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Urban growth and decline: Europe's shrinking cities in a comparative perspective 1990–2010

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Abstract

At the beginning of the 21st century, the phenomenon of shrinking cities was widely discussed across Europe. Most European countries saw an increasingly ageing population and an internal migration from underdeveloped to more competitive locations. Since the turn of the century, and in contrast to the past, a great deal has been written about the causes and impacts of shrinkage, as well as about policies and planning strategies. However, the state of knowledge in a cross-national comparative perspective is rather poor because, to date, studies have basically analysed large cities and empirical evidence hardly shifts attention to the contextual influence on local dynamics. Against this background, this paper fills the gap between macrotheoretical conceptualisation and empirical observation by testing a heuristic model of urban shrinkage encompassing the whole range of cities in Europe. The paper questions to what extent urban shrinkage represents a broader trend in Europe in terms of both duration and distribution, and aims to investigate the influence of economic and demographic drivers on the non-linear evolution of shrinking cities in Europe. Thereby, the spatial distribution of different trajectories of shrinking cities in urban Europe in the period from 1990 to 2010 will be presented in a comprehensive survey which reveals that 20% of European cities experienced shrinkage between 1990 and 2010, whereas 883 cities face recent shrinkage.

Keywords

Cross-national comparative perspective, demographic typology, local scale, shrinking cities, trajectory

Introduction

At the beginning of the 21st century, the phenomenon of shrinking cities was widely discussed across Europe. Most European countries saw an increasingly ageing population and an internal migration from underdeveloped to more competitive locations. The percentage of cities that experienced population loss, called shrinking cities, has remained stable worldwide at around 10% during 1970–1990 and 1990–2014 (UN, 2015: 72). This trend is largely associated with cities in the developed world, where around 40%

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were classified as shrinking cities between 1990 and 2000; this is especially pronounced in North America and Europe (UN-HABITAT, 2008: 40). Several studies provide an idea of the persistence and spatial extent of this phenomenon in Europe (e.g. Cheshire, 1995; Cheshire and Hay, 1989; Hall and Hay, 1980; Kabisch and Haase, 2011) and beyond (Oswalt, 2006; Oswalt and Rieniets, 2006). This paper will add to these discussions by revealing that duration and the point in time of urban shrinkage significantly differ depending on contextual factors.

According to the latest State of the European Cities Report, based on the transnational database for European cities Urban Audit, almost one-third of Europe's larger cities lost population between 2001 and 2011 (European Commission and UN-Habitat, 2016). Turok and Mykhnenko (2007) demonstrated that growth and decline differ significantly for most cities over different time periods. They analysed the average growth rates over several time periods between 1960 and 2005 for 310 European cities in 36 countries whose population exceeded 200,000 inhabitants. Only 13 cities in the UK and in Germany experienced long-term shrinkage, and 40% of the investigated cities experienced occasional shrinkage.

Although scholars know much about the causes, effects and planning responses in shrinking cities, the state of knowledge in a cross-national comparative perspective is rather poor, basically because of *three facts*.

- Firstly, comparative studies on urban shrinkage in Europe usually analyse *large cities* with a population greater than 200,000 or 50,000 (European Commission, 2010; Turok and Mykhnenko, 2007) inhabitants. However, Europe is dominated by small- and medium-sized cities with less than 10,000 inhabitants that constitute a remarkable proportion of Europe's population with individual trajectories.
- Secondly, urban trends are hardly evolving in a linear way but rather fluctuate and show changes, such as from growth to shrinkage or vice versa, with different speeds and durations. However, a perspective that considers these *non-linear dynamics* of shrinkage in order to explore the interdependencies between causes and effects of shrinkage and the feedback mechanisms that are in operation is lacking (Hoekveld, 2012).
- Thirdly, the non-linearity is accompanied by the need to develop an explanatory heuristic that moves beyond static analyses of population loss and, instead, towards *more complex* explanations of context factors and their dynamic influence on urban shrinkage (Grossmann et al., 2013). Such a heuristic conceptualisation of urban shrinkage, which bridges trends on the macro scale, such as demographic change, with population loss in cities, is lacking empirical evidence to date (Haase et al., 2014).

Against this background, this paper fills the gap between macrotheoretical conceptualisation and empirical observation by testing a heuristic model of urban shrinkage developed by Haase et al. (2014). The paper questions to what extent urban shrinkage represents a broader trend in Europe in terms of both duration and distribution, and aims to investigate the influence of economic and demographic drivers on the non-linear evolution of shrinking cities in Europe.

Firstly, a definition of cities is developed that allows the study of both larger and smaller cities and the differences between trajectories with respect to a city's size (total survey). Secondly, the paper draws attention to a dynamic perspective by demonstrating a typology that investigates to what extent the duration and speed of urban shrinkage differ. Thirdly, this typology is linked to the heuristic model in order to identify possible impacts from the macro trends of demographic change and economic restructuring on shrinking cities.

This approach provides the opportunity to broaden the focus on the phenomenon of urban shrinkage and its drivers by discussing the spatial distribution of different trajectories of shrinking cities in Europe during the period from 1990 to 2010 in a comprehensive survey and their intersection with major contextual factors on the macro scale.

From the debate on shrinking cities to the challenges of conceptualisation

Since the turn of the century, and in contrast to the past, a great deal has been written about the causes and impacts of shrinkage, as well as about policies and planning strategies, especially in Germany (Bernt, 2009; Kabisch et al., 2006; Pallagst et al., 2013; Wiechmann and Pallagst, 2012). Although the academic debate on a long-term population decrease and urban transitions had already started in the 1980s, particularly in Germany (Häußermann and Siebel, 1987), the point of departure for a broad debate on urban shrinkage was primarily the East German housing market crisis in the early 1990s. In Europe, the 'demographic shock' of post-socialist countries (Steinführer and Haase, 2007) shifted the focus of the debate on shrinking cities from a one-theme issue to a policy field that incorporates a range of issues. For Europe (Baron et al., 2010; Turok and Mykhnenko, 2007), as well as for North America (Beauregard, 2009; Hollander et al., 2009), recent research highlights shrinking cities as a dominant developmental trend and an emerging focus for research on planning. The discussion about how to deal with the problems of shrinking cities had just re-emerged when the global financial and economic crisis, which was triggered by the bursting of the US housing bubble in 2007, drew much attention to this issue. Thus, urban shrinkage, as such, is not new, although the major causes of shrinkage have changed in post-industrial times. Recent research has distinguished several major drivers of shrinkage (Haase et al., 2014; Reckien and Martinez-Fernandez, 2011; Wiechmann and Bontje, 2014) that are basically rooted in changing demographic and economic conditions, and reinforced by shifting spatial configurations (suburbanisation).

