our perceptions of an area once the process is in full swing, as the consumer power of the new residents is taken advantage of by businesses new and old. Those residents who remain may struggle to make their presence felt, but that is not necessarily to say they disappear in an unstoppable tide of gentrification. Contextual differences between cities, such as housing legislation, histories of town planning and aspects pertaining to the built environment, to name but a few, can determine the pace and comprehensiveness of gentrification both from city to city and within

cities. An aim of this thesis is to place Oslo's Inner East within the now vast international literature of gentrification in terms of how the process has unfolded.

1.1 Background to research questions: International research

A feature of academic debate during the 1980s and into the 1990s was a preoccupation with the causes of gentrification, led by Smith (1979, 1996) who argued for an emphasis on supply side arguments, "a back to the city movement of capital, not people", and Ley (1986, 1996) who focused on the characteristics of the middle class in-migrants. But by the turn of the century the call had come out by Lees (2000) for the need for an emphasis on geographic and contextual differences between cities that had not featured so prominently in previous literature. She cites the dangers of local politicians basing their policies on a one-size-fits-all premise in arguing for urban regeneration. What may be 'good' for London and New York is not necessarily the case for smaller cities in the UK and USA. To this should be added cities large and small in other countries, western or otherwise, among which Oslo finds itself. With this in mind, it is hoped that this thesis can assist in a movement 'towards a geography of gentrification'.[1]

Much of gentrification research has been based on North American cities and London, with many of the main theoretical perspectives and models being developed from this research. A further aim of this thesis is to analyse and discuss whether this theory is applicable to the case of the Inner East. For example, gentrification stage models have been prominent in the literature. A common emphasis in early models was a tendency for the first 'pioneers' to be rich in cultural capital (particularly artists and design professionals), contributing to an upgrading of an area's reputation that paved the way for an influx of residents richer in economic capital (Clay 1979, Gale 1979). Although these were early models, given Oslo's relatively late meeting with gentrification they may still be applicable to certain areas during the time period under research. Hackworth and Smith (2001) follow the tradition of stage models by conceptualising gentrification as a series of 'waves'. Of particular relevance considering the time period is the 'third wave' of gentrification in the 1990s, in which large-scale capital contributed towards resurgence in the USA after a lull in the late 1980s/early 1990s. These models are undeniably influenced by research in North America, so it is an open question how relevant they may be to the Oslo experience.

[1] Taken from the title of Lees' (2000) article: A reappraisal of gentrification: towards a 'geography of gentrification'.

The unevenness of the gentrification process as it takes hold has also been a focus of gentrification research. It is rarely the case that a whole area will be gentrified at the same time and at the same pace. Despite Smith's (1996) insistence on the importance of the capitalization of a rent gap in instigating a gentrification process, even he admits that the process is likely to start adjacent to areas that already house a significant middle class population (which he terms 'beachheads', evoking battlefield imagery), before creeping towards the heart of a run-down neighbourhood where the rent gap is largest. While no part of the Oslo's Inner East can be compared to an American ghetto, it is still conceivable that gentrification has spread organically from areas that could be termed 'beachheads', something that could be determined by analysing census tracts. Alternatively, especially considering the lack of seriously deprived areas as in the American experience, the process may be more random, perhaps leapfrogging certain areas with an undesirable built environment, for example.

One of the outcomes of gentrification that has often been perceived as positive, particularly by local politicians looking to prevent the formation of ghetto-like areas, is creating a 'social mix' (Lees et al. 2008). In considering the case of London, Hamnett (2003) emphasises the importance of analysis on different geographic levels. Looking at the macro borough scale one could come to the conclusion that social segregation has declined in London since the 1970s. But on a smaller geographic scale segregation is palpable, where blocks of wealthy homeowners are just streets away from council tenants. In other words, it is micro-scale segregation that can arise as a result of gentrification rather than macro-scale. Analysis on the level of the census tract is thus best suited to picking up these trends, being the smallest geographic unit available for analysis.

1.2 Background to research questions: Inner East

In an historical account of Oslo from 1900-1948 Kjeldstadli (1990) describes Oslo as 'the divided city', the physical divide between the west and the east also one in which social class was pertinent, most notably in the inner zone. The Inner West was the domain of the bourgeois, while the Inner East was held by the working class. Nearly half a century later Hagen et al. (1994) could conclude that differences in income and education levels still followed an east-west axis, with living conditions in the Inner East posing far more difficulties for its residents than in the rest of the city. But by this time there were signs of

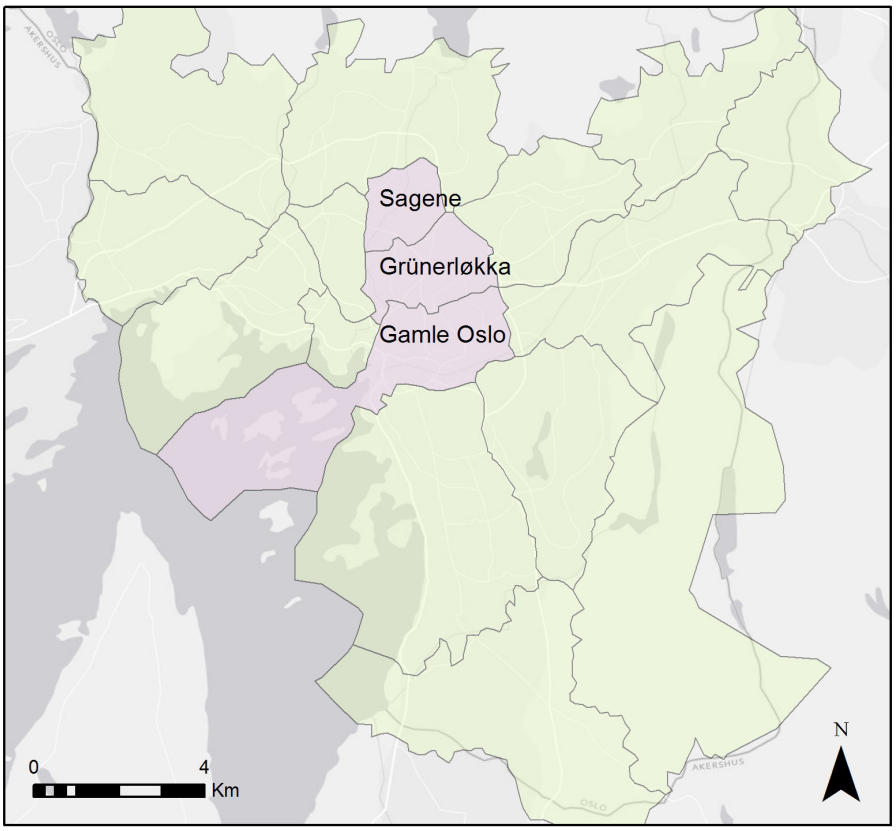

Figure 1.1 Oslo Inner East boroughs

Administrative boundaries of the three boroughs of the Inner East, after 2004

change, riding on the back of a programme of urban renewal in the late 1970s to early 1980s, which led to displacement in the affected areas and an ensuing substantial rise in average household income level as a result, developments which Bysveen and Wessel (1984) linked to the relatively new phenomenon of gentrification. The middle of last decade saw two collaborative books published focussing on the Inner East, Sæter and Ruud (2005) concentrating on Gamle Oslo and Aspen (2005) editing a book about urban transformation in Oslo generally, but with an emphasis on gentrification in the Inner East. Finally Huse (2010) published a book that looked at the effects of gentrification on one specific street in Gamle Oslo, Tøyengata. The traditionally working class area of the Inner East has thus become the area in Oslo that has had by far the most focus on it regarding gentrification. An aim of this thesis is to place itself within this body of literature, so the demarcation of the study area to the three boroughs that constitute the Inner East – Gamle Oslo, Grünnerløkka and Sagene, is a natural choice.

One difficulty in choosing these three boroughs as a study area over the period 1992-2008 is that a restructuring of local government led to different boundaries being drawn up in 2004. This affected Gamle Oslo and Grünnerløkka (formerly Grünerløkka-Sofienberg), as

both now incorporate some of the census tracts of the former Helsfyr-Sinsen borough to the east. Gamle Oslo also gained two tracts from the former Ekeberg-Bekkelaget borough to the south and one tract from Bygdøy-Frogner covering the islands closest to the city in the Oslo harbour. The more traditional demarcation of the Inner East is the former three boroughs (Sagene was known as Sagene-Torshov, but the area has stayed the same), but in the analysis the new boundaries will constitute the study area. The new tracts in the east distinguish themselves from the original inner tracts in that they arguably display many of the characteristics of suburbia – industrial areas, single-family dwellings and apartment complexes resembling Oslo's satellite towns more than the concentrated urban core. They are taken into the analysis not only to provide a possible contrast to the core tracts, but also to see whether they too show signs of gentrification as gentrification processes become more comprehensive. This can be particularly relevant when one considers the considerable amount of brownfield development that has taken place in some of these tracts in recent years.

1.3 Research questions

For the sake of simplicity and considering the data available for this project, one overriding research question can be formulated:

> *How has the process of gentrification manifested itself spatially in Oslo's Inner East over the period 1992 to 2008?*

But rather than focussing on the area as a whole or even on the level of the borough and giving rather general indications of socioeconomic developments, the analysis of data at census tract level can be particularly useful for seeing how gentrification can be a diffuse (or uniform) process. An analysis of the Inner East which groups data into only the three boroughs, for example, can tell us whether there has been an increase in the overall education or income level as a whole in each borough. Yet it tells us nothing of whether this has been a general increase spread evenly over the whole borough, or an uneven process in which in-migrants favour some neighbourhoods over others.

The census tracts used by SSB in Norway are dealt up so that they are as uniform as possible with respect to the natural and physical environment[2]. This means that a presentation of socioeconomic trends in map form on the basis of these tracts not only shows us the geographic relationships that emerge, but may be able to assist in determining some common

[2] http://www3.ssb.no/stabas/ClassificationFrames.asp?ID=1498751&Language=nb accessed 15/7/11

characteristics of the areas both where gentrification is more prominent and those that are left behind. An example may be that gentrifiers favour an area built during a certain time period over an area where buildings from another time period predominate. If the idea behind census tracts is that they should be as uniform as possible, then there is a strong possibility that these two areas would constitute separate tracts even if they were geographically adjacent to each other. Thus by mapping developments over the given time period on census tract level, a more comprehensive and detailed analysis of gentrification in the Inner East can be carried out. With this in mind a series of sub-questions can be formulated, concerning temporal and physical patterns that emerge on a census tract level:

A) *How relevant are established theoretical models of gentrification in describing the process as it has unfolded in the Inner East?*

These models, already mentioned above and based predominantly on research in Northern American cities, will be outlined in more detail in the next chapter.

B) *What temporal variations are evident for the area as a whole, and between different areas?*

It may be the case that some areas have reached a peak already, while others are only just beginning to display signs of gentrification, for example. It may also be the case that temporal variations can be found for the area as a whole. Assuming that there are in fact variations between areas, a third sub-question becomes:

C) *Are there characteristics common to the areas or tracts that have witnessed, respectively, the highest degrees of gentrification and the lowest degrees of gentrification during the study period?*

The aim here is not necessarily to identify objective truths about these two sub-groups of neighbourhoods, but rather to offer a speculative foundation for further study which could be more appropriately analysed through other methods, as well as placing particular emphasis on relating the findings to previous literature on gentrification and considering how the study area fits in comparatively. Particular emphasis will be placed on the built environment.

Another approach to analysing the changing social structure is to see whether there has been an increase in socioeconomic polarisation, characterised by increases in both the lowest

and highest socioeconomic groups, whether it is symmetrical or asymmetrical. While gentrification often displaces lower socioeconomic groups, it can also be the case that neighbourhoods are increasingly divided into richer and poorer areas as gentrifiers direct their intentions towards certain parts and oversee others. Of interest then are firstly changes to the overall socioeconomic structure, and secondly whether geographic polarisation has taken place – when residents are increasingly concentrated into tracts characterised by respectively high status and low status groups. The fourth and final sub-question is therefore:

D) *Has gentrification led to increasing polarisation in the overall socioeconomic structure, and/or geographic polarisation at tract-level?*

1.4 Thesis structure

In order to answer these questions, the thesis will be divided up into a further six chapters.

In chapter 2, an overview of theory most relevant to the research questions will be given, some of which has already been introduced in this chapter. In this chapter a clarification will be made concerning the conceptual definition of gentrification that will be used in the analysis. Following that will be a focus on models of gentrification processes, the attributes of the gentrifiers and the spatial manifestation of gentrification.

Chapter 3 will give an overview of the study area, both historically and in relation to previous research on gentrification. While this type of overview is often given before a discussion of theoretical perspectives, by placing it in this order a more fruitful discussion of the Inner East in relation to gentrification theory can result.

Chapter 4 presents the method and data that will be used in the analysis, discussing throughout the weaknesses and strengths both of the data and its operationalization, and the use of GIS as method.

The analysis is divided into two chapters. The bulk of the analysis, chapter 5, concerns itself with spatial patterns. Discussion will be centred round a series of maps, showing tracts at various time intervals and their changes over time. The aim of this chapter is to answer the research sub-questions A, B and C, with connections made to the theory in chapter 2 throughout. In chapter 6 the last sub-question will be taken up, analysing polarisation patterns in the form of tables and graphs.

Lastly, chapter 7 will refer directly back to the research questions, answering them with reference to the analysis in the preceding two chapters.

2. Theoretical perspectives on gentrification

This chapter is divided into four parts. The aim is to outline the most relevant aspects of previous research and theory in relation to the research questions –defining gentrification, models of gentrification, the gentrifiers, spatial patterns and socioeconomic polarisation. What will become clear is the overweight of anglophone research on the phenomenon. Hence Lees' (2000) appeal for a focus on different geographies of gentrification, and the hope that this thesis can be among research that can contribute to the response.

The first section will trace observations of gentrification and the corresponding debates over the conceptualization of the process. The second section will summarise two models of gentrification, as introduced in the introduction – a stage model relevant for developments on a neighbourhood scale and a three-wave model that places gentrification in a broader context. Thirdly, I outline some characteristics of the in-migrants, the gentrifiers, particularly in relation to cultural and economic capital. Fourthly, and especially relevant for the aim of this thesis, I look at some attempts to map the spatial manifestation of the process, before concluding with a discussion of different attempts to analyse the social and geographic polarisation that is often prevalent.

2.1 Defining gentrification, from origins to contemporary conceptualizations

The first observations of urban development that could be likened to gentrification were significant in that they were concerned with a process that seemed to go against the grain of accepted urban theory. The Chicago School's theoretical model of urban development could be described as an ecological one, in which neighbourhoods went through natural processes of invasion and succession - as an urban area aged and declined in desirability, high-income residents moved further out to the suburbs and were replaced by low-income groups, whether it be in a concentric pattern centred around the centre (Burgess 1925) or along sectors extending out from the centre (Hoyt 1943). These were 'ideal models' – Burgess emphasised the importance of context in different cities. Most interestingly from a gentrification perspective Hoyt (1943: 480) remarked that it was probable that "central areas possessing superior advantages of location would be rebuilt for the higher-income groups".

By the end of the 1950s Hoover and Vernon (1959: 194-198) could observe that this had begun to happen to such a degree in New York that an extra stage could be added to an urban development model based on the Chicago School's approach. This stage was focussed on renewal of inner-city slum areas, either with the aid of public subsidies in providing

mainly middle-income rental properties and some lower-income, *or* the building of unsubsidized luxury apartments on razed sites. They also identified a third process, at this stage relatively minor and confined to Greenwich Village:

> "Old areas of felicitous design and conveniently central location, originally high-income but deteriorated, are restored piecemeal to high-grade occupancy by extensive repair and remodelling, merger of dwelling units, and a little new construction". (Hoover and Vernon 1959: 196)

This was a process that they considered had the potential to take hold in other parts of the city as well. Indeed, by 1964 Hoyt felt compelled to review his and Burgess' models, taking into account contemporary developments that included a proliferation of high-end apartments in redeveloped areas of downtown, as well as the clearance and redevelopment of slums and dilapidated buildings in what was Burgess' light industrial zone, closest to the CBD, as industry moved out to more peripheral locations (Hoyt 1964). Birch (1971) also included 'recapture' as a final stage in his model of urban growth, describing it as the point in which

> "The land occupied by an old slum becomes too valuable to justify its use as an old slum, and its inhabitants too weak politically to hold on to it. Property is then reacquired, levelled or rehabilitated, and put to more efficient use, such as high-income apartments or office buildings or public housing". (Birch 1971: 81)

Meanwhile across the Atlantic in London Ruth Glass (1964) was making observations of a process that was analogous to that which Greenwich Village was undergoing:

> "One by one, many of the working class quarters of London have been invaded by the middle classes – upper and lower. Shabby, modest mews and cottages – two rooms up and two down – have been taken over, when their leases have expired, and have become elegant, expensive residences (…) Once this process of 'gentrification' starts in a district, it goes on rapidly until all or most of the original working class occupiers are displaced, and the whole social character of the district is changed." (Glass 1964: xviii)

Thus the term 'gentrification' was born, a play on the word 'gentry' which signified the rural land-owning class in the old English class-structure. It should not, however, be taken as the

origin of the process itself, as she even describes in the same passage areas of London (Hampstead and Chelsea) that had already been taken over by the middle class "some time ago".

The emphasis here is exclusively on renovation of older Victorian houses, with no mention of the razing and redevelopment of inner-city slums that had been observed in the USA at that time. This has come to be known by many as 'classical gentrification' (Lees et al. 2008). The need to term it 'classical' highlights a debate that has taken place among scholars since that time over what exactly can be called gentrification. A central question has been whether to hold onto the observation made by Glass and only apply the term to that form, the rehabilitation of old housing stock, or to include other examples of working class areas (whether residential or commercial) that had been or were being taken over by the middle class (Slater 2006).

By the 1980s there was widespread recognition among scholars of a variety of processes that could be conceived of as gentrification. In reviewing the literature up to his time of writing, Beauregard (1986) argued that gentrification should be seen as a 'chaotic concept' that encompasses a diverse array of processes, rather than one single phenomenon. Specific contextual circumstances combine to produce distinct processes in different places, and not in others. Among these processes he includes redevelopment of historical districts, gay-led transformation of working class neighbourhoods, displacement of tenants from multi-family housing due to speculation, redevelopment of abandoned housing, and warehouse conversion into homes for the wealthy. This list is notable for the fact that despite gentrification being 'chaotic', all these examples still involve the quintessential renovation of the existing physical environment that Glass referred to, albeit not exclusively original residential. The building of brand new housing and the upgrading of the commercial environment to cater for a middle class market are not included, for example. To include these processes would seem to make gentrification even more complex and chaotic – or would it?

Clark (2005) takes a different tack and urges us to see the 'order and simplicity' of gentrification rather than the 'chaos and complexity' Beauregard sees. He offers this definition:

> "Gentrification is a process involving a change in the population of land-users, such that the new users are of a higher socioeconomic status than the previous users, together with an associated change in the built environment through a reinvestment in fixed capital … It does not matter where, it does not matter when." (Clark 2005: 258)

He focuses on what he considers are the necessary relations of class and reinvestment in the built environment. These relations were paramount in the process described by Glass; in the context of 1960s London this resulted in rehabilitation of the already existing built environment. They are also relations that have played out in many other contexts before that (Clark refers to Haussmann's redevelopment of Paris) and since, without necessarily involving rehabilitation, and not necessarily in an urban setting. Seeing gentrification in this light incorporates, for example, new-build gentrification on brownfield sites, as it refers to 'users' as distinct from residents, and rural gentrification, processes not included by Beauregard.

Putting theory to practice, Hedin et al. (2011)[3] distinguish between three types of gentrification in a study of three Swedish cities (Stockholm, Gothenburg and Malmö). The study is not just confined to the inner city, but to the wider metropolitan areas, taking as a starting point a neighbourhood's original socioeconomic status: low-income neighbourhoods experiencing a socioeconomic upgrading; middle-income neighbourhoods experiencing the same; and 'super-gentrification', where already high-income neighbourhoods experience a further upgrading in status.[4] A key finding for them was "a grey mass of ordinary gentrification in the middle strata, so ordinary (and perhaps uninteresting) that it has failed to attract the attention of gentrification researchers" (Hedin et al. 2011: 18). This, they argue, supports a move towards a more generic understanding of gentrification. The same structural forces are at work, i.e. the developer's pursuit of capital profit, whether the setting is a lower-income, middle-income or high-income neighbourhood. The results are somewhat more benign in already middle-income neighbourhoods, lacking the conflict and displacement that so often occurs in their lower-income counterparts.

It is this last aspect that particularly concerns Davidson and Lees (2005). For them gentrification is still a process fundamentally concerned with displacement. They offer a similar definition to Clark, listing four characteristics of gentrification: "(1) reinvestment of capital; (2) social upgrading of locale by incoming high-income groups; (3) landscape change; and *(4) direct or indirect displacement of low-income groups*" (Davidson and Lees 2005: 1170, my emphasis). It is particularly this last characteristic that would seem to be at odds

[3] including Clark

[4] Lees et al. (2008) refer to super-gentrification as a second wave of gentrification of an already gentrified neighbourhood. However no such condition is required in Henin et al.'s operationalisation – there need not be a prior history of gentrification to qualify for super-gentrification in their study.

with Hedin et al.'s (2011) conceptualisation of gentrification. The latter authors do not adhere to the view that it must be of exclusively low-income groups.

Summing up, the observations by Hoyt (1964), Hoover and Vernon (1959), and Birch (1971) in the USA can all be incorporated into the definition offered by Clarke, and arguably that offered by Davidson and Lees. All three had included observations of slum clearance and subsequent new-build projects aimed (mostly) at middle-income earners, the rehabilitation of existing stock, and quite possibly a degree of displacement of low-income residents. It was however one particular sub-process of this extra 'stage' in their urban development models, the rehabilitation of housing stock, that was seized upon by other researchers, and later the media, which came to be known as 'gentrification'. Pattison (1977) makes the point that heavy public funding was a driving force behind the 'renewal' and 'redevelopment' observed by these authors, and by the late 1970s this money had largely dried up as a movement away from more grandiose planning took place, in the USA at least. Thus the middle class takeover of low-income areas in 1970s USA took its form predominantly as the classic gentrification Glass had observed. Indeed, the earlier observations of 'urban renewal' and 'recapture' often did include the provision of social housing in order to justify the large-scale development (though, as is evident from Hoover and Vernon's observations, non-subsidised development for the higher end of the housing market al.so took place), and this is something that Smith (2002) argues differentiated the private-capital led gentrification described by Glass and Pattison from the process of state-assisted urban renewal. Nevertheless, both processes involved a renewed affinity for urban living by the middle class when suburbanisation had become a dominant trend, and both processes sit comfortably inside the definition put forward by Clark (2005).

2.2 Models of gentrification

Focussing on classical gentrification, it was recognised early on in North American research that a neighbourhood typically went through various stages in becoming gentrified, with different stages linked to different characteristics of the people moving in (Pattison 1977, Gale 1979, Clay 1979). Ideal models of gentrification were developed, which were very much a product of the context in which these scholars were writing (Lees et al. 2010), and as such they cannot be unconditionally imposed on today's situations. But they offer a starting point in analysing the process, and it cannot be ruled out that there are contexts today in which they remain pertinent, for example in cities outside the western cities that have traditionally been researched on, as well as in areas of cities that have hereto been ignored by

gentrifiers. They have also provided a starting point for Hackworth and Smith's (2001) three-wave model, which has been a useful analytical framework that has provoked much discussion, particularly in regards to the aforementioned debate on the definition of gentrification.

Based on observations in two Boston neighbourhoods, Pattison (1977) divided in-migrants into three categories based on their relationship to risk, in either the form of 'risk of acceptance' or 'financial risk on investment'. The first to move into a neighbourhood, the pioneers, were *risk-oblivious,* more or less with little to lose as they were on the fringes of mainstream middle class society, such as gays, artists and inter-racial couples. They renovated houses using 'sweat equity', in the same manner Glass (1964) had observed in London. Following them were the *risk-prone*, who saw the potential in the area after the first signs of change, and were willing to take a gamble on investing in property. Lastly came the *risk-averse*, most often professionals, who entered the neighbourhood after the way had been paved for them and were therefore assured of acceptance and a secure investment. Developers had entered the market by this stage, and the residences this group were moving into were most often already renovated. By this stage real estate prices had risen considerably. Based on these different groups of gentrifiers, Pattison developed a four-stage model that was tested, confirmed and elaborated on by Clay (1979).

Gale (1979) found evidence in his research focussing on Washington D.C. to support this stage model, adding that varying phases could not only be found in different neighbourhoods, but also *within* neighbourhoods. This of course depends on the unit of 'neighbourhood' used for analysis – in his study he took this as census tract level. He also agreed that the different stages involved different people, a finding that was to prove a constant in subsequent research. Kerstein (1990) argues that it was particularly in-migrants to areas where more large-scale developers had played a role in the gentrification process that differed from the risk-oblivious small-scale gentrifiers. This finding sits in agreement with the fourth stage of the model, and as gentrification evolved it was particularly this stage that stood out as a profound departure from earlier gentrification, a stage that increasingly involved processes of gentrification that forced scholars to reconsider the concept of gentrification as small-scale renovation of old houses.

In a similar vein but on a broader scale, Hackworth and Smith (2001) conceptualised gentrification as a series of three waves, based largely on research on New York but also taking other research into account. The *first wave* lasted up until the mid-1970s, a wave in which the earlier stages of Pattison's model sit comfortably in. This wave was sporadic, as well as being encouraged by local government as a way in which the tax base of a community

could be enhanced. The recession of the mid to late 1970s meant that speculators could buy up large amounts of land, and when the economy resurged they were able to redevelop, thus producing gentrification on a much larger scale than during the 1970s. This is perhaps a trend that would have been far more evident in North America than in Europe, where regulation in most countries would have made this tactic difficult. This was something that Pattison (1977) had not included in his model, but was evident to Clay (1979) – the final stage of his model featured more large-scale rehabilitation developments. The *second wave* continued throughout the 1980s, a wave termed by Hackworth and Smith (2001: 467) as the 'anchoring of gentrification', noticeable not only for the departure from models of 'classical gentrification', but also for the spread of the process to smaller, non-global cities and the decreased role of the state as private market forces were allowed to prevail. Smith (2002) adds that opposition movements at the neighbourhood scale were also successful in at least stalling gentrification in some cities.

The recession of the late 1980s and early 1990s caused a slow-down in gentrification processes, leading Bourne (1993) to predict a decreasing role for gentrification in urban development. But Hackworth and Smith (2001) argue that this wasn't the case (with the advantage of hindsight), as gentrification returned with a vengeance in a *third wave*, taking hold from about 1993 and continuing throughout the 1990s. This wave distinguished itself in four main ways – an expansion of the process within neighbourhoods and also to more remote areas outside the city core; larger developers became more central as globalisation and restructuring affected the real estate market; resistance decreased as working class neighbourhoods became smaller and more spatially fragmented as the original residents were displaced; and the state was back as a major actor both in providing support and giving planning permission for large-scale development. Smith (2002: 441) also emphasises that during this wave gentrification has become a global urban strategy – although the process varies from city to city, the neoliberal ideology of this wave has led to "a thread of convergence between urban experiences in the larger cities of what used to be called the First and Third Worlds".

It was/is during this third wave that gentrification in Clark's (2005) wider sense, as opposed to the classical definition, has taken a foothold in many cities. Davidson and Lees (2005) point out that new forms have featured during this wave, such as *super-gentrification* (already gentrified neighbourhoods experiencing further social and physical upgrading), *commercial* gentrification (consumer goods and services catering to an increasingly up-market customer base) and *new-build* gentrification. While Hackworth and Smith (2001) and Davidson and Lees (2005) use research on New York and London to highlight the processes

afoot in this wave, it is by no means confined to these two global cities. For example, Murphy (2008) highlights the role of local government in redeveloping the former port area of Auckland for an exclusive residential market, by both spending money on infrastructure in the area and giving planning permission to developers with no conditions concerning the provision of affordable housing. In China, He (2007) discusses the role the state has played in Shanghai, displacing large numbers of working class waterfront residents in taking over properties, before selling them to large-scale developers, as well as investing in beautification and infrastructure to tempt middle class residents to these areas.

However, there is not a unanimous consensus among researchers that this third wave qualifies as gentrification. Harking back to the previous discussion on definitions of gentrification, Boddy (2007) is particularly vociferous in his claims that this is stretching the use of gentrification as a concept. It is particularly the last of Davidson and Lees' (2005) characteristics of gentrification that he takes exception to, arguing that their study of brownfield developments on the Thames riverside failed to find any evidence of displacement. Davidson and Lees contend that the new-build developments acted as beachheads, providing security for middle class in-migrants to the adjacent census tracts (the risk-averse), thereby beginning to displace the original population. Boddy argues that the increase in high income earners in these census tracts was relative to the remainder of inner areas of London, though to counter this argument a comparison to Greater London would probably have shown a greater relative growth – it is precisely the inner areas that are most likely to be undergoing gentrification. In his study of Bristol he finds no evidence of displacement in new-build projects situated on brownfield city sites, as there had been no-one living there before, calling the process one of *re-urbanisation* rather than displacement and therefore gentrification. This is a term that has gained support in demographic literature recently (see Haase et al. 2010 for their discussion on four European cities), one that specifically plays down the occurrence of displacement.

Countering this perspective, Davidson and Lees (2010) argue that displacement is all too often perceived as static in time and space. Following this line of thinking, if a new building project or rehabilitation does not explicitly displace someone there and then, it is not thought of as displacement. Displacement can have a much longer time trajectory than this, both in the immediate vicinity and in spreading to surrounding neighbourhoods. As they point out, Marcuse (1986) offered a wider definition of displacement that took into account the temporal aspect, when residents of an area feel *displacement pressure* and *exclusionary displacement.* The former occurs when residents remaining in an area undergoing gentrification become alienated from it as services catering to the middle class take over and

their social network becomes fragmented as friends and family move out. The latter is when groups that previously would have had the financial resources to be able to move into the area, or upgrade to a larger abode, are unable to do so any longer. This could, for example, affect children moving out of their parents' home, unable to find a reasonably priced property in the neighbourhood they have grown up in. Young couples needing more space when establishing a family may not have the resources to buy something larger in the neighbourhood.

Marcuse may have been writing before third-wave gentrification took hold, but by applying this wider understanding of displacement to Hackworth and Smith's (2001) schema it becomes more apparent how third-wave gentrification qualifies as gentrification rather than mere re-urbanisation. Large-scale developments may be built on brownfield sites, but their effects and upgrading of the immediate vicinity can over time spread to neighbouring neighbourhoods, thus causing displacement pressure and exclusionary displacement. As these communities become fragmented resistance decreases, thus encouraging more developers to enter the market.

2.3 The gentrifiers

We have already seen how early observers (Pattison 1977, Gale 1979) identified different groups of in-migrants at different stages of early gentrification based on their relationship to risk. Inherent in that conceptualization, particularly for the risk-prone and risk-averse, is the act of moving into a gentrifying neighbourhood being perceived as a possible lucrative capital investment, albeit with the possibility of failure. Greater economic resources can alleviate the need to buy into the cheapest area, meaning that those who enter the neighbourhood at later stages once prices have risen a little are generally richer in economic capital than the 'pioneers'. Beauregard (1986), in a typology of potential gentrifiers (exclusively in relation to 'classical' gentrification at this stage), also places the main emphasis on the economic rationality of that decision. But he is concerned with explaining why it should be the inner city that is a more attractive investment, when in fact house prices in the suburbs were also inflating at a rapid rate during the 1970s. His discussion centres on those that come immediately after the pioneers (there is no mention of minority middle class groups here). He points out that a typical gentrifier is relatively new to their career, and therefore unlikely to have amassed much savings and to be on a lower wage compared to older counterparts. The capital needed to buy in the suburbs is thus out of their reach. It is not, however, any old cheap housing they are looking to purchase, as they are looking to project a certain image

through their consumption that they are unable to achieve through the exclusive use of economic capital. Their 'good taste' must still be reflected in their housing choice, and given their financial constraints emphasis is placed on the both the aesthetic qualities of the (pre-modern) architecture and the potential for renovation.

