Urban decline within the region: Understanding the intra-regional differentiation in urban population development in the declining regions Saarland and Southern-Limburg

Hoekveld, J.J.

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Introduction

1.1 Urban change

An increasing number of cities and regions in the Western World are ‘shrinking’ or ‘declining’. Shrinkage is a combination of economic decline and demographic decline (population loss), which leads to an amalgamation of social, environmental and financial problems, which influence the livelihoods of the inhabitants in those affected areas. The liveability problems are, for example, vacancies and derelict lots, and the closures of shops, schools and facilities (Hospers, 2014). In addition, lower demand for housing due to a declining population makes selling one’s own house increasingly difficult, which may give inhabitants a feeling of ‘being stuck’ (Mallach, 2011). Furthermore, selective out-migration means that lower-income and low-educated households tend to get left behind in declining cities, which leads to social segregation. Due to consequent decreasing tax revenues, city administrations then increasingly find it more difficult to maintain public facilities, such as infrastructure, public transportation and sewerage systems. As a consequence, neighbourhoods and even entire cities or city regions can become unliveable. One of the best known examples of a declining city is Detroit, which lost over 60% of its population between 1950 and 2011 and it is experiencing severe financial and liveability problems (Galster 2013; Short and Mussman, 2014).

Of course, liveability problems such as congestion, pollution and housing shortages can also occur in growing cities. This fact is used by urban planners, who stress the positive side of urban shrinkage and who also perceive urban shrinkage as an opportunity: less people means less pressure on the housing market, less congestion and pollution and more green space. However, on the whole, the problems associated with shrinkage largely negate the advantages that may exist. Due to the urgency of these problems, it is extremely important that we understand the mechanisms of urban decline. This may contribute to a more informed way of dealing with decline for urban planners and policymakers.

The roots of these problems are often sought firstly in structural economic changes in a city or region resulting from globalization, which in turn leads to out-migration and consequent population decline (Martinez-Fernandez et al., 2012; Rink et al., 2012). A second factor is fundamental change in reproductive behaviour leading to lower birth rates and, as a result, population decline (Richardson and Woon Nam,
In addition, major political shifts, wars and changing living preferences (leading to urbanization or suburbanization) can spur migration flows and affect birth and death rates (Reckien and Martinez-Fernandez, 2011).

Extensive knowledge therefore already exists about the causes and consequences of urban decline. However, at least two fundamental gaps in our understanding about urban shrinkage remain. The first gap concerns the causal relationships between demographic and economic development. In the literature, it is often assumed that if employment opportunities fall, people will leave the city or region to search for employment elsewhere. Some scholars point out that this causal relation between economic and demographic development might be cumulative (Rink et al., 2011a; Verwest and van Dam, 2010. A possible cumulative causal shrinkage sequence is that outmigration then leads to a smaller customer market for shops, services, sewerage systems, public transportation, etcetera. The area becomes less attractive because of these diminishing (service) infrastructures, which again fuels new waves of out-migration. As a consequence, companies get into difficulty finding high-quality employees and so they also move to other areas, which again reduces employment opportunities in the area. Such a sequence of events has been assumed, but empirical evidence underpinning this assumption is scarce. In this dissertation, I address this issue in three shrinking Dutch regions.

A second and even more fundamental gap concerns the attention paid to the explanations for intra-regional differentiation in population development, i.e. the differences in levels of population development between cities and villages within a region. Whereas many explanations explain shrinkage at regional or even supra-regional level (deindustrialization, low fertility rates, political shocks) little attention is paid to causes at local level. There must also be local causes, given the fact that we still encounter varying levels of shrinkage within, for example, a deindustrializing region. Such differences cannot be explained by those macro-level processes alone. This question has been largely overlooked in the literature about urban shrinkage. In this dissertation, I address the causes of this intra-regional differentiation in shrinkage in two case study regions, both being affected by the higher-level process of deindustrialization.