In Central and Eastern Europe, in particular, the political changes led to an exceptionally severe shrinkage phenomenon driven by changing *demographics*, including outmigration and a sharp decrease in fertility rates since 1990 (Müller and Siedentop, 2004; Steinführer and Haase, 2007). This dramatic decline of fertility rates to levels far below the natural reproduction rate had already been interpreted in the 1980s, during Europe's 'second demographic transition' by Lesthaeghe and Van de Kaa (1986; cf. Van de Kaa, 1987). The transition, which began in the mid-1960s and accelerated during the 1980s, was marked by declining numbers of married couples, rising divorce rates, an increasing age at marriage and dramatically decreasing fertility rates, especially after the contraceptive pill was introduced in the 1970s. In addition, in several European countries, the flight of people and jobs to the suburbs has led to a hollowing out of the core city (Couch et al., 2005; Nuissl and Rink, 2005), which is described within the framework of life-cycle theories of urban development (Berry, 1977; Van den Berg et al., 1982).

The search for jobs is very important for migration decisions, and often leads to changes in the territorial division of labour (Massey, 1984). For a long time a decline was expected to occur only if dominant industries or companies lost their competitive position and market shares, which depend on the actual forms of production and strategic decisions (Haase et al., 2014). Thus, the *economic* concentration of enterprises, industries and labour can dissolve when forms of production (e.g. towards tertiarisation) or demand is changing, or in case of crisis effects. The basic assumption was that economic decline leads to selective outmigration and, concomitantly, to population decline. Such structural economic changes have been observed ever since the Fordist form of mass production and mass consumption (Beauregard, 2009) plunged into crisis and could not be replaced by modern services or other industries of the tertiary sector. This has led to spatial disparities and even to the redistribution of capital, thus serving as an explanation for the dynamics of urbanisation under capitalism and the emerging 'uneven development' (Harvey, 2006).

In general, it is not easy to establish clear cause–effect relationships between demographic or economic drivers and the local impact on population development. However, it is important to combine these factors for the heuristic model developed by Haase et al. (2014). The underlying assumption is that shrinkage is a result of the 'place-specific interplay of

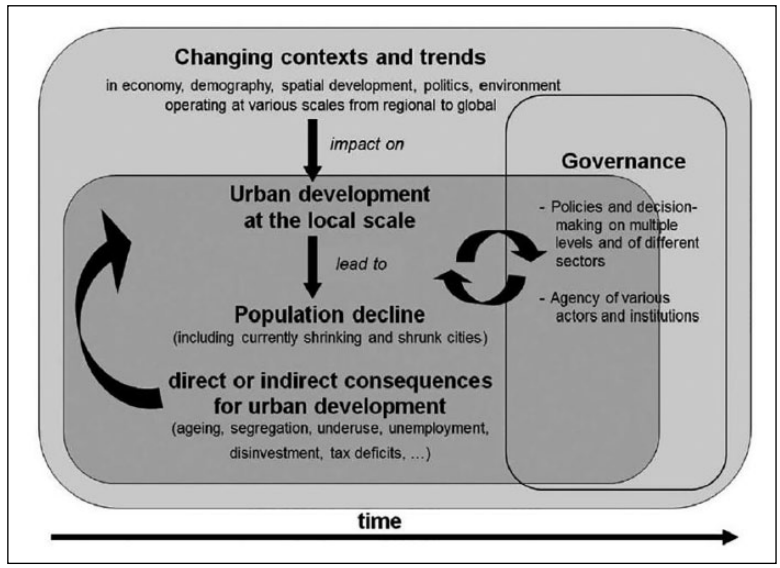


Figure 1. Heuristic model of urban shrinkage (Haase et al., 2014).

economic transformation, suburbanisation and demographic change' that directly or indirectly impacts on the local settings of a city, for example, the labour market, socio-spatial differentiation, housing, patterns of land use, the state of the social and technical infrastructure, etc. (Haase et al., 2014: 1529; see Figure 1). The advantage of this model is the heuristic connection of causes and impacts, based on a variety of theories, which allows it to be applied to different contexts and to evaluate various explanatory factors. However, besides qualitative and narrative studies, an empirical implementation of this model is still lacking.

Thus, following this heuristic, this paper aims to test the model by providing a synthetic, cross-country picture of the varieties of urban shrinkage using demographic and economic trends to explain local urban trajectories. Because cities are not isolated entities but are embedded in regional contexts, a broader scale of observation is required (Grossmann et al., 2013; Turok and Mykhnenko, 2007; Wolff, 2010). The drivers are therefore conceptualised by the development of a region in which a shrinking city is located in order to estimate the influence of the regional context on the local trajectories of cities. Thus, we can hypothesise that urban shrinkage will hold longer for regions that are less economically strong, have a weaker labour market and have a less favourable the demographic situation.

Methods and data

The model is operationalised by using population decline as the key indicator for describing shrinking cities (Bradbury et al., 1982; Haase et al., 2014) because it is an easily accessible and simple indicator for spatial analysis and allows several assumptions on households and investments (Beauregard, 2009; Turok and Mykhnenko, 2007). For the collection of local population data, a compromise between data availability and methodological–theoretical considerations has shown that analysing the mid-term past after the political changes in 1990 would be most beneficial for the expected results. Since population change shows a non-linear evolution (Beauregard, 2009), the observed period is split into 5-year intervals (1990, 1995, 2000, 2005 and 2010)[1] because it is assumed that changes in a period of more than 5 years can be considered as structural changes (Hoekveld, 2012).

However, population change reflects the multidimensional phenomenon of shrinkage only to a certain extent (Grossmann et al., 2013). Therefore, we

add a second-level analysis that focuses on the impacts of changing contexts on shrinking cities. More specifically, we investigate the impact of demographic change and economic restructuring (macro trends)[2] at a regional scale (NUTS 2) on their embedded cities.

In line with other studies, the operationalisation of demographic change uses the natural population balance (birth–death ratio), the total fertility rate (TFR) and the share of elderly (65+) people as indicators, thus providing information about the surplus of deaths, the reproduction level and the ageing process (ESPON, 2010). Economic restructuring is described by gross domestic product (GDP) changes indicating changing production conditions, and by employment and unemployment rates, which indicate work productivity and, furthermore, provide evidence of the impact of economic changes on the society (Hannemann, 2003). Unemployment must be seen in combination with job development because, when people lose their jobs, they can still out-migrate. Therefore, we include migration balance, which indicates employment deficits and reflects residential decisions due to changing lifestyles (Kabisch et al., 2006).

Population data are used to differentiate between trajectories that demonstrate the duration of a city's population loss. In order to draw a conclusion about the impact of macro trends on the trajectories of shrinking cities, the development rate of all seven regional demographic-economic indicators was calculated for 1990–2000[3] and 2000–2010 and finally clustered (ward algorithm with squared Euclidian distance and elbow criteria). The resulting five regional types were then intersected with the trajectories of the cities.