Though not spelt out in Bourdieu-esque terms by Beauregard, this last point reflects the importance of cultural capital for gentrifiers in the earlier stages, and certainly in relation to classical gentrification, when economic capital isn't sufficient to be able to buy into a readymade image. Bridge (1995) argues that the ability to appreciate the 'gentrification aesthetic' is something that becomes embodied in the individual as a result of social background, and in particular the cultural capital indicator of a higher education. This is a term made popular by Jager (1986), where the Victorian architecture of working class suburbs in Melbourne became popular with the middle class, and since has become synonymous with various styles of heritage housing and old industrial architecture. Zukin (1987) points out though that it is not limited to Victorian-era housing; indeed, the 'gentrification aesthetic' can be adapted to fit the existing stock of older housing in a city, not just housing that is pre-20th century. She also argues that it is not a purely 'cultural' decision to direct attention towards this building stock. As prices in an area rise because of the influx of high-income earners, this housing choice can easily be converted to economic capital, something most in-migrants are conscious of.

For Ley (1996), gentrification in a North American context was a consequence of the counter-cultural student politics of the late 1960s, heavily concentrated in urban areas, in which artists played a major role in presenting an alternative way of living than mainstream America. They were the trailblazers of gentrification (the risk-oblivious, not concerned with making a capital gain), setting the benchmark for what could be considered 'good taste', and the students of the counter-cultural revolution soon followed. As with the stage model thesis, general patterns emerged in exactly which former students followed the artistic crowd and in which order: first came people now working in design and advertising, the media, writers and academics, accompanied by various public-sector workers; then came more established professionals such as lawyers, doctors and so forth; and lastly, corresponding with the 'risk-averse' typology, private-sector elites and workers in the financial sector. Gentrification could thus be seen as a process characterised by one in which in-migrants with an overweight of cultural capital provided the initial impetus, before economic capital took over in its more mature stages, reflected in the characteristics of the gentrifiers.

Ley identifies here some general patterns and traits of the gentrifiers, which he stresses are idealizations and should be treated as such. Rose (1984) takes issue with positivist

methods of conceptualising gentrification, and along the same lines as Beauregard's (1986) 'chaotic concept' she urges us to see the diffuse nature of gentrification and the resulting heterogeneity of the gentrifiers. In accordance with this perspective there are a number of 'marginal gentrifiers' who play a part in the process. Some groups are similar to ones already mentioned, such as those shut out of the suburban market because of financial resources and untraditional families. There are others which are related firstly to the (at that time) relatively recent diversification of household structure, and secondly to the labour market. Single mothers, for example, find the convenience of living central beneficial to combining work and childcare because of the concentration of facilities and the reduced time used commuting. Educated but unemployed young people (at any time the quantity of which is dependent on the national and local economic situation) enjoy the opportunity to save on commuting costs and be able to work under the table, assisting other gentrifiers with renovation work, for example.

These are not necessarily groups that are captured in quantitative studies of trends in urban areas, and therefore do not contribute to building an image of a stereotypical gentrifier. But they reinforce the arguments and observations by many of the aforementioned theorists in regards to economic capital – in many cases, and particularly up to the mid-1980s before the third wave was set in motion, the financial resources of the gentrifiers were perhaps not always the definitive indicators of whether the process was taking hold in a neighbourhood. However, as the process unfolds and economic capital becomes more important it is these marginal gentrifiers who, along with the original population, can also find themselves among the displaced. It is this division between gentrifiers that Rose (1984) wants us to acknowledge, the divisions and social chasms that exist *within* the gentrifying middle class.

The interplay between cultural and economic capital is not just distinct at different phases of a gentrifying neighbourhood, but it can also vary from neighbourhood to neighbourhood within cities and between cities. Butler (1997) carried out a comparative analysis of two qualitatively different neighbourhoods within the borough of Hackney, London at the end of the 1980s: De Beauvoir, characterised by wide streets, larger, more private dwellings, often with gardens, and a lack of commercial and public amenities; and North Defoe, characterised by terrace houses, a more robust commercial life and more public spaces. Despite the geographic proximity of the two neighbourhoods and the apparently similar trajectory of gentrification processes, Butler found a significantly different social composition to the middle class owner-occupiers in the two areas. The former contained more workers in the financial sector, with higher average incomes and who were less politically oriented towards the left than those residents in the latter. The title of the study's

accompanying book, "Gentrification and the Middle Classes", leaves little doubt over the author's thesis – here were social groups that were not only different from the non-urban middle class in terms of attitudes (despite North Defoe's more radical political views, both areas were still more radical by middle class standards generally), but also different from one another.

This was a theme elaborated on a decade later, this time with a more comprehensive selection of six London neighbourhoods, in Butler and Robson (2003). The interplay between cultural and economic capital is even more apparent with this wider selection. Standing out from the rest is an example of new-build gentrification, Docklands, where economic capital was paramount in buying into an image created by marketing which focussed on convenience (close to the city, particularly the financial district) and natural amenity (the riverfront). The lack of a need to build a neighbourhood socially, and therefore little social obligation to the area, was emphasised by residents as a positive factor, in contrast to the other five study areas, which the authors classified as gentrification by collective social action. In these neighbourhoods social and cultural capital were more important, but in Barnsbury in particular this was mediated by the use of economic capital. Barnsbury was singled out by Less et al. (2008) as an example of super-gentrification, and Butler and Robson confirm this impression. New residents were moving into an already gentrified area, the formation of which had been based on some degree of social integration. While they claimed to be attracted by this aspect the reality of their actions was somewhat different, for example when it came to sending their children to private schools outside the area. These two neighbourhoods thus represent two different gentrification processes in which economic capital reigns over cultural, the former as a readymade middle class urban landscape created by developers, skipping the pioneer stage of gentrification in which cultural capital dominates, the latter in a middle class urban landscape *already* created by pioneer gentrifiers.

These studies illustrate the different trajectories that gentrifying neighbourhoods can take, depending upon a variety of contextual variables. The importance of context, it seems, cannot be overstated – there does not appear to be one, defining trajectory that all gentrifying neighbourhoods follow. The main characteristics of the gentrifiers will be contingent on this context, some of which can be difficult to pick up in a quantitative analysis – these studies use a combination of quantitative and qualitative methods. However, by looking at education levels as well as when and where economic capital has played an increasingly important role we can begin to understand the trajectories various neighbourhoods have taken.

2.4 Spatial manifestations of gentrification

> "As an economic line, the gentrification frontier is sharply perceived in the minds of developers active in a neighbourhood. From one block to the next, developers find themselves in very different economic worlds with very different prospects." (Smith 1996: 190)

In very few cases, if any at all, is gentrification a randomly targeted process whereby any suitably aesthetically pleasing heritage buildings or natural environment is targeted for takeover by the middle class. Interestingly, the background to Smith's contemplations here was a study of the Lower East Side in New York, the area immediately adjacent to the neighbourhood Hoover and Vernon (1959) had commented on decades earlier, Greenwich Village. This is no small coincidence, as Smith shows in mapping the 'gentrification frontier' (figure 2.1, below**)** how it has extended out temporally since the mid-1970s from higher-income areas, among which was Greenwich Village, acknowledged by Smith as an early site

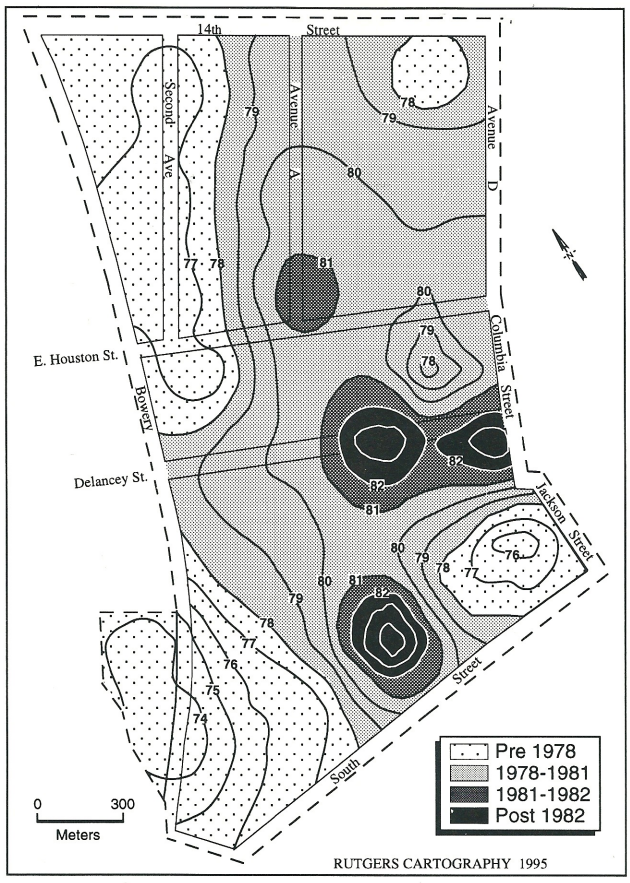

Figure 2.1: Mapping of the spread of gentrification, Lower East Side 1974 – 1986. (Smith 1996: 205).

of gentrification in the 1950s and 1960s. This is a pattern similar to that observed by Davidson and Lees (2005), mentioned above, captured by their notion of beachheads. Smith (1996: 205) maps the advancement of the frontier, taking the existence of a 'rent gap' as his starting point.

This is a concept that places emphasis on capital as an explanation of gentrification. Reinvestment in disinvested areas takes place when the gap between potential ground rent and capitalised ground rent becomes so great that renovation of a building or redevelopment of the lot becomes a rational choice for the owner. A key aspect of this theory becomes then the surrounding area – if this is totally devoid of investment then there is little potential ground rent to be capitalised on, as the area is scarcely attractive for any potential market for the capitalist. Therein lies the importance of the frontier, as when properties behind, or surrounding, the disinvested lots are being renovated or redeveloped, the capitalist's confidence in realising a profit by doing up his/her own property is increased.

In figure 2.1, the number of properties in property tax arrears of over three years is used as a variable. For each census tract the peak year is noted, as a decrease in this number was an indication of reinvestment (the owner decides to not risk having the property foreclosed because of being too far behind in property tax payments). Using this method the data could be analysed and an isotope map produced which showed how the frontier had advanced. The further apart the isotopes are, the quicker the pace of reinvestment, and therefore gentrification. Of particular interest are the areas in the east and southeast that experienced reinvestment later and at a slower rate than the rest. Smith points out that these areas were the poorest areas of Lower East Side, site of the most social housing in the area. This presented a significant barrier to gentrification, coupled with the noise and commercial activity of neighbouring Delaney St. So while gentrification in this instance is shown to be a reasonably organic process in terms of spreading to neighbouring areas, it is not necessarily an all-encompassing sweep over an area reaching out from the beachheads – the process can be slowed or perhaps halted by undesirable conditions.

Smith takes the flow of capital as a starting point, but attempts to map the spatial manifestation of gentrification have also focussed on the socioeconomic characteristics of neighbourhood residents. Ley (1996) uses census data to constitute an index consisting of occupational attributes (the proportion in quaternary occupations) and educational attainment to map gentrification in Canadian cities. He too finds evidence of a spatial trajectory that extends outwards from beachheads of higher-income areas. These 'targeted' areas are also strongly correlated with access to urban amenities: the physical appearance of a neighbourhood, entertainment and cultural facilities, parks and recreation, and the natural

environment. This is a phenomenon which he finds was prevalent during the 1970s, but much less so during the 1980s. The 1980s were highlighted, in Canada at least, by a much more sporadic pattern as "a broader range of inner-city neighbourhoods have become candidates for gentrification" (Ley 1996: 110), a pattern that Ley saw signs of continuation of throughout the 1990s. Meligrana and Skaburskis (2005) build on Ley's study (taking the period 1981-2001), but crosschecking their quantitative analysis with interviews of housing market analysts. Operating with a narrow definition of gentrification, confined to the upgrading of older housing stock, they confirm Ley's observations of an increasingly diffuse spatial pattern. However, the average distance from the city of the identified gentrifying tracts is still far less than other non-gentrifying tracts (4.6km compared with 12.5km), implying that access to urban amenities was still a key factor. A wider conceptualisation of gentrification may have produced different results however, as all neighbourhoods with a residential building stock built after 1946 were automatically ruled out as candidates for gentrification.

The increasing complexity identified by these two studies is not confined to Canada, as a trip back to Smith's Lower East Side and the follow-up research of Smith and DeFilippis (1999) demonstrates. Smith (1996) had been able to construct a relatively fluid map of the gentrification frontier in Lower East Side up until the early 1980s, due to the peak and subsequent decline in disinvestment across all census tracts – had each census tract experienced a series of peaks and troughs the frontier would have been indecipherable. Using the same method, Smith and DeFilippis (1999) show how when the recession began in 1987, hitting New York particularly hard, many tracts entered a period of disinvestment once again (corresponding with claims of the death of gentrification). However, by the late 1990s the third wave had hit the Lower East Side, in sync with a global and national economic upturn, as reinvestment became a feature once again. But the spatial patterns of disinvestment and reinvestment are not as smooth as they were in the 1970s and early 1980s, leading the authors to contemplate that Smith's (1996) analogy of the advancement of the 'frontier' no longer applies for third wave gentrification. There is rather a more complicated pattern in which pockets of disinvestment and reinvestment can be found behind the original line, rising and falling in relation to local, national and international economic swings. Capitalists don't see the virtue of trying to riskily capitalise on a rent gap when money is scarce, but will do so when the economy picks up, and this pattern of disinvestment and reinvestment affects some areas differently to others. This tendency highlights the importance of economic factors in gentrification processes, adding fuel to Smith's (1996) argument that capital is the driving force behind the process. Ley (1996), on the other hand, using socioeconomic indicators, was unable to find significant correlations during the 1980s that explained the presence of

gentrification in some neighbourhoods but not in others. Common to both though are observations, confirmed by Smith and DeFillipis, and Meligrana and Skaburskis, of the more diffuse nature of spatial patterns after the early 1980s.

Hedin et al. (2011) use income quartiles to map gentrification in three Swedish cities between 1986 and 2001 – Stockholm, Malmö and Gothenburg. They pay considerably more attention to macroeconomic factors than Ley, however, dividing their analysis into three periods reflecting boom and bust cycles, as well as theorising on the effects of the neoliberalization of Swedish housing policy. By taking this approach they found not only variations in the pace and intensity of gentrification during the different cycles, but variations between the three cities during the cycles. The study is notable for the quality of data they were able to analyse. Individual data of in-migrants (therefore controlling for general demographic changes) were grouped to 'neighbourhoods' of 100 meters by 100 meters, and were able to be tracked through time. This compares favourably to data available to North American and British researchers (for example Ley 1996, Wyly and Hammel 1999, Hamnett 2003, Walks and Maaranen 2008) using 10-yearly census data grouped into much larger areas and using the whole population for analysis.

Two distinct patterns could be identified. Firstly, super-gentrification was little affected by the recession. It increased continuously, though at the opposite end of the scale disinvestment led to declines in status of already low-income areas, a process of social filtering. Secondly, during the recession gentrification of low-income and middle-income areas declined mostly in Malmö, less in Gothenburg but not at all in Stockholm. The authors argue that this could indicate that recessionary cycles have more of a slow-down effect on gentrification in smaller cities. What is particularly notable though, particularly when comparing this study with Meligrana and Skaburskis (2005), are the patterns that can be observed when taking a wider definition of gentrification as a basis for analysis. They have taken the wider metropolitan area as a study area, thereby doing away with the premise that an urban location is necessary for the process to be called gentrification, as well as considering already high-income areas that have undergone a further social status upgrade (super-gentrification). If this approach was not taken the patterns of reinvestment during the recession, concentrated largely outside the inner city (most notably in Stockholm) and in already relatively affluent neighbourhoods, would not have been captured.

As a final point in relation to spatial patterns, it is worth pointing out that each neighbourhood in a city is a result of multiple processes at different levels that lead to uneven development, even on a very localised scale. To borrow a concept from the geography of labour can perhaps illustrate this most vividly. Massey (1979) takes a production-based

approach in arguing that regional or local spatial variations are a result of rounds of new investment, each one associated with a new form of spatial division of labour. Warde (1985) depicts this process as a *geological metaphor*. He states "successive rounds of accumulation deposit layers of industrial sediment in geographical space. That sediment comprises both plant and persons, the qualities of the latter, deposited in one round, being a primary importance at the beginning of the next round" (Warde 1985: 197).

Applying this to a gentrification framework, it is particularly the transition from manufacturing to service based industry in western cities that is of relevance. The growth of the service industry takes place in cities where there is already a morphological imprint left by manufacture-based industry, not just in terms of disused industrial sites but also the housing stock, predominantly affordable housing for the working class. The 'wave' of gentrification leaves its own mark on the city's morphology, washing against the 'sediment' left by the previous epoch and tweaking it to the consumer preferences of the new residents.

However, Warde warns against seeing emerging patterns and spatial differentiation in purely economically deterministic terms, extending the geological metaphor to include human agency to a greater degree. Political processes as well as economic processes, on a global, national, metropolitan and local level, contribute toward forming specific neighbourhoods, as do autonomous spatial effects that can be attributed to local culture or community. This implies that gentrification processes can play out differently in different local contexts, not necessarily having to be an inevitable outcome. The result of this can become a mosaic of urban development rather than a pattern of homogeneity.

2.5 Socioeconomic polarisation as an outcome of gentrification

The patterns observed by Hedin et al. (2011) are illustrative of another spatial outcome that has been a topic of gentrification research, social polarisation. Social polarisation happens when the socioeconomic structure develops in such a way that the middle groups are thinned out, leading to a greater concentration in the upper and lower groups. The structure goes from a roughly egg-shaped distribution to an hourglass-shaped distribution (Anderson 2005). This should be distinguished from increased inequality, where income becomes distributed more unevenly, for example when a few rich people at the top of the ladder earn a greater share of total income. Instead of two distinct groups forming at each pole, as is the case with polarisation, a number of subgroups may form with unequal access to resources (Walks and Maaranen 2005).

Polarisation manifests itself spatially when there are an increasing amount of neighbourhoods at each end of the spectrum, either as a result of increased or decreased wealth for the original residents, or as a result of people moving in and out of the neighbourhood (Hedin et al. 2011). If this is the case then increased segregation between income groups can result, as each group ends up living in areas with a population more like themselves. Thus there may not only be a social polarisation taking place among the general population, but also a geographical polarisation as greater proportions of the population live in respectively rich and poor neighbourhoods.

A key question has been whether policies of 'social mix' adopted by local and national governments, focussed almost exclusively on encouraging more affluent residents to low-income areas, have in fact led to a dissolution of geographic (and subsequently social) boundaries between low-income and high-income residents (Lees et al. 2008). The answer can often depend largely on the level of analysis. Hamnett (2003) observes that:

> "as the middle classes have pushed out in hitherto working class areas, the gross segregation between the working class Inner London boroughs and the middle class areas has been reduced. But, simultaneously, there is now arguably an increased micro-scale segregation, sometimes on opposite sides of the street, between relatively well-off middle class owners living in renovated or converted period houses and low-skilled, low-income council tenants." (Hamnett 2003: 13)

This can be difficult to pick up in analyses using available data – indeed, Hamnett himself fluctuates between ward level, primarily to map social deprivation, and borough level, to map the professionalization of the workforce. Across nearly all boroughs there was an increase in professionals and managers during the 1980s, *including* those that consisted mainly of some of London's most deprived wards. This would hint at the possibility of geographic polarisation on a smaller scale, but little attempt is made to investigate this possible tendency further – the purpose of the analysis was to look at polarisation on a citywide level. In a neighbourhood with such stark contrasts as Hamnett describes, it may be the case that the poorer areas are becoming poorer as residents who have the resources to move out do so, leaving the remainder in a weaker position to withstand gentrification encroaching.

Walks and Maaranen (2008) make a more rigorous effort to analyse polarized socioeconomic structures in gentrified tracts in Toronto, Montreal and Vancouver at the census tract level. They look at polarization *within* tracts rather than *between* tracts, so their analysis does not necessarily investigate *geographic* polarization. Dividing the tracts into

four groups defined by fixed breaks, a dominant trend among gentrifying tracts was a decrease in the proportion of residents in the bottom two categories and an increase in the top two. The longer a tract had been gentrifying, the more weighted towards the top end it tended to be, in contrast to non-gentrifying tracts in which the bottom group had increased on average. The authors suggest "gentrification may actually shift some polarizing tendency to other neighbourhoods, as the latter begin to concentrate poor and disadvantaged populations that previously had been housed in the inner city" (Walks and Maaranen 2008: 320). This is a tendency that finds support in Hedin et al.'s (2011) study, exemplified by the increased social filtering of already low-income areas on the outskirts of the city, rather than in the centre.

It is worth contemplating what this means when relating it to the 'social mix' argument championed by pro-gentrification local politicians referred to previously. Walks and Maaranen do show that the socioeconomic structure diversifies slightly in the first phases of gentrification, but this diversification is only a temporary condition. The earlier a neighbourhood has gentrified, the more top-heavy the structure has become across all three cities in the Canadian context. It is therefore difficult to argue that this evidence supports a social mix policy, when the process appears to just be pushing lower status groups into other areas, creating a new geographical pattern of polarisation.

2.6 Relevance of perspectives to the conceptual validity of this study

Firstly, a clarification of the definition of gentrification that will be adopted in this thesis is in order. To limit gentrification to the classic form, the renovation of old houses, limits the effects of the middle class takeover to a few select areas in Oslo, when the transformation of the Inner East seems to have been much broader in scope. In line with Clark (2005), it is this class transformation of an area that I believe to be the essence of gentrification, rather than simply 'classical gentrification', the renovation of old housing stock. I will therefore take any social upgrade of an area as being an indicator of gentrification, whether it is from a low-income area to a middle-income area or from an area already with a relatively high status to an even higher status, 'super-gentrification'.

In taking the Inner East as a study area it would seem I am confining gentrification to an urban phenomenon, in contrast to Hedin et al.'s (2011) much wider conceptualization. This is not my intention – indeed, Hansen and Brattbakk (2005) find clear signs of gentrification in some of Oslo's outlying housing estates, and a further analysis of the metropolitan area as a whole would also prove to be a worthwhile study. Meanwhile the Inner East is the area that has received the most attention of researchers and seems the area in

Oslo that has gone through the most major changes in the past two decades. This is the reason this area is chosen as the study area. A compromise is made by operating with a wider demarcation of the Inner East than has traditionally been the case, which will be discussed in chapter 4.

The thesis is first and foremost a spatial analysis. This method can obscure some nuances in the data and the process as it plays out. For example, it will not be possible from the data to ascertain whether marginal gentrifiers have played a part in the process, or whether it's a certain type of person that is attracted to different areas, aside from some inferences made regarding different patterns in education and income levels (though, as discussed in chapter 4, this too can be difficult given the crudeness of the indicators). It is also not possible to say with certainty whether displacement is taking place. Nevertheless, these perspectives will be discussed as possible explanations of trends in the data, and can form the basis for further study. What the analysis will be able to show, however, is the spatial manifestation of the process as it has taken place. These patterns will be related to trends picked up in the studies mentioned above. They will also be discussed in light of Hackworth and Smith's wave model, determining how relevant this model is for the Inner East experience of gentrification. The next chapter discusses the context for the study, at the end of which it will be discussed how the Inner East can be related to the theory outlined in this chapter.

Lastly, the studies outlined concerning gentrification and polarisation use data that differs from the data available in this study. Therefore a straight out 'test' of their findings in relation to Oslo cannot be done in this instance. The issue is a crucial one though when thought of in terms of public policy, considering creating a social mix has been used to justify pro-gentrification policy in the past. Therefore other methods used for determining socioeconomic polarisation generally (but not in relation to gentrification) will be used to see if similar trends can be picked up, which will be discussed in chapter 4.

3. The making of the Inner East

When considering the social and physical characteristics of the Inner East at the beginning of the 1990s, and how they came to be how they were, there are particularly two aspects of its historical context that are important to take into account. The physical (here referring to the built environment rather than the natural environment) and the social are of course inextricably entwined, with the historical development of Oslo socially leaving its mark on its morphology, both in relation to the placement of industry and the provision of housing.

Firstly, Oslo has long been noted for its social division between east and west, in which the former developed into the poorer neighbour of the latter. The Aker River has served as a rough dividing line between the two, though should not be taken as the absolute defining border. Secondly, just as there can be variation along this 'border', there is considerable variation within the Inner East as well. The built environment can be described more as a patchwork of different periods and styles rather than the product of a grand plan. A walk from Kampen down to Grønland highlights this variation, from the preserved wooden houses interspersed with brick apartment housing of Kampen, through the modernist architecture of Tøyen centre and Enerhaugen, past old industrial sites and housing on Tøyengata and finally on to the newer apartment complexes flanking Teaterplassen. Each of these areas are features of a certain time and social context in the Inner East's history, and have at various times housed different groups of residents. It is particularly this variation that can be interesting in a gentrification perspective, as different styles of housing can be attractive to the middle class in-migrants.

The rest of the chapter will summarise these two aspects, the social and the physical, both from a historical perspective and in relation to more recent research on changes that are taking place with all the hallmarks of gentrification. Each borough will be summarised individually, both descriptively and with a table showing aspects of the residential built environment using data from the 2001 census. This will provide an academic platform for further analysis of the process and how it has manifested itself in the Inner East. Figure 3.1 provides an overview of census tracts that will form the basis for analysis – tracts which never reach more than 30 people in the 30-39 age group are taken out, plus all tracts which are predominantly parkland and thus are shaded green and will not form part of the analysis for the same reason. This map, made large enough in order to be able to clearly label all census tracts, should be used as a reference throughout this chapter and chapter 5.

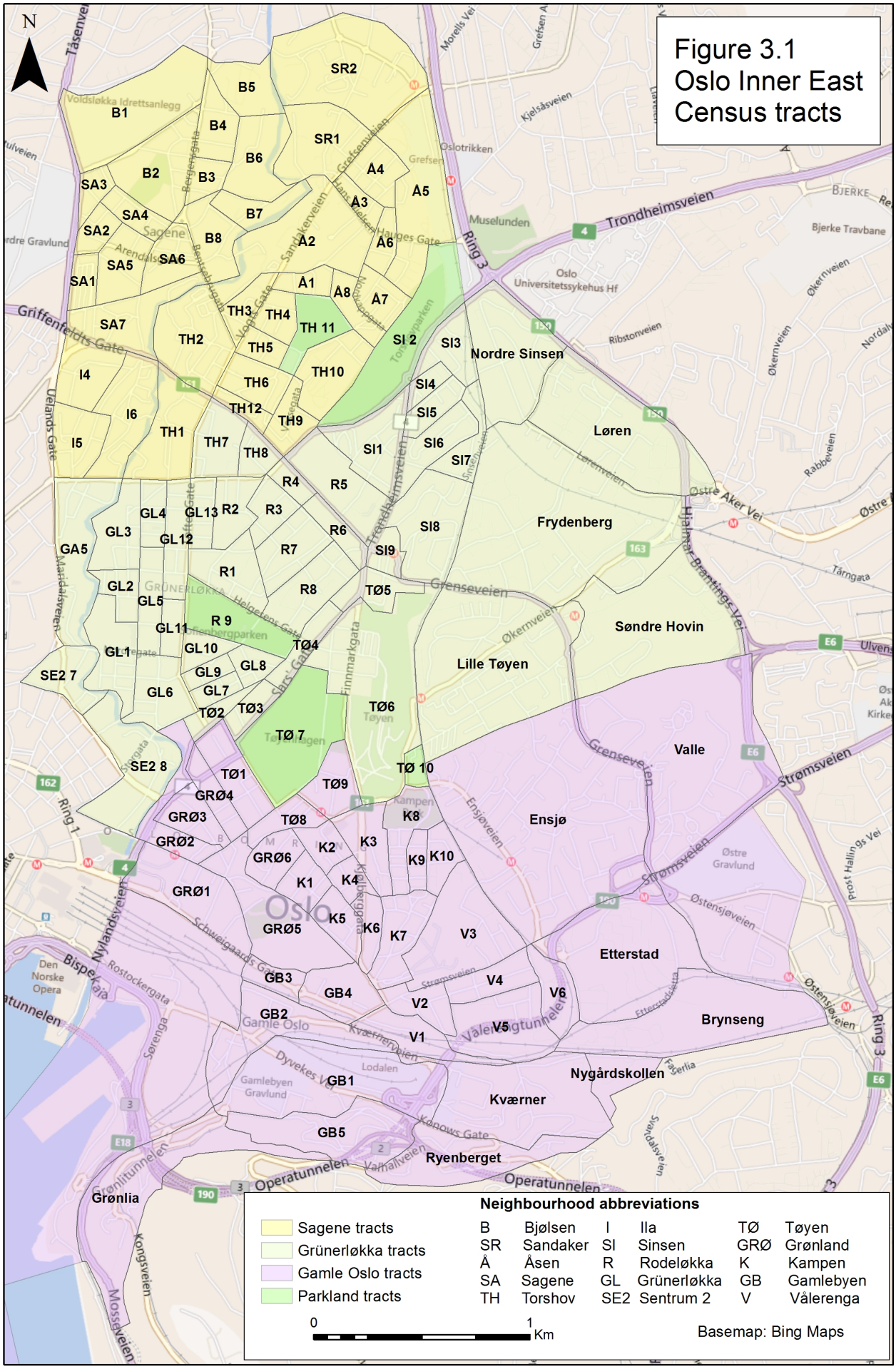
Figure 3.1
Oslo Inner East
Census tracts
N
B1
B2
B3
B4
B5
B6
B7
B8
SR1
SR2
SA1
SA2
SA3
SA4
SA5
SA6
A1
A2
A3
A4
A5
A6
A7
A8
TH1
TH2
TH3
TH4
TH5
TH6
TH7
TH8
TH9
TH10
TH 11
TH12
I4
I5
I6
SI 2
SI3
SI4
SI5
SI6
SI7
SI8
SI9
Nordre Sinsen
Løren
Frydenberg
R1
R2
R3
R4
R5
R6
R7
R8
R 9
GL1
GL2
GL3
GL4
GL5
GL6
GL7
GL8
GL9
GL10
GL11
GL12
GL13
GA5
SE2 7
SE2 8
TØ1
TØ2
TØ3
TØ4
TØ5
TØ6
TØ 7
TØ 10
TØ8
TØ9
Lille Tøyen
Søndre Hovin
Valle
Ensjø
GRØ1
GRØ2
GRØ3
GRØ4
GRØ5
GRØ6
K1
K2
K3
K4
K5
K6
K7
K8
K9
K10
V1
V2
V3
V4
V5
V6
Etterstad
Brynseng
Nygårdskollen
Kværner
Ryenberget
GB1
GB2
GB3
GB4
GB5
Grønlia
Oslo
Gamle Oslo
Grünerløkka
Tøyen
Kampen
Lodalen
Gamlebyen
Østre Gravlund
Trondheimsveien
Ring 3
Ring 1
Grensevegen
Strømsveien
Østensjøveien
Operatunnelen
Vålerengtunnelen
Nylandsveien
Griffenfeldts Gate
Grefsenveien
Sandakerveien
Hjalmar Brantings Vei
Østre Aker Vei
Økernveien
Finnmarkgata
Schweigaards Gate
Dyvekes Vei
Kongsveien
Mossveien
Neighbourhood abbreviations
Sagene tracts
Grünerløkka tracts
Gamle Oslo tracts
Parkland tracts
B Bjølsen
SR Sandaker
Å Åsen
SA Sagene
TH Torshov
I Ila
SI Sinsen
R Rodeløkka
GL Grünerløkka
SE2 Sentrum 2
TØ Tøyen
GRØ Grønland
K Kampen
GB Gamlebyen
V Vålerenga
0
1
Km
Basemap: Bing Maps

3.1 The divided city

Socioeconomic divisions in Oslo are not a recent phenomenon. The years following the 1850s were notable for an emptying out of the centre by the bourgeoisie towards the west, reinforcing a social divide that had begun to emerge. Kjeldstadli and Myhre (1995) point to various mechanisms that combined to divide the city. Oslo was also experiencing rapid commercial growth at this time, which forced prices in the centre to become so high that they became out of reach of most families. The city thus became a more strictly commercial heart, which in turn created more noise and pollution, making it an unattractive place to live even for those that could afford it. The west of the city, bordered by idyllic forestland (*bymarka*), became a sanctuary for the bourgeoisie. Gradually summerhouses were converted into permanent residences, while the placement of the new royal palace west of the city centre did no harm to the area's reputation. This pattern was reinforced by town planning that forbade industrial enterprise in many western areas, plus a tendency for people to seek neighbours of a similar status to themselves.