In the literature so far, this multi-level and intra-regional perspective for understanding urban decline has largely been overlooked. It is of both societal and academic relevance to disentangle the impacts on decline from a multi-level and intra-regional perspective.
1.2 Theoretical framework

Concepts
Urban shrinkage and urban decline both signify severe economic and demographic transformation processes occurring in an urban setting. The term urban decline is rooted in the Anglo-Saxon context and signifies demographic and economic changes which lead to a concentration of social, economic and environmental problems in a city (OECD, 1983). The term urban shrinkage is rooted in the German context (called Schrumpfung) and denotes also both economic and demographic loss (Rieniets, 2005), as a shrinking city “...has experienced population loss, economic downturn, employment decline and social problems as symptoms of a structural crisis.” (Martinez-Fernandez et al., 2012, 214). Urban shrinkage is, especially in the German context, also linked to negative natural population developments (low birth rates and high death rates) (Großmann et al., 2008). These negative natural developments are caused by changing values in relation to family formation, living arrangements and child birth (Surkyn and Lesthaeghe, 2004), in Eastern Europe closely related to the post-socialist transformation. It is often argued that urban shrinkage poses a ’new urban reality’, as it “...connotes an urban process that is, at least in part, new in its foundation, spatial manifestations and social, economic and environmental implications.” (Cunningham-Sabot et al., 2014, 14). I use in chapter 1 – 3 the rather broad definition of shrinkage and decline: a process of economic and demographic decline in an urban setting. In this definition, the (liveability) consequences of decline are not mentioned. The reason for leaving the consequences out is that such consequences do not need to be present (yet) in a declining city.

One may notice that with the second gap about intra-regional differentiation (which will be addressed in chapters 4 – 5), the focus shifted from the wider process of urban decline to the more specific term population development. The reasons for this were, firstly, that population growth would not be ruled out as a possibility this way. This is crucial as not all cities are necessarily losing population in declining regions. Secondly, population development is in this way uncoupled from economic development, as the relationship between population development and economic development may be less pronounced at local level than at regional level. After all, if employment opportunities are decreasing in a city, people do not necessarily have to move since they can commute to other cities in the vicinity.
Theories

Urban shrinkage and population development are first positioned within the wider literature about urban change. Figure 1.1 shows four theoretical models for urban change in terms of economic and demographic development. Obviously, the urban shrinkage and decline debates need to be positioned in boxes 2 and 3.

Figure 1.1. Theoretical possibilities

There are two aspects of urban change which are central in this dissertation: the first is the process, or sequence of change, investigated at regional level. The main bodies of theory used to explain these processes are structural economic and institutional approaches. The second aspect is the intra-regional differentiation in population development, i.e. the variance at local level. Why there are differences in growth or decline rates between municipalities within the same region is investigated here. The main bodies of theory used are the institutional and behavioural approaches. Figure 1.2 captures these various concepts and the building blocks of the research and indicates in which chapters they are addressed.
Structural economic theories and especially viewpoints of evolutionary economic geography can be used to explain both the continuation of growth or decline in a specific area (positions 1 and 3 in figure 1.1) and the shift from one position to another. The continuation of growth is often explained by agglomeration economies and increasing returns. The general idea is that growth or decline in population and employment is a reinforcing process with a positive relationship between economic and demographic development: “the productivity of capital and labor is greatly enhanced where selected units of each come together in geographic space to form interconnected systems or agglomerations of firms and workers.” (Storper and Scott, 2009, 156). Localized external economies of scale boost these agglomeration processes promoting further growth (position 1). The opposite is possible too. Once a process of decline is set in motion, economic losses will spur migration, which contributes to further economic losses (position 3) (Friedrichs, 1993; Gatzweiler et al., 2003). Path dependency is therefore an important concept in explaining processes of growth and decline (Musterd and Kovács, 2013).

