

Chapter 2. Sprawl in European cities: the comparative background

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2.1. Urban trends in Europe.

This chapter provides an overview of some of the major trends in urban development and sprawl across Europe before going on to describe the characteristics of each of the case study areas used in this book.

The total population of the 25 states of the European Union (EU) was just over 455 million in 2005, giving an average population density of about 117.5 inhabitants per km² (Eurostat, 2005). This can be compared with the USA, which had a population of 296 million in 2005 (US Census Bureau) and a population density of about 31.6 inhabitants per km². Looking towards the next twenty years it is anticipated that the total EU population will increase only moderately. Because the population is ageing and fertility rates are generally low, even this level of growth is dependent upon inward migration from outside the EU. There is also likely to be some modest internal redistribution of population with some internal migration from east to west (European Commission 2004). According to UN estimates the proportion of the population of Europe living in urban areas is likely to rise from 73.3% in 2005 to 78.0% in 2025 (United Nations, 2004). There is a continuing drift of existing populations from rural to urban areas and the majority of new immigrants tend to settle in urban areas, reinforcing existing patterns of urbanisation (European Commission, 1999, p58). If these trends continue it is estimated that existing or new urban areas will have to accommodate around 28 million additional inhabitants over the next 20 years. The pressure for urban sprawl will be considerable. Furthermore, according to the European Commission there will be:

“A higher proportion of older people, who will, in contrast with previous generations, be more mobile, prosperous and active. Children and young people will increasingly be from immigrant families and will often be caught ‘between cultures’. As has been the case with the extended family of typical rural society, the ‘average family’ is also on the decline. People living alone, single parents (often financially weak) and childless couples (...comparatively financially strong) are increasingly characterising society in the EU. Different groups make different demands on space; social requirements for land use are becoming more complex” (European Commission, 1999, pp58-59).

In most European countries strong polycentric urban systems can be seen. In many cases these towns and cities are developing networks, pooling resources and sharing functions with other cities. New and changing economic functions are putting pressure on cities to release more peripheral land for commercial and industrial development. The growing number of urban households and the increasing affluence of those households is continually pushing up housing demand both in terms of the number of dwellings and their space requirements. Urban sprawl has become a problem across the European Union. Traffic congestion and pollution have become acute problems in many cities. Natural environments and the built heritage within and adjacent to cities are under increasing threat from development and pollution. Growing differences in income and lifestyles are leading to increasing social tensions and segregation within cities. Many communities in inner urban areas and peripheral social housing estates suffer social and economic deprivation (European Community, 1999, pp64-70).

The question arises as to the extent of urban sprawl in Europe: have all cities experienced similar degrees of sprawl or are there variations in trends between countries or between different types of city? In order to obtain an impression of trends in urban sprawl across Europe we have analysed data from the European Union’s ‘Urban Audit’

(<http://www.urbanaudit.org>). The Urban Audit presents socio-economic and environmental data for 258 large and medium sized cities within the European Union and candidate countries. Data is generally provided for both the city and 'larger urban zones' (LUZ). According to the Urban Audit:

“political (local government) boundaries were used to define the city level. In many countries these boundaries are clearly established and well-known. As a result, for most cities the boundary used in the Urban Audit corresponds to the general perception of that city. The larger urban zone (LUZ) allows a comparison between the city and its surroundings. The goal was to have an area from a significant share of the resident commute into the city, a concept known as the “functional urban region”. To ensure a good data availability, the Urban Audit works with administrative boundaries that approximate the functional urban region”

(<http://www.urbanaudit.org/help.aspx>).

By comparing data for 1991 and 2001 for both the city and the LUZ it is possible to obtain an impression of population change and the extent of urban sprawl. However, some caution must be exercised in using and interpreting this data for the boundaries are political and do not necessarily coincide with functional boundaries. The extent to which a functional city is fully enclosed within its political boundary will vary from city to city and from country to country. For example, in the United Kingdom the built up area of Liverpool very evidently extends well beyond the local authority boundary of the City of Liverpool, whereas the boundary of Leeds City Council includes not only the built up area of Leeds but also a number of outlying villages and surrounding countryside. So the comparison between cities regarding the amount of sprawl must be treated with some caution. However, the data on the changing amount of sprawl around each city over time (between 1991 and 2001) is rather more robust and the analysis therefore more reliable. Rather than look at all 258 cities, the data has been sampled. The Urban Audit covers a different number of cities in each country.

Unfortunately the data are not comprehensive and some countries (Spain and France for example) had to be excluded due to lack of data. For each country, where adequate data is available for city and LUZ populations in 1991 and 2001, the largest, median and smallest cities included in the audit have been selected. Where our case study cities have not been included in this sample we have added them to our list. London has been excluded from the sample because of the distorting effect of its size compared with other cities.

The allocation of cities and LUZs to European zones in the following sections follows the classification used by Hall and Hay (1980) in their analysis of patterns of growth and sprawl in the European urban system – with the exception that an Eastern Europe zone has been added. Our analysis makes use of the distinction between urban growth and sprawl mentioned in chapter one. Growth occurs when the population of the conurbation increases. Sprawl occurs when the percentage of population living in the core city declines relative to the total population of the conurbation (LUZ).

Table 2.1. shows results for Atlantic, Northern and Western Europe. The first column shows the percentage change in total population in each city's LUZ. The second column shows the change in the share of the LUZ's population lying within the LUZ's core city. Where there has been a decline in the proportion of the LUZ's population within the core city, sprawl has occurred.