Meanwhile, east of the centre became the domain of working class residents. According to Kjeldstadli and Myhre (1995) this can be attributed to settlement patterns that were already taking place before the rise of industry, owing mainly to the fact that most new residents to the city came from the northeast, east and southeast. They came along the main arterial routes of Trondheimsveien, Strømsveien and Enebakkveien, settling down in suburbs such as Rodeløkka, Ekeberg and Vålerenga that were extensions of the older neighbourhoods on the city limits. When industrialization came to be prominent around Akerselva it acted as reinforcement for this pattern rather than an instigator, as workers settled close to their places of work.

Over 100 years after the seeds of social division were sown, Hagen et al. (1994) still found considerable differences between East and West Oslo, after a period of steady post-war deindustrialisation. Playing down the role of increased social differentiation nationally (a larger gap between rich and poor in Norwegian society generally), they speculate that "social inequality within Oslo has increased, not necessarily because of greater social differences between individuals, but because different sections of the population are restricted in where they settle as a result of their resources" (Hagen et al. 1994: 297, my translation). They found that living conditions were worst for residents of the Inner East, prompting a call for social policy that enabled a more mixed residential composition. The timing of this claim is interesting – as will be discussed below gentrification processes had already been shown to be

underway ten years earlier. Indeed, Wessel (2000) found that by 1993 the Inner East had caught up considerably with the Inner West on a number of socioeconomic indicators.

Bråthen et al. (2007) report big differences in average income between East and West, particularly when capital income is included in the analysis. A reinforcing factor they point to was the significantly lower economic resources of non-western immigrants, a group that had become increasingly present in the Inner East. This was not an even spread, with certain tracts proving far more attractive to immigrants than others. By 1998, Blom (2002) could identify a continuous area of fourteen tracts in Gamle Oslo as being a concentrated immigrant area, with particularly the tracts west of Tøyen Park displaying high concentrations of over 50 per cent (figure 5.1, Blom 2002). The overall figures appeared to be stabilising however in the succeeding three years. While the data used in this thesis does not cover the ethnic composition of residents, the findings by Blom suggest that the manifestation of gentrification may not be an even process, should these trends correspond to indicators of socioeconomic status.

3.2 Signs of change

The large socioeconomic differences between the Inner East and the rest of Oslo led to a comprehensive urban renewal programme that gained full momentum in the 1980s. Despite it being a goal to improve living conditions for residents in the area, the renewal also had the effect of attracting higher status socioeconomic groups to the area. This encouragement of a social mix was something that was a stated goal of the Oslo city council (Wessel 1983). At the same time housing policy was undergoing dramatic changes in Norway, with a law change in 1983 that made it easier to convert rental apartments into condominiums (eierleiligheter) having a particularly big impact on inner-city property markets.

Even before this new law had taken effect, Wessel (1983) pointed to signs of the first stages of gentrification in the Inner East in a study that surveyed residents, in-migrants and out-migrants of apartment buildings affected by the renewal. It was found that in-migrants were on average younger and with a higher socioeconomic status than out-migrants and the remaining residential population, particularly in those areas that had received most funding to that point. This trend was reinforced by the conversion of rental apartments to owner-occupied condominiums, a process that gained momentum after the new law of 1983. Pre-1980s the condominium market had been almost non-existent in the Inner East, but its blossoming in the 1980s added a whole new aspect to a residential structure that was becoming increasingly market-based. Wessel (1996) found that it was mainly young renters,

many of whom sold within the next four years for a large profit, who exercised the right-to-buy at a price well below market value. The average income of the in-migrants (those who bought after ownership form had been converted) was well over that of existing residents, the average age well under, adding further impetus to the trends picked up in the original study. However, the target of the initial renewal projects were not targeted evenly to those areas that were in greatest need of improvement. Between 1977 and 1982 Grønland, Vålerenga and Gamlebyen were under-financed considering that the worst living conditions in the Inner East were found here. Instead, Kampen, Bjølsen and particularly Grünerløkka were targeted, areas with slightly better prerequisites for a successful renewal (Wessel 1983).

A new round of area-based programmes was instigated in the 1990s, the most comprehensive of which was the Oslo Inner East Action Programme (Handlingsprogram Oslo indre øst) spanning from 1997 to 2006. This time policies directed at children were prioritised, particularly in the earlier stages, with the goals of both improving the childhood environment for those already in the area and attracting more families to the area. Emphasis was also placed on improving the quality of public areas, such as along the Aker River and in parks. Barstad et al. (2007) point out that although gentrification was clearly discussed among those developing the program, policies were never put in place that actively addressed gentrification and assisted people in remaining in the area when rising prices on the housing marketing may have made it difficult to stay. Residential mobility among young adults (15-35 years) is higher than other areas in Oslo, and on the increase. In other words, the Inner East is more of a transitory area for young adults in a life phase between finishing education and raising a family. When starting to raise a family, the most economically viable option thus becomes to move out of gentrifying areas.

Confirming the trends that Wessel (1983) first picked up on, the in-migrants are contributing to a decreasing gap in higher-education levels with Oslo West. Coupled with this pattern, and contrary to the goals of the area-based policies, it does not appear that families with small children are increasingly attracted to the area, or that those that live there display an increasing tendency to stay (Havnen 2006). Picking up on this, Sæter and Ruud (2005), in a study of gentrification in Gamle Oslo, draw attention to the increased inclination for politicians to leave housing issues to the domain of the private market. Despite a desire to attract families to the area, private developers consider smaller apartments marketed at a young, urban clientele far easier to sell. They more often than not eventually get their way. The tendency for politicians to facilitate for private developers, rather than imposing building requirements, is characteristic of the 'third wave' of gentrification discussed in the previous chapter.

Research has shown that the socioeconomic structure of the Inner East has become increasingly differentiated. Wessel (2000) points to an increased proportion of service workers and stable figures for people with low education, leading to the area becoming increasingly socioeconomically polarised as higher status residents moved in to the area at the same time. Barstad et al. (2007) also draw attention to the increasing residential differentiation in the Inner East. An increasing influx of young ethnic Norwegians is contrasted by increasing numbers of non-western immigrants requiring long-term social welfare support, together with an increased concentration of the worst-off residents in the remaining council-housing (the pool of which has been significantly reduced in recent years, though still high when compared with the rest of Oslo). Politicians have been resolute in their commitment to equalizing socioeconomic differences through encouraging a 'social mix' of residents, but Sæter and Ruud (2005) argue that this has been achieved not by raising the living standards of the worst-off residents, but rather through replacement of the worst-off by in-migrants with a higher socioeconomic status. The affluence of the in-migrants does not ´trickle down' to those with a lower status, and the two groups lead largely segregated lives both in terms of where they live and their consumer preferences.

With the exception of Blom (2002), the aforementioned studies take a holistic approach in analysing the Inner East, picking up on general patterns over the entire area or at the borough level. Remaining to be done is a comprehensive analysis at census tract level, the intention of this study. In order to gain a better background understanding of the different areas and tracts, a brief summary of important characteristics of each borough will now be presented.

3.3 Inner East and the built environment

As discussed in Chapter 2, the built environment and character of an area can be important when considering the process of gentrification. Gentrifiers can be attracted to some neighbourhoods more than others depending upon the quality and form of housing, neighbouring buildings and natural amenities such as parks. With this in mind it can be fruitful to provide a general contextual background for each of the boroughs, with particular emphasis on why each one's physical residential environment displays some of the characteristics it does today. While the space is not available to review each census tract, an attempt will be made to outline some of the main aspects for each borough, with reference to figure 3.1 and the corresponding tract numbers. Where applicable, census tracts are referred to either in the text or in brackets.

3.3.1 Gamle Oslo

Gamlebyen: An interesting starting point in an overview of Gamle Oslo is the suburb of Gamlebyen (*Old Town*), situated where settlement was focussed in the middle ages before the 1624 fire led to a re-centring of the city to the west. Kjeldstadli and Myhre (1995:180) note that at the turn of last century the area was notable for a wealthier composition of residents relative to the rest of East Oslo. New construction immediately before the housing market crash of 1899 was predominantly two-room and three-room apartments, contrasting with the more standard one-room apartments that were a feature of the rest of the Inner East, and thus attracting a wealthier residential base (Gamlebyen 3,4). These buildings are still a feature of the landscape today. The area became less and less attractive for the middle class over the course of the 20th century as the area became one of Norway's busiest areas for traffic, the E6 cutting through it, and there was an accompanying deterioration in much of the housing stock. This problem began to be remedied in 1989 with the opening of the Vålerenga tunnel, though this effectively only moved traffic from St Halvards Gate to Dyvekes Vei/Konows Gate (from Gamlebyen 2 to Gamlebyen 1 and 5). These areas were, however, freed up from traffic with the opening of the Ekeberg tunnel in 1995, with a third tunnel in 2000, the Svartdal tunnel, taking traffic away from Ryen and Ekeberg (Ryenberget and Grønlia respectively). These improvements led to strong satisfaction among residents and a flurry of rehabilitation and residential construction in the area (Kolbenstvedt and Fyhri 2004), an important development in a gentrification perspective. It may be that the middle class are on the way back to reclaiming the area, a trend that could be expected to show up in the following analysis.

Wooden house tracts: The city (then Christiania) experienced rapid population growth in the last half of the 19th century, and the interplay between this, the definition of the city limits (revised in 1859 and 1878) and the banning of building in wood inside these limits set its mark on the built environment. Grønland and the lower part of Tøyen were incorporated into the city in 1859. Up to this time houses had been built predominantly in wood, but in the years after 1859 a desire to densify meant many of these buildings were demolished to make way for brick tenement housing (Aslaksby 1998). Meanwhile, outside the city limits neighbourhoods built in wood sprang up on this subdivided land – Enerhaugen, Kampen and Vålerenga.

Enerhaugen (Grønland 6) acquired a reputation early as an area with substandard living conditions, a reputation that lingered through to the next century and culminated in a full-scale demolition and rebuilding process between 1960 and 1965. The modernist apartment towers today are a feature of the Inner East skyline, with none of the former wooden houses remaining, and have gained a reputation as popular with a more urban middle

class residential crowd (Sæter and Ruud 2005). Demolition wasn't a fate that Kampen and Vålerenga met however, as a public backlash to this policy led an effort to *preserve* wooden housing rather than demolish it. Thus these latter areas exhibit traits of 'classic gentrification', the rehabilitation of old housing stock. Its quaint heritage character sits comfortably with perceptions of the 'gentrification aesthetic' as discussed in the previous chapter. Pløger (1995) identified Kampen early as the domain of 'pioneers' high in cultural capital, predominantly architects and academics. Various developments have resulted in an Upper Kampen today that is not exclusively wooden housing – a large fire in 1879 led to stricter building regulations, the site of the Christiania Steelworks was replaced by brick apartment blocks in the 1930s, and some of the earlier wooden houses at Brinken were replaced by newer houses in the 1980s (Oslo byleksikon 2010) – but they give the elevated suburb a certain character which distinguishes it from Tøyen, Enerhaugen and Grønland below it. The wooden housing is scattered through the Kampen tracts 7 to 10, with the highest concentration in 7.

Vålerenga today is also a mix of the old wooden houses built before the area was incorporated into the city in the 1878 extension of the city limits and subsequent development. The wooden houses, concentrated largely in tracts 4 and 5, first faced the threat of demolition in 1929, and it wasn't until the late 1980s/1990s that a concerted effort was made to rehabilitate them. Vålerenga also faced traffic problems similar to neighbouring Gamlebyen as the automobile took centre stage, with the rehabilitation of housing coinciding with the opening of the Vålerenga tunnel alleviating the pressure from traffic somewhat (Oslo byleksikon 2010). Strømsveien was closed to thru-traffic in 1992, and as with in Gamlebyen and Ryen/Ekeberg residents were positive to the move, as well as increasing its attractiveness to middle class in-migrants (Kolbenstvedt and Fyrhi 2004).

Tøyen/Grønland: Moving back to the Tøyen/Grønland area, Kjeldstadli (1994) points out that with the establishing of the green lungs of Tøyen Park and the Botanical Gardens in the late 19th century it was felt that the middle class would also be attracted to the area. This was reflected in some of the housing that was constructed. For example, Aslaksby (1998) writes that L.S. Platou (owner of Ladegård estate) wanted to avoid another Enerhaugen when he insisted on higher quality buildings on the land he was selling off (Grønland 5), a requirement he later relaxed. But as industry became more prominent and wealthier residents moved out west it became more and more working class. From a gentrification perspective the original intentions of creating a social mix is an interesting feature of the area – a century later gentrifiers throughout western cities were being attracted to areas with 'green lungs' and

housing which in many cities had originally been occupied by the middle class, a process Smith (1996) labels as revanchist – the taking back of lost land.

An example of housing earmarked specifically for the working class were the thirteen redbrick tenements developed by Ole Olsen, completed in 1894, consisting of one-room apartments, flanking the western side of Tøyen Park and the Botanical Gardens, Tøyen tracts 1 and 3 (Oslo byleksikon 2010). These tenements (known locally as 'gråbeingårdene') gained a reputation for inferior living conditions, leading to stigmatisation of residents both in the playground and the labour market (Kjeldstadli 1990), and were a target of the urban renewal programme in the early 1980s. Some of these residences are on Tøyengata, a street which was selected by Huse (2010) for her study of gentrification in the area, an area she identifies as having firstly gone through a transition from working class to a centre of immigrant life, and which is now being gentrified. Another area that got a complete revamp around this time in conjunction with the renewal program was Grønlands torg (Grønland 1), which was totally developed into new apartment complexes completed in 1990 (Oslo byleksikon 2010).

New tracts: Gamle Oslo today cannot thus be defined as characteristic of any one period. Though much still remains from the latter years of the 19th century it has been joined by various developments since that time producing a patchwork of styles. This characteristic was enhanced further with the redrawing of borough borders in 2004, adding tracts that have not been traditionally thought of as 'Inner East'. The tracts of Brynseng and Ensjø were added, which were predominantly industrial but are gradually being developed residentially. Also added were Valle and Etterstad, two areas that saw residential development post-1930 in the form of large building projects, in line with suburban developments further east (Oslo byleksikon 2010). As one travels northwards in the study area to the borough of Grünerløkka it can be argued that a more consistent landscape emerges.

Year of construction	1900 or before	1901-1920	1921-1945	1946-1960	1961-1970	1971-1980	1981-1990	1991-2001	Total
Total dwellings	4918	1017	3856	2198	492	807	2899	3702	19 889
Percentage	24.7	5.1	19.4	11.1	2.5	4.1	14.6	18.6	100
Number of rooms	1	2	3	4	5	6+			
Total dwellings	3115	7372	6168	2411	639	184			19 889
Percentage	15.7	37.1	31	12.1	3.2	1			100

Table 3.1 Residential housing structure, Gamle Oslo. Source: Census 2001 (in Oslo kommune 2004)

3.3.2 Grünerløkka

The defining of the city limits played a role in the early development of this area as well. Before it was incorporated into the city in 1859 people were quick to build as much as possible in wood, so much so that the area became known as a local version of New York, a reference to the speed in which buildings were built (Bull 1984). Few of the wooden houses are left standing in the original area in what is now the lower part of Grünerløkka however. The architecture came to be dominated by the period after 1859 up to the turn of the century, consisting of three and four story tenement housing around central courtyards.

Myhre (1990) singles Grünerløkka out as an early example of regulated planning that was lacking in the rest of the city, as Thorvald Meyer developed a neighbourhood that was characterised by a grid network of relatively open roads centred round a series of parks. At the same time industry played a major role in the area, so it was natural that a lot of these residences were built for industry workers. As indicated in the first chapter, the area is known among Oslo residents as having gone a class transformation since the 1980s, but this hasn't been as stark in the lower Grünnerløkka tracts as in the upper tracts. The difference between these two areas is focussed on by Børrud (2005) in a gentrification perspective. In a study of the commercial uses of the area between 2001 and 2004 she finds a far greater tendency towards gentrification in the upper part than the lower, with a high proliferation of coffee bars and restaurants. This is a pattern she links to the generally higher standards that Meyer had ensured in his development of this area a century before, regarding both the quality of residences and the surrounding physical environment. Gentrifiers had first been attracted to this area because of those qualities – although gentrification had seemed to slow during the early 1990s the process had made a comeback, in the area that had shown the strongest signs during the first phase. She argues that although Lower Grünerløkka and Tøyen-Grønland were not exhibiting as many traits of gentrification at that time, a general disinvestment in the area meant that there was considerable potential for the process to take hold in succeeding years.

As with the construction in Tøyen and Grønland from the same time period, small apartments were the norm, something that has been partially addressed by the renewal programs of the 1970s and 1980s, as many were combined to make larger ones (Benum 1994). Deindustrialising in the latter half of last century has meant that the area is littered with old industrial buildings that are no longer in use for their original purpose, such as Schous Brewery (now a cultural centre and office spaces) and the Christiania Seildugsfabrikk (canvas factory which now houses the School of Fine Arts), examples of the tendency of

gentrifying areas to convert old industrial buildings to residential, cultural or commercial uses.

The area has also seen a fair amount of new-build apartment housing in recent years. A complex that was singled out by Sæter and Ruud (2005) was Waldemars Hage, on the western bank of the Aker River (Gamle Aker 5). In this case the developers made no secret of the fact that they were marketing themselves to a young, urban clientele with financial capital. With its proximity to parkland and the river it can be considered an attractive location for gentrifiers.

An area in Grünerløkka borough that has retained its own special character is the wooden house tracts of Rodeløkka 7 and 8. As with Kampen and Vålerenga, Rodeløkka was situated just outside the city limits when they were extended in 1859 before being incorporated in 1878. And as was the case with the two former, houses were constructed with wood in taking advantage of the lack of regulation and cheaper building cost. The threat of demolition and redevelopment hung over Grünerløkka throughout the middle part of last century, and it was particularly a movement led by architecture students and intellectuals to preserve Rodeløkka that resulted in the threat being lifted (Benum 1994).

Flanking the eastern side of Grünerløkka are several development projects undertaken in the 1930s and 1940s by OBOS (Oslo Bolig og Sparelag) and other actors. These are notable for the uniform design of the apartment blocks, in line with modernist principles of functionality and efficiency as a housing shortage in Oslo was addressed. These include the housing projects between Tøyen and Carl Berners (Tøyen tracts 4, 5 and 6), around Carl Berners (Sinsen 8 and 9), along Chr. Michelsons gate at the top of Rodeløkka (Rodeløkka 4 and 5) and on up to Sinsen (tracts 1 to 7). These latter tracts were developed at the same time as 'Sinsenbyen' by the property entrepreneurs Brødrene Johnsen – in all 45 apartment blocks completed in 1939 (Oslo byleksikon 2010). Bull (1984) suggests that particularly the northern reaches of this development could be thought of nearly as a totally new city, though he points out that little in the way of communal facilities were planned and built. Again the emphasis was on smaller apartments for working class residents, but with electricity, running water and private bathrooms they were a considerable improvement for workers and their families moving there from other areas of the Inner East.

The Sinsen tracts were added into the borough of Grünerløkka's new administrative boundaries in 2004, along with the eastern tracts of Lille Tøyen, Søndre Hovin, Frydenberg, Løren and Nordre Sinsen. Similarly to Gamle Oslo's new eastern tracts, these tracts are a mix of industrial areas, new residential construction and older, planned suburban areas.

Year of construction	1900 or before	1901-1920	1921-1945	1946-1960	1961-1970	1971-1980	1981-1990	1991-2001	Total
Total dwellings	6862	985	6973	3206	683	911	1958	1345	22 923
Percentage	29.9	4.3	30.4	14	3	4	8.5	5.9	100
Number of rooms	1	2	3	4	5	6+			
Total dwellings	4473	8584	6665	2166	709	326			22923
Percentage	19.5	37.5	29.1	9.4	3.1	1.4			100

Table 3.2 Residential housing structure, Grünerløkka. Source: Census 2001 (in Oslo kommune 2004)

3.3.3 Sagene

North along the Aker River a community had been developing separately from Christiania during the 19th century. Until the middle of the century residents and workers in Sagene regarded their settlement as 'a village unto itself' (Myhre 1990), built around the sawmills that used the river for their operation. Just west of the river (highlighting the problematic aspect of taking the river as the east/west divide) along Sagveien and Maridalsveien housing was already established by the time the first large-scale industrial textile factory was ready for operation in 1845, but as with the other suburbs there was a flurry of wooden construction in the years up until 1859, when this area was also incorporated into the city limits (Ila 6). After incorporation the first brick tenements in the area joined these houses. Much of this area has been preserved today, largely as a result of the renewal program of the 1980s. Not only were the original buildings rehabilitated, but small wooden houses were also constructed that kept faithful to the character of these originals (Oslo byleksikon 2010). The industry is largely gone though, the industrial buildings having been converted mainly to office locales.

The area north of the original settlement extending up into Bjølsen was developed over the course of the 1890s (Myhre 1990). As with other parts of the city, the property market crash of 1899 meant that little construction took place in the area in the subsequent years, but a number of large-scale building projects beginning in the 1910s have left their mark on the area. Pockets of uniform apartment complexes built with social ideals in mind are a characteristic of the borough. The first major one of these was the privately funded Rivertzke complex of 1912 (although financial assistance was needed from Oslo municipality later), intended for the working class with an emphasis on improved light and air quality (Sagene 1). Oslo municipality was responsible for Torshovbyen (Torshov tracts 4,5,10 and 11, Åsen 1 and 8), built between 1917-1925 and inspired by English Garden City ideals, with Sandaker following a few years later, completed in 1930. The area of Bjølsen (tracts 5 and 6) between Maridalsveien and the river was developed in the years following this, with the rest

of Åsen also developed during this time period, between 1923 and 1932. The exception was Åsen 7, which was developed by OBOS in 1950-52, a feature being bigger apartments than was typical for the pre-WW2 complexes (Oslo Byleksikon 2010).

These projects were aimed at providing reasonably priced residences for the working class, and the borough has retained a reputation as a working class area into this century. Of the three boroughs in the study area Sagene is the one that gets least mention in the gentrification literature concerning Oslo, despite also being a target of the urban renewal programme of the 1970s and 1980s, as well as new-build projects from the 1990s onwards. When reviewing the international gentrification literature little mention is made of areas that can be likened to Sagene with its collection of housing projects extending out from the pre-20th century city core. Perhaps this is because of Oslo's relatively compact size and youthfulness compared to many European cities – similar housing projects would most likely be located further from the centre in a larger, older city, unlikely to attract the attention of gentrifiers who are after a central location. The ideals behind these projects, with an emphasis on green areas and a higher standard of housing than was the norm for the working class at that time, could potentially also be appealing to gentrifiers combined with the relatively central location. A large part of the housing stock is made up of small apartments though, as shown below. The borough also has the highest amount of council housing in Oslo (Boligbygg 2008), meaning the juxtaposition of gentrified housing and low status neighbourhoods described by Hamnett (2003) could be a reality also in this area.

Year of construction	1900 or before	1901-1920	1921-1945	1946-1960	1961-1970	1971-1980	1981-1990	1991-2001	Total
Total dwellings	1298	1583	8260	3309	1034	1145	791	1441	18 861
Percentage	24.7	5.1	19.4	11.1	2.5	4.1	14.6	18.6	100
Number of rooms	1	2	3	4	5	6+			
Total dwellings	4544	7520	4786	1478	385	148			18 861
Percentage	24.1	39.9	25.4	7.8	2	0.8			100

Table 3.3 Residential housing structure, Sagene. Source: Census 2001 (in Oslo kommune 2004)

3.4 Summary, relevance to international theory

The Inner East is a varied collection of neighbourhoods in which the contrasting built environments have been produced as a result of various social processes over the last 200 years: wooden housing on the outskirts of the original city limits, brick tenements mainly for industry workers, large-scale housing projects from the 1920s through to the 1960s to

provide affordable housing for the masses, and more modern apartments as the result of urban renewal programs and recent investment in the area.

An outline of gentrification theory was given in chapter 2, predominantly based on North American and London research. Temporal and spatial trajectories of the process determined as the result of this research should not, however, be applied unproblematically to the Oslo experience. While the phenomenon was being observed in the 1960s in the case of the former, the Inner East was still relatively industrialised at this stage. It was not until the Oslo city council embarked on a comprehensive urban renewal program in the late 1970s that the first signs began to appear. This was at the same time that a movement for preservation rather than demolition became prominent, but this was rather a result of collective social action rather than the more individual-based rehabilitation and subsequent capitalisation patterns of early gentrification in North America (Wessel 1996). New loan schemes made it possible for private actors to borrow money from Husbanken, a state institution for residential mortgages, for the rehabilitation of pre-1900 buildings with cultural-historical value (Wessel 1983). This differed markedly from pioneer gentrification in North America that was in areas where it was difficult or impossible to get private or public loans. Thus the initiation of the process in the Inner East can be characterised as one in which public policy laid an important material foundation.

Should we at all be talking about 'waves' of gentrification when we consider the process in Oslo? The process can be described as marginal throughout the 1980s, with only Grünerløkka steadily gaining a reputation as a neighbourhood in transformation, the area that had been targeted most by the urban renewal program. Not long after Wessel (1983) had found the first indications of socioeconomic changes in the area, by 1985 the Real Estate Board of New York was buying prime advertising space in the *New York Times* to defend gentrification to a sceptical public (Smith 1996). Barely a ripple in Oslo, yet justifiably labelled as a wave across the Atlantic. There were other pockets occurring in the Inner East, such as in Kampen and Rodeløkka, but this can better be described as early stages of sporadic gentrification, characteristic of the first wave in North America but not constituting a first wave in itself.

The much later and uneven start to gentrification processes means that there are most likely neighbourhoods in the Inner East that represent characteristics of each of the three waves in Hackworth and Smith's (2001) model. As discussed previously, the third wave has been described by Smith (2002) as being more global in nature. So while it may seem apparent that the Inner East has been included in this third wave, particularly when large-scale development has become a more prominent feature of the landscape (for

example Waldemers Hage), what is more likely is that the following analysis will also uncover uneven development in the last two decades that can still be likened to the first two waves. What has taken place in North America and London during the last fifty years has been condensed into a much shorter time period in the case of Oslo.

4. Data and Method

The aim of this chapter is to give an outline of the data used and the methods used to present it. The design of the thesis is a temporal GIS analysis of gentrification in Oslo's Inner East at the level of the census tract, after which the socioeconomic structure will be analysed for the area as a whole, with a focus on geographic polarisation and trends over time. This type of analysis has not been undertaken on this area before, and as such a number of possibilities present themselves in relation to operationalization and methodology. The choices made in this analysis will therefore be discussed in light of gentrification theory rather than any previous research on Oslo.

Reliability and validity will be discussed throughout the chapter in relation to various aspects of the research design, rather than constituting a separate section. *Reliability* will be discussed in relation to the quality of the data and its various strengths and weaknesses. *Validity* will be discussed in relation to how well the operationalization of the data measures what it sets out to measure, the spatial manifestation of gentrification.

The chapter is divided into three sections. In the first section the data and its sources will be presented, along with a discussion on how these are operationalized and made relevant to gentrification theory. Included in this section is a discussion of the advantages and disadvantages of using the census tract as a unit of analysis. Secondly, a Geographic Information System (GIS) as a choice of methodology will be presented and discussed, pointing out the weaknesses as well as the strengths of using it as a method of analysis. Hot spot analysis and measuring spatial autocorrelation are two tools that are used in the analysis, so their interpretation and the mathematics behind them will be presented. Thirdly, the methods used for analysing geographic polarisation in chapter 6 will form the final section of the chapter.

4.1 Data

The data that forms the main part of the analysis are individual data from the Statistics Central Bureau (Statistisk Sentralbyrå, SSB) in Norway, which have been processed to census tract level before being made available for to me for this analysis. The data was made available as part of the research project NODES (Nordic welfare states and the dynamics and effects of ethnic residential segregation), although this thesis has no affiliation with that project. The data is for the time period covering 1992 to 2008, and is registered for each year (education from 1992 and income from 1993). This time period was in accordance with the timeframe analysed in NODES, but it is also a time period in which the Inner East has experienced

change associated with gentrification according to previous research, as discussed in the previous chapter, and a more general local perception.

A large amount of previous research on gentrification has used census data (for example Ley 1996, Walks and Maarenen 2008, Davidson and Lees 2005), meaning that comparisons can only be made at ten-year intervals. This can hide nuances in the data; for example, if a tract has experienced a decline in socioeconomic status in the first five years but an increase in the last five, this may show up as little change at all. If a tract shows up as increasing as status over the ten year period this could mistakenly be taken for a process that has happened steadily, while the truth may be that a new-build development two years from the end of the period has led to the bulk of the change. The advantages of having data available for each year mean that general trends that may change midway through a census period can be isolated to the years in which they occur. As shall become clear in the analysis, this was particularly useful in breaking up the 1990s into distinct periods in the case of the Inner East. It was also advantageous in assessing the impact of large new-build developments in individual tracts, where substantial increases in the number of residents in a tract coincided with the year after completion of major developments. By looking at the change in socioeconomic status in these years it could be inferred whether this could be classified as new-build gentrification.

Another source of data that was used was an overview of residential buildings in the study area, which included the age and the type of building, obtained from the Planning and Building Office of the Oslo City Council (Plan- og bygningsetaten, Oslo kommune). This was with spatial coordinates, so it could be matched up with the various census tracts. Though this data is not shown in the maps that form the basis of the analysis, apart from the analysis of new-build gentrification, it is used throughout the discussion of these maps to give an indication of the building stock in tracts and areas of interest. A weakness was that total household units were not included in the data – buildings were registered as being detached, semi-detached, apartment buildings up to four stories or apartment buildings over five stories. Nevertheless, in areas where a conglomeration of buildings in the latter category were completed in the same year it is reasonably safe to assume that they would have a large impact on the surrounding tract, something which was usually clearly visible in the tract-level data.

In an analysis of gentrification, data concerning household tenure can be particularly relevant. Available was data from the 2001 census, from SSB, with the proportion of all households for each category of tenure per tract. It is only for one year, but one can assume that the data presented for that year only changes marginally each year. The fact that 2001 is

right in the middle of the study period means that it gives a reasonably good indication of tenure throughout the period.