Shifts in position from growth to decline and vice versa can be explained by the principle of the industrial life cycle (Menzel and Fornahl, 2010). Agglomerations can mature and eventually decline as their main industries pass through the industrial life cycle under the influence of all kinds of evolutionary changes and negative externalities (Potter and Watts, 2011). Consequently, a city can make the transition
from growth (position 1) to economic decline with population growth (position 4) or to both economic and demographic decline (position 3).

In recent urban shrinkage and urban decline debates, the root of urban shrinkage was indeed often sought in these large-scale evolutionary changes, as shrinkage is understood as ‘socio-spatial manifestations of the forces of globalization’ (Pallagst et al., 2014, 3). Shrinking cities or regions are considered to have made the move from the mature stage towards the decline stage of the industrial life cycle concept, as these cities or regions were not able to make the transition from an industrial economic structure to a service-based economic structure (Wu, 2013). Cities that have a more varied economic structure are less vulnerable to such economic shocks (Frenken et al., 2007). Potter and Watts (2011, 31) recapture the above as they state that “…similarities and differences between territories can be understood in the context of long term evolutionary processes and structural change […] and that diverging regional development trajectories represent the spatial outcome of city-regions that have become locked into industries that are at different stages of the industry life cycle.”

Institutional approaches shed a different light on the spatial patterns of growth and decline, as it is assumed in these approaches “…that although institutions are unlikely to be the sole “cause” of geographically uneven development, they enable, constraint and refract economic development in spatially differentiated ways.” (Martin, 2000, 79). They study how local economic development is affected by place-specific and higher level institutions (Boschma and Frenken, 2006). Williamson (2000) distinguishes institutional factors affecting economic development operating at four levels of analysis: level 1 entails ‘social embeddedness’, and all informal institutions, norms, traditions and religions. The second level is the ‘institutional environment’, containing formal rules such as constitutions, laws and property rights. Level 3 contains the ‘institutions of governance’, and level 4 ‘resource allocation and employment’, which strongly relates to agency theory and the importance of actors (see also Scully, 1988; North, 1999). The latter two levels are also addressed in the literature about ‘institutional thickness’, or strength of local institutional relations (Amin and Thrift, 1994). According to Logan and Molotch, it is especially the presence and behaviour of urban elites that count in explaining differences between cities: “although virtually all places are subject to the pervasive rule of growth boosters, places with more active and creative elites may have an edge over other areas.” (Logan and Molotch, 2007, 52). Conversely, institutional lock-in or ‘institutional sclerosis’ can withhold the area from growing further (Amin, 1999). With institutional sclerosis is meant how interest groups can hamper growth as they resist change.
Still, these local efforts to boost (or hamper) local economic development can only take place within and are shaped by the higher levels as mentioned by Williamson. This not only refers to higher level legal frameworks and policies (level 2 and 3), but also to the changing views on how society and the economy should function (level 1). An example of the latter is the shift towards a more neo-liberal climate, which leads to the move away from territorial redistributive policies. As a consequence, the differences in economic performance between regions that are able to compete on the worldwide economic marketplace and those that are not are likely to increase even further (Peck and Tickell, 1994).

There are still intra-regional differences in the level of population development within such growing and declining regions. Behavioural approaches can be used to address these differences. It is common to explain the intra-regional differences by differences in migration rates. Migration is the result of a household’s appraisal of its preferences, resources, opportunities and constraints (Mulder, 1993). Migration is often fuelled by life course events, such as leaving the parental home, cohabitation or divorce. A considerable number of studies have been devoted to unravelling the residential preferences and they tend to focus on a range of dwelling- and neighbourhood characteristics (Michalos, 1996). More recently, studies addressed the importance of life styles in residential location decisions (Walker and Li, 2007; Ærø, 2006). The general tendency is that the decision process is dominated by the size, type, price, and tenure of the dwelling and its location relative to workplaces and services (Dieleman, 2001). What is regarded as attractive does differ for different types of households in terms of stage of life cycle and socio-economic status and it also differs in different periods. The most evident example of the latter is the shift from urbanization (fuelled by the need and the desire to live close to the workplace), to suburbanization and counterurbanization (the desire to live in a quieter environment and in a larger dwelling), to reurbanization (the desire to live near cultural amenities) (Geyer and Kontuly, 1993; Richardson, 1977; Champion and Illeris, 1990; Storper and Manville, 2006). At the same time, such preferences cannot be realized without housing opportunities in those preferred locations. It is therefore necessary to draw in institutional approaches and investigate the opportunities and constraints imposed by the institutional setting, which comprises both local and supra-local housing market policies, housing subsidization schemes, mortgage and taxation regulations etcetera (Bramley, 1993).