In each country, different definitions of cities exist and the databases currently available for Europe cover large cities. To define cities, also taking smaller ones into account, we followed existing projects but developed an independent approach (Brezzi et al., 2012; ESPON, 2014).[4] In order to minimise the bias due to size and shape, a combination of a minimum population threshold within the administrative territory and minimum density of their morphological units is applied. The resulting 7742 cities in 36 European countries fully meet three criteria:

- minimum population of 5000 inhabitants in 2010;
- minimum density of 50% of the population living in densely populated parts with more than 1000 inhabitants per km^2 in 2006[5]; and
- minimum share of built-up area of 5% in 2006 for municipalities with less than 30,000 inhabitants in 2010.

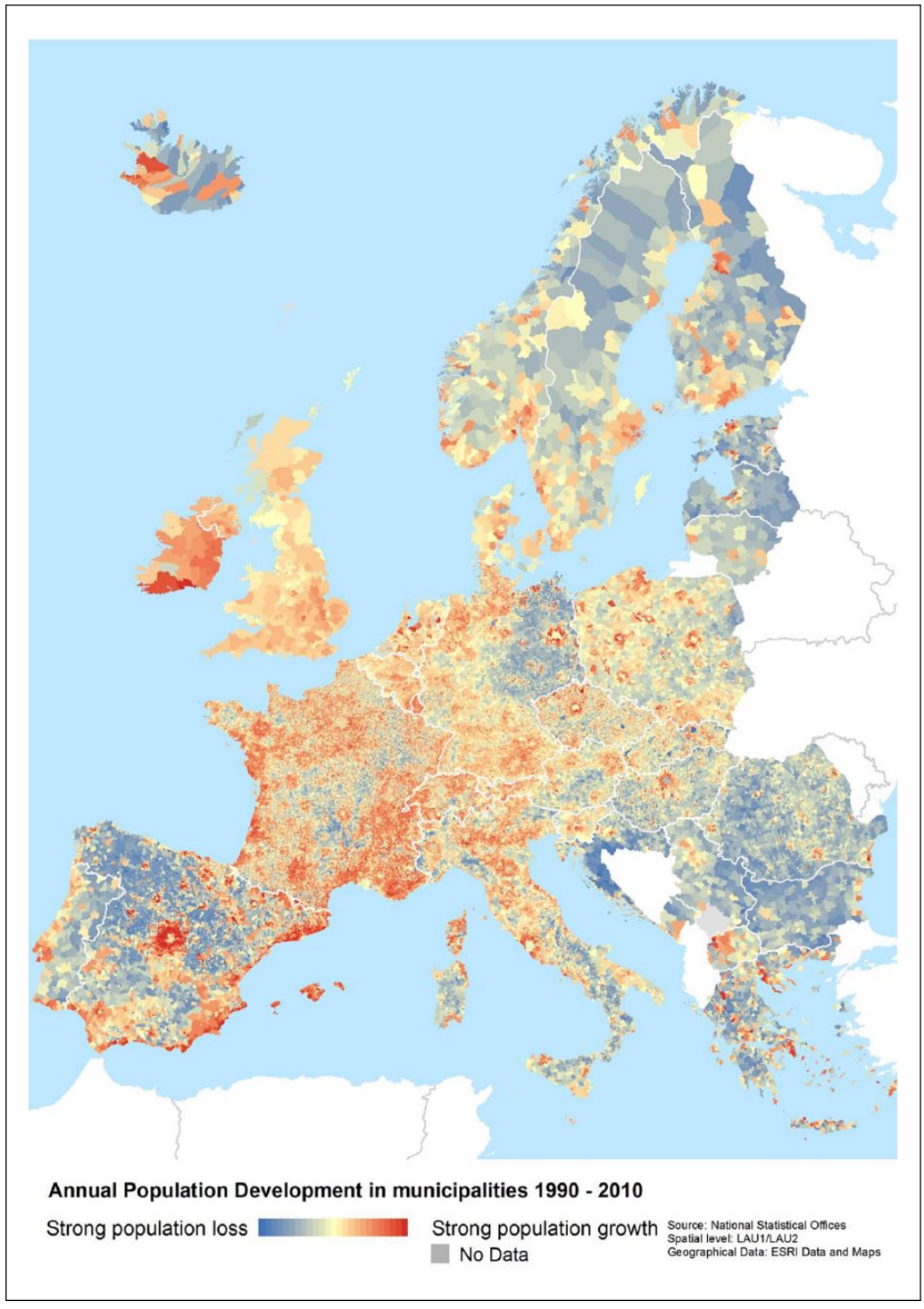
For some countries with limited data availability LAU 1 had to be chosen, which required two indicators in addition those listed above in order to allow comparability:

- the ratio of population of the largest settlement[6] to the total population of all settlements within one municipality exceeds 80%; and
- the ratio of the population of the largest settlement to the total population of its municipality exceeds 50%.

Results: Urban shrinkage in a comparative perspective

National differences of population loss in Europe

Within 20 years, Europe experienced a population increase of 2.5% from 1990 to 2000 and an increase of 3.4% from 2000 to 2010. This trend was accompanied by national differences ranging between fast population growth in the British Isles, Scandinavia, Benelux, France and Spain (>10%), and fast decline in the Baltic States and South-Eastern Europe (<–10%). As Map 1 shows, post-socialist countries with a political and economic transition have municipalities that are especially prone to prominent population losses, for example, the Baltic States, Eastern Poland, Hungary, Romania, Bulgaria, Serbia and the eastern part of Germany. However, contrary to widely held assumptions, municipalities with population loss are widespread in Europe and can also be found in growing countries, such as in the peripheral regions of Scandinavia, Northern Spain and Southern Italy. In particular, the 'inner-peripheral' population loss—declining municipalities that lie within the heart of the country and are surrounded by growing



Map 1. Population development in Europe 1990–2010.