4.1.1 Sample

For each year, a complete sample of residents from the age of 30 to 39 in the study area is analysed. The data was limited in the sense that it was not possible to distinguish between in-migrants and existing residents. Ideally, in a gentrification perspective, the characteristics of in-migrants are those that should be focussed upon – when analysing trends over time, is this group increasing in socioeconomic status? In the absence of this distinction, the choice of one age group can to a certain extent compensate. Over the course of ten years, this group is totally replaced by a new group of 30-39 year olds. By isolating the one age group, rather than taking the population as a whole, a better understanding is gained of how the socioeconomic structure is changing (or staying similar). If the whole population was used in the analysis, groups with the lowest socioeconomic status at the beginning of the period may remain in the area over the course of the entire period. In the total analysis this will moderate the effect of an influx of in-migrants with high socioeconomic status, perhaps undermining the effect gentrification is having on a tract.

The age group 30-39 is chosen because gentrification has been to a large degree led by young adults. The advantage in relation to reliability of taking this group rather than 20-29 is that most are finished with higher education by this age, and have had a chance to find jobs relevant to their degrees. With the data available it is impossible to distinguish between low-income earners and students. This means that it could seem like there is a disproportionate amount of low-income earners in the 20-29 age group, when in fact many of these would be students.

However, a threat to the analysis' validity could be that any trend towards high status 'empty nesters' (parents with children who have left home) or older divorcees moving into the area will not be picked up, for example. Another consideration should be given to whether this group forms a large part of the population in a tract. For example, if there is a large amount of old people in a tract the effect on a neighbourhood may not be substantial. However, all indications are that this group form an increasingly large proportion of the study area, justifying an analysis that only takes into account this particular age group. Comparison of statistics from 1992 with those from 2008 is made difficult by the redrawing of borough borders in 2004 and different age categorisations by Oslo kommune, but a rough indication of age distribution can be made; in 1992 34.9 per cent of the population of the three boroughs Sagene-Torshov, Grünerløkka-Sofienberg and Gamle Oslo were between 25 and 39 years old

(Oslo average 27.5 per cent) (Oslo kommune 1992); by 2008 the proportion of this age group in the Inner East as it is defined in this study was 45.1 per cent (Oslo average 29.5 per cent) (Oslo kommune 2008). Another advantage in relation to validity is that there is a generally high rate of moving activity among this group, meaning that income levels will be correlated to real estate price increases to a greater degree than other, less mobile age groups, and therefore gentrification.

By taking this age group an indication can be gauged of how the total population may evolve in forthcoming years. These residents will either stay in the area, with the likelihood that their socioeconomic status will either remain roughly the same or increase as they progress career-wise, or they will move out. In the case of the latter, if an area has seen an influx of high status residents this will most likely push real estate prices up in that area, meaning that they will have to be replaced by in-migrants who earn a similarly high income. For this reason also this method can perhaps give a better indication of gentrification processes than an analysis of the whole population, where those remaining from previous years will still be figured into the data. A disadvantage, however, can be that if there is any tendency towards displacement this may be difficult to pick up. If the 30-39 age group is increasing in size all the time, this could mean that all socioeconomic groups appear to be increasing – some more than others – even though low status groups in older age groups are diminishing.

4.1.2 Indicators of gentrification

Discussion over how to measure gentrification has been a subject of academic debate throughout the literature, and is central to the validity of an analysis. One argument holds that rises in rent and real estate prices are a better indicator of gentrification (though this is not totally synonymous with Smith's (1979) rent gap thesis, the operationalizing and measuring of which is notoriously difficult according to Smith (1996) himself). Another argument takes into account the changing demographics of a population, where it has particularly been higher education and occupation (Ley 1986) as well as income (Smith 1987, Hammel and Wyly 1996) that have proved favourable as indicators of gentrification. The purpose of this thesis is not to put one method and theoretical perspective up against the other. As discussed in chapter 2, gentrification research has moved passed this theoretical impasse and should concentrate on geographies of gentrification rather than causes (Lees 2000). The data made available for this analysis thus coheres with the latter method for measuring gentrification, though no ideological standpoint is claimed because of this.

Two variables were made available, income and education level. Income is represented as the percentage in each tract that was in each income quartile on an Oslo-wide basis. Therefore, if a tract were to be representative of Oslo generally, 25 per cent would be in each quartile. The annual net income of each individual is recorded, rather than the household income. This is all capital and self-employment income, wages and transfers after tax.

Education was broken down into four categories in relation to the highest completed level: unregistered, primary (grunnskole/ungdomsskole), secondary (videregående) and tertiary (universitet /høyskole). Included in the data was an overview of the Oslo average for each year and for each category, for the age group 30-39. Rates of higher education among this group in Oslo have increased continually over the study period – from 41.9 per cent of those with registered education in 1992 to 60.5 per cent in 2008. To give an indicator of levels of higher education relative to the rest of Oslo the percentages in each tract were converted to a localisation quotient. This is done by dividing the percentage in the tract by the Oslo average for that year. Thus a localisation quotient over 1 indicates that the proportion with tertiary education in a tract is over the Oslo average.

Most gentrification research has found that income and higher education are highly correlated, and have chosen to use one or the other as an indicator of gentrification processes. For example Ley (1986) uses education, whereas Hedin et al. (2011) use income, both after having tested for, and found, strong correlation between the two. This is the case with the Inner East also. In 1993 the correlation between higher education levels and proportion of residents earning above the Oslo median was $r = 0.61$; by 2008 this had risen to 0.78. But there are some nuances to be found, particularly in identifying areas which had low education levels yet high income levels at the beginning of the period. The analysis therefore takes into account both indicators, but more emphasis will be placed on income.

The main reason for placing more emphasis on income is two perceived weaknesses in regard to the education variable, the first concerning reliability and the second concerning validity. The first is the very high rate of unregistered education levels – this was 27.3 per cent per tract on average in 1992, rising to 32.1 per cent in 2008**.** It is likely that almost all who have taken a tertiary education in Norway are registered as such, meaning that a large part of the 'unknowns' either have not acquired a tertiary degree, or have acquired one overseas before immigrating to Norway. Either way, this means a large proportion of this group would perhaps find themselves in a lower socioeconomic category, the former because of a lack of education and the latter because of the difficulty in getting their education recognised in Norway. The second reason, concerning validity, is that as a bachelor degree

becomes increasingly common the influence this has on high-earning career prospects becomes less. Perhaps a better way to analyse gentrification and polarisation would be to distinguish between those with a five-year higher education and those without. The type of degree could also be interesting in a gentrification perspective, with those taking more career-oriented degrees which lead to higher economic capital (such as economics, law and engineering) distinguished from more design or culturally oriented degrees, when these two groups have been found to play a part in different stages and processes of gentrification. This will unfortunately have to be left for another analysis.

The big advantage in relation to reliability of using income as an indicator in this case is simply that every resident is registered. The use of quartiles relative to Oslo means that the data do not have to be adjusted for inflation, and give an indication of where a tract stands on an Oslo-wide basis, as distinct from being relative to the rest of the Inner East or to Norway. Gentrification is an urban process, and a neighbourhood is judged within a city relative to other neighbourhoods in that city.

However, some reservations can be made against the reliability of using individual income rather than household income as a variable. The consumption power of a couple both earning a similar income is greater than a person living alone earning the same. If a neighbourhood is characterised by the former, particularly if children are a rarity, one would expect to find more signs of gentrification when residents generally have more money to spend. It also may be the case that in some households one partner may earn enough so that the other may only need to work part time or not at all, still maintaining a comfortable standard of living. In the data this person may register in the lowest quartile, which would be somewhat misleading. Thus this will be taken into account when surprising results are observed. One must also be mindful of the effect welfare transfers may have. A single mother with several children could hypothetically receive a relatively large amount from the state, but have to support her children with it. To compare her income with a single person earning a similar amount would be misleading, but it cannot be determined from the data if this may be the situation.

4.1.3 Geographic units: census tracts

All tracts with less than 30 people in the 30-39 year old age group are left out of the analysis. Those that are left out include those that are mainly parkland (referred to as 'parkland tracts' on the maps) and which were industrial throughout the period (Helsfyr and Loenga). The remainder amounted to 119 tracts. In a few of these tracts there were less than 30 people to begin with, but substantial growth thereafter. This concerned mostly industrial areas that saw

brownfield development throughout the period – an example being Løren which had only 18 people in 1992 but 323 in 2008. Such tracts are kept in the analysis throughout, but where necessary it is pointed out that the values should not be given too much weight when the population is so small. Seemingly drastic fluctuations can result from a small population, when only a few new residents can make a big difference to proportional values for a tract.

A particular challenge was how to incorporate the tract of Brynseng into the analysis. After a boundary change the tract went from 0 residents to 225 in 1996, residents who previously were a part of Etterstad. This becomes especially problematic when analysing changes in proportions of each income quartile (it is meaningless to map a change from 0) and when carrying out cluster analyses, as the value of '0' will unduly effect those tracts neighbouring it, showing up as cold spots (see below). For this reason Brynseng is left out of maps prior to 1996, as well as maps that show changes with 1992 and 1993 as the starting point.

There has been no previous attempt made to map gentrification in Oslo using census tracts, so it is perhaps more prudent to discuss the advantages and disadvantages with Norwegian census tracts (grunnkretser) in light of similar studies in other cities. While census tracts are the smallest available units of data that enable us to study trends over time, they can in some cases be less than ideal. In their analysis using census tracts in Minneapolis-St. Paul, Hammel and Wyly (1996) point out that even within a census tract there can be big differences in building type and quality, for example, which attract residents with differing degrees of spending power, leading to micro-level segregation. But while U.S. tracts generally range from 2500-8000 people[5], with Canadian tracts being a similar size[6], in the study area of Oslo's Inner East the majority of tracts were under 1000 people in 2001, with only one containing over 2000. So while this problem will most likely still be present, one can assume that it is not as common as when using U.S. data. The residential building data is useful in this respect – when it is felt that this should be taken into consideration it will be pointed out in the analysis. Despite this challenge, Hammel and Wyly found that their statistical model for mapping gentrification still corresponded well to *a priori* qualitative surveys of their study area (in which qualitative aspects of the built environment were assessed), so it is conceivable that the smaller scale Norwegian tracts can be even more precise.

[5] http://www.census.gov/geo/www/cen_tract.html accessed 21/4/12

[6] http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-597/index.cfm accessed 21/4/12

Another advantage of Norwegian census tracts is their relative stability over time. This differs markedly to the U.K., for example, even though these tracts are of a similar size to Norwegian ones. In Davidson and Lees' (2005) study of riverfront tracts in London, the census tracts had been redrawn considerably between 1991 and 2001. An overall impression of the spread of gentrification could be given, but to analyse specific tracts would have been a challenge. In the case of the Inner East the tracts have almost not changed at all over the period, and can even still be compared further back in time, making it a lot easier to analyse changes in very specific neighbourhoods. There was only the one change made, that to Brynseng. This aim for stability over time, however, can have a negative consequence. Tracts are originally drawn up in Norway in a way that groups together relatively homogenous residential development. Over time, however, new development can take place in the same tract that does not fit in with the original uniformity. Regarding an analysis of gentrification, this can be particularly challenging when new development takes place in an area with old, rehabilitated housing, for example – as discussed in chapter 2 this can attract quite different people to the area. The wooden house tracts discussed in the previous chapter are an example of this in the Inner East, so analysis results can be somewhat ambiguous. This will be taken into account and discussed further in the final analysis.

4.2 GIS as a method of analysis

The analysis uses ArcGIS as a tool for analysing spatial patterns, with census tracts as vectors. The variables of education and income are the attributes that are mapped, both at certain points in time and changes across time. The census tract map is an extraction of the three boroughs of Sagene, Grünerløkka and Gamle Oslo from a vector map of the whole of Oslo released by the Norwegian Mapping Authority (Statens Kraftwerk) from 2009. The only error in using this as a basis for analysis is the aforementioned boundary change between Etterstad and Brynseng, but this does not affect the analysis unduly. The border shown is that which is valid from 1996.

As Steinberg and Steinberg (2006) point out, GIS-based analyses are particularly effective for temporal spatial analyses, when two or more variables for different points in time can be linked to one spatial unit. For each year from 1992 to 2008, each tract has severable variables (four categories for education, four for income plus total sample population), a daunting table of variables to attempt to analyse. Putting them into a Geographic Information System enables spatial patterns to become far clearer, enabling easy experimentation with different years to try and establish key trends. However, GIS has not been without its critics.

In outlining academic debate over GIS in the 1990s as it emerged as a popular analytical tool within human geography, Schuurman (2000) highlights a polarisation between critics and GIS users that characterised the early part of the decade. It was argued by the former that GIS represented a turn back to positivist traditions within human geography, carrying out idiographic analyses that concerned themselves only with geographic facts rather than the processes behind them. Taylor (1990) had expressed the hope that the new generation of quantitative researchers would focus on processes rather than just descriptive analyses. Ten years later Schuurman could write of a new level of cooperation between the GIS users and other human geographers, each side more willing to accept constructive criticism from each other; another decade on Longley et al. (2011: 524) could conclude that "GIS brings together the best from the idiographic and nomothetic traditions in the interest of practical problem solving".

Throughout the following analysis the series of GIS maps will be used as a platform for discussing gentrification processes in relation to the theory outlined in the previous chapter. In this way GIS becomes an instrument for *thinking* geographically, instead of becoming geography itself (Downs 1997). The analysis is descriptive to a degree – a study of spatial patterns will always have that element. An advantage of GIS as I see it is that while there isn't the space to go into detailed analysis of every tract, readers will be able to see in the maps trends for particular tracts and areas that they are interested in, either because of familiarity with the area or as a basis for their own research. I have selected patterns and areas that I feel are the most relevant in an analysis of gentrification of the Inner East, but the data is laid out in the open in map form for others to come to their own conclusions that may challenge mine.

Researchers often ignore the effects of different ways of classifying data. This is despite the fact that very different impressions can be made by different classifications (Kent and Klosterman 2000), affecting the validity of the analysis. Longley et al. (2011) distinguish between spatially extensive variables (true of entire areas, such as total population) and spatially intensive variables (could potentially be true of every part of an area if it was homogenous, such as densities or proportions). The proportion of residents with high income or higher education, rather than the total amount, can probably best gauge the effect of gentrification on an area, as tracts vary in population size. Thus the analysis uses spatially intensive variables in all but one map. These are generally grouped into categories of equal intervals that remain consistent in each map in a time series, making comparison between maps easy. However, in the maps where changes in income quartile proportions are shown the intervals immediately above and below 0 are combined to form one. This is done so that

only changes above a certain threshold are coloured to show an increase or a decrease, weeding out those tracts where only very minor changes have taken place. Otherwise these would show up as gentrification or filtering when in truth the population is staying relatively stable. Tracts can also fluctuate between categories without too much change taking place if their values are close to the cut-off point between categories. For this reason an effort will be made to focus the analysis only on those tracts which see consistent and/or major change.

4.2.1 Analysing patterns

It can be a challenge to pinpoint statistically significant patterns using one's own eye and inference. For individual tracts this is not too difficult, but to gain an understanding of processes in different areas and across the whole area two statistical techniques are employed. These techniques use the underlying data of each feature for analysis, meaning that identifying patterns is not affected by the classifications used (Mitchell 2009). Hot spot analysis is used to pinpoint clusters that stand out as both hot spots and cold spots relative to the rest of the area, and Moran's I is used as a measure of spatial autocorrelation.

Moran's I: This statistic is used to see whether gentrification processes have been totally random in the Inner East, or whether there is some sort of spatial pattern, and therefore autocorrelation. In the patterns observed by Smith (1996) in the Lower Eastside gentrification occurred in an organic process that spread from neighbouring tract to neighbouring tract, indicating a high degree of spatial autocorrelation. Subsequent research since the early 1990s have indicated a more diffuse pattern to gentrification processes, as discussed in the previous chapter. One would therefore expect a lower degree of autocorrelation.

The Global Moran's I gives a global statistic (for a whole area). It does this by comparing the difference in values between each pair of neighbours, and subsequently comparing this to the difference in values between all features (Mitchell 2009). In the analysis polygon contiguity will be used, when only adjacent tracts are taken into account (a set distance can also be chosen). This is based on the theory that the gentrification of one tract has been found to increase the likelihood of a neighbouring tract then gentrifying, as Smith had argued pre-1990s.

The equation used to calculate the statistic is:

$$\textbf{Moran's I} = \frac{n \, \Sigma_i \Sigma_j \, w_{ij} \;\; (\mathrm{X}_i - \overline{\mathrm{X}}) \, (X_j - \overline{\mathrm{X}})}{\Sigma_i \, \Sigma_j w_{ij} \;\; \Sigma_i \;\; (\mathrm{X}_i - \overline{\mathrm{X}})^2}$$

where i = the target feature, j= neighbour feature, n= total features and w = weight for the pair of features. In the case of polygon contiguity all pairs of adjacent tracts are assigned a weight of 1, all other pairs a weight of 0 (meaning therefore that they are not included in the equation).

A Moran's I value equal close to 0 indicates a random pattern. A value between 0 and 1 indicates clustering of similar values, with 1 equalling perfect autocorrelation. A high value would mean that tracts with high values are adjacent to other tracts with high values, while tracts with low values are adjacent to other tracts with low values. In other words, a segregated pattern emerges. A negative value indicates dispersion of values. The statistic can be tested for significance, by comparing the calculated value with the expected value for a random distribution (E(I) = -1/n-1, so very near 0, increasingly so with a higher number of features). Each tract has a value for a given variable – there are many possible ways that these could be distributed across the study area. That a pattern is statistically significant means that the incidence of high and low values being grouped together is too high to be a result of randomness.

The statistic will be calculated in this analysis to assess trends in the Inner East, so will be compared at different time intervals in relation to values for high income and higher education across all tracts. With no previous studies to compare to it is difficult to know what to expect regarding the value, but what is interesting in a gentrification perspective is to see whether there has been change over time.

Hot spot analysis: Getis-Ord's Gi* is used in the analysis to pinpoint areas that score highly or lowly relative to the rest of the area, thus identifying hot spots and cold spots of census tracts. It is a local statistic, meaning that a value is calculated for each attribute (i). The equation is as follows:

$$G_i^* = \frac{\sum_j w_{i,j}\, x_j - \bar{X} \sum_j w_{i,j}}{S\sqrt{\frac{n\sum_j w_{i,j}^2 - (\sum_j w_{i,j})^2}{n-1}}}$$

where x_j is the attribute value for other attributes within the study area. Again, polygon contiguity is used, meaning that all adjacent tracts are weighted as 1 and non-adjacent tracks fall out of the equation ($w_{i,j}$ being the spatial weight between the feature the statistic is being calculated for and all other tracts). n is the total number of features, $\bar{X}$ is the mean of all features, and $S = \sqrt{\frac{\sum_j x_j^2}{n} - \bar{X}^2}$. This gives a z-score, which is then mapped by ArcGis. If all

adjacent tracts and the target tract are roughly around the mean, then the numerator will be a low number, giving a z-score near 0 and thus not statistically significant. Neighbours that are generally considerably above the mean will give the target tract a high value, below the mean will give a negative value. If there are many tracts with similarly high or low values grouped together, these will tend to show up as hot spots or cold spots. Worth noting is that a tract can still show up with a high z-score despite having a low value if its neighbours have high enough values, and vice versa. This can seem a little nonsensical, but the idea behind it is that neighbouring tracts will have an effect on each over time. In this sense, the hot spot analysis can possibly act as a predictor for subsequent years.

Mitchell (2009) points out that a disadvantage with this method is that those tracts with relatively few neighbours will perhaps give skewed results, as these values take on more importance in the calculation. This particularly concerns tracts on the edge of the study area. Because of this, tracts that do not appear part of any larger conglomeration of hot or cold spots will not be focussed on in the analysis. Also important to remember is that it is only the tracts in the Inner East that are taking into account by the GIS in the calculation of values. This could mean that if the whole area is gentrifying a cold spot could also conceivably be gentrifying – just not to as great a degree as the rest of the area. This will also be considered during the analysis, cross-checking with the main maps (the hot spot analyses will be presented as insets for the maps which the analysis was based on).

While hot spot analysis is generally used on cross-sectional designs, using the value for a feature at a point in time, I have chosen to use it on changes in these values over time as well. The reason for this is that a more nuanced picture of gentrification processes can be gained. If an area begins the period as 'gentrified' and continues to be relatively high-status compared to the rest of the study area throughout the time period analysed, it will always show up as a hot spot. By analysing changes it can be ascertained where the most activity in relation to social upgrading or downgrading has taken place during a given time period, even if this area hasn't reached the status of the originally 'gentrified' tracts.

4.3 Measuring socioeconomic polarisation

There are various ways to measure polarisation. A main consideration in the following analysis (chapter 6) is the form of the data – in this case income quartiles rather than average income, and three categories of education rather than total years or a greater number of categories.

The first part of the analysis concerns itself simply with the changes in each category at borough level and the Inner East as a whole. As it is looking at polarisation, discussed in chapter 2, the focus is on the lowest and highest categories – tertiary and primary education (converted to localisation quotients), and the top and bottom income quartiles. A perceived weakness in relation to validity can be the comparison of primary and tertiary education, with a middle category of secondary. The difference between someone who has completed secondary but not gone onto tertiary and someone who has only completed primary is perhaps questionable. Their chances in today's labour market would probably not be too dissimilar to each other. It may be the case today that as undergraduate degrees become more of a norm, polarisation is more relevant if we compare people with postgraduate degrees and those without any form of tertiary education. Undergraduate degrees then form a middle category. But the analysis has to be adapted to the data available, and it can be argued that while this is a trend that has become more and more prevalent in the last twenty years, it was not as relevant to the beginning of the period. Therefore in 1992 it was not necessarily the case to such a degree as it is now – indeed, the social structure of the Inner East and Oslo generally was much more even between the three categories. Taking this as a starting point can therefore still be illuminating in relation to analysing changes in the social structure, particularly when converted to a localisation quotient.

The second part of the analysis focuses on geographic polarisation at tract level. Two different methods are used for education and income respectively, each one chosen in relation to the form of the data and previous analyses that have been done on the topic. For education a method developed by Dorling and Woodward (1999) is used, for income a method used by Storstadskommittén (1997), from the Social Department in Sweden, is employed.

Dorling and Woodward (1999) analyse socioeconomic geographic polarisation in Great Britain. They use as a starting point the proportion of the population of a group with a particular trait in each tract, using nominal categories. This lends itself therefore to taking the proportion of people with a tertiary education in each tract. This is converted to a localisation quotient – in their case using the proportion for Great Britain, in this case the proportion for Oslo. The relevant population is then tabulated in wards/tracts categorised according to the ratios. For example, how many people (given as a percentage of the total population of 30-39 year olds) lived in tracts with a localisation quotient below 0.7? These categories are chosen intuitively – for simplicity's sake I have chosen categories divided into 0.1, the lowest group being below 0.7 and the highest above 1.3 – this gave a relatively even spread at the beginning of the period. Dorling and Woodward operate with a very large number of tracts – over 10 000 – so are able to use more categories than can be used here. With a low number of

tracts, large tracts may have a big influence on results – if there is one large tract in either the lowest or highest category this could lead to a distorted impression of polarisation.
In the final analysis it is the highest and lowest categories that are most relevant. If it can be shown that people are being increasingly concentrated in tracts in the highest and lowest categories, we can say that geographic polarisation is occurring. This can be asymmetrical too, if both poles are increasing, but one by more than the other.

Storstadskommittén (1997) have used income data in the form of quintiles to assess geographic polarisation in Swedish cities, a method that can therefore easily be applied to the income data in the following analysis. Tracts are categorised according to the ratio of residents in the lowest quartile compared to the highest quartile. Thus a high ratio indicates a higher proportion of low-income earners, and vice versa. The tracts are then tabulated in the same way as in Dorling and Woodward's method, seeing if there has been any change over time in the proportion living in tracts with very high ratios or very low ratios. This is a method that could also be used with the education data, using a ratio of primary to tertiary education levels. This analysis was carried out, but not shown in the analysis, as it was felt the first method gave a better indication of changes – there were simply too many tracts with a low ratio, particularly by the end of the period. This is an indication of the weakness discussed in relation to the education categorisations, as the number of people with an undergraduate degree becomes much larger, and the number with only primary education smaller.

A point of difference between these two studies and the following analysis is the standardisation of data to relative values, which can affect the analysis' validity. This is done in relation to the rest of the study area in the case of the first two, but in the following analysis it is standardised to Oslo, of which the study area is a subarea. As discussed previously, this can be justified by the fact that the analysis is essentially giving an indication of how these tracts compare to the city as a whole, whereby typically gentrification processes transform an area which is traditionally known as 'working class' by the rest of the city, to one which is above the average for the city as a whole. With geographic polarisation what becomes interesting is to see whether the population that remains is increasingly concentrated in certain tracts, while others display signs of an upgrade in status.

5. Spatial patterns

The purpose of this chapter is to focus on the first three sub-questions formulated in chapter 1. With this in mind, the first part of the analysis will concentrate on temporal variations, both across the area as a whole and in regard to different areas and tracts. Important in this respect is presenting a picture of the Inner East at the beginning of the period – while without data on census tract-level it is difficult to say which tracts are 'gentrifying' and which have always been home to high-income earners, but this will be discussed in light of previous research. This lays the foundation for an analysis of trends since 1992. An aspect of this analysis will be whether those tracts already identified as 'high-income' saw a further increase in status, a process of 'super gentrification'.

Following this, several aspects will be further discussed, largely in relation to changes over the whole study period. Firstly, a crosscheck with absolute numbers will be made, providing a counter-discussion to trends shown using spatially intensive variables, mainly focussing on displacement. This discussion will also be related to tenure structure. Secondly, looking at total changes on tract-level for the whole study period, two areas singled out as a hot spot and cold spot respectively will be discussed in greater detail. Thirdly, new-build gentrification will be analysed and discussed, and the impact it has had on the Inner East, focussing on individual tracts that stand out in relation to this phenomenon.

5.1 Setting the scene

How to read figures 5.1 and 5.2, chronology in relation to text

1. The first maps in each series will be focussed on first, giving an idea of the socioeconomic status of tracts at the beginning of the study period. Tracts referred to in the text are labelled.
2. For each year mapped, an accompanying hot spot analysis is performed, using Getis-Ord Gi* (explained in chapter 4). This gives a more nuanced picture than can be gained by a visual impression of the main map, identifying areas of tracts that are of interest. These will be discussed together with the main maps.
3. Global Moran's I is calculated, giving an indication of spatial autocorrelation. This statistic will be discussed at the end of sections 5.2 and 5.3, in relation to the changes observed in figure 5.4 also.

Figure 5.1
Higher education 1992-2008

Localisation quotient, residents aged 30-39 with higher education (three years).

- 0.55 or below
- 0.56 - 0.7
- 0.71 - 0.85
- 0.86 - 1
- 1.01 - 1.15
- 1.16 or above
- parkland tracts

Insets show statistically significant hotspots and coldspots

Z-scores, Getis-ord Gi*

- < -2.58 std dev
- -2.579 - -1.96
- -1.959 - -1.65
- -1.649 - 1.65
- 1.651 - 1.96
- 1.961 - 2.58
- > 2.58

Moran's I: *** = p < 0.01

Source: SSB register data

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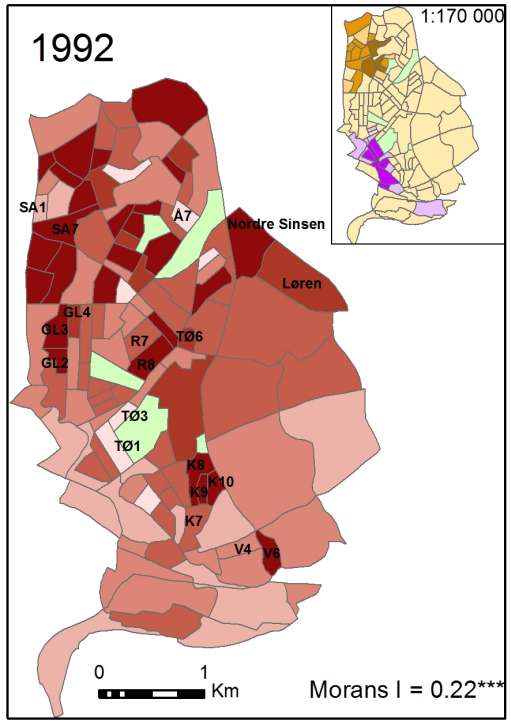
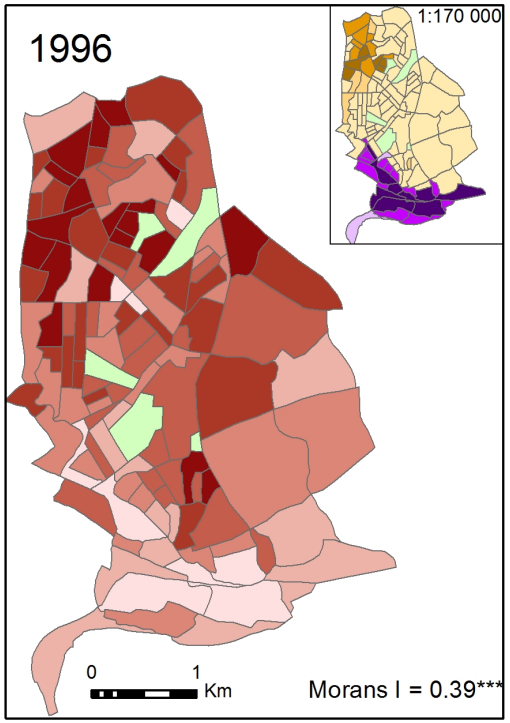
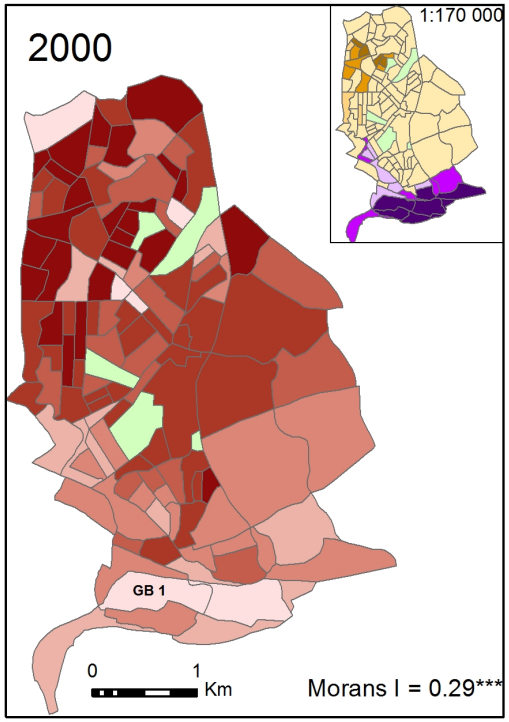
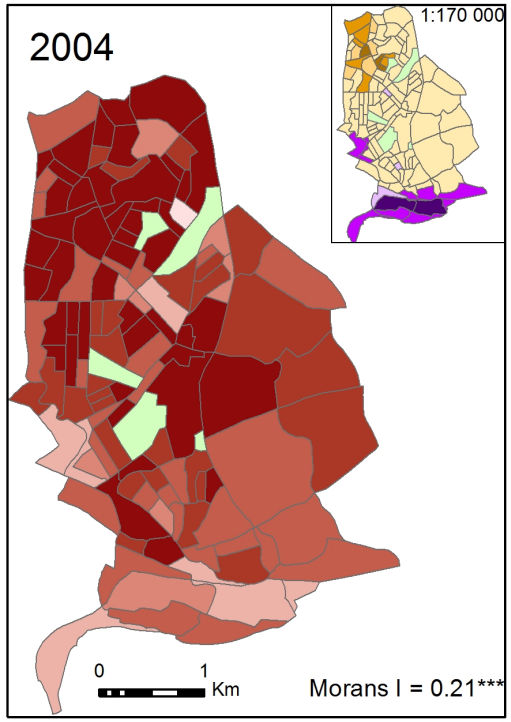
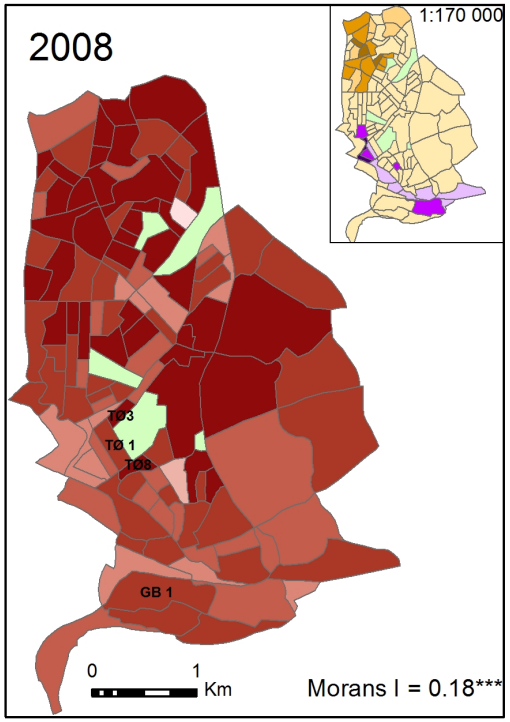










Higher education: Taking education as an indicator - the proportion of residents with at least three years of higher education – a number of patterns emerge in 1992 (figure 5.1). The most striking are illustrated in the hot spot analysis, remembering that this is carried out in relation to the study area as a whole, thereby identifying the most extreme clusters relative to the rest of the Inner East. Two areas draw our attention. The northwest corner encompassing Ila, Bjølsen, Sagene and much of Torshov is identified as a hot spot. Noticeable though is the considerable variation between tracts in these neighbourhoods, a trait also shared by the Åsen tracts (one of which, Åsen 7, has by a considerable margin the lowest localisation coefficient of the entire study area, 0.28). An example of this is the difference in localisation coefficients between the neighbouring tracts of Sagene 1 and 7, 0.56 and 1.45 respectively. Whether the tracts displaying high coefficients can be classified as 'gentrified' or 'gentrifying' can be open to discussion without the benefit of similar census tract data in the preceding years. But it is clear that this area has the overall highest rates of higher education among the age group 30-39. In regard to the rest of the analysis, what will be interesting to see is whether the high rates of higher education spill over to those tracts that lay below the average in 1992 – do they act as 'beachheads' akin to Smith's (1996) study of the Lower East Side? In this respect Sinsen, for the most part below the Oslo average yet neighbour to Torshov, an area with generally high education levels, could be a target for gentrification in the succeeding years.