Still, differences may exist between cities of the same type, located in the same region and being affected by the same higher level economic and institutional
process. Such differences can possibly be explained by the specific local conditions, or place-particularities (Nijman, 2007), like the life cycle of the suburb as explanatory variable for the differences in growth rates between suburbs (Choldin et al., 1980; Bier, 2001), or the pro-growth stance of local politicians or alternatively anti-growth sentiments and lobbying of the current residents (Short et al., 2007).

There are two difficulties with the current state of knowledge described above. Firstly, these residential relocation studies are conducted in a setting of population growth. Can we use the same principles and explanations for understanding the pattern of intra-regional differentiation in shrinkage as we use for intra-regional differentiation in growth? I expect that if we find a different pattern of intra-regional population development in a shrinking region than in a growing region, this is not the result of different mechanisms, but rather of a composition effect: we know that different types of households have different types of living preferences, resources, opportunities and constraints. We also know that in declining regions the population composition tends to be different, with relatively more older and less affluent households. So one might expect these differing population compositions to crystallize into differences in the perceived attractiveness of those areas by households and thus in the local growth or decline rates (the intra-regional differentiation).

A second difficulty concerns the effect of natural developments on total population development. Natural decreases are a commonly accepted cause of shrinkage in the shrinkage debates. It is expected that natural development will become even more important than migration in the future (Wiechmann and Pallagst, 2012). However, the question is, whether these natural developments have a spatially differentiated effect too (just like migration) or whether these natural decreases are found throughout the region and are therefore not important for explaining the intra-regional differentiation in population development.

1.3 Questions and methodology

Research questions
The analysis consists of three parts. The first part builds on and elaborates the theoretical discussion above. It further elucidates the concept of urban decline and urban shrinkage and describes how the explanations for decline found in the literature can contribute to a better understanding of intra-regional differentiation in urban decline. The research question for this part of the analysis is: how can inter-regional
and intra-regional differentiation in levels of decline between and within Western European regions be explained?

The second part of this study addresses the gap in our understanding of the process of decline. How the process of shrinkage unfolds and whether or not there is a uniform shrinkage trajectory was investigated. For this part of the analysis, the main research question is: how does the process of regional shrinkage unfold over time?

The third part of the study concerns the gap in our understanding of intra-regional differences in population development within declining regions. For this part of the analysis, the research question was: how can intra-regional differentiation in the level of urban population development in the declining regions of Saarland and Southern-Limburg be explained?

Levels of analysis
In this research, multiple levels and units of analysis were used. As already evident in the introduction and theoretical discussion, studying urban shrinkage requires a multi-level approach, as causes and effects take place at different levels of analysis. Figure 1.3 illustrates the different levels of analysis that play a role in the process of shrinkage.