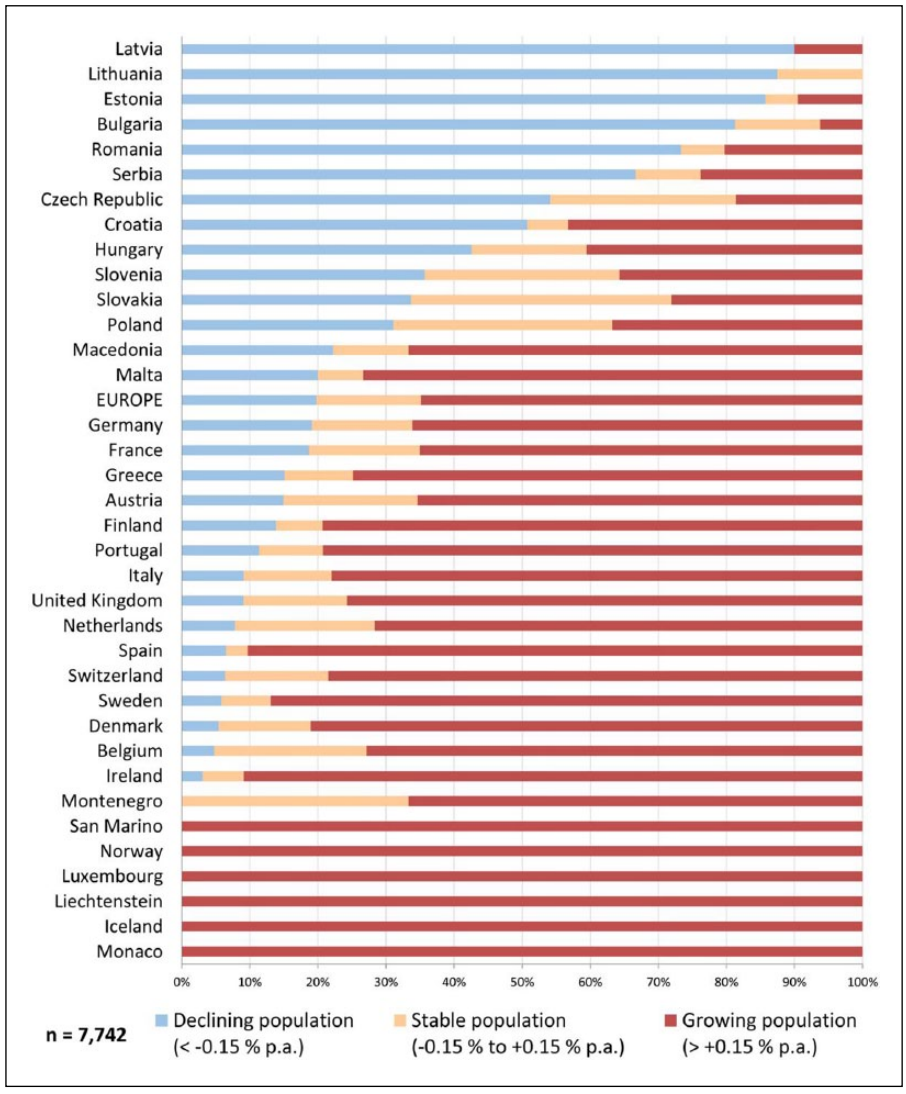


Figure 2. Population development in European cities 1990–2010.

municipalities—is a dominating spatial pattern in Central France, Southern Italy and scattered parts of Greece and Austria.

Urban shrinkage unevenly affects countries

Focusing on cities, Figure 2 shows that more than one-fifth of cities lost more than 0.15% per year; in other words, one out of five cities in Europe has faced population losses over the 20 years since 1990. Thereby, shrinking cities are especially pronounced in the Baltic States, Bulgaria, Romania, the Czech Republic, Serbia and Croatia, with more than half of their cities having experienced population decline. Other Eastern European countries have a share of cities with population losses slightly above the European average (25–50%), for example, Hungary and Poland, whereas the large Western European countries, Germany and France, belong to a group

Table 1. Cities with population loss, stability and growth 1990–2010 per city size.

Total population in 2010	All CITIES		Thereof with population					
			Loss (<–0.15% p.a.)		Stability (–0.15 to +0.15% p.a.)		Growth (>+0.15% p.a.)	
	#	%	#	%	#	%	#	%
5001–10,000	**2390**	**30.9**	407	17.0	319	13.4	1664	69.6
10,001–25,000	**2732**	**35.3**	529	19.3	401	14.7	1802	66.0
25,001–50,000	**1246**	**16.1**	262	21.1	196	15.7	788	63.2
50,001–100,000	**717**	**9.2**	171	23.8	142	19.8	404	56.4
100,001–200,000	**370**	**4.8**	88	23.8	61	16.5	221	59.7
200,001–300,000	**136**	**1.8**	34	25.0	34	25.0	68	50.0
300,001–500,000	**74**	**0.9**	22	29.7	17	23.0	35	47.3
>500,000	**77**	**1.0**	18	23.4	17	22.1	42	54.5
Total (#)	**7742**	**100**	1531		1187		5024	
Total (%)	**100**		**19.8**		**15.3**		**64.9**	

within the range of the European average (15–25%). These numbers reveal important differences between countries because population loss in most Southern European and Scandinavian countries is a major challenge for rural areas and a few cities located in remote areas. In addition, Map 1 shows the decline of larger municipalities, due to suburbanisation within their sphere of influence, in locations such as Porto, Lisbon, Barcelona, Athens, Milan, Venice and Naples, as well as Tallinn, Riga, Lodz, Poznan, Budapest and Bratislava.

Shrinking cities by city size

The spatial patterns described above and, in particular, the inner-periphery effect and suburbanisation, suggest that city size seems to play an important role in urban shrinkage. Table 1 shows a strong, positive relationship between city size and shrinkage: with each size band, the share of shrinking cities grows. The proportion of cities losing population is very low among the smallest cities with less than 10,000 inhabitants (17%) but increases with city size (up to 25% among cities between 200,000 and 300,000 inhabitants). In fact, almost one-third of cities with between 300,000 and 500,000 inhabitants faced population loss in what mirrors the results of previous analyses (European Commission, 2010; Kabisch and Haase, 2011). However, this relationship does not hold for the largest cities (over 500,000 inhabitants) as their agglomeration economies accumulate both economic activities and a skilled workforce (Krugman, 1991).

However, a simple regression model that differentiates between single periods shows that growth rates, especially of these large cities, increased further after 2000, as in Northern and Western Europe. Moreover, several cities in Southern or Eastern Europe have been pushed from former shrinkage to growth after 2005. In contrast, a substantial proportion of small cities had population losses, especially in Western Europe after 2000 and South-Eastern Europe after 2005, with more cities showing a rapid population loss of more than 2% p.a., thus leading to a weakening of the lower hierarchy of the urban systems in these countries.

These short reflections reveal that duration and point in time of urban shrinkage differ significantly. In order to address this complex issue, the paper draws attention to a dynamic perspective and combines this with possible impacts from the macro trends of demographic change and economic restructuring.

Trajectories of shrinking cities in Europe

The trajectories follow a definition from the Shrinking Cities International Research Network

Table 2. Trajectories of shrinking cities.