Contrarily, Tøyen/Grønland stretching into Gamlebyen is identified as an area with generally lower levels of higher education. In fact, if we take these three neighbourhoods together with Vålerenga there are only two tracts that have a level of higher education equal to or over the Oslo-wide average – Tøyen 6, which is physically separated residentially from the rest of Tøyen by Tøyen park, and Vålerenga 6, which at this stage only had 31 residents in the target age group. This can skew the results somewhat, as is evidenced by a fluctuating level in this tract in subsequent years. Of note are the particularly low levels of higher education in the two tracts on the western flank of Tøyen park, Tøyen 1 and 3 (0.5 and 0.42 respectively).

As discussed in chapter 3, Wessel (1983) found that although Grønland, Gamlebyen and Vålerenga were most in need of renewal in the first five years of the renewal program, funding was not directed towards these areas in sufficient amounts relative to other areas of the Inner East. The relationship between targeted areas and gentrification that was found suggests therefore that these would not be among the first to show signs of gentrification, and the pattern here confirms that.

On the other hand, other pockets with higher education levels above the average include three tracts in Upper Grünerløkka (2, 3 and 4) and the three tracts south of Kampen

park (Kampen 8, 9 and 10). Without census tract data for preceding years it is difficult to surmise whether these can be classified as 'gentrified/gentrifying' or whether they have always stood out as pockets of middle class residential areas. Taking Wessel's evidence into account though (these were areas which received some of the highest funding initially), it seems safe to assume that the higher education levels in these tracts is a result of gentrification processes put in motion by the renewal program.

There is also other research that supports this interpretation. As discussed in chapter 3, Grünerløkka had been singled out as an area undergoing gentrification in the 1990s by other researchers too. The data supports the research of Børrud (2005), confirming a relationship between the socioeconomic status of residents (here measured as higher education levels) and attributes of the commercial environment typical of gentrification - but in Upper Grünerløkka rather than Lower Grünerløkka, after a first wave of gentrification in the 1980s. Likewise, the movement to preserve Kampen as a heritage area had been instigated in the 1970s, a typical characteristic of the first stages of gentrification (Gale 1979), the area being identified by Pløger (1995) as a pioneer area for gentrification in Oslo. Thus it is clear that these areas were undergoing or had undergone a gentrification process in/by the early 1990s. A question for the remainder of the analysis is whether this process has dropped off, or gained momentum and can possibly be classified as areas of 'super-gentrification'.

Interestingly, given their potential appeal to those concerned with the 'gentrification aesthetic', the tracts which feature highest proportion of preserved wooden houses do not necessarily stand out. Neither Kampen 7, Vålerenga 4 nor Rodeløkka 7 reach the Oslo average, with only Rodeløkka 8 having a localisation coefficient above 1 (1.18). This can be a consequence of studying only a cross-section of residents, as it can be conceivably the case that there are already a number of well-established residents in the area that came there during the preservation movement of the late 1970s and early 1980s, and that these residents, well past the 30-39 age group, now live at the most expensive addresses. In this case, an analysis of the population as a whole may have thus proved more indicative of higher education levels and thus gentrification. Those in the 30-39 age group may also be effectively priced out of the market to a degree, as the capital now needed to buy most of the detached family housing in the area is generally too much for people in the early stages of their housing career. Those 30-39 year olds that do live there may be confined to other forms of residence that the tracts offer. But it is an aspect to this last point that it perhaps most important. While the tracts are mainly defined according to the predominant residential environment, it is seldom that a tract will be completely uniform in terms of the built environment. Each of these tracts do contain apartment blocks as well, some of which may not be particularly appealing to gentrifiers.

Figure 5.2
High income 1993-2008

Percentage of residents aged 30-39 in the top two income quartiles on an Oslo-wide basis.

- 30 or below
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 or above
- parkland tracts

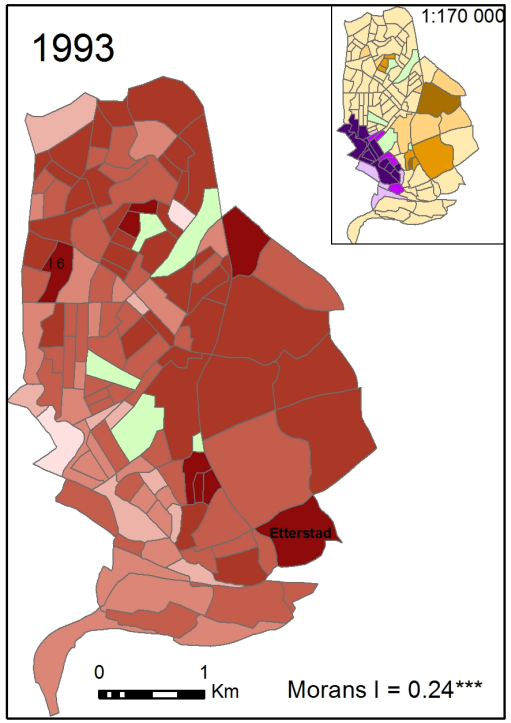
Insets show statistically significant hotspots and coldspots

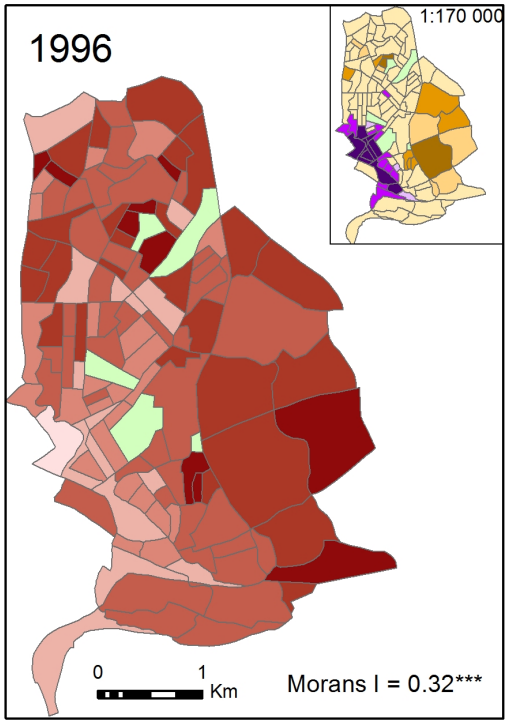
Z-scores, Getis-ord Gi'

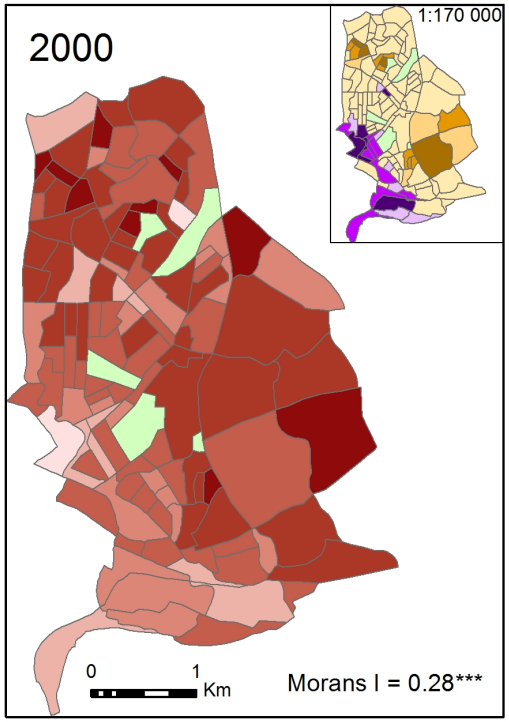
- <-2.58 std. dev.
- -2.579 - -1.96
- -1.959 - -1.65
- -1.649 - 1.65
- 1.651 - 1.96
- 1.961 - 2.58
- > 2.58

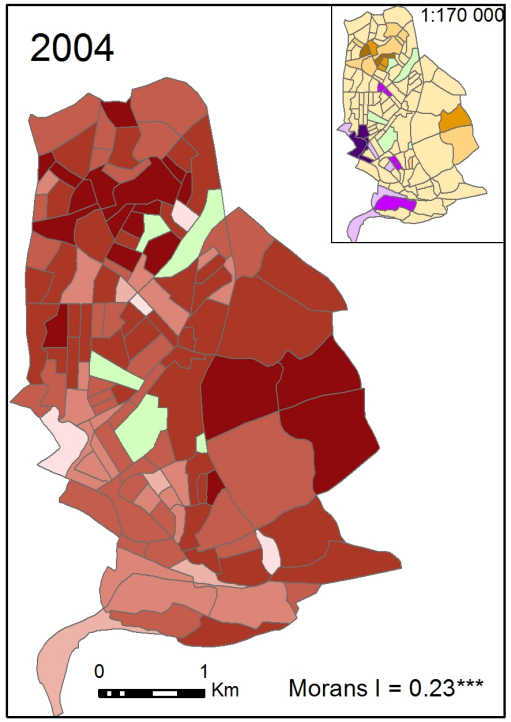
Moran's I: *** = p < 0.01

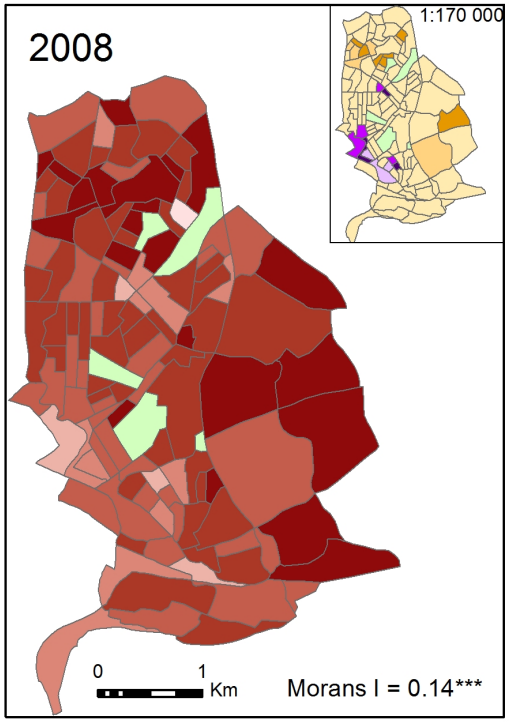
Source: SSB register data











Although the wooden houses make up a large percentage of residential structures, each apartment building houses a far greater amount of people than each single detached wooden house. The residents of these buildings thus have a large effect on tract-level statistics, which in some cases may 'water down' the socioeconomic status of the tract seen as one. The pattern Hamnett (2003) observed in London, quoted in chapter 2, where one side of the street may be markedly different from the other, would lead to ambiguous results on the tract level. This is a possibility concerning these wooden house tracts.

High income: Turning our attention towards income, figure 5.2 indicates similar trends to higher education, with relatively high proportions of residents in the top two quartiles (i.e., earning above the median income) in the borough of Sagene, tending more towards average in Grünerløkka and Rodeløkka (average here meant as 50 per cent in the top two quartiles, logically the norm for the city as a whole), with the lowest levels again in Tøyen, Grønland and Gamlebyen. In the hot spot analysis this latter area again comes up as the area with the highest clustering of low values, though this time extending northwards to lower Grünerløkka and the two Sentrum tracts. The three tracts south of Kampen Park again display high values, all with over 70 per cent of residents in the top two quartiles Oslo-wide, all within the top 8 tracts in the study area. Ila 6 is also one that stands out. This is a tract, which with its predominance of semi-detached housing and riverside location, is unsurprisingly attractive to a higher income group. This tract also scored very highly on higher education levels. Like the wooden house tracts there is also a proportion of apartment buildings here, but the idyll location probably makes these more attractive for high-income earners in these tracts than in the former. Whether or not this is 'gentrification' or whether it has always been a more affluent area requires data going back further in time, but as discussed in chapter 3 this was also a tract that received considerable attention during the renewal program.

One of the most striking differences between the two indicators in figure 5.1 and 5.2 at the beginning of the period is the hot spot of high values. As discussed previously, the more suburban-like eastern tracts are taken into the analysis even though they are not traditionally considered part of the Inner East, in line with a wider conception of gentrification as not necessarily limited to the urban core. They were reasonably consistent in their levels of higher education, falling generally on a coefficient below the Oslo average (the exceptions being Nordre Sinsen and Løren in the north which manage to top it, both of which had low total numbers, 53 and 18 respectively). However, in terms of high-income earners, these tracts show up as a hot spot relative to the rest of the study area. It should be pointed out that this is affected by the high Kampen values, being neighbouring tracts to Ensjø, but all the

same this is a significant pattern when considering gentrification processes. Given their relatively low values for higher education, the fact that all of them have values of around 60 per cent or above in the top two income quartiles indicates that a different type of resident may be attracted toward these areas. Economic capital seems to play a more important role here, rather than the cultural capital indicator of education. As discussed in chapter 2 this can be a feature of later stages of gentrification, when original gentrifiers become priced out of the housing market. To say that this process may have been happening in the eastern tracts though is most probably a misinterpretation. The indicators are too crude to say anything definite. It can be presumed that the true economic elites would generally also have at least three years education, such that there would be a stronger correlation between education and income using this data if it was this group living in these areas. Indeed, as discussed in the previous chapter, most studies on gentrification have found that higher education and income are so strongly correlated, as they are in this analysis generally, that it makes little difference which is used for analysis. The fact that it is particularly these tracts that appear to deviate from the rest indicates that they may be home to a different demographic than one that corresponds to that of gentrifiers. It may rather be the case that small-business owners and tradespeople earning decent wages predominate in these tracts. Without data on profession it is difficult to draw conclusions, though this could absolutely be a subject for further analysis.

Should Norwegian developments correspond in any way to American research, this was a period in which the process had stagnated somewhat after the first and second waves, before a third wave took over later in the decade (Hackworth and Smith 2001). As discussed previously, it would be misleading to describe a 'wave' of gentrification in the Oslo context. However, taking into account the patterns shown and previous research, an interpretation can be that gentrification was underway in Grünerløkka/Rodeløkka, particularly the northern tracts, Upper Kampen[7] and much of the borough of Sagene (though owing to a lack of gentrification research on this borough it is unclear whether this is gentrification or status quo). If Oslo was to show signs that could be likened to the third wave in the following years it is most likely these areas that would be affected (although, as discussed in chapter 2, the spatial patterns have proved to be more random in this wave), though many tracts were arguably still going through earlier stages of gentrification at this time. Most of Gamle Oslo, however, was either showing signs reminiscent of the first wave in North America (sporadic, classic gentrification, encouraged by the state) or little sign of gentrification at all, with the

[7] Actually the eastern Kampen tracts, but referred to as 'Upper' in local parlance because of their location on a ridge overlooking 'Lower Kampen'

borough displaying both low levels of education and a relative lack of residents in the top two income quartiles Oslo-wide. It is worth remembering though that a feature of the second wave was its spread to non-global cities. It could be argued that Oslo can be described as such. This illustrates that it can be problematic applying this schema to other cities outside North America – they are part of the second wave supposedly, yet display traits from the first.

5.2 1993 to 1998

Bourne wrote in 1993 that gentrification was on the decline and was most probably an aberration. Figure 5.3 shows that this could have been a conclusion a researcher may have drawn if they were doing a quantitative analysis of gentrification in the Inner East at that time. The diagram is a summary of the study area as a whole, therefore not showing any differences between tracts and neighbourhoods, but it is useful in analysing general temporal tendencies. Hackworth and Smith (2001) place the end of the transition between the second and third wave at around 1993 in the USA. Without income data for the years leading up to 1993 it is impossible to say whether the first two year period can be considered a 'stagnation' or a continuation of patterns in the Inner East, where a similar amount of tracts experienced filtering as those that experienced gentrification. But what is clear from the diagram is that from 1996 onwards a general pattern much more heavily in favour of gentrification than filtering emerges, a gap emerging after 1996 and staying significantly large. Between 1994 and 1995, for example, 16 tracts increased by two or more percentage points, compared with 38 that decreased by two or more percentage points, hardly data that supports a process of

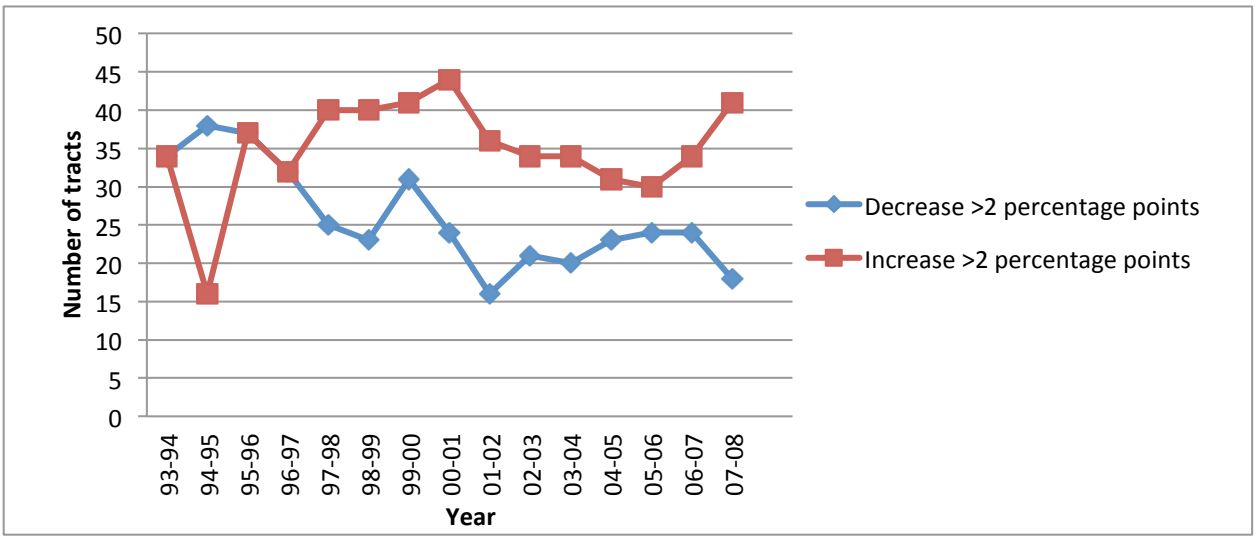


Figure 5.3: Graph showing the number of tracts over the whole study area which showed either an increase or decrease in the proportion of high-income earners, per year, for the age group 30-39 years. High income is defined as above the median Oslo-wide (in the top two income quartiles).

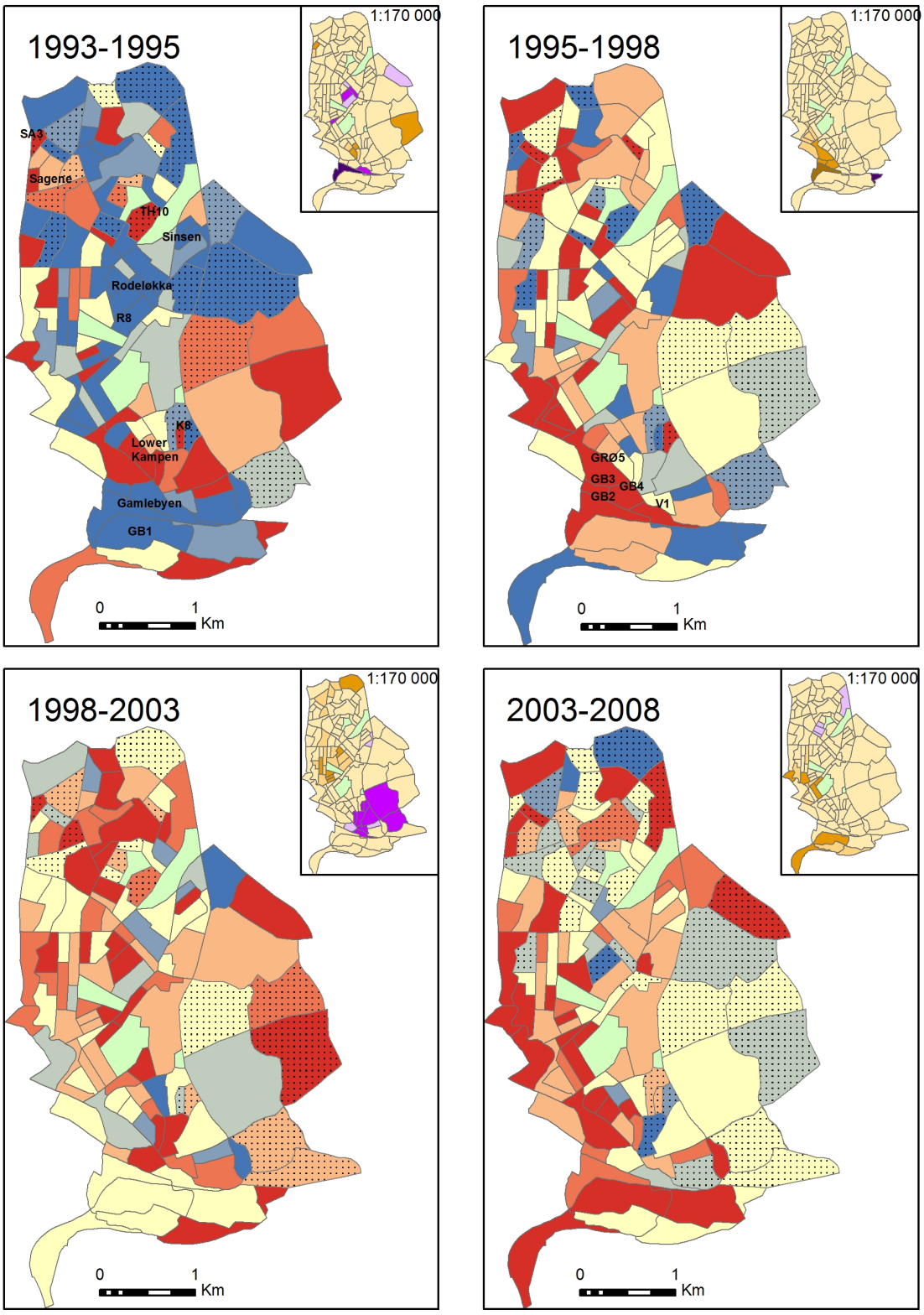


Figure 5.4 Change in high income 1993-2008

Average percentage point change of residents aged 30-39 in the top two income quartiles on an Oslo-wide basis, per year. Tracts with a value of more than 65% at the beginning of each period are dotted.

- -1.5 or below
- -1.49 - -1
- -0.99 - -0.5
- -0.49 - 0.5
- 0.51 - 1
- 1.01 - 1.5
- 1.51 or above
- > 65%, start of period
- parkland tracts

Insets show statistically significant hotspots and coldspots.

Z-scores, Getis-ord Gi*

- < -2.58 std dev
- -2.579 - -1.96
- -1.959 - -1.65
- -1.649 - 1.65
- 1.651 - 1.96
- 1.961 - 2.58
- > 2.58

N

Source: SSB register data

gentrification. But over the course of the next year, between 1995 and 1996, the tide had turned. Between these years 40 tracts increased by two or more percentage points, compared with 25 that decreased by the same amount.

An analysis of census tracts that takes into account the overall trends shown in figure 5.3, by dividing maps into suitable time intervals, is illustrated in figure 5.4. Here the time period covered by income data is broken up into five-year intervals, but the first period, 1993-1998, is split into two to convey the reasonably dramatic changes that began to take place approximately midway in that period. It should be pointed out that this means the first two maps in the series are relatively sensitive to random swings in population, as each tract is a relatively small population of 30-39 year olds (average in 1993 = 149) and the change in percentage points for the top two quartiles is averaged out over only two and three years respectively, compared with five in the succeeding two maps. However, to maintain consistency between the maps the same categories are used in each one, an average over the years mapped perceived as being the best way to do this.

1993 to 1995: Certain areas in particular appear to have undergone a filtering process during the first two years, with Gamlebyen and Rodeløkka two that stand out, confirmed by the hot spot analysis. In the case of Gamlebyen, this appears to support the argument that the addressing of traffic problems assisted the onset of gentrification (Kolbenstvedt and Fyhri 2004) – the Ekeberg tunnel was not completed until 1995. During this first period at the tail end of a recession the area was therefore not perceived as very attractive for the middle class, bearing in mind that the map shows a downward trend – the proportion of high-income earners was higher in 1993. It is possible that the area had attracted the attention of gentrifiers in a first/second wave prior to 1993. One tract in particular is one to watch, Gamlebyen 1. Only 41 30-39 year olds lived here in 1993, just 38 per cent in the top two income quartiles. At the time of writing in 2004 Kolbenstvedt and Fyrhi commented on the pending residential development in the area. As we shall see later, this development was to have a considerable effect on the tract's socioeconomic status.

The case of Rodeløkka is however more difficult to attempt to explain. There were a number of new houses built in these tracts, mainly detached – it is possible that these were not as popular with higher income earners as the restored housing from the previous century was, thereby leading to a small decline in the proportion in the top two income quartiles. Where there were apartment buildings constructed, effects can be more obvious. For example, in Rodeløkka 8 a large apartment building was completed in the southeast corner in 1993, on Trondheimsveien/Helgesens gate. The population of 30-39 year olds jumped from 228 to 275

between 1993 and 1994, with the proportion of high income earners falling 58.8 to 53.1 per cent at the same time. While we cannot ascertain from the data whether this was a direct effect of the new construction (data that can be linked to residential address would be required for this), it seems quite conceivable. It would be difficult to argue that the new building, in keeping with the style of modernist-style brick building of this part of Trondheimsveien, adheres to the 'gentrification aesthetic'.

Two areas in particular show up with increases in status. The Sagene tracts were still generally attractive, improving on already high values. As evidenced by the hot spot analysis though, there does appear to be gentrification activity in the tracts encompassing Lower Kampen (1, 3, 5 and 7) plus some tracts surrounding them, including Grønland 5. These tracts continue to be prominent throughout the rest of the study period. Though at this stage they were still dominated by the residents in the lower two quartiles (see the 1996 map, figure 5.2), the fact that they register with increases in the top two income quartiles at a time when most of the rest of the Inner East did not is indicative of the area becoming a target for gentrifiers at around this time.

Tracts with more than 65 per cent of residents in the top two income quartiles at the beginning of the period shown in each map are dotted. This is to enable an analysis of 'super-gentrification'. If these tracts show an increase over the time period shown it could be inferred that this is taking place. The value of 65 per cent is chosen, as this would seem a fair indicator of an area already with a substantial high-income population. Put another way, it says that roughly two out of every three people earn above the Oslo median income. What kind of increase constitutes a 'super-gentrification' of the area is not something there is unanimous agreement on among researchers. As an example, Hedin et al. (2011), define super-gentrification as taking place in neighbourhoods which already find themselves in the top 25 per cent in initial income and among the top 10 per cent in relation to increase in income level. As discussed in chapter 2, they take a citywide approach, but the data set for this study only encompasses a part of Oslo. It is therefore impossible to see which tracts are in the top 10 per cent in regard to income change Oslo-wide, so analysis is limited to a more pragmatic approach which will see whether any average annual change over 1.5 percentage points has taken place in these tracts, rather than labelling tracts 'super-gentrifying' or 'not'.

There were 23 tracts that were over the 65 per cent threshold in 1993. Of these only three (Sagene 3, Torshov 10 and Kampen 8) increased by more than three percentage points up to 1995. Eleven saw a decrease by more than two, seven of these by more than four points. Thus the data here does not give support to super-gentrification being a feature of the Inner East between 1993 and 1995, with filtering being a more predominant trend in these

tracts. As discussed previously, Hedin et al. (2011) found that super-gentrification had continued in Sweden throughout the recession. For this reason data for the greater Oslo region would be beneficial, to see if high-income groups were focussing their attention elsewhere at this time.

1995 to 1998: Corresponding with the trends evident in figure 5.3, the map for 1995-1998 contrasts markedly with the first map, indicating that gentrification processes had indeed picked up after 1995, just a couple of years after the beginning of the third wave in North America. Some of these tracts with the largest increases (an increase over 4.5 percentage points during the period, in dark red) were among those that had experienced large decreases in the previous period, indicating a definite turning point in some cases in terms of gentrification, either discovered or rediscovered by gentrifiers in this period. I hesitate to use the term 'pioneers', as in the American context. Even in the tracts scoring lowest on income and education, all groups are represented at the start of the period in all tracts. (This may not have been the case in many instances in the USA, where the term was coined, as significantly higher rates of segregation than is the case with Oslo predominated in the 1970s, the decade the impact of gentrification began to be felt across North American cities.) But a change in attractiveness to middle class in-migrants in some tracts can be assumed, and therefore a shift from a tendency towards filtering to a tendency towards gentrification.

In this case those tracts that were dark blue in the 1993-1995 map and dark red in the 1995-1998 map are particularly relevant. Of particular note is Gamlebyen, where the tracts of 2, 3 and 4 plus the adjacent tract of Vålerenga 1 go from being in a 'cold spot' according to the first map to a 'hot spot' according to the second, remembering that this period began with the opening of the Ekeberg tunnel. This area generally seems to show signs of gentrification now, and it can be deduced from the map that the process has spread not only from Grønland 5 southwards, but also to the tracts north, through Tøyen east of Tøyen park and on into the Sentrum tracts and lower Grünerløkka. As discussed, Børrud (2005) didn't find strong evidence of gentrification in the commercial environment of this latter area in 2001-2004, yet nonetheless predicted that this area had the potential to be a gentrification target. The evidence here points to the beginnings of the process before this time – changes in the commercial environment can be expected to lag a bit behind changes in residents' socioeconomic status.