Figure 1.3. Levels of analysis

<table>
<thead>
<tr>
<th>Processes operating at:</th>
<th>Characteristics independent variable</th>
<th>Characteristics dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual level</td>
<td>Characteristics and preferences of individual</td>
<td>Individual level: Migration/births/deaths</td>
</tr>
<tr>
<td>Local level</td>
<td>Characteristics of city/village; amenities, housing, location etc.</td>
<td>Local level: Sum of individual demographic events = local population development</td>
</tr>
<tr>
<td>Regional level</td>
<td>Characteristics of region; employment structure, location, regional institutional framework</td>
<td>Regional level: Intra-regional differentiation in local level population development</td>
</tr>
<tr>
<td>National level</td>
<td>Characteristics of nation-state; institutional framework</td>
<td></td>
</tr>
</tbody>
</table>

The figure illustrates the relationship between the levels of analysis of the dependent variables and the independent variables. The regional level captures intra-regional
differentiation in local level population development. The causes for this differentiation can only be understood by incorporating the local and individual levels of analysis and investigating why apparently different individual demographic events take place in some cities in that region, in contrast with other cities in that region (the right column).

The causes for these differentiated individual demographic events are also taking place at different levels, indicated by the independent variable characteristics (the middle column). These demographic events depend on the characteristics and preferences of those individuals, the characteristics of the city (as regards what kind of people are attracted to and live in what types of cities, in what types of cities are more births and deaths taking place) and the regional level (as regards the characteristics of the region, such as the regional employment structure) and the national level (policies dictating where housing is allowed, the level of health care, family policies). These individual, local, regional and national characteristics are, however, not set in stone. All kinds of processes can lead to changes in these characteristics and such processes can again occur at different levels of analysis (the left column).

The dotted arrows in the scheme indicate the possibility of a feedback mechanism between local/regional population development and local/regional characteristics. Local population decreases can affect local housing opportunities and the city’s image for example. Moreover, processes and characteristics at multiple levels of analysis can be interrelated in the process of decline: such local changes can in turn call for local and regional policies. In this situation, population decline becomes an independent variable and these local characteristics become dependent variables.

In chapter 3 (investigating the regional shrinkage trajectory), no distinction is made between dependent and independent regional characteristics. Instead the several regional characteristics are perceived as mutually influencing each other.

**Methods**

Different methods were used to answer the questions. For the question about the theoretical explanations for differentiation in urban shrinkage, the literature about urban decline and urban shrinkage in Western contexts was reviewed. A distinction was made between drivers of economic and demographic decline – as particularly the latter is of interest for the remainder of the analysis – and between causes of decline at regional level and local level. These drivers were captured in a conceptual model.

For the research question about the process of decline, the focus was on disentangling how regional trajectories of decline as expressed in demographic and economic processes are unfolding over time and whether different processes are
affecting each other in a linear or in a cumulative causal manner. The choice was taken to focus on the regional level here, as expectations were that regional economic changes would have a greater impact on population development than local economic changes would have. For this purpose, a time series analysis was performed on a set of demographic and economic variables over the period 1990-2010. With this type of analysis, one can, if applicable, isolate the time lag in the relationship between two variables. The analysis focused on the three Dutch regions experiencing population decline.

The research question about the causes of intra-regional differentiation in population development was addressed in several ways. In the final section of chapter 3, a first effort was made to explore the role of spatial local characteristics in explaining the intra-regional differentiation in decline by means of a cluster analysis. The cluster analysis yielded a typology of declining municipalities on the basis of spatial characteristics of the municipalities in two Dutch declining regions.

The cluster analysis findings called for closer investigation of the intra-regional differentiation within one of those regions (Southern-Limburg) and these findings were compared with another similar type of declining region (Saarland). A variety of methods were used to grasp the intra-regional differences. Firstly, the spatial differentiation in local population decline was mapped. Population decline at local level was measured as a percentage since the year in which population decline started in the municipality concerned (the local level of analysis). Second, regression analyses were performed on the relationship between total population development and the components of population decline – net migration rate and the net rate of natural increase – to see which of these components contributed the most to the differentiation in population development in the region. These components were measured pro mille, in order to control the influence of population size, and based on a five year average.