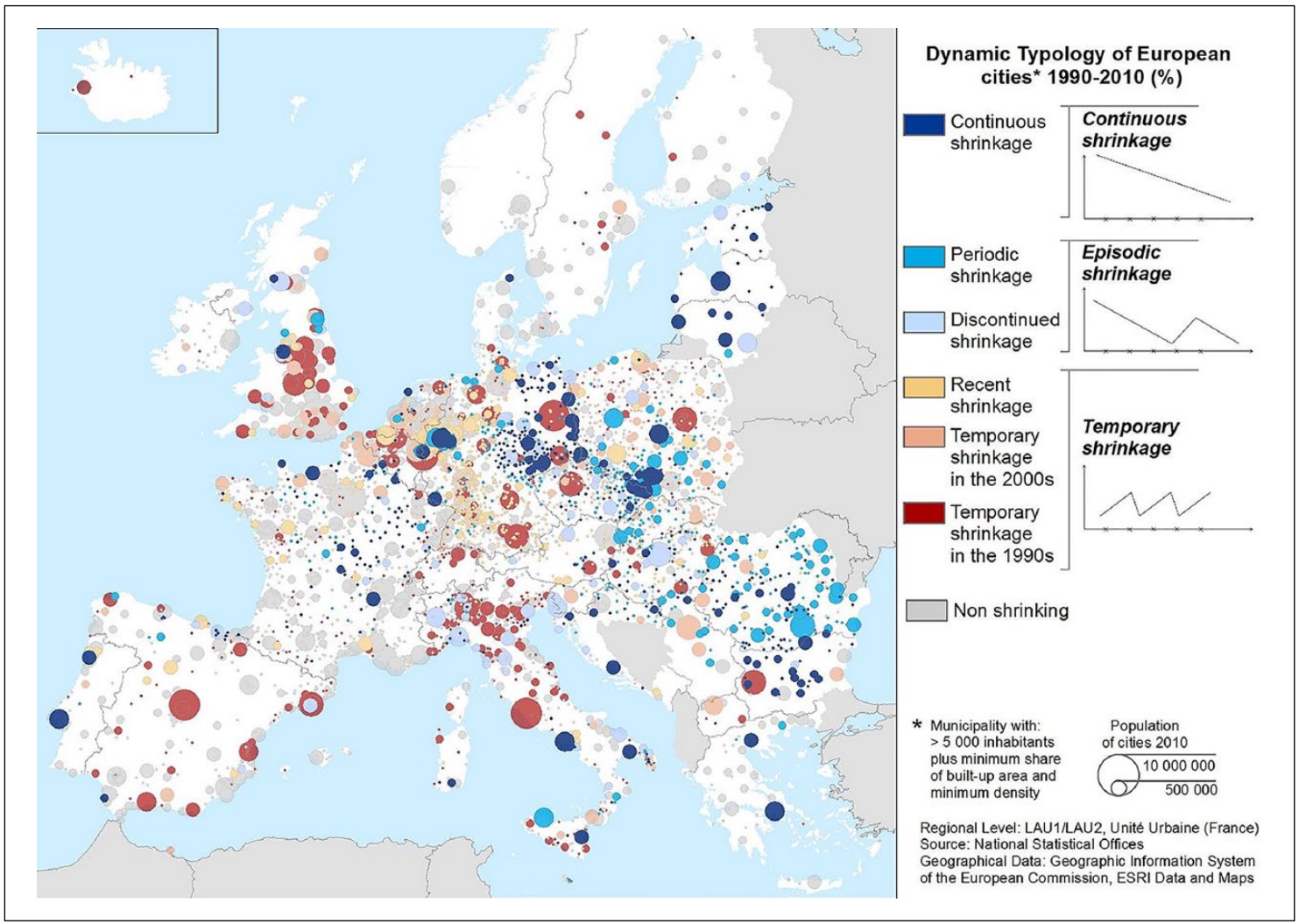
Duration (general types)	Time (subtypes)
Continuously shrinking cities Population loss of at least 0.15% p.a. in all four 5-year periods	• *Continuous shrinkage* Population decline 1990–2010
Episodically shrinking cities Population loss of at least 0.15% p.a. over the entire period, with a stable or even growing population (>–0.15% p.a.) in at least one 5-year period	• *Periodic shrinkage* Population decline 1995–2010 or 2000–2010 • *Discontinued shrinkage* Population decline 1990–2005, 1990–2000 or 1995–2005
Temporarily shrinking cities That have not lost at least 0.15% of their population p.a. over the entire period, but in at least one 5-year period	• *Temporary shrinkage in the 1990s* Population decline 1990–1995 or 1995–2000 • *Temporary shrinkage in the 2000s* Population decline 2000–2005 (or together with 1990–1995) • *Recent shrinkage* Population decline 2005–2010 (or together with 1990–1995 or 1995–2000)

(SCiRN) and are specified by the COST Action 'Cities Regrowing Smaller', according to which a shrinking city is an urbanised area that has recently faced a population loss of more than 0.15% annually for at least 5 years or in some former period. In order to separate long-term trends from short-term 'events' (Turok and Mykhnenko, 2007), we single out cities that experienced population loss between 1990 and 2010 either permanently or for a minimum of one out of four 5-year periods and derive subtypes, indicating the time period of population loss (Table 2). According to this typology, almost half of Europe's cities have faced some kind of population loss and can be regarded as one of the types of shrinking cities (3784 out of 7742 cities; 49%, Map 2).

Continuously shrinking cities. Continuously shrinking cities represent 14% of all shrinking cities (534 out of 3784 cities) and are predominantly located in Western Europe, especially in Eastern Germany, the Ruhr area and the industrial areas of North-Eastern and Central France, but also in Bulgaria, Croatia, Romania, the old Polish-Czech industrial areas and the Baltic States.

Episodically shrinking cities. This group covers 23% (854 cities), of which the group displaying periodic shrinkage is dominant, that is, those that started losing population in the mid-1990s or after the turn of the century (517 cities). These shrinking cities are concentrated in post-socialist countries: Poland, the Czech Republic, Slovakia, Romania and Serbia, as well as in Western Europe at the former inner-German border, and in Northern and Central France. In contrast, several medium and large cities (>50,000 inhabitants) ceased to shrink after 2005 (337 cities); these are located particularly in Poland, the Czech Republic, Hungary, Eastern Germany and Northern Italy.

Temporarily shrinking cities. A large share of cities shows temporary shrinkage (2396 cities, 63%). The largest fraction among them lost population during the 1990s, which is very characteristic for Italy and Spain, but also for Sweden, the United Kingdom, Poland, the Czech Republic, Hungary and Western Germany (878 cities). Similar to France and Southern Italy, small cities, particularly in Eastern Europe and capitals such as Warsaw, Prague and Sofia, are affected. However, recent population losses affect 883 cities, especially large cities in Western Germany, smaller cities in Austria and medium-sized cities in France, but also large- and medium-sized cities in Hungary, Romania and Poland.



Map 2. Types of shrinking cities in Europe 1990–2010.