It could be inferred then that the areas in Lower Kampen that showed up in the previous hot spot analysis have acted as something of a beachhead during this period, though the process appears to have died down a little in those actual tracts. In fact most of Kampen

down into Vålerenga experienced a decrease in this period. Remembering that Kampen was an area identified as one of the higher income areas at the beginning of the study period, and therefore a candidate for super-gentrification, it appears that this wasn't happening up until 1998. Indeed, as with the first period, super-gentrification does not appear to be a key process in the Inner East between 1995 and 1998. Of the eighteen tracts that were above the 65 per cent threshold, only three experienced an average increase greater than 1.5 percentage points (in fact, these were the only ones of these tracts to register an average increase over 0.5 percentage points), while ten saw an average decrease of more than 0.5 points.

Moran's I, measuring spatial autocorrelation, has been calculated for each map in figure 5.1 and 5.2, and is statistically significant in all the years mapped. In figure 5.1, using education as an indicator, it reaches a peak of 0.39 in 1996 before declining steadily over the course of the following years. Likewise, in figure 5.2, using high income as an indicator, it reaches a peak of 0.32 in 1996 before declining. While these values are relatively low, they do indicate a trend in residential patterns that can be interpreted in relation to gentrification. The Inner East was characterised by areas up to 1996 that were at different stages of gentrification – some areas that showed little sign of the process, others that had most probably been gentrifying since the 1980s. Had this been confined to distinct tracts, lower levels of spatial correlation would have resulted. The fact that it was some distinct areas that did and did not experience gentrification means that by 1996 there was more of a tendency for tracts with high values on education and income to cluster together, with a similar tendency for tracts with low values to do the same. Though Walks and Maaranen (2008) were referring to the more polarized socioeconomic structure within *tracts* in the earlier stages of gentrification before becoming top-heavy in later stages, if we think of the Inner East as one geographic unit the value for Moran's I can be seen as illustrative of this progression. As discussed, by 1996 it was problematic to talk of 'waves' of gentrification hitting Oslo. Taking the study area as a whole, it seems reasonable to contend that overall it was in the relatively early stages of gentrification compared with many North American cities. Thus in 1996, in line with Walks and Maaranen's argument, it was at its most segregated – as the process matured and more tracts displayed higher values on education and income a more top-heavy spatial pattern emerges, as low-scoring tracts find themselves more isolated and spread, pushing down tendencies towards spatial autocorrelation.

5.3 Post 1998

Between 1998 and 2003 no less than 43 tracts increased by more than five percentage points (shown as average increase above 1), with 40 doing the same in the final period. Thus it can be surmised that the difference between the first two maps was not a blip, but rather the (re)beginning of an overall process of gentrification which was accentuated over the course of the following decade. The last two maps are noticeable for the lack of tracts that saw declines in status. Many of those that did were from a high starting point anyway. The spread of gentrification is perhaps, however, best illustrated if we refer back to figures 5.1 and 5.2.

When analysing changes on a census tract level, values can, and do, fluctuate in ways that sometimes can seem quite random. Particularly taking just the one age group as a unit of analysis, the population of each tract is relatively small, often less than one hundred people. Just accounting for natural succession means that roughly around ten per cent will be replaced each year as they reach 40 years old, replaced by those that have now turned 30. These tracts also lie in an area that has a high rate of migratory activity (Havnen 2006). Therefore in any given year the change in population can change in unexpected ways, but by looking at the tract over time any random changes are 'smoothed out', the sum of all changes contributing towards the overall characteristics of the tract. For this reason, the cross-sectional design of figures 5.1 and 5.2 gives us an insight into the accumulation effect on an area of the changes taking place in figure 5.4. The increasing rates of higher education offer a particularly succinct picture of the spread and effect of gentrification over the study period. Taking the tracts of Grünerløkka 2,3 and 4 as a case in point, we can see that in 1992 these three tracts, all adjacent to one another in the northern part of the neighbourhood, have a rate of higher education above the Oslo average. None of the adjacent tracts to the west, south or east of these three tracts exhibit the same. Casting our eyes progressively over the four remaining maps we can see how, barring the odd fluctuation between under and over the average, the adjacent tracts in these directions become 'filled in' so that by 2008 nearly all adjacent tracts have now become over the Oslo average. Thus this particular neighbourhood displays trends similar to the organic process Smith (1996) picked up on in the Lower Eastside.

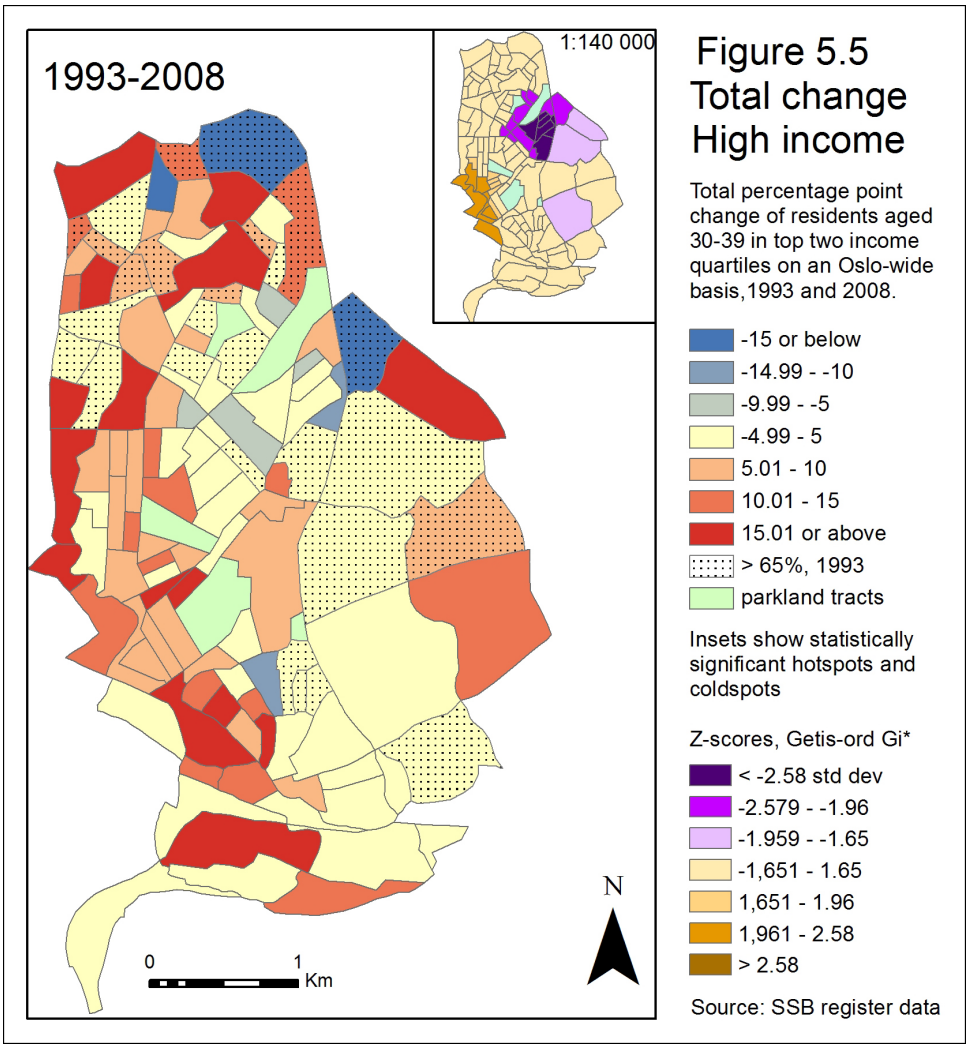
A similar pattern emerges for the borough of Sagene. As discussed previously, at the beginning of the period this was the borough with tracts that scored highest regarding education. By the end of the period, those tracts that stood out originally were surrounded by other tracts that had caught up to the average. By this time almost all tracts had come over the Oslo average, with the notable exception of Åsen 7, which will be discussed below. An interesting example is the aforementioned tract Sagene 1, which went from a coefficient of 0.56 to 0.81, indicating that the adjacent tract of Sagene 7 that scored so highly in the

Photo 5.1: Rivertzke complex, Sagene 1

beginning can have had somewhat of a beachhead effect on this tract. Remembering that this is the tract that is dominated by the Rivertzke complex, with its emphasis on light, spacious surroundings, it could appear that during the study period this type of complex, so close to the city, has fallen more and more in favour with an educated middle class, with the added security of knowing that nearby neighbourhoods are inhabited by residents similar to themselves. However, the total population of 30-39 year olds is relatively small in this tract (remaining around 100 throughout the entire period), meaning that the data can be sensitive to random variations, though it should be noted that these variations tended towards an even higher coefficient – as evidenced in the map for 1996 when it was at 1.01.

As shown in 5.1, higher education levels in the western half of the borough of Sagene have remained high relative to the rest of the study area, remaining a hot spot throughout. Meanwhile, higher income levels were not *as* pronounced in this area at the beginning of the period (though still reasonably high). Yet by 2008 the tracts belonging to the borough of Sagene had become particularly affluent in relation to the other boroughs. Twelve tracts here consisted of over 70 per cent in the top two quartiles, compared with eight in the rest of the study area (five of which were in the Eastern tracts). This illustrates that economic capital has most probably become increasingly important, in line with theory that suggests that in more mature stages of gentrification this is the case, such as the cycle theorised by Ley (1996).

Keeping our attention on Sagene borough, some observations concerning super-genrification can be made. If we look at the total change between 1993-2008 (figure 5.5, next page) there are three tracts with an original proportion of over 65 per cent high-income earners that also increased by ten or more percentage points, all in Sagene borough. There are also five tracts that increased by between five and ten percentage points. So if we can talk of super-gentrification in the Inner East at all, it is of Sagene we should do it, though it has been



a relatively marginal process thus far. Although not so many other tracts registered this high starting point, none of those that were in the Eastern tracts or Upper Kampen displayed this tendency. Why this is so may be down to a combination of factors. Many of the developments from the 1910s onwards that placed emphasis on environmental qualities such as light and green space seem to be proving popular among middle class in-migrants, and this has been combined with several new-build developments, particularly riverside, which appear to have contributed to a continuing increase in socioeconomic status across the whole borough of Sagene. It should be noted, however, that none of the original 65 per cent tracts featured in the top category in figure 5.5, with a percentage point increase over 15. A greater tendency was for tracts where new-build development featured to do so. This will be elaborated on below in a discussion of new-build gentrification.

A clue as to why super-gentrification has not been a major feature can perhaps be found in the housing structure data presented for each borough in figures 3.1, 3.2 and 3.3. The percentage of housing units that have only one or two rooms was over 50 per cent in each borough in 2001. It is likely that there is a strong correlation between unit size and high-income residents, though this cannot be ascertained with the data available here, as it is not

broken down into tracts. Therefore the high proportion of small residences probably provides a hindrance to super-gentrification. This could also be a reason why the tracts with new development seem to be attracting a high-income market, as the size of these apartments may be generally bigger than what else is available on the real estate market.

Particularly active over the last two periods from 1998 onwards are the tracts surrounding Tøyen Park (especially on the western flank) and extending up to Lower Grünerløkka. Most of these tracts show increases, many over five percentage points in at least one of the periods. One of the factors put forward by researchers as being attractive to gentrifiers is access to natural amenities (Ley 1996). Though it may be too deterministic to claim that that this is why gentrification seems to be strong around this area (why didn't it happen before this period?), the progression of change since the first map further reinforces the impression that this area was in a period of heightened gentrification activity.

By the last period mapped the whole area west and southwest from these tracts, down into Gamlebyen, is red (after fluctuating somewhat in the periods before this), converging with the area of Lower Kampen/Grønland 5 singled out before. The hot spot analysis for 2003-2008 confirms that it is the southwest of the study area that is particularly active in this period. The transformation this area has undergone is also reflected in the progress of higher education levels in figure 5.1. Comparing the map for 1996 with 2008 illustrates this clearly. In 1996 there were several tracts in the lowest category, and most of the remainder were in the second lowest. By 2008 many were above the Oslo average, Tøyen 3 and Tøyen 8 having reached the top category. Tøyen 3 was thus the only tract in the study area to go from the lowest category to the highest, almost followed by neighbouring Tøyen 1 (with a localisation quotient of 1.13 in 2008).

The tracts in Gamlebyen and south of Gamlebyen that were identified as having major traffic problems at the beginning of the study period appear increasingly attractive to higher income groups, particularly as evidenced in the map showing high income change in 2003 to 2008. When contrasted with the first two maps this change in fortunes becomes even more apparent. Notably, the tract Gamlebyen 1 goes from the lowest higher-education category in 2000 to above the Oslo average in 2008. This is most likely the result of a causal chain in which developers have been attracted to the area because of the reduced traffic volumes, building apartment complexes that are attractive for middle-to-high-income earners. Again, this is also taking advantage of the improved reputation neighbouring areas have achieved among the middle class target market, as gentrification spreads through Gamle Oslo.

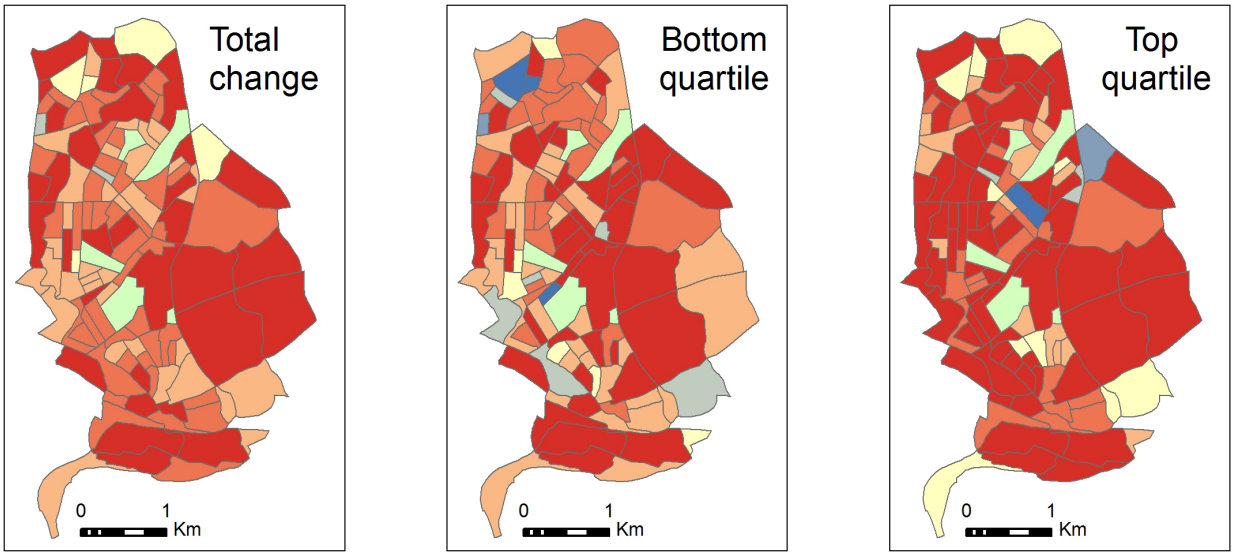


Figure 5.6 Percentage change, total numbers 1993-2008

Percentage change in absolute numbers of 30-39 year olds in each tract, 1993 to 2008. Shown for the age-group as a whole, the bottom income quartile and the top income quartile. Quartiles on an Oslowide basis.

-50 or below | -49.99 - -30 | -29.99 - -10 | -10 - 10 | 10.01 - 50 | 50 - 100 | 100.01 or above | parkland tracts

N

For all tracts, 30-39 year olds

Total increase: 13 858 (+ 77.8%)
Total increase, bottom: 1878 (+ 49.3%)
Total increase, top: 4526 (+ 99%)

Source: SSB register data

By 2008 Moran's I was at its lowest point in both figures. As tracts with low values become fewer, the tendency for them to be neighbouring each other becomes less. This pattern can be related to patterns observed in other western cities, whereby a fragmentation of working class areas occurs in later stages, a feature of the third wave according to Hackworth and Smith (2001). This fragmentation is also illustrated quite clearly in the difference in the hot spot analyses for 1996 and 2008 respectively, for both income and education. For both indicators, there are quite distinct clusters in 1996; by 2008, these clusters have become less pronounced and broken up.

5.4 Displacement?

Particularly interesting in light of the theoretical discussions on displacement summarised in chapter 2 is an analysis of absolute numbers. Until now the analysis has focussed on the *proportion* of each tract in different income quartiles or with higher education. This can potentially be misleading – it may appear that numbers in the lower quartiles are dwindling, which, although the data can give no definite causal relationship, may lead one to believe that displacement could be occurring. Figure 5.6 takes as a starting point absolute numbers, rather than proportions, in the bottom and top quartiles, showing the percentage change in total

residents in the 30-39 year age group for each tract. The immediate impression they give is that a high number of tracts have witnessed an increase in numbers in not only the top quartile, but also the bottom quartile.

As discussed in chapter 2, Davidson and Lees (2010) argue that a condition of gentrification is that a process of displacement takes place – higher income in-migrants *replacing* the original lower income residents, forcing them out into outer areas of the city. A further densification of the inner city area has been a goal of the Oslo city council throughout the period of analysis, and the large increase in the 30-39 age group goes some way to testifying that this has taken place – however it should not be assumed that all age groups have seen similar increases. The most interesting trend that emerges when analysing the absolute increases and decreases in figure 5.6 is that *both income quartiles are increasing in numbers, but the top quartile is increasing more.* It cannot therefore be ascertained from the data that a general process of displacement is taking place – if this was happening then we would probably see a far greater amount of tracts with a decrease in absolute numbers in the lowest quartile. In fact, the opposite is happening. The overall impression of gentrification is created by the fact that these numbers are, to a degree, cancelled out by the influx of higher income earners. The fastest increasing local consumer market thus becomes these higher income earners; hence the increasing signs found in the commercial environment that the area is being gentrified (Børrud 2005). For this reason it can be argued that the proportion of residents in each income quartile gives a fairer indication of gentrification, in that this value will give a better indication of the changing overall character of a neighbourhood. A longer-term effect can be what Marcuse (1986) refers to displacement pressure, when residents of a lower socioeconomic status become increasingly alienated from the surrounding neighbourhood and commercial environment. This becomes more of an issue perhaps in more mature stages of gentrification, a stage that few neighbourhoods in the Inner East have reached.

Wessel (1983) found evidence of displacement occurring, and it may be the case that the 1980s saw this happen to a far greater degree as rental units were converted to owner-occupier units in large numbers. Not all areas are the same though, and we can see for instance that the area Lower Grünerløkka and Tøyen/Grønland is the most patchy when looking at the bottom quartile, yet firmly dark red when looking at the top quartile – this is consistent with the hot spot analysis in figure 5.5. It cannot be ruled out that displacement could be a feature here. It is worth remembering too that the group of 30-39 year olds is of course a totally different group at the end of the period than the beginning, meaning that the lowest quartile is generally upheld in terms of absolute numbers either by residents who move

into the area or by those coming in from the 20 – 29 age group – there is no way from the data to determine whether those originally in the area have stayed (and are now in the 40 – 49 age group) or have left.

Meanwhile, it should again be emphasised that income statistics are per person rather than household, and it is worth deliberating on what this may mean for the analysis of these data. May it be the case, for example, that 'marginal gentrifiers', as proposed by Rose (1984), are playing a role in the gentrification process? It could be the case that many young people employed in the hospitality industry are making the Inner East their home, perhaps flatting together with other relatively low income earners in the same or similar service industries, in order to pool together funds to meet rising rents. People with higher education who may be waiting for relevant jobs, or starting from the bottom and working their way up in seniority and wage-level after completing their education, may be included. The data may include people living in two-person households where their partner earns a higher wage, meaning that household consumption power is still high, despite their being registered as lower income earners. A higher proportion of gay residents may be attracted towards the area and a more urban and open lifestyle, whatever their income level. The consumption tastes of all these subgroups would most likely correspond with the new urban gentry rather than the working class, thus also contributing to the overall impression of gentrification. Rose was critical to the tendency of quantitative research to obscure these characteristics; more detailed data is required to discover possible nuances.

It should, however, be reemphasised that the choice of the age group 30–39 should go some way to weeding out the impact of people in a relatively transient stage of life, as people tend to be in a more settled life-phase than the age group 20–29. This would tend to suggest that there is still a sizeable contingent of lower income earners that cannot be classified as 'marginal gentrifiers', and that this group has not shrunk as much as might have been thought. Bearing this in mind, it must also be remembered that the Inner East still has the highest proportion of council housing in the city. This means that the absolute lowest income earners are still provided with a safe housing alternative in the area, most of whom would likely be in the bottom quartile. It may be the case that those on the next rung up may struggle to remain or move into the area, particularly when entering a different life phase, such as having a family when larger living space is required. At the mercy of the private market, when a great proportion of other prospective buyers or renters in the area have a relatively high income prices will be pushed up. This is a trend that would not be able to be captured by the data used here.

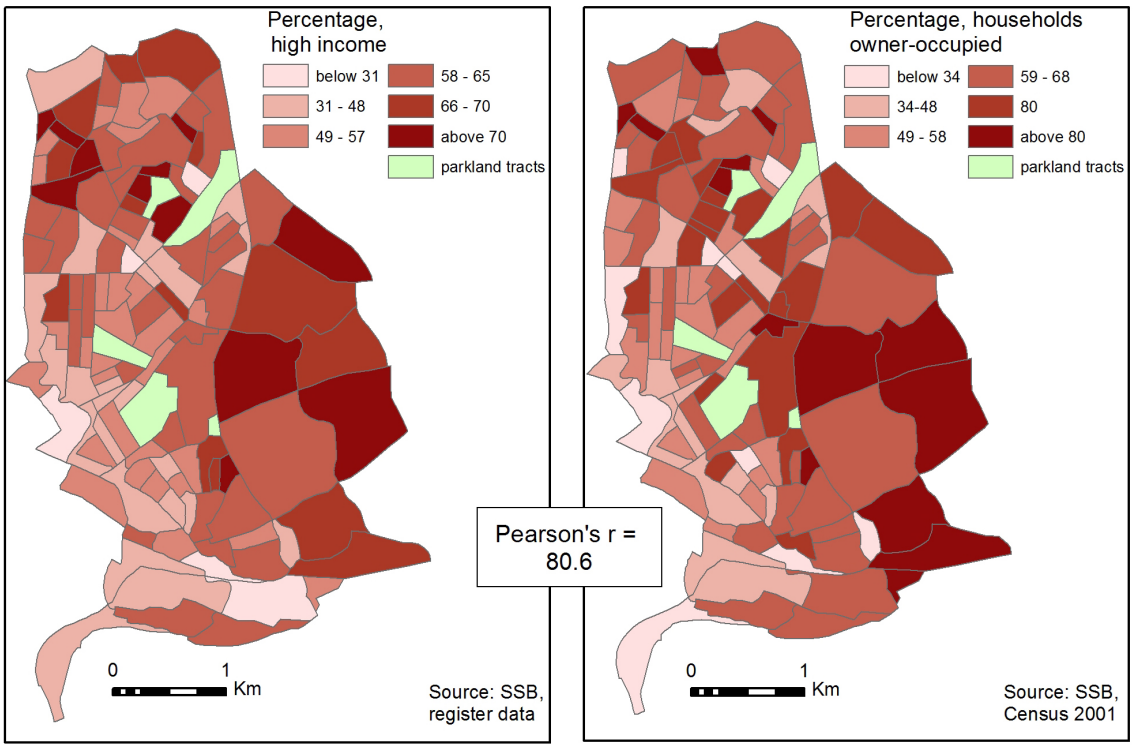


Figure 5.7 Relationship between tenure and high income, 2001

The map to the left shows the proportion of residents 30-39 years old in the top two income quartiles, Oslowide. The map to the right shows the percentage of total households in each tract that are owner-occupied, freehold and cooperative combined.

What is available is data from the 2001 census showing tenure, measured as the proportion of total households that are owner-occupied, whether it is freehold or cooperative (see figure 5.7). One should be mindful of comparing the selected age group's characteristics and the *total* population of households, but nevertheless the relationship seems a strong one. The maps, categorised into natural breaks (ArcGis uses an algorithm to determine a natural categorisation of values), look uncannily similar. The dramatic changes in the tenure structure during the 1980s were picked up on by Wessel (1996) as a root cause of gentrification processes, as discussed previously. The evidence here is that, by 2001, there was a strong positive correlation between the proportion of high-income earners and owner-occupiers, reflected in a correlation of r = 80.6. The implications of this are that it is difficult for low-income earners to break into the real estate market in the Inner East. The data supports the notion that it is most likely difficult for the second-lowest rung who do not qualify for council housing. The likelihood that this group faces exclusionary displacement is strong, especially during life-cycle transitions.

5.5 Hot spot: Lower Grünerløkka + Tøyen/Grønland

Figure 5.8 shows a closer analysis of the tracts picked up in the hot spot analysis for total change between 1993 and 2008, plus surrounding tracts which also scored relatively high z-scores (remembering that these surrounding tracts have an effect on how high each of the outer tracts in the hot spot scored). The changes in income quartile composition are by no means uniform across this area, as the changes in figure 5.5 indicate. In a hot spot analysis of change, tracts that see significant changes have a higher effect on neighbouring tracts than tracts experience change reasonably consistent with the rest of the area (i.e. close to the mean). It is therefore of interest to look closer at those tracts that stand out most, and attempt to look for reasons as to why they have been particularly attractive for gentrifiers. The change in income quartile distribution has been patchier on tract level in Tøyen/Grønland than in Lower Grünerløkka – some tracts here have experienced little change in their income quartile graphs (for example Grønland 1, 2 and 3), yet the area contains the four tracts which have experienced the most change in the top two quartiles: Tøyen 3, Tøyen 2, Grønland 5 and Gamle Aker respectively.

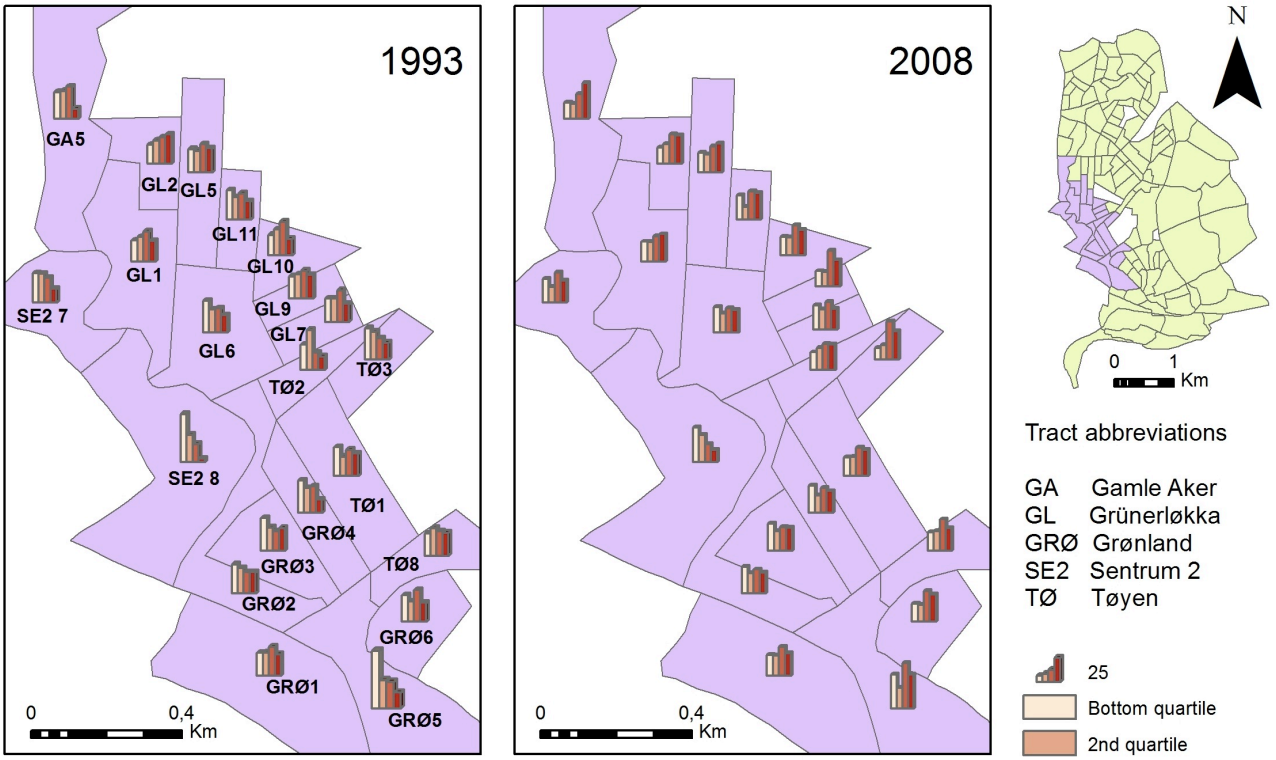


Figure 5.8 Hot spot: Grünerløkka and Tøyen/Grønland

Selected tracts from hot spot analysis in figure 5.5, showing an area which has undergone major changes in the proportion of high income earners, age 30-39, compared to the rest of the study area. The map graphs the income distribution for each tract, in relation to income quartiles on an Oslo-wide basis.

Photo 5.2: Gråbeingård, Tøyen 3

As is apparent from the contrasting graphs in 1993 and 2008, Tøyen 3 has undergone quite dramatic changes. These have taken place steadily throughout the period, with the exception of the first two years (see figure 5.4), the proportion in the top two income quartiles going from 39.1 per cent to 71.9 per cent. This tract is entirely made up of the tenement blocks known as 'gråbeingårdene', completed in the early 1890s. It was rehabilitated as part of the Oslo urban renewal programme in the early 1980s, in association with SIBO (Selskapet for innvandrerboliger), before being converted from rental property to a housing cooperative.[8] These buildings would appear to have become more and more popular with high income earners during the course of the study period; the neighbouring tract of Tøyen 1, which has also seen substantial change, the other to be dominated by these properties. The combination of rehabilitated older housing, its association with the working class industrial past fitting the requirements of a 'gentrification aesthetic', and the vicinity to Tøyen Park (this particular corner being home the Botanic Gardens) has probably aided the area's attractiveness for high-income earners. Tøyen 3 also saw a decrease in absolute numbers for the lowest income quartile (a decrease of 56 per cent, the second highest decrease of any tract), indicating a process where poorer residents are being squeezed out of the neighbourhood.

Tøyen 2 is the tract that has seen the third largest average increase in high-income earners over the course of the study period. It, too, has a building mass predominantly from the 1890s, but unlike Tøyen 3 there has been new construction during the period. Interestingly, the biggest changes have come in this tract in the last two years, with a nine percentage point increase from 2006 to 2008. This corresponds with a major housing development being completed on Heimdalsgata in 2006. There is a danger in falling into an

[8] Information from http://toyenparken.org, website from the housing cooperative, accessed 28/3/12

ecological fallacy – a change at a macro-level being attributed to a change at the micro-level – but it seems safe to draw the conclusion that this new development has at least contributed towards a socioeconomic upgrading of the tract. The number of 30-39 year olds rose from 180 to 232 in these last two years, coinciding with an increase in the proportion of high income earners from 47.2 to 56.5 per cent. This indicates that this development was most probably a factor, but data on the level of the individual would be needed to confirm a direct link between the new development and changes in the income quartile distribution.