In one region, the factors driving total population development and migration were first investigated using a multiple regression analysis (chapter 5). The dependent variable was the percentage of population decline since the year decline started. The independent variables were local characteristics potentially steering migration into different parts of the settlement system identified in the literature. These were accessibility to and type of employment, level of deindustrialization, population density, infrastructural connectivity, accessibility to services, schools and type of housing, housing prices and real estate taxation. The goal was to see whether there is a relationship between degree of decline and the characteristics of the city.
In the second region, a different quantitative approach was used because the small number of municipalities did not allow for a regression analysis between local population development and local characteristics. Moreover, data at individual level were available for this region (chapter 4). Here, the factors driving migration were drawn from the large-scale WoOn-surveys of 2006 and 2012 in which about 70,000 Dutch inhabitants were questioned about their living situation, household characteristics, their living preferences, and constraints (the individual level of analysis).

A total of 50 interviews with local and regional administrative, economic and societal key persons in the two regions were used to scrutinize the findings of the quantitative analyses and find additional factors explaining the intra-regional differentiation in decline. See appendix 1 for the list of anonymized interviewees and appendix 2 for the topic lists of the interviews. The interviews focused broadly on four topics: the development and particularities of the region and the municipality, the causes of intra-regional differentiation, residential mobility and the political and financial situation of the municipality.

1.4 Cases

The empirical analysis consists of two parts: the investigation of the process of shrinkage and the investigation of the intra-regional differentiation of population development. For both analyses a total of four regions were investigated (the region of Southern-Limburg was part of both analyses). The spatial demarcation of the regions was based on the Functional Urban Areas demarcation, which uses the criteria of an urban core and its ‘worker-catchment area’ as hinterland (OECD, 2013). While acknowledging that every regional demarcation is by definition artificial, I believe the choice for this criterion of core and hinterland, in terms of employment and employees, makes sense for the purpose of this research. For, in a region spatially defined on the basis of the interdependent relation between core and hinterland, one can investigate the often hypothesized importance of regional employment for population development.

Of course, such intra-regional interdependencies are fluid in practice, as the scope of the catchment area can increase and decrease under the influence of macro trends like increasing accessibility or changing access to employment opportunities. This might be the case particularly in an area undergoing such structural changes as the declining regions under study.
Case selection for investigating the process of shrinkage

Chapter 3 reports the findings of the investigation of the shrinkage trajectories of three Dutch declining regions. These are Zeeuws-Vlaanderen, East-Groningen and Southern-Limburg (see table 1.1).

Table 1.1. Key figures case study regions

<table>
<thead>
<tr>
<th></th>
<th>Zeeuws-Vlaanderen</th>
<th>East-Groningen</th>
<th>Southern-Limburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inhabitants, 2014</td>
<td>105,917</td>
<td>148,944</td>
<td>604,154</td>
</tr>
<tr>
<td>Regional population decline</td>
<td>-2.1%</td>
<td>-3.7%</td>
<td>-7.0%</td>
</tr>
<tr>
<td>Year start population decline</td>
<td>2003</td>
<td>2003</td>
<td>1997</td>
</tr>
<tr>
<td>Area</td>
<td>875 km$^2$</td>
<td>907 km$^2$</td>
<td>660 km$^2$</td>
</tr>
</tbody>
</table>

Source: CBS, 2014a,b

These three regions were the three most prominent Dutch shrinking regions. They were all border regions and located in the periphery of the Netherlands. However, they also differed significantly in some of their regional characteristics: the development of Southern-Limburg was strongly related to its mining history, Zeeuws-Vlaanderen is both an industrial and touristic region with interrelations with Belgium and East-Groningen is an agricultural region. So, these regions allowed for an investigation into whether different types of regions also had different types of shrinkage trajectories.