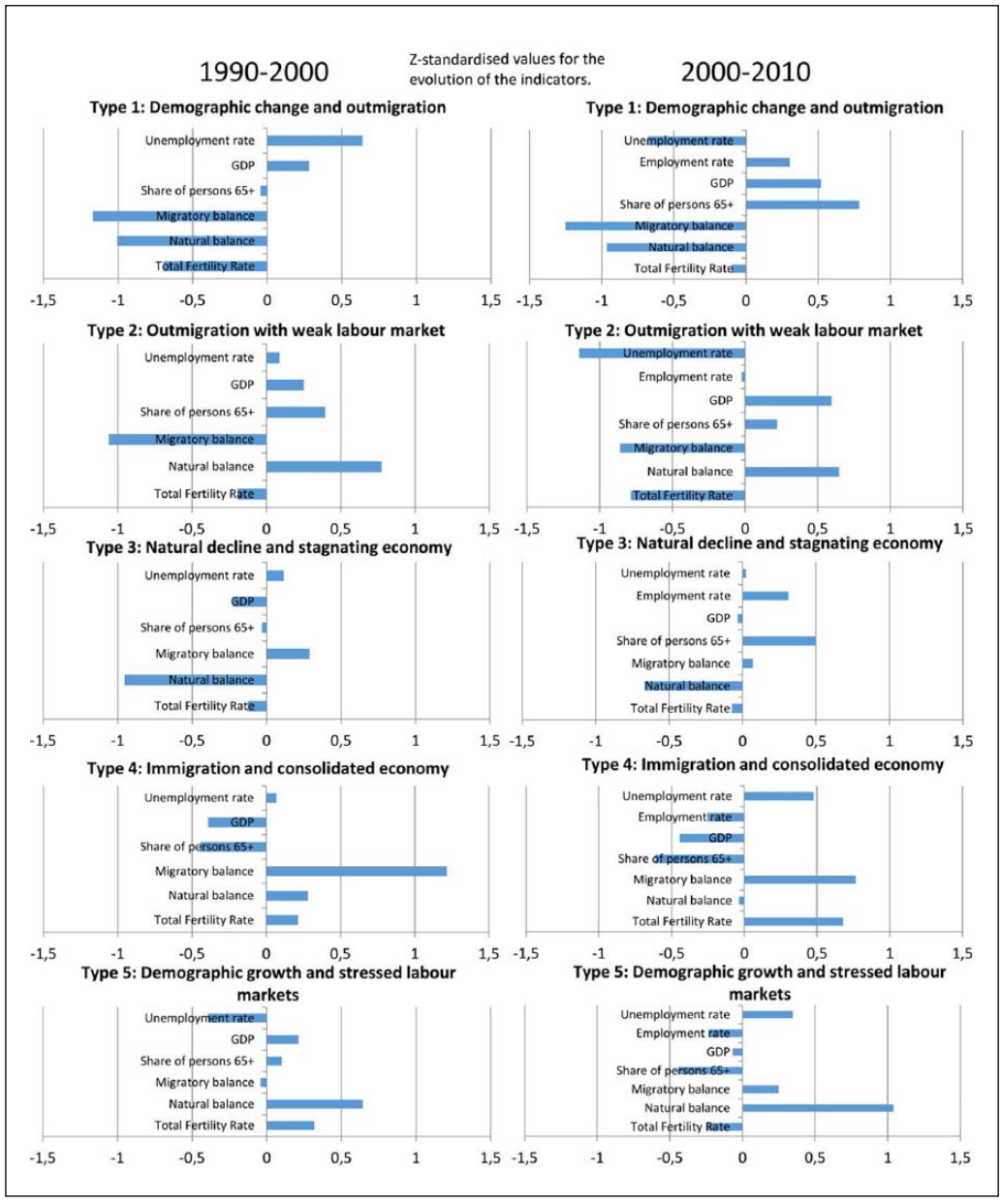


Figure 3. Profiles for each regional type. GDP: gross domestic product.

Influence of macro trends on the trajectories

Following the heuristic model, European regions show different trends in terms of demographic change and economic restructuring (Figure 3). Whereas some basically post-socialist regions are affected by natural decline and selective outmigration (type 1) in contrast to regions with immigration and a positive natural balance (type 5), weak labour

markets lead to job-driven outmigration in North-Western France and Southern Italy (type 2). Natural decline is driving economically strong regions in Germany and Austria (type 3). In contrast, regions in the UK, the Spanish–French Mediterranean and Northern Italy benefit from strong immigration (type 4) with, however, pressure on the labour market because the economy is improving at a slower pace. These trends have different impacts on urban population trends in Europe (percentage values are based on Table 3 in the Appendix).

Natural decline and outmigration drive long-term shrinkage. Continuously and periodically shrinking cities are predominantly located in regions driven by negative natural growth and outmigration (42% and 62% correspond to type 1, respectively). This is especially pronounced in the post-socialist regions of Romania, Bulgaria, Poland, Croatia[6] and Eastern Germany, but also in old industrial regions with a predominance of heavy, extractive and textile industries, especially in Upper Silesia. Unable to adjust to the new market conditions relatively quickly, these basically mono-industrialised cities saw their economy declining even though GDP had risen in these regions, especially after the enlargement of 2004/2007 (Birch and Mykhnenko, 2009). This growth hardly had an effect on the labour market because unemployment rates rose during the 1990s due to the decreasing competitiveness of these regions.[7] The resulting age-selective outmigration reinforced the long-term population loss due to the lack of births and a surplus of deaths (Müller and Siedentop, 2004; Steinführer and Haase, 2007).

Episodic shrinkage in economically disadvantaged regions. Old industrial regions that underwent economic restructuring since the deindustrialisation of the 1970s are marked by constant job-driven outmigration (type 2, Baron et al., 2010). Depending on the economic diversity and the degree of specialisation and productivity, this trend pushes continuous shrinkage (12%), for instance in Northern France, Eastern France and Southern Italy, as well as periodic decline (17%), as seen in Central Poland and North-Eastern Romania. These structural disadvantages led to inflexible labour markets (Ferrerol, 2010), marked by increasing unemployment rates and a stagnating GDP. The fluctuation of population loss in these cities can thus be explained by increasingly irregular migration patterns that are also highlighted by the high share of cities that lost population as a consequence of the economic crisis in the late 2000s that spread all over Europe (21%).

Natural decline as a self-reinforcing avalanche. The impact of natural decline (type 3) as an essential factor for continuous shrinkage (14%) basically occurs in less dense regions such as the Iberian Peninsula, Central France, parts of Austria, Hungary and the Czech Republic. Significantly, this trend is increasingly affecting cities, explaining the high shares of recently shrinking cities: whereas regions with a strong natural decline cover 26% of all periodically shrinking cities with population losses between 1995 and 2010, the share is almost 46% among recent shrinking cities. This trend is characteristic for Western Germany, the Czech Republic, Slovakia and Hungary. Although these regions are economically strong, outmigration of young jobseekers; low attractiveness for families; and absence of immigration due to a loss of functions, for example, supply, administration, health services, etc., give rise to the impact of natural decline in these cities. Besides these local factors, changing lifestyles lead to low and decreasing birth rates, especially after 2000, which indicates a decoupling of population development and economic strength. Rather, the natural decline, in turn, has an effect on the labour market of these regions as productivity only slowly increased, followed by decreasing employment rates. Finally, residential decisions targeting larger cities, accompanied by the stagnation of suburbanisation, for example, in Hungary and Slovakia, and (international) immigration, led to the regrowth of cities (discontinued shrinkage 22%), including Germany, but are at the same time expressing a shift towards urban lifestyles with a strong population concentration, whereas the remaining areas suffer from natural decline.