A tract where new-build residential developments have been even more apparent is in Gamle Aker 5. In this tract new apartment buildings were completed throughout the 2000s, the most notable being Waldemars Hage in 2005, discussed in Sæter and Ruud (2005). From a population of 124 30-39 year olds in 2003, the tract was home to 369 by 2007 (the biggest increase, of 95, happening between 2005 and 2006). There can be little doubt about the impact of the new-build development, both on total numbers and the socioeconomic composition of this age group; the latter demonstrated in the markedly different income quartile graphs in figure 5.8. But again one should be weary of assuming that it was purely a flood of high-income earners coming into the tract. Looking at absolute numbers, in 1993 there were 49 people in the lowest two income quartiles (56.3 per cent), while by 2008 there were 125. This pales in comparison to the top quartile however, which went from 9 people in 1993 to 143 in 2008. It is no coincidence that this area has been targeted by developers aiming for a high-income market. Three factors make it particularly attractive in accordance with a gentrification perspective: its location by a natural amenity, the river and its surrounding parkland; its proximity to the city; and the fact that the tracts immediately east in Grünerløkka had already received attention from gentrifiers and were continuing to do so. In

Photo 5.3: Waldemers Hage, Gamle Aker 5

fact, all the tracts surrounding the river saw some form of development over the study period, particularly during the 2000s, though none had such a clear impact as in Gamle Aker 5.

It is perhaps a little harder to pinpoint why Grønland 5 has experienced so much change. The housing in this fish-shaped tract is clustered in the northern 'tail' centred round Tøyengata and Platous gate (the southern 'body' contains the Police House and parkland). The housing stock is mainly from between 1870 and 1892, with some new construction during the study period, in 2003, though this had little impact on total numbers. Housing from this period is still proving popular with high-income earners, as evidenced in Tøyen 1 and 3. The housing in the Grünerløkka tracts is also predominantly from this period, and as is apparent in figure 5.8 this is also now proving attractive in Lower Grünerløkka. Gamlebyen 3 and 4 (not shown) has a similar housing stock, and it too has seen a considerable upgrade in socioeconomic status over the study period. As discussed in chapter 3, the area covered by Grønland 5 was intended by Platou to be a better grade of housing than Enerhaugen above it – though it didn't necessarily attract the middle class back then, it appears to finally be doing that now.

The building stock can be contrasted with that of the tracts that appear not to be gentrifying to any great degree, although all have some buildings from this period. In the case of Grønland 1, a feature is a development completed in 1992, centred around a pedestrian shopping street on Smalgangen - its distinctly 1980s façade struggles to bring forth connotations of the 'gentrification aesthetic'. In Sentrum2 8, a student complex owned by the Anker foundation on Storgata, completed in 1976, dominates, going some way to explaining the high proportion in the bottom income quartile at both the start and the end of the period. This highlights the importance of affordable housing, rental or otherwise, regardless of whether it is aimed at students or low-income earners generally, in providing a counter to gentrification processes.

To conclude though that only old housing and brand new housing attracts gentrifiers would probably be oversimplifying matters. Grønland 6, covering Enerhaugen, is proof that this doesn't have to be the case. As discussed in chapter 3, this tract is dominated by 4 14-storey modernist housing blocks (though with some developments on the eastern flank from 1988 and 1990, plus some 19th century housing), contrasting markedly with the rest of Gamle Oslo and not conforming to a typical 'gentrification aesthetic'. However, these apartments have views over Oslo and the tract shows a clear tendency towards gentrification. This is particularly clear in the highest income quartile, rising from 19.3 to 29.7 percentage points over the period. As discussed in chapter 2, Butler and Robson (2003) point to different types of gentrifiers being attracted to different types of neighbourhoods. While the data cannot

uncover nuances in this case, a point of departure for further analysis could be whether the residents in this tract differ from other tracts in the area where pre-1900 residences predominate, as there is a somewhat stark contrast between these built environments.

In summary though, with the notable exception of Enerhaugen, we can surmise that classic gentrification of pre-1900 housing stock has been a feature of this area, spreading down from Upper Grünerløkka and Upper Kampen, as is best evidenced by referring back to figures 5.1 and 5.2. This pattern is largely in accordance with Smith's (1996) model of the Lower East Side, where gentrification spread from higher status neighbourhoods through similar housing stock. This trend has, however, been supplemented by new-build developments in the latter years of the study period, such as in Gamle Aker 5 and Tøyen 2. The area can thus be observed to still be displaying characteristics of the first and second waves of gentrification, with further reinforcement from large-scale developers, the predominant characteristic of the third wave, highlighting the complex nature of the more condensed temporal trajectory of gentrification in the Inner East.

5.6 Cold spot: Sinsen and surround

As discussed preciously, hot spot analyses are carried out relative to the rest of the study area. When an area on the whole is gentrifying, any hot spots will tend to show some dramatic changes in some tracts, as was illustrated above. Meanwhile, the fact that an area shows up as a cold spot in a gentrifying study area will not necessarily mean it is going through a dramatic downgrade in socioeconomic status. It may just be only slightly gentrifying or remaining roughly the same – it just so happens that the rest of the area is undergoing more marked increases in status. The area emphasised as a cold spot in figure 5.5, covering all the Sinsen tracts and some neighbouring tracts, can give one the impression that this is the case here when comparing the income quartile graphs at the start and the end of the period in figure 5.9. Also referring back to figures 5.1 and 5.2, the differences between 1992/1993 and 2008 appear minimal. It was hypothesised that Torshov could act as a beachhead for gentrification during the study period. As this has not occurred, a closer analysis of what it is that has hindered this from happening is in order.

In a hot spot it is necessary to pinpoint those tracts which have undergone the largest increases in socioeconomic status, as was done above. In a cold spot, the opposite should be done, to give one a better understanding of why this area shows up. In this case there are a number of tracts where particularly the bottom income quartile has increased its share of the population. Those tracts in which this quartile has increased by more than ten percentage

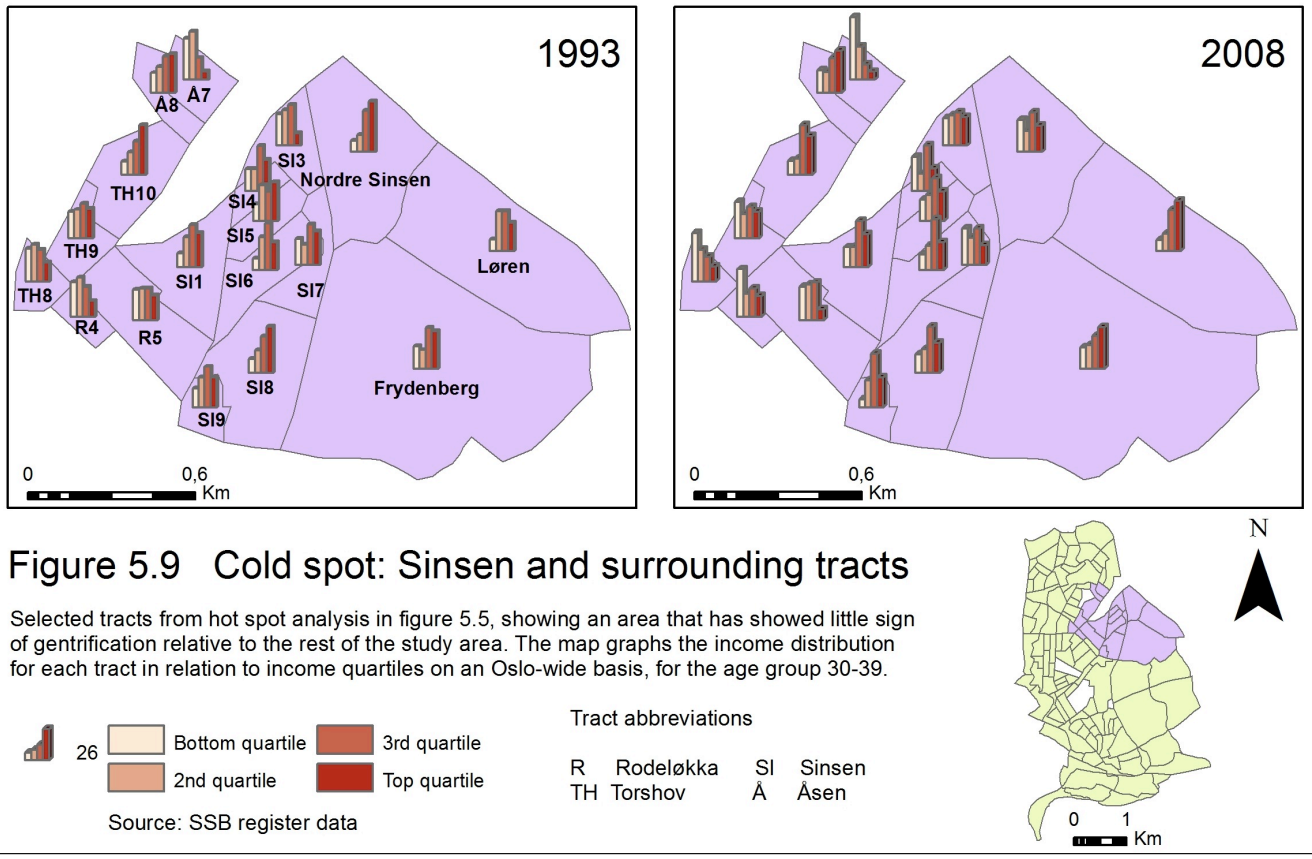


Figure 5.9 Cold spot: Sinsen and surrounding tracts

Selected tracts from hot spot analysis in figure 5.5, showing an area that has showed little sign of gentrification relative to the rest of the study area. The map graphs the income distribution for each tract in relation to income quartiles on an Oslo-wide basis, for the age group 30-39.

points include, going anti-clockwise from top left: Åsen 7 (from 34.3 per cent to 52.5 per cent); Torshov 8 (27.1 per cent to 40.3 per cent); Rodeløkka 4 (29 per cent to 39.8 per cent); Sinsen 4 (18.2 per cent to 28.6 per cent); and Nordre Sinsen (from 9.4 per cent to 27 per cent). Nordre Sinsen is distinctly different to the other tracts, composed of mainly detached and semi-detached housing built mainly in the 1930s. As always, care should be taken when analysing tracts with a small population – this tract was home to 63 30-39 year olds in 1993 and 64 in 2008, the small number making it difficult to draw any conclusion, as each income quartile fluctuated a lot throughout the period.

Meanwhile, the other tracts listed are relatively similar to each other – brick tenement housing constructed in the 1930s. It is most probably not just the design that is not attractive to gentrifiers, but also the fact that this area has a high concentration of council housing relative to the rest of the area. Using data from the 2001 census, the proportion of housing which was rented from the council in 2001 in the first three tracts mentioned above are: Åsen 7 82.1 per cent (the highest in the entire study area); Torshov 8 65.8 per cent; Rodeløkka 4 55.2 per cent. Thus the area shows clearly how housing policy, in this case the provision of council housing, can prevent a tide of gentrification from flowing through all neighbourhoods in an area. What is clear from the data is that during the study period there has been an

Photo 5.4: Trondheimsveien, Sinsen 4

increase in residents in the bottom income quartile in these tracts. Wyly and Hammel (1999) write of 'islands of decay in seas of renewal' in American cities after gentrification processes picked up there after the lull of the early 1990s, and the data here would appear to indicate that the juxtaposition between gentrifying tracts and tracts with a lower socioeconomic profile is perhaps becoming more pronounced in the Inner East, though the prevalence of the latter is diminishing.

A tract that is of particular interest in regard to new-build developments is Løren. This tract shows up in the cold spot owing to the fact that it shares a border with only two neighbours, neither of which has seen an increase in the top two income quartiles, although this hasn't been reflected in the actual data for the tract itself. Nevertheless, it is interesting to include in the analysis as a marked contrast to the rest of the Sinsen area. The area has previously been an industrial zone, with only a small block of terrace housing the only residential area at the beginning of the period. The population of 30-39 year olds varied from

Photo 5.5: Lørenbyen, Løren

only 8 to 22 up to 2003, meaning that the income quartile graph in 1993 (when there were 21 residents in total) shouldn't be given too much weight. However, during the period the area was targeted as an area to be converted to mainly residential, with one developer, Selvaag[9], being responsible for the development of 'Lørenbyen'. The tract is thus a good example of what Hackworth and Smith (2002) point out as being particularly characteristic of the third wave, whereby public policy, in this case re-zoning, lays the foundations for major private actors to develop neighbourhoods on a large scale. Of course, if it were to show in the data that a mixed income profile was emerging one would have to question whether this could be labelled as gentrification. But the data reveals the new neighbourhood's socioeconomic composition as far from mixed. When the first major bit of the project was completed in 2006 (the population of 30-39 year olds jumped from 63 to 171 from 2005 to 2006), the proportion in the top two income quartiles rose from 64.3 per cent to 80.1 per cent, making it the second most affluent tract in the entire Inner East for that year. Two years later the proportion had dropped slightly to 76.5 per cent, but it is still clear that the new development is attracting a relatively high income group of in-migrants. The proportion of people with higher education also went from below to above the Oslo average. It should be noted however that the development was still only partly completed in 2008, and it may have been more economically rational to begin with the building of more expensive apartments in order to help fund the rest of the project.

It is perhaps less clear why this area has been targeted for high-income development (whether or not it was intended for a high income market, that appears to have been the result) when compared with the ideal conditions in relation to gentrification theory that Gamle Aker 5 enjoyed. Neighbouring Sinsen is the area showing least sign of gentrification, nor is there an obvious natural amenity nearby. While Waldemars Hage can arguably be labelled as a continuation of gentrification processes in Grünerløkka, Lørenbyen is perhaps more symptomatic of more random targeting by developers that have been observed in other western cities. As discussed in 2.4, patterns of gentrification in New York and cities in Canada appeared to become more random during the 1990s and 2000s as the third wave took hold (Lee 1996, Smith and Dephillipis 1999, Meligrana and Skaburskis 2005), differing from the march of the 'gentrification frontier' Smith (1996) had observed during the 1970s and early 1980s. Lørenbyen is arguably proof that this is a pattern that is becoming equally applicable to Oslo, as a contrast to the more traditional patterns picked up in the hot spot tracts. Such developments near less affluent neighbourhoods can also go some way to

[9] www.selvaag.no, accessed 26/3/12

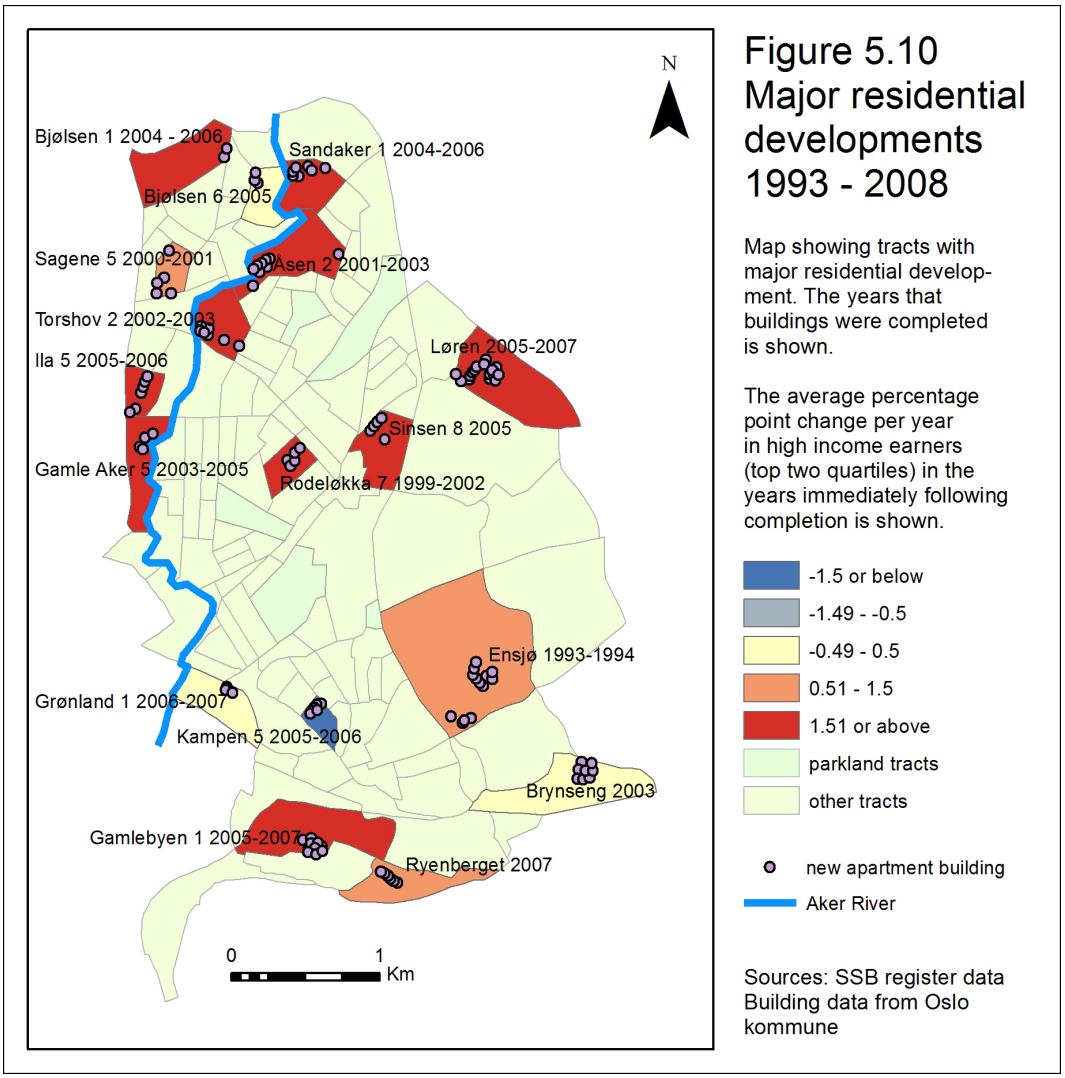
explaining the decline in Moran's I observed in figure 5.1 and 5.2, as it becomes less evident that high status tracts group together and low status tracts group together. Interestingly, in the period 2003 to 2008 the Sinsen tracts generally experienced increases in high-income earners, the only period in which this was a pattern (decreases in the previous periods had cancelled these out in the hot spot analysis), as is evident in figure 5.4. This can give cause to consider Davidson and Lee's (2005) argument that brownfield development has a beachhead effect on surrounding areas. It may be the case that the development taking place in the eastern tracts is making this area a safer investment and living environment for gentrifiers. It will be of interest to see whether this pattern is maintained in the next five-year period. As the Inner East becomes increasingly gentrified these tracts may also be catching the attention of people looking for a more affordable central location.

5.7 New-build gentrification

The patterns seen in both Løren and Gamle Aker 5 are worth discussing further in relation to the rest of the Inner East throughout the period of study. Figure 5.10 is a map of tracts that have been home to large-scale residential development at some stage during the study period. The limitations of the available data mean that it is impossible to prove a direct 'cause and effect' relationship between the developments and changes in a tract's economic status – to do so would require data that could be linked to individual addresses. For that reason we can only discuss possible relationships, but the data points to some interesting patterns.

Owing to the danger of falling into an ecological fallacy, the tracts that have been selected are subject to the following strict criteria:

- There are new apartment buildings, as distinct from other smaller forms of housing, which have been completed in roughly the same years, grouped together. When there are buildings elsewhere in the tract that were competed in the same time period, these are pointed out too, as the tract-level data does not allow us to distinguish between them.
- The tract-level data must have shown at least an increase of 30 per cent and 50 people in the 30-39 year age group, from the year of the first building completed to a year or two after the last is completed. Some leniency is given as to the time period, to allow for differing lengths of time in the moving-in process. All years around the time of completion in which there has been a significant increase in N are taken into account.
- The percentage point change of high-income earners (top two quartiles) over these years are averaged out and mapped.



This by no means captures all new-build developments (the previously discussed Tøyen 2 does not qualify, for example) – particularly in tracts where the population was already large it becomes difficult for a project to fit these criteria, but in these tracts it is also more difficult to ascertain whether there has been an effect on the socioeconomic status of the tract. It is perhaps problematic to say with certainty that it is the development has led to an increase or decrease in status, as changes may have been going on in other parts of the tract. But, in line with gentrification theory that maintains that new-build gentrification can act as a beachhead for gentrification, it could be argued that any changes in the rest of the tract could possibly be because that tract is enjoying an enhanced reputation that comes with urban renewal.

There was considerable residential development between 1993 and 1995, tailing off between 1995 and 1998 before picking up again. This may seem contradictory, when the period between 1993 and 1995 saw a lull in gentrification processes before picking up again in the latter period. A possible reason for this could be a lag in planning, approval and construction processes – the completed constructions had been planned originally when

gentrification was more prevalent. It becomes apparent on closer inspection though that little of this original development was large-scale – only one development, Ensjø 1993-1994, makes it onto the map. *All* the other 16 developments took place from 1999 onwards. As discussed, this has been a pattern picked up on elsewhere in regard to the 'third wave' of gentrification, where large-scale capital developers have moved in to already gentrifying areas and consolidated, if not enhanced, the process.

While the wisdom of describing gentrification as a series of waves has already been questioned, the development in Rodeløkka 7 is the first that carried with it signs of a different type of gentrification, the large-scale development that has featured in other cities as a characteristic of the third wave. Built alongside the classically gentrified wooden houses, the development of this tract involved the building of five apartment buildings on Gøteborggata, which coincided with nearly a doubling of the population of 30-39 year olds in the tract. The percentage of high income earners rose above from 54.8 per cent to 71.3 per cent between 1999 and 2003 (a trend that *could* also have been aided by people needing increasing amounts of economic capital to move into the classic-style houses), probably a more intense increase that at any time previously. Thus the large-scale development (with OBOS as developer) and influx of people with comparatively high income to the tract at the same time fits in with the characteristics of the third wave.

Of course, when surveying the other tracts, to argue that it is gentrification there must be a link to increased socioeconomic status, and what is indeed striking about the data is that only one of the tracts (Kampen 5) has experienced a decrease in the proportion of high-income earners during a period of large-scale development. The average annual increase in high income earners over all tracts for the years covered was 1.91 percentage points, all the more impressive when one considers that some of these tracts already had a high proportion of high income earners at the beginning of the period, making it harder to increase the proportion by any great amount.

It is also difficult to pick up on any spatial pattern that presents itself. Certainly, the riverside has been somewhat of a magnet for development, and the condensed nature of existing housing in many parts of the study area rule it out for large-scale development. What is perhaps significant is that, with the exception of Bjølsen 1, all development was in tracts that already had over 50 per cent in the top two income quartiles. Developers have perhaps not been too keen to develop in areas that still had not gained a good reputation among gentrifier

Photo 5.6: Large-scale new-build gentrification, Lilleborg, Sandaker 1

The four riverside developments (Sandaker 1, Åsen 2, Torshov 2 and Gamle Aker 5) each correspond with large increases in higher income earners over the period of development for their respective tracts (increases of 9, 8.7, 5.7 and 10.9 percentage points respectively). With the exception of Gamle Aker 5, which remained stable from a relatively high starting point of 1.08, the higher education localisation quotient for each tract was also raised significantly (increases of 0.23, 0.21 and 0.09 respectively, not shown). Thus it can be inferred that these developments are catering to a certain market – high in economic capital and (by proxy) educated. Indeed, in all development tracts in the rest of the borough of Sagene the socioeconomic status was at least maintained, from some high starting points. As discussed previously, it was only in the borough of Sagene that signs of super-gentrification showed, and the examples in figure 5.10 would tend to suggest that new-build development played an important role in this pattern. The influx of high-income groups that these developments housed would most likely further enhance the borough's reputation and lead to changes in the commercial environment that would cater for a middle class market. This can have an interaction effect with other tracts, many of which were already high status, aiding the process of super-gentrification.

Kampen 5 was the only tract that experienced a decrease in socioeconomic status, both in terms of high-income and higher education. As such, it should be analysed a little closer to see why this may be the case. The tract only just made the 30 per cent threshold of change in N, and therefore no direct conclusions should be made, as changes going on elsewhere in the tract will have more of an influence than in many of the other tracts analysed. In light of the previous discussion on the effect of council housing on stemming the flow of gentrification, it should come as no surprise that the council has hired 43 of these new

apartments to rent out to those who qualify[10], with a special targeting of families with young children. The anomaly in the seventeen developments picked out thus proves to be the anomaly in terms of intended market, highlighting the need for regulation if a mixed population is to be maintained in the face of gentrification.

5.8 Summary

During the first three years of the study period, up to 1995, the process of filtering was more common across most of the study area. Although one should be wary of dividing up gentrification processes in the Inner East according in a series of waves, this does correspond with trends in North American cities for this period that were described as a transition period between the second and third waves. The lull in gentrification processes continued a couple of years longer in this case, before picking up again around 1995. During the period 1998 to 2008 these processes gathered pace, a particular trend being the proliferation of large new-build housing projects that have attracted a generally high-income market. This is consistent with aspects of the third wave in North America.

The further fragmentation of working class communities is also a feature of the third wave in North America; in the case of the Inner East it is difficult to detect displacement, as numbers in all income quartiles have increased in the age group analysed. But numbers in the top quartile have increased significantly more than the bottom. This can have led to a feeling of alienation on the part of original residents as well as exclusionary displacement. The high correlation between high-income and owner-occupancy rates also suggest that it is difficult for low-income earners who do not qualify for council housing to enter the real estate market in the Inner East.

Super-gentrification was not a feature of the period, only hinted at in Sagene. A possible reason for this may be the high proportion of small apartments across the area. A perhaps surprising result was that this process could not be detected in the tracts containing pre-1900 wooden housing, when they might have been expected to be in a more mature phase of gentrification.

A hot spot was identified which covered the tracts of Lower Grünnerløkka and on into Tøyen/Grønland. These tracts are characterised by a residential building stock from pre-1900, but there is also some new-build development as well as modernist apartment buildings from the 1960s. This highlights the simultaneous gentrification processes that have been going on

[10] **http://www.sak.oslo.kommune.no/dok/Byr per cent5C2005 per cent5CBR1 per cent5C2005021296-1.pdf** accessed 31/3/12

during the study period, underlining the danger in applying the wave schema directly onto the case of the Inner East.

A cold spot was also identified, centred on the Sinsen tracts. A built environment not corresponding to the 'gentrification aesthetic', plus a high proportion of council housing, has prevented gentrification from taking hold in this area so far. The importance of council housing in stalling gentrification was also demonstrated in the case of Kampen 5, the only new-build tract that saw a drop in socioeconomic status.

6. Socioeconomic structure

We have seen that there has been a general trend across most of the study area towards either consolidating or increasing higher socioeconomic status during the study period, although it has been noted that some tracts have been left behind somewhat. This chapter will take a look at overall changes to the socioeconomic structure of the Inner East. Firstly, data will be presented analysing changes on a more general level, giving a summary of the 30-39 year old age group at both the borough level and for the Inner East as a whole. Secondly, an analysis of geographic polarization will be presented, taking both indicators of education and income into account.

As discussed in chapter 2, geographic socioeconomic polarization occurs when a greater percentage of the total population live in both very high income and very low income neighbourhoods, with fewer living in middle income neighbourhoods. Or in the case of education, when a greater percentage of the total population live in both neighbourhoods with very high levels of education and neighbourhoods with very low levels of education. These theses will be adapted to the data available, to see if the Inner East has been geographically polarized as a consequence of gentrification. This can be important in assessing the potential for conflict in an area – when two groups at the opposite end of the income or education group together residentially the differences from tract to tract become increasingly marked. Residents in higher status neighbourhoods may feel the need for 'cleaning up' neighbouring low status tracts in order to protect their housing investment, while residents in low-income neighbourhoods may become hostile to the increasing visible affluence in neighbouring high-income tracts, leading to a greater will to 'protect' their territory.

6.1 Total change to socioeconomic structure

To ascertain whether the socioeconomic structure on the whole is tending towards a more polarised one it is the groups on the outmost points that we are concerned with. In regard to the data available for this analysis, education is broken up into three groups; it is thus those with only primary education and those with tertiary education that are of interest – the problematic aspects of these categorisations having been discussed in chapter 4. Income is broken up into quartiles; it is thus the bottom and top quartiles that are the focus of analysis. If these groups are all increasing their share of the population, naturally meaning that the middle group is getting smaller, the population is being drawn towards the 'poles', and can be said to be polarising.

		1992 %	LQ	2000 %	LQ	2008 %	LQ	Change LQ 92-00	Change LQ 00-08	Change LQ 92-08
Sagene	Primary	25.6	1.12	18.5	1.01	8.7	0.65	-0.11	-0.36	**-0.47**
	Secondary	28.9	0.82	25.6	0.83	19.1	0.73	+0.01	-0.1	-0.09
	Tertiary	45.5	1.08	55.9	1.1	72.3	1.2	+0.02	+0.1	**+0.12**
Grünerløkka	Primary	28.1	1.23	19.3	1.06	10.4	0.78	-0.17	-0.28	**-0.45**
	Secondary	32.5	0.92	28.6	0.93	23.1	0.87	+0.01	-0.06	-0.05
	Tertiary	39.4	0.94	52.1	1.02	66.5	1.1	+0.08	+0.08	**+0.16**
Gamle Oslo	Primary	32	1.36	25.6	1.4	13.7	1.04	+0.04	-0.36	**-0.32**
	Secondary	35.1	0.99	32.3	1.05	25.6	0.98	+0.06	-0.07	-0.01
	Tertiary	33.9	0.81	42.2	0.83	60.7	1	+0.02	+0.17	**+0.19**
Inner East total	Primary	28.2	1.24	21.1	1.15	11	0.83	-0.09	-0.32	**-0.41**
	Secondary	32.2	0.91	28.9	0.94	22.7	0.86	+0.03	-0.08	-0.05
	Tertiary	39.6	0.94	50.1	0.98	66.3	1.1	+0.04	+0.12	**+0.16**

Table 6.1: Percentage of 30-39 year olds in each borough, and the Inner East as a whole, in each category of highest completed education. All residents whose education was unregistered are left out of the analysis. The percentage is converted into a localisation quotient, which is the ratio to Oslo as a whole.

Taking the whole study area first, it is clear from the data in table 6.1 that there has been significant changes in the population structure over the course of the period under analysis, taking education levels as an indicator. Not surprisingly, considering the changes observed in the previous chapter, the group with tertiary education has seen significant increases, particularly in the last half of the period. The Oslo average has continually increased during the period, so if the Inner East were to keep pace with these changes there would naturally be an increase in that proportion. But the proportion has done more than this, increasing from under the Oslo average in 1992 (49.1 per cent for Oslo) to lie 10 per cent over the average in 2008 (60.5 per cent for Oslo). If the area was seeing polarisation occurring, we would expect the group with primary education to also be expanding its share. This could be done in two ways; either by looking at the percentage of this group in the area as a whole and seeing if it has increased, or by seeing if it has increased its localisation quotient (which it could theoretically do while still declining in its proportion in the Inner East, as this group's Oslo-wide proportion has declined significantly over the period). Either way one chooses to look at it, there has been a sharp decline, particularly over the course of the last eight years. A relatively even distribution in 1992 has thus become heavily weighted towards the top end of the education scale in 2008, rather than a more polarised structure.

This pattern is something that is shared by all three boroughs since 2000. This was also happening in Sagene and Grünerløkka on a smaller scale prior to 2000 (remembering that

the period 1993-1995 was a transition period when gentrification wasn't a feature – this will have watered down the figures somewhat). Gamle Oslo stands out as having two quite distinct periods. In 1992 the population structure was distinguished by a much greater proportion of people with primary education than was the case for Oslo on the whole – a localisation coefficient of 1.36 indicating over a third more than the average for the city. The proportion with tertiary education was nearly a fifth less than the average. While the former group decreased its proportion during the next eight years and the latter group increased its proportion, this was roughly in line with trends Oslo-wide, meaning similar localisation coefficients for the two groups in 2000. But this has changed markedly between 2000 and 2008. Over this period the two groups have decreased and increased respectively to such an extent that they ended on or near the Oslo average in 2008.