Case selection for investigating intra-regional differentiation

The choice for the two regions in the part of the study that focused on intra-regional differentiation was based on the findings of the theoretical explorations in chapter 2 and the analysis of the regional shrinkage process in chapter 3. In chapter 2, it was suggested that the intra-regional differentiation in population decline was the result of the spatially differentiated filtering down of wider societal processes (such as deindustrialization or suburbanization), through the institutional, spatial and local context. Institutional context is understood to mean the governmental structure and its power relationships, roles and responsibilities of governmental bodies, regulations and policies, rather than governance structures or the organisation of society in general.

The effect of the local context was isolated by comparing two regions which were affected by similar macro processes and which as much as possible had similar institutional and regional characteristics. In chapter 3, the findings of the cluster analysis fuelled the need to further investigate the situation in Southern-Limburg. A
comparable region was the German region Saarland. The two regions were exposed to the same higher-level process of deindustrialization and are both former mining regions and are from a national perspective peripherally located and from a European perspective centrally (the spatial context). Furthermore, they had a very similar type of welfare regime. Both regions have experienced severe regional population decline and have a large variance in levels of population decline (see table 1.2).

In this research, the municipality was used as the unit of analysis for the local level. In the two regions under study, many municipalities consisted of numerous cities and villages. Since one might expect the village as a residential nucleus to be a stronger determinant in residential location choices than the administrative municipality, using the village instead of the municipality as unit of analysis would be logical. Unfortunately, there were no data available at this lowest level in the two regions. Therefore the choice for the municipality was based on the pragmatic argument of data availability.

All municipalities in the two regions were investigated for the quantitative parts of the analyses. For the qualitative part of the analysis of Saarland (the interviews), a selection had to be made due to time limitations in combination with the large number of municipalities in this region (see §5.3 for the selection criteria). In Southern-Limburg all municipalities were part of the qualitative analysis (see figure 1.4).
Figure 1.4. Case study regions with case study municipalities
Table 1.2. Key figures for case study regions

<table>
<thead>
<tr>
<th></th>
<th>Saarland (minus Merzig-Wadern)</th>
<th>Southern-Limburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inhabitants</td>
<td>890,767 (2012)</td>
<td>604,154 (2014)</td>
</tr>
<tr>
<td>Regional population decline</td>
<td>-7.3%</td>
<td>-7.0%</td>
</tr>
<tr>
<td>Year start of regional population decline</td>
<td>1992</td>
<td>1997</td>
</tr>
<tr>
<td>Variance population decline</td>
<td>28.4 (-23.0% &lt;&gt; -3.3%)</td>
<td>14.1 (-18.5% &lt;&gt; -0.9%)</td>
</tr>
<tr>
<td>Number of municipalities</td>
<td>45</td>
<td>18</td>
</tr>
<tr>
<td>Area</td>
<td>2014 km²</td>
<td>660 km²</td>
</tr>
<tr>
<td>Period of closure of mines</td>
<td>1957-2012</td>
<td>1965-1975</td>
</tr>
</tbody>
</table>


1.5 Reading guide

Chapter 2 first discusses the concepts of urban decline and urban shrinkage and scrutinizes the usefulness of the common explanations for decline for understanding inter-regional and intra-regional differentiation in decline in the Western European, more specifically the Northwestern European context. Chapter 3 presents the analysis of the process of urban shrinkage and how these processes differ between different types of regions. Chapter 4 describes the factors that help to understand the intra-regional differentiation in population development in Southern-Limburg and chapter 5 does the same for the region of Saarland. Chapter 6, the conclusion and discussion, recaptures the findings and answers of the research questions. These findings are linked back to theory again. Furthermore, some reflections on the methods and data are included along with a brief discussion of an agenda for future research.

The chapters 2-5 are based on articles written for international peer-reviewed academic journals. Two of them were published, one was accepted for publication and one was under review. The articles were copied in full. However, I took the liberty of altering the text in a couple of instances (e.g. changing ‘in this article’ to ‘in this chapter’). The alterations were very minor. In some cases, I had to add sentences to the main body of text due to progressive insight and the findings of the qualitative analysis. These additions are marked at the end of the sentence with this symbol: i.