Imbalanced labour markets causing temporarily shrinkage. In regions with traditionally high immigration (type 4), cities managed to regrow after 2005

(discontinued shrinkage, 20%), such as in the UK, Spanish-French Mediterranean areas and Northern Italy, mitigating population losses due to suburbanisation and a natural decline in these regions during the 1990s (40%). However, these regions are characterised by the production of low-value and non-competitive industrial products and corresponding low productivity and high unemployment rates, such as in Northern Spain or Southern Italy. Thus, the comparably low share of cities with population loss during 2000 is thereby due to immigration from rural areas and the lack of job opportunities outside the cities (Hoggart, 2005). Consequently, the labour market in these regions is tight because it cannot compensate for the high rates of immigration, leading to decreasing employment and increasing unemployment rates.

Urban shrinkage due to competition. Short-term population losses in cities can even be recorded in economically advanced regions with positive population development (type 5). Firstly, this phenomenon is due to an increasing gap between growing productivity and the effects on the labour market with a corresponding increase in unemployment rates. Secondly, residential preferences for urban amenities together with the increasing mobility of a well-educated and trained labour force indicate that shrinkage in densely populated regions close to large centres is less associated with economic performance. Both aspects accelerate an increasing competition between cities and within advanced regions and, as a consequence of the economic crisis during the 2000s, led to temporary shrinkage (Pallagst et al., 2013), which is characteristic for cities in Ireland, Belgium and the Netherlands, and in large parts of France (24%).

Discussion

In almost all European states, some type of shrinking cities with population losses of more than 0.15% can be found after 1990. However, countries are affected differently with variations in city size and duration of population loss. These variations strongly depend on the combination of different drivers, which will now be discussed by reflecting on the used model. Finally, the conclusion points to implications for policy and urban theory.

Reflection on the heuristic model

The model *confirmed* that multiple and self-reinforcing negative factors push urban shrinkage towards a structural phenomenon (Martinez-Fernandez et al., 2012). The 534 continuously shrinking cities, in particular, are driven by natural and economic decline, mirrored by fast outmigration and long-term low fertility rates. This is especially characteristic in post-socialist regions based on their less-competitive development within their protected economies before 1990 and especially accelerated, with the exception of the capital regions, during the 2000s, which was reinforced by the 2004/2007 European Union (EU) enlargement with international outmigration.

Moreover, impacts of macro trends are not evolving in a similar way everywhere, leading to *specifications* of the model. Firstly, in particular, small- and medium-sized mono-industrialised cities with mining, steel, ports or textile industries have been affected by structural economic downturn ever since the 1970s (Deaton, 2005). As production factors, such as capital or technology, cannot be compensated by the competitive services of the tertiary sector, these cities are especially exposed to changes of demand, production and market conditions; this situation leads to high unemployment and outmigration and thus to long-term, and especially to periodic, shrinkage (Acemoglu, 2009). Secondly, the strong natural decline in several European regions has an increasing impact on urban shrinkage related to the second demographic transition (Van de Kaa, 1987). Among the 2391 temporarily shrinking cities, a large number of small- and medium-sized cities are affected by recent population losses, especially in South-Eastern and Western Europe. As whole regions and countries are concerned, a shift away from the conventional definition of ‘families’ as couples with children, to more varied household types, including an increasing number of blended families, is characteristic.

Moreover, two *variations* from the model assumption have been identified that are basically due to an increasing decoupling of local population trends

from regional economic performance. Neither does economic downturn automatically lead to urban shrinkage, which is observable in Southern Europe, and nor does economic success of a region prevent their cities from shrinking. This is due to the explanation power of the paper's approach, which is limited to the spatial scale chosen, as well as to the selection of seven basic influence factors. However, four points are increasingly important for the discussion on shrinking cities, as follows.

- An increasing mobile workforce leads to increasing *competition between cities* (Batey and Friedrich, 2000) regarding both labour opportunities and urban amenities. From this perspective, not economic decline of one city but, rather, economic growth of adjacent cities leads to shrinkage, which makes it necessary to think about new ways in which drivers interact.
- The *circular redistribution of labour* depends on actual forms of production, functional aggregations of industry in space and strategic decisions (Massey, 1984; Scott, 1988). The question regarding if this weakening manifests in short- or long-term shrinkage depends on the individual preconditions of cities that makes them more resistant to population decline, although they are hit by the same demographic and economic factors. This explains why people move to larger cities where the discrepancy between a qualified demand and an unqualified supply is increasing, although the region's economy is moving downward (Hannemann, 2003). This trend was accelerated by the economic crisis in the late 2000s, where political-economic interventions on a national scale exposed several regional labour markets (Haase et al., 2014).
- In this regard, *city size* seems to play an increasingly more important role, especially in the context of the recent polarisation of the urban landscape in Europe. Predominantly large cities managed to regrow, benefiting from the decline of others (Kabisch and Haase, 2011), whereas, in particular, smaller cities benefit from 'borrowing' agglomeration effects while avoiding agglomeration costs based on relationships and flows to more distant cities (Camagni and Capello, 2015).
- Natural population drop, ageing and a lack of job-starters for certain industries is of increasing importance compared to short-term migration tendencies, as it discourages economic activities, entrepreneurship, private and public investments, and innovation and technology development, all leading to economic decline (European Commission, 2014; Friedrich, 1987). The impact of natural decline was already visible as soon as immigration was absent, especially after 2005. In the face of the upcoming second demographic wave, this impact is expected to increase even in regions with immigration and economically moderate performance, due to a higher number of job offers, rising living standards and technological innovations that influence reproductive behaviour (Ferry and Vironen, 2010).

Further research

Although this study has not analysed suburbanisation as a driver of shrinkage according to the model, there are indications of the role of the hinterland for the cities' trajectories. In several areas, reurbanisation (Berry, 1977; Van den Berg et al., 1982) can be observed, although their regions still suffer from outmigration and natural decline. This may point to halted suburbanisation with population loss and ageing of former home-owners in the hinterland. In contrast, shrinkage due to suburbanisation does not always coincide with a general decline in the economic activity of the city because people moving to the suburbs keep their jobs in the city. This would also explain why long-term shrinking cities are located in regions that perform well in terms of economy and labour.