Similar trends are evident when looking at income distribution for the three boroughs and the Inner East as whole. Remembering that the absolute number of residents increased across most tracts for both the bottom and top quartiles; it could have been a sign of polarisation of the income structure as a whole. This does not appear to be happening however, indicating that the middle income groups have increased in absolute numbers as well. Indeed, there were increases in absolute numbers in all quartiles in all three boroughs, for both periods (not shown). But we should also be aware of the disadvantage of using quartiles in analysing polarisation. The quartiles will always have the same proportion of

		1993 (%)	2000 (%)	2008 (%)	Change 93-00	Change 00-08	Change 93-08
Sagene	1st quartile	18.8	18.3	15.9	-0.5	-2.4	-2.9
	2nd quartile	20.9	20.6	17.5	-0.3	-3.1	-3.4
	3rd quartile	31.7	32.8	34.1	+1.1	+1.3	+2.4
	4th quartile	28.7	28.3	32.6	-0.4	+4.3	+3.9
Grünerløkka	1st quartile	21	21.5	18	+0.5	-3.5	-3
	2nd quartile	24	22.4	19.6	-1.6	-2.8	-4.4
	3rd quartile	30.5	30.9	34	+0.4	+3.1	+3.5
	4th quartile	24.6	25.1	28.4	+0.5	+3.3	+3.8
Gamle Oslo	1st quartile	24.2	23.4	19.7	-0.8	-3.7	-4.5
	2nd quartile	22.7	22.7	21.1	------	-1.6	-1.6
	3rd quartile	28.9	29.9	33.4	+1	+3.5	+4.5
	4th quartile	24.3	24.1	25.8	-0.2	+1.7	+1.5
Inner East total	1st quartile	21.4	21.2	17.9	-0.2	-3.3	-3.5
	2nd quartile	22.7	22	19.5	-0.7	-2.5	-3.2
	3rd quartile	30.3	31.1	33.8	+0.8	+2.7	+3.5
	4th quartile	25.7	25.7	28.7	------	+3	+3

Table 6.2: Percentage of 30-39 year olds in each income quartile on an Oslo-wide basis.

people in, 25 per cent, Oslo-wide. If, for example, there were more people earning very high and very low wages in Oslo over the course of the period, this could increase the spread of the income level that 25 per cent were under and over respectively. But there will still be 25 per cent of total residents in each group, by virtue of the fact they are divided into quartiles. So theoretically, if in the Inner East the spread of incomes stayed the same while this was happening in the rest of Oslo, more people could find themselves in the middle two quartiles because the measure is relative to the city as a whole. The income structure could even be more polarised, but if this wasn't happening to as great a degree as in the rest of Oslo this would not show up as polarisation.

If we take the income quartile data together with the data on education levels, however, we can with reasonable certainty ascertain that there has been a significant shift in the socioeconomic structure. Again, this is particularly evident since 2000, particularly in the decline in residents in the bottom quartile in all three boroughs. In all three this quartile remained relatively stable between 1992 and 2000, with significant declines between 2000 and 2008. If we take the two top quartiles in each borough, while all increasing overall, slightly different trends can be observed from borough to borough; in Sagene the sharpest increase has been in the top quartile between 2000 and 2008 (4.3 percentage points), from a higher starting point than the other two (28.3); in Grünerløkka both the top two quartiles increased significantly between 2000 and 2008 (3.1 and 3.3 respectively); and in Gamle Oslo it was particularly the third quartile that saw a significant increase between 2000 and 2008 (3.5). It is possible to relate this to gentrification processes that were picked up on in the previous chapter. Firstly, Sagene was generally the only borough where 'super-gentrification' was partially a factor since 2000, thus becoming increasingly attractive to people with high economic capital – those in the top quartile. Gentrification processes that began in the 1980s have been consolidated in Grünerløkka – its income distribution is now similar to Sagene at the beginning of the period. Lastly, gentrification processes in Gamle Oslo (with the exception of Kampen) only began to be particularly pertinent in the latter period, but this appears to have largely been due to an increase in the third quartile. This is logical when considering the stage model of gentrification – those with middle-high income with high cultural capital move into an area first, before economic capital becomes increasingly important in later stages – this group represented here in the top quartile – as it has become in Sagene and, more so than Gamle Oslo at any rate, in Grünerløkka. Evidence of this process is also found when considering the changes in education for Sagene and Grünerløkka in the first period – these were much more significant than the changes in income levels.

6.2 Geographic polarisation

In this section a summary of trends in regard to geographic polarisation in the Inner East as a whole will be presented. In assessing geographic polarisation it is a goal to see how many people live in tracts which overall have a high proportion of either the lowest or highest income or education categories. We have seen that the overall socioeconomic structure is moving in a top-heavy direction, favouring higher status groups. It could therefore be expected that with the shrinking proportion of lower income/education groups there will be proportionately less people living in tracts with an overweight of these groups. But it could also be the case that those who remain are becoming increasingly concentrated spatially.

The analysis takes into account 119 tracts, enough to give an idea of polarisation patterns using the tract as an analysis unit. This is enough tracts so that the effect of very large tracts and/or tracts with extreme values do not affect the analysis unduly. This, however, may not be the case when taking the borough as the level of analysis, where only about 40 tracts make up each one. A more suitable unit of analysis in the case of the latter would be on an even lower geographic level than the tract, such as the block. For this reason the following analysis will focus on the whole of the Inner East, as the data available is on the level of the census tract.

Table 6.3 and figure 6.1 analyse geographic polarisation using higher education levels as an indicator, based on the method developed by Dorling and Woodward (1996) outlined in chapter 4. The overall trend is of an increasingly smaller proportion of the population living in tracts with a localisation quotient in all categories below one (below the average for Oslo), with all categories above one increasing *except* the highest category. Even without this last trend it cannot be argued that geographic polarisation is taking place among 30-39 year olds. Rather, there is a very pronounced shift towards a higher proportion of residents living in tracts where there are predominantly residents with higher education. Figure 6.1 illustrates

Localisation Quotient	1992 (%)	2000 (%)	2008 (%)	Change 92 - 00	Change 00 - 08	Change 92 - 08
< 0.7	14.3	9.9	1.1	-4.4	-8.8	-13.2
0.7 to 0.8	13.5	14	2.2	+0.5	-11.8	-11.3
0.8 to 0.9	22.8	9.5	7.1	-13.3	-2.4	-15.7
0.9 to 1	15.3	15.3	14.7	-------	-0.6	-0.6
1 to 1.1	9.1	23.4	21.3	+14.4	-2.1	+12.3
1.1 to 1.2	9.4	13	26.8	+3.6	+13.8	+17.4
1.2 to 1.3	5	6.4	21.4	+1.4	+15	+16.5
> 1.3	10.7	8.6	5.4	-2.1	-3.2	-5.3

Table 6.3: Percentage of residents 30-39 years old living in tracts grouped according to localisation quotients for higher education

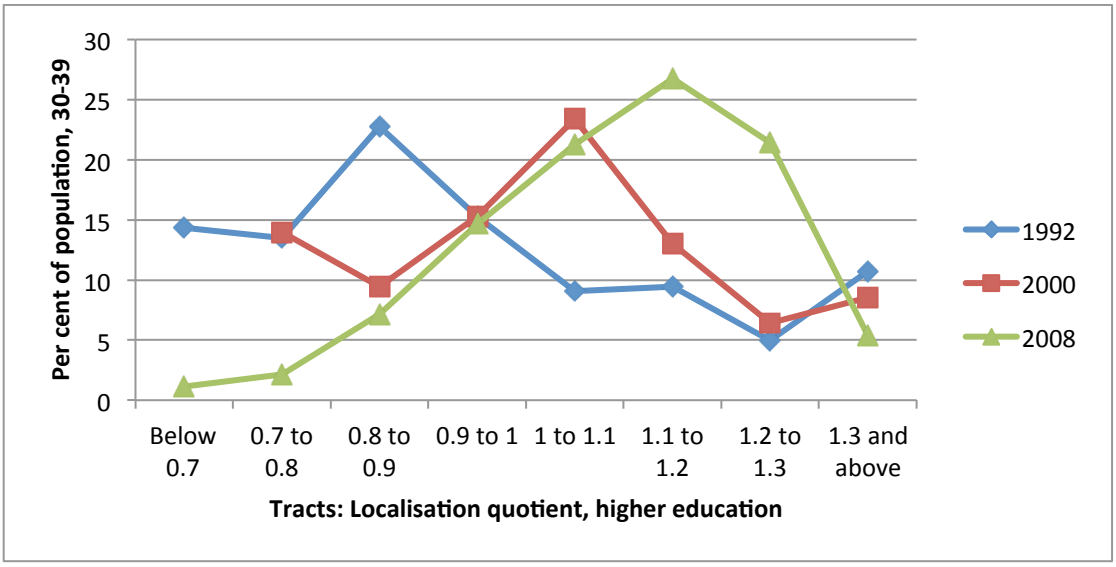


Figure 6.1: Graphic representation of residents 30-39 years old living in tracts grouped according to localisation quotients for higher education.

the changing geographic distribution clearly, highlighted by the shift towards higher values. The changes that have taken place make for quite dramatic reading. In 1992 about one in two residents in this age group lived in tracts with a higher education level less than ninety per cent of the Oslo mean; by 2008 this figure was down to one in ten. On the other hand, by 2008 over half the population lived in tracks with a higher education level than the Oslo average.

As was also discussed in chapter 4, the high proportion of residents with unregistered education levels can affect the reliability of the analysis. It could be the case that these are geographically concentrated, meaning that the localisation quotients may be misleading for a number of tracts, particularly if actual education levels of the 'unregistered' differ markedly

	1st quartile /4th quartile	1993 (%)	2000 (%)	2008 (%)	Change 93 - 00	Change 00 - 08	Change 93-08
Low Income	> 4	2.8	2.1	0.5	-0.7	-1.6	-2.3
	2-4	7.9	6.4	3.4	-1.5	-3	-4.5
	1.33 – 2	10.9	10.6	3.4	-0.3	-7.2	-7.5
	1- 1.33	12.1	14.4	7.3	+2.3	-7.1	-4.8
	0.75 – 1	16.2	20.2	13.3	+4	-6.9	-2.9
	0.5 – 0.75	25.7	23.8	33	-2	+9.3	+7.3
High income	0.25 – 0.5	23.3	18.1	33.5	-5.2	+15.4	+10.2
	< 0.25	1	4.5	5.6	+3.4	+1.1	+4.5

Table 6.4: Proportion of residents 30-39 years old living in tracts grouped according to the ratio of low income earners (1st quartile Oslo-wide) to high income earners (4th quartile Oslo-wide).

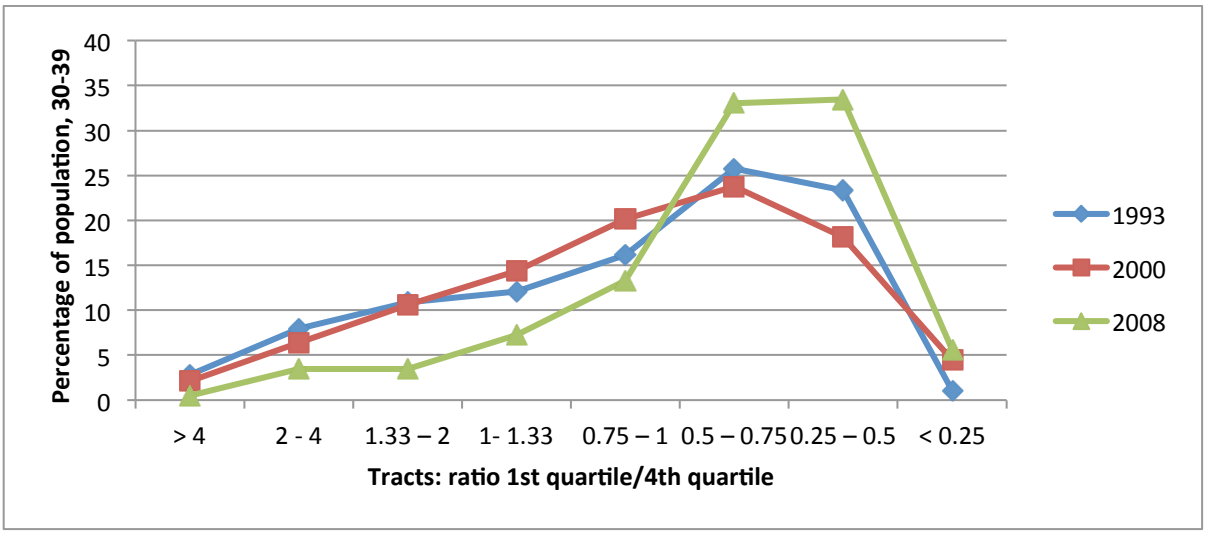


Figure 6.2: Graphic representation of residents 30-39 years old living in tracts grouped according to the ratio of low income earners to high income earners.

from those 'registered'. Thus it is perhaps more effective to see if people with high and low incomes are geographically polarised, as everybody in the population has a registered income. The data in table 6.4 uses a method categorising tracts based upon the method used by Storstadksommittéen (1997), also outlined in chapter 4. This looks at the ratio of low income earners to high income earners in each tract. The data reveals patterns similar to those using education as an indicator. All low income tracts (where people in the lowest quartile outnumber those in the highest) have declined their share of the population of 30-39 year olds, more dramatically in the second period than in the first. Though there were mixed results in the first period among the high income tracts, over the course of the second period the top three groups increased their combined share substantially. The distribution curves in figure 6.2 show clearly that even at the beginning of the period the distribution of residents was weighted towards higher income tracts. In 2000 the distribution was quite similar to 1993, but in the years up to 2008 a more pronounced bell-shape curve with a sharper incline centred on the high-income tracts had eventuated. By 2008 72 per cent lived in tracts where high income earners outnumbered low income earners by more than two to one, while only seven per cent lived in tracts where low income earners outnumbered high income earners by two to one; in 1993 this figure had been 50 per cent and 22 per cent respectively. The data confirms that there has not been a geographic socioeconomic polarisation among 30-39 year olds, but rather a marked shift towards the upper end of the spectrum.

6.3 Discussion and summary

As discussed in chapter 2, Walks and Maarenen (2008) found that gentrification in Canadian cities did not contribute towards more socially mixed neighbourhoods. They showed that the income structure in gentrified tracts was increasingly skewed towards high income groups – the longer a tract had been gentrifying , the more significant this trend became. The data here shows similar patterns to those findings in the case of the Inner East, firstly across the area as a whole, and secondly if we look at the three boroughs, regardless of whether education or income is taken as an indicator. Generally speaking, Sagene and Grünerløkka have had pockets of gentrification from an earlier stage than Gamle Oslo, which have now spread to other areas of each borough. They have an income structure more weighted in favour of the top two income quartiles than is the case with Gamle Oslo, but there have been significant changes in Gamle Oslo during the second period of analysis as it shows increasing signs of gentrification.

In this analysis of the Inner East the focus has been on geographic polarisation. So while they found an increased tendency towards a top-heavy income structure *within* tracts as a long-term consequence of gentrification, this cannot be taken as an argument for geographic polarisation per se. Applying their findings to a more geographic analysis though, and similar findings come to light. In the case of the Inner East, fewer and fewer people are living in tracts with a high ratio of low income earners to high earners, while more and more are living in tracts where the opposite is the case. This is not a sign of polarisation, but rather a sign of the increased predominance of higher income earners spread across most tracts. This has happened despite an increase in the total amount of low income earners, highlighting the fact that there has been a huge influx of high income earners among this age group.

It should also be noted that in the Canadian case study, aggregate data for the whole population was used, whereas in this analysis it is only the 30-39 year old age group that has been analysed. This would likely have an effect on results. If we were to take the total population of the Inner East, it is quite conceivable that older age groups, with a greater proportion of residents having lived in the area over a long period of time, would have a greater proportion of lower income earners than is the case with the age group analysed. Even taking the 20-29 year old age group, the higher proportion of students and people at the beginning of their careers would likely result in a more polarized structure among that group. Thus the findings would probably have been quite different, possibly with a more polarized structure overall. Meanwhile, as discussed in chapter 4, the 30-39 year old age group provides an indicator of how the socioeconomic structure may be for the population as a whole in the years ahead. These residents will either continue to live in the neighbourhood, or

move out and be replaced with people of a similar demographic and socioeconomic status as real estate prices are pushed up as a result of gentrification processes.

A wider analysis of Oslo would perhaps bring to light some interesting patterns concerning geographic polarisation. Considering that income quartiles will always represent 25 per cent of the population, a pertinent question must be where lower quartile residents are making up a greater proportion of the population, if not the Inner East as they traditionally have. Are they being spatially concentrated in other areas? Walks and Maaranen contended that this may be a result of gentrification in Canada, and Hedin et al. (2011) found filtering of low-status neighbourhoods to be a suburban phenomenon in Sweden. In line with the findings here, it would not be unreasonable to suggest that this may be a pattern that could be applicable to Oslo.

7. Conclusions

It has become clear during the analysis that gentrification has been a feature of the Inner East during the time period studied, 1992 to 2008. While there is no doubt that the process had already featured in some areas at the beginning of the period, by the end it had expanded to become a more prominent aspect of the urban landscape than at any time previously. I have attempted to pinpoint the areas and trends that appeared to be the most important, a challenge when presented with a geographic area made up of tracts that can be so distinct from one another. As I have pointed out previously, the fact that the data have been presented in a series of maps means that the intricacies involved in the process can be perceived in different ways by different readers, depending on which areas one is most interested in. Nevertheless, I have chosen to focus on aspects that I feel are most relevant to answering the four research questions I set out to answer. The rest of this chapter will be used to go through these questions, before discussing the relevance of these findings for the urban development of Oslo.

A) How relevant are established theoretical models of gentrification in describing the process as it has unfolded in the Inner East?

Particular emphasis has been placed throughout the analysis on the wave model posited by Hackworth and Smith (2001). The beginning of the study period coincided with the 'transition' from the second to third waves according to this schema. Up to 1995 there was indeed a lull in gentrification processes in the Inner East, as a far larger proportion of tracts experienced filtering than in any other period. But to claim that 'waves' of gentrification had hit Oslo prior to 1992 is misleading. There were great variations between areas in 1992 – while Upper Grünerløkka, much of Sagene borough and Upper Kampen had certainly experienced the first stages of gentrification, other parts of the study area showed little sign. Gentrification had hit the Inner East much later than many other cities in North America, during the 1980s rather than beginning in the 1960s, a process that was state-led in conjunction with an urban renewal program (an aspect of the first wave) and changes in house ownership laws (private market forces being allowed to prevail an aspect of the second). Thus by the time the 'third wave' hit North America, aspects of the first two were still evident in Inner East neighbourhoods. These three waves have been condensed into a shorter time period, as well as probably being too marginal pre 1990s to be considered 'waves'.

Gentrification post-1995 has however displayed many aspects in the Inner East that can be related to the third wave in North America. The process has been expanded to cover most of the study area; large developments have taken place on previously non-residential

land, which have generally attracted in-migrants with high socioeconomic status; and working class neighbourhoods have diminished or become more fragmented.

Displacement of the original residents is an aspect which has featured right through from the early stage models to the third wave in North America. While it is difficult to prove that displacement has taken place during the period, there is a strong relationship between ownership status and high-income residents, indicating that it is difficult for low-income groups that do not qualify for council housing to compete on the private real estate market. While numbers of residents aged 30-39 have increased in all income quartiles, this growth has been far more substantial in the top quartile than the bottom, changing the character of many neighbourhoods. Signs of super-gentrification have appeared in Sagene borough, though this has not been a dominant phenomenon. So while the third wave is certainly relevant to trends in the Inner East, in particular in relation to new-build gentrification, it should be noted that social upgrading is still occurring in some neighbourhoods characterised by old building stock, more reminiscent of first-wave and 'classic gentrification'.

B) What temporal variations are evident for the area as a whole, and between different areas?

As mentioned above, for the area as a whole gentrification was not a feature between 1992 and 1995. 1995 was a turning point – many tracts went from filtering to gentrification around this time. After 1998 this tendency was accentuated, such that gentrification spread from those areas originally singled out to encompass most of the study area. It is this period, 1998-2008, which can be thought of as the consolidation of gentrification in the Inner East, rather than the 1980s as it was in North America.

While the encroachment of a gentrification frontier tract by tract as Smith (1996) maps is not necessarily the case for the Inner East, there is some evidence to suggest that some areas have had somewhat of a beachhead effect in encouraging gentrification in neighbouring areas. Relatively few tracts showed signs of gentrification 1993-1995, but there was a hot spot centred on Lower Kampen, indicating that the Upper Kampen tracts may have been contributing towards an improvement in the area's reputation. After 1998 this had spread to Gamlebyen and Tøyen/Grønland, a period in which Lower Grünerløkka also showed increasing signs of gentrification. In the case of the latter Upper Grünerløkka acted as a beachhead. After 2003 tendencies towards gentrification spread further to the southernmost tracts in the area, a trend that can also be seen in relation to new-build gentrification and improved environmental quality because of traffic reductions.

The borough of Sagene started the period as a hot spot for higher education. Over the course of the study period high-income levels have become more significant – by 2004 this borough was registering as a more pronounced hot spot for high income than previously. This is in line with much gentrification theory, which shows that high economic capital becomes more characteristic of in-migrants in more mature stages of gentrification.

Some areas have shown relatively little tendency towards gentrification. Sinsen particularly has been an area where gentrification has not been a feature, despite being a neighbour to Torshov, a neighbourhood that exhibited a high socioeconomic status from the outset of the period. Though even in Sinsen slight tendencies could be picked up on after 2003.

C) Are there characteristics common to the areas or tracts that have witnessed, respectively, the highest degrees of gentrification and the lowest degrees of gentrification during the study period?

Important in this respect is the stage which neighbourhoods found themselves in at the beginning of the period. The areas of Upper Grünerløkka, Sagene and Kampen that had been focussed on first during the urban renewal program, between 1977 and 1982, were areas that were already reasonably well advanced in terms of gentrification in 1992. So while these have not proved a focus of the analysis for the period analysed, their roles as beachheads as they improve an area's reputation has been in focus.

Lower Grünerløkka together with Tøyen/Grønland was identified as a hot spot in relation to total percentage point changes in high-income earners during the course of the study period. Much of this area is home to pre-1900 housing stock, meaning that gentrification here can be likened to 'classic gentrification', an aspect that had been prominent in gentrification processes in Upper Grünerløkka and Kampen before the start of the period. This housing is favoured over the building stock from the 1970s and 1980s that is also found in this area. Yet the picture is more complex than this, as there has also been some large-scale new-build development that has proved popular since 2000, as well as modernist housing form the 1960s in Enerhaugen. This emphasises the difficulty in categorising the progression of 'waves' of gentrification in the Inner East, when aspects of all three can be apparent in such a small area at the same time.

Tracts which have seen major new-build developments during the last ten years of the study period have featured among the tracts that have shown the highest increases in socioeconomic status. All but one of the developments big enough to show up clearly in the data led to an increase in high-income earners. These developments have taken place without

any particular spatial pattern, though tracts that border the Aker River have been popular with developers, showing that access to natural amenities can still be a factor in new-build as well as classical gentrification. The borough of Sagene has also seen significant new-build development, interacting with other already high-income tracts to create a picture where this borough had become increasingly high-income by the end of the period.

Sinsen and neighbouring tracts were identified as a cold spot. This is an area characterised by brick modernist buildings built in the 1930s, not a style associated with the 'gentrification aesthetic'. But more importantly, there is a high concentration of council housing in this area. It is particularly these tracts that display no indication of gentrification, highlighting the fact that this is one of the few hindrances to gentrification in the Inner East. Council housing was also a factor in the only new-build development analysed that corresponded with a drop in the proportion of high-income earners, in Lower Kampen.

D) Has gentrification led to increasing polarisation in the overall socioeconomic structure, and/or geographic polarisation at tract-level?

There has not been a socioeconomic polarisation for across the Inner East as a whole, but rather a shift in the socioeconomic structure towards the top end, regarding both education and income as indicators. This has not been paralleled by a growth in the bottom end – the proportion of residents in the bottom two categories for both education and income have declined. These changes have been particularly prominent in the last half of the period. In this last period all three boroughs have seen substantial increases in the proportion of high-income earners (the top two quartiles) and residents with higher education. From different starting points (with Sagene already top-heavy at the beginning of the period, Grünerløkka slightly less so and Gamle Oslo relatively evenly distributed), all three boroughs had a considerably more top-heavy structure by the end of the period than at the beginning.

There was no geographic socioeconomic polarisation taking place during the study period either. Rather, an increasingly high proportion of residents lived in tracts that had an overweight of residents with high socioeconomic status, measured either in terms of either higher education or high-income. At the same time there was a decreasing proportion living in tracts with an overweight of low-status residents. Though no wider analysis of Oslo was done, this can hint at the possibility that a filtering process may have been happening in other parts of the Oslo metropolitan area, possibly concentrating low-status residents into certain areas. The justification given for attracting higher-status residents to an area, to create a 'social mix' may work in the short term, as evidenced by the relatively even distribution in Gamle Oslo at the beginning of the period, but does not appear to work in the long term.

7.1 A product of several processes

Processes that have contributed to gentrification in the Inner East have taken place on a number of geographic levels and at different times. In this respect the geological metaphor of different layers shaping the urban landscape can be an apt one, creating a mosaic of spatial localities formed around the sediment left by industrialisation. These new layers have been affected by different processes, sometimes at a very local level.

A focus of this thesis has been the residential built environment. Much of this was built in the latter part of the 19th century, particularly in Gamle Oslo and Grünerløkka – though some may have been aimed at middle-income groups, as industrialisation became prominent it was the factory workers that became the main target and consumers of housing. This continued into the 20th century. As the area became the working class realm of Oslo, housing was directed increasingly specifically at this group, affordable housing which was characterised by a large proportion of small apartments. When deindustrialisation took place, a regional process as well as a global process as the spatial division of labour became increasingly internationally oriented, it was this built environment that the new residents of the Inner East had to relate to. Thus a process such as super-gentrification, a relatively recent phenomenon, is not as predominant here as in some other western cities where housing in working class areas was generally larger, often because it was originally settled by the middle class before they moved out to the suburbs. This is an example of how one contemporary process can be affected by another process from a seemingly distant past. But it can work the other way too; the emphasis on space between buildings, green spaces and light conditions which were important in the building projects for the working class through much of the borough of Sagene have proved popular with gentrifiers, as small as these apartments may be. It is the scope for further gentrification that is perhaps limited, but this is currently being aided by new-build projects in the area.

Politics on different levels have shaped the way gentrification has played out in the Inner East. On a national level the liberalisation of housing policy has led to a private real estate market that has grown considerably as a proportion of the total housing stock. The increasing popularity of the area among high-income earners has led to a situation where there is a high correlation between tracts with high owner-occupancy and high-income earners. On the metropolitan level, an extensive urban renewal program has paved the way for housing that adheres to the 'gentrification aesthetic' to be a viable alternative for gentrifiers. A less active role by local government in the housing market in relation to regulation and provision

of social housing has let developers play an increasingly major role, particularly in the last half of the study period. Right down to the local neighbourhood level, political processes have been important. Before the study period, the movement for preservation of heritage housing was an important factor in early gentrification. An example during the course of the study period is the way in which the problem of heavy traffic has been addressed in Gamlebyen, which appears to have aided gentrification processes.

A valid question is how the shaping of the morphology of the Inner East that has taken place in the last thirty years, and is taking place now, will affect urban development in the future. Will the considerable number of large projects developed since 1998 continue to prove popular with middle class residents? Or will their often monotone character mean that a filtering process is more likely to occur as their 'newness' wears off? Another large development project, Fjordbyen, on the waterfront in the western part of Gamle Oslo, can also have an effect on the surrounding area. Gentrification processes in the Grønland tracts east of this area may be accelerated as the new development acts a beachhead.

7.2 Relevance for urban development in Oslo

As the Inner East has gained in popularity among the middle class, a natural development when private market forces are left to prevail is a rise in real estate prices and therefore barriers to entry for low-income earners. The correlation between owner-occupier and high income at tract level of data from 2001 shows this relationship. While public sector housing is predominant in other Northern European cities, this sector is relatively small and diminishing in Oslo. A greater social mix among Inner East residents was one of the goals behind the urban renewal program when it was planned thirty years ago. This may have been successful at first, as new residents balanced out the generally lower status of original residents, the socioeconomic structure of Gamle Oslo at the beginning of the period exemplifying this. However, the analysis here shows that this is becoming increasingly less of a reality as more areas become dominated by residents of a higher socioeconomic status. The onus now needs to be on maintaining or re-establishing the social diversity for which the area has become known.

The goal of renovating heritage-worthy buildings to a liveable standard rather than knocking them down is a worthy one, but when combined with a shift towards a more market-oriented real estate structure this has the perhaps inevitable result of attracting middle class in-migrants concerned with the 'gentrification aesthetic' to these buildings. The only areas where a social mix can be said to be forthcoming now are areas with a high concentration of

council housing, where gentrification processes have been relatively benign during the study period. Sinsen is the prime example of this.

If it is to be a goal to hinder further gentrification and keep or re-establish a social mix then some key aspects of policy need to be considered. The Inner East still does have a high proportion of council housing in relation to the rest of Oslo, but this stock is under threat – the council have a policy of evaluating whether to sell a residence as a renter moves out[11]. A tract that has stood out in the borough of Sagene, Åsen 7, had a number of its residences sold in 2011, for example (Boligbygg 2011). In this year alone there were 41 council residences sold off in the Inner East, while only three were bought. The council wishes to spread council housing throughout the city more effectively, in particular by buying up more housing in West Oslo. While this policy is intended to hinder segregation on a citywide level, this analysis makes it clear that by diminishing the supply in the Inner East gentrification processes will be assisted. An alternative solution would be to focus on expanding the council housing sector rather than dispersing it. This would have the added advantage of broadening the scope of people who qualify, leading to less stigmatisation and a chance for people who don't qualify for housing now to be able to live in the Inner East if they wish, rather than being forced to look into buying in other areas of Oslo. The only new-build development that bucked the trend, in Kampen 5, was an example of how an active role by the council can hinder gentrification processes.

The link made between new-build developments and gentrification that has been shown to apply to the Inner East is an important one as well. When urban development is left primarily to market forces, it is a natural consequence that developers will attempt to earn the maximum amount of profit that they can. Realising that there is high demand among young high-income earners for a central location they will direct their attentions towards them, building apartments aimed towards a more lucrative market that fail to cater for families, for example. Either that, or they will condense as many apartments as possible into the space they have available. Greater direction from the council is one way to hinder this, by setting demands on quality and type of residence. But even this will not hinder gentrification in a purely private market – those with money but no family may be attracted towards larger residences as well, and have the money to outbid other potential buyers. The use of auction as a means of selling could be restricted, for example. Subsidies and incentives for developers who are committed to building affordable apartments can also be used to greater effect.

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[11] http://www.boligbygg.oslo.kommune.no/eiendomssalg/ accessed 4/5/12

The analysis here has focussed only on the age group 30-39. The trends towards comprehensive gentrification would most likely not show up as strongly in other age groups and for the population as a whole, when it is exactly this age-group that has been shown to be the one at the forefront of gentrification processes in other studies across the western world. It does however give an indication of how the population of the Inner East may be in the coming decades if housing policy remains the same. Should trends not be quite as strong in other group, a greater proportion of housing is still in the hands of a more socially diverse population than is evident among this age group. Changes in policy, as well as a continuation of policy that still allows for examples such as Kampen 5 to be possible, can still mean that a social mix can be maintained. The overall working class character of the Inner East may have disappeared for the foreseeable future, but elements of a socially diverse population can still be salvaged.

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