In this regard, further research needs to take into account that the cities' trajectories are not autonomous from their hinterland (ESPON, 2014) by questioning whether suburbanisation should be understood more as a spatial consequence driven by economic (welfare) or demographic (family houses) factors rather than as a causative driver. Thus, a

second-level analysis would empirically enrich the heuristic model, studying two factors. Firstly, in line with life-cycle models, we need to ask if cities are centralising or decentralising by comparing population growth rates in the cities and their hinterland (Van den Berg et al., 1982). Secondly, as the decline in density has often been used as the very definition of sprawl, a comparison of both the population growth and the growth of built-up areas, expressed as density changes, can provide additional explanations serving the heuristic model (Siedentop and Fina, 2012). Still, both factors need to be contextualised by different national planning schemes and land use regulatory systems.

Conclusion

This study tested a heuristic model of urban shrinkage with a total survey of European cities setting the cities' trajectories between 1990 and 2010 into their regional context. The approach has shed light on the explanatory power of macro drivers on urban shrinkage and, in line with previous studies, serves as an empirical contribution to the debate on urban shrinkage (Haase et al., 2014; Turok and Mykhnenko, 2007). After the fall of the Iron Curtain, 20% of European cities experienced shrinkage, however, with differences between countries and city sizes. Among them, 883 basically small cities faced recent shrinkage in addition to 1051 cities with long-term shrinkage: underlining that urban shrinkage is an emerging issue for scholars and planners.

Urban shrinkage was previously described by conceptual frameworks providing anchor points to major *urban theories*, such as agglomeration effects and uneven development (Harvey, 2006). The demonstrated measurement framework following a heuristic model reveals two dimensions that are deemed to be most significant for theoretical reflections on shrinking cities: the process-specific dimension of different causes and the location of shrinking cities within their regional and national context. To understand the process of shrinkage, the combination of various drivers and impacts on local trajectories needs to be considered, rather than individual factors. The same drivers do not automatically lead to similar population trends. Rather, differences in the dynamics of regional spatial systems point to the strong interrelation of multiple scales causing urban shrinkage. Macro trends, for example, on a regional or even a national level, are always a product of the evolution of the corresponding cities, and vice versa. Thus, typologies have the power to reflect the variations of processes but need to be supplemented by local case studies addressing planning regimes, the role of suburbanisation or the competition between cities. This requires a multi-scale perspective, both theoretically and empirically, to fully elaborate the theories on urban shrinkage.

These theoretical reflections drawn from the empirical findings of the paper also point to *policy implications*. Shrinkage should neither be stigmatised by hopeless spots of unemployment, land degradation and social deterioration, and seeking to reverse this trend at all costs, nor should the emerging open space and affordable housing be praised for solving all problems while being blind to the structural process of shrinkage. Rather, planning needs to understand shrinkage as a normal phenomenon of the developed world determined by regional contexts and local preconditions that requires flexible answers that are sensitive to challenges operating on different scales. Local planning needs to re-think the city as a space for reconstruction or cultural practice by maintaining the infrastructure while facing shrinking budgets and pressures regarding financial priorities. Multi-scale processes require multi-scale policy responses rather than thinking in economic growth models. Thereby, the proposed typology may support supranational regeneration strategies because it reveals that different strategies are required for long-term versus future-shrinking cities (due low birth rates and economic shifts) and for smaller versus larger cities, as they all follow different logics of shrinkage. Thereby, the EU Cohesion Policy is mostly promising to pay attention to these variations and supporting the implementation of regeneration strategies. These strategies include improving environmental aesthetics, services and infrastructure; encouraging the development of skills, governance partnerships, networking, private and public collaboration; or supporting economic development.

Combining the foci on shrinking cities, both the processual and the spatial, allows us to investigate under which conditions shrinkage remains temporary or turns into a structural challenge and points to policy implementations. This seems to be crucial, as many European cities have already lost a segment of their population and the rate is more than likely to increase in the future, representing a major challenge for future urban policies and urban research in Europe.

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Notes

1. Data source: national statistical offices. Reference years vary in some cases, ±1 year; in very few cases, ± up to 3 years; for some countries, missing data had to be estimated. Because of boundary changes, frozen boundaries of 2010 or the largest spatial extent of each municipality is used for the calculations of time series.
2. Analysing other model elements, such as governance, would require another research design or spatial scale.
3. GDP 1995–2000, unemployment rate 1989–2000. Data source: EUROSTAT, 2nd Cohesion Report, National Statistical Offices.
4. Local administrative units (LAU 2) are used; a few cases used LAU 1 due to data availability (Bulgaria, Denmark, Greece, United Kingdom, Ireland, Lithuania, Macedonia, Montenegro, Portugal, Serbia); Unité Urbaine was used for France.
5. The GEOSTAT population grid was used with a cluster of all cells with a density above 1000 inhabitants per km^2 (for France 300, see ESPON, 2014) within a municipality. For Croatia, Macedonia, Montenegro and Serbia Urban Morphological Zones (European Environment Agency, 2013) and World-Gazetteer, for Switzerland, PELCOM land cover data were used.
6. After population losses during the War of Independence in 1991–1995, Croatia recorded immigration and a positive natural change from 1995 to 1998.
7. Strong outmigration led to decreasing unemployment rates after 2000 (except Romania).

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Appendix

Table 3. Cross-table of typologies.

In %	REGIONAL TYPOLOGY OF DEMOGRAPHIC CHANGE AND ECONOMIC RESTRUCTIRING						
	Type 1	Type 2	Type 3	Type4	Type 5	Not classified	Total
TYPOLOGY OF TRAJECTORIES	1990–2000						
Continuous shrinkage	48.9	17.2	14.4	2.6	6.6	10.3	100
Periodic shrinkage	28.6	14.1	25.3	8.7	6.0	17.2	100
Discontinued shrinkage	12.2	15.7	36.2	2.4	14.8	18.7	100
Temporary shrinkage in the 1990s	5.7	14.2	37.5	9.6	21.8	11.3	100
Temporary shrinkage in the 2000s	6.0	15.1	20.0	18.3	17.8	22.7	100
Recent shrinkage	6.1	8.6	24.0	43.6	12.1	5.5	100
Non-shrinkage	2.2	10.6	25.7	23.0	33.3	5.1	100
Total	8.8	12.1	26.0	20.2	23.8	9.1	100
2000–2010							
Continuous shrinkage	61.8	12.0	12.4	4.7	8.2	0.9	100
Periodic shrinkage	42.0	16.8	25.9	4.8	8.3	2.1	100
Discontinued shrinkage	25.2	16.9	22.3	20.5	14.8	0.3	100
Temporary shrinkage in the 1990s	6.6	13.4	21.4	40.2	17.4	0.9	100
Temporary shrinkage in the 2000s	15.6	20.8	28.9	10.4	23.5	0.8	100
Recent shrinkage	15.4	10.6	46.3	13.1	14.3	.2	100
Non-shrinkage	2.9	10.1	18.6	38.5	28.8	1.2	100
Total	13.4	12.3	23.1	28.1	22.0	1.0	100