Table 2.1. Patterns of growth and sprawl across Atlantic Europe, Northern Europe, and Western Europe - selected cities.

City	Percentage growth in population of the conurbation (LUZ)	Change in the percentage of conurbation population living in the core city
Atlantic Europe		
United Kingdom		
Birmingham	-1.63%	-0.5%
Liverpool	-5.28%	-0.8%
Leicester	+3.78%	-1.6%
Ireland		
Dublin	+14.4%	-3.4%
Cork	+11.5%	-6.0%
Limerick	+17.7%	-3.0%
Northern Europe		
Denmark		
Copenhagen	+5.1%	+0.6%
Aarhus	+5.8%	+1.1%
Aalborg	+1.9%	+0.7%
Sweden		
Stockholm	+11.1%	+0.1%
Western Europe		
Luxembourg		
Luxembourg	+6.6%	-3.1%
Belgium		
Brussels	+3.7%	-0.7%
Gent	+1.3%	-2.2%
Bruges	+1.5%	-1.4%
Netherlands		

Amsterdam	+7.1%	-1.4%
Eindhoven	+8.6%	-1.0%
Arnhem	+6.5%	-0.1%

Source: Authors' calculation from EU Urban Audit data.

Nearly all of our selected LUZs from Atlantic Europe, Northern Europe, and Western Europe, have increased in population, 1991-2001. Of the seven cities, which are the focus of this book, Stockholm LUZ has experienced high growth (+11.1%), while the Liverpool conurbation has experienced significant decline (-5.3%).

Atlantic Europe includes the UK and Ireland. All the conurbations examined are sprawling, although the rate of sprawling in the UK cities is modest. Birmingham and Liverpool stand out as declining and sprawling at the same time. It is notable that the three Irish cities show some of the fastest growth rates of any of those in our sample and have quite high rates of sprawl.

The cities of Northern Europe appear to be the most successful in combating sprawl. This is the only zone in which conurbations are consistently growing but achieving greater compaction at the same time. Against this measure Aarhus is the most successful city in our sample.

In Western Europe all the conurbations sampled are growing with quite modest rates of sprawl. The Dutch cities in particular appear to be combining quite high growth rates with strong restraints on sprawl.

Table 2.2. Patterns of growth and sprawl across Central Europe and Eastern Europe - selected cities.

City	Percentage growth in population of the conurbation (LUZ)	Change in the percentage of conurbation population living in the core city
Central Europe		
Germany		
Berlin	+1.4%	-2.5%
Leipzig	-3.1%	-3.7%
Bonn	+7.1%	-1.5%
Weimar	+2.8%	-0.6%
Austria		
Vienna	+2.8%	-1.5%
Graz	+0.5%	-3.5%
Linz	+1.4%	-4.3%
Eastern Europe		
Poland		
Warsaw	+8.9%	-0.1%
Czech Republic		
Prague	-1.7%	-1.2%
Brno	-1.3%	-1.0%
Usti nad Labem	-0.9%	-0.8%
Slovakia		
Bratislava	-1.2%	-1.3%
Kosice	+2.6%	-1.5%
Banska By..	+0.7%	-0.8%
Hungary		
Budapest	-5.0%	-5.5%
Miskolc	-2.4%	-2.4%
Nyiregyhaza	+3.6%	-0.2%
Slovenia		
Ljubljana	+3.8%	-2.5%
Maribor	-3.1%	-0.4%

Source: Authors' calculation from EU Urban Audit data.

Central European and Eastern European LUZs have shown mixed patterns in terms of growth or decline, 1991-2001, with eleven of our selected LUZs showing an increase in population, and eight of our selected LUZs declining. Of our case study cities, Warsaw (8.9%), Ljubljana (3.8%), and Vienna (2.8%), have each grown, while Leipzig has declined (-3.1%).

The majority of conurbations in Central Europe are growing steadily and all exhibit some degree of sprawl. The exception is Leipzig, which is a declining conurbation and yet displayed the second highest rate of sprawl in the zone. However, it must be remembered that Leipzig and Weimar were formerly in East Germany and between 1946 and 1989 subject to the same type of socialist political regime and the countries of the Eastern European zone.

There is a mixed pattern of urban development across the Eastern Europe zone. Warsaw is expanding quickly with very little sprawl. On the other hand a number of conurbations sampled in the zone are, in a manner similar to Leipzig, declining and sprawling at the same time. Budapest stands out as doing particularly badly in this regard.

Table 2.3 Patterns of growth and sprawl across Southern Europe - selected cities.

City	Percentage growth in population of the conurbation (LUZ)	Change in the percentage of conurbation population living in the core city
Southern Europe		
Greece		
Athens	+26.7%	-4.8%
Larissa	+4.3%	+4.9%
Kalamata	-0.2%	+6.7%
Cyprus		
Nicosia	+14.7%	+1.4%
Italy		
Rome	-1.6%	-5.0%
Taranto	-1.7%	-4.6%
Campobasso	-3.4%	+0.7%
Portugal		
Lisbon	+4.3%	-5.4%
Porto	+7.5%	-5.7%

Source: Authors' calculation from EU Urban Audit data.

Five out of the nine Southern European LUZs have experienced growth in population 1991-2001. Four of the nine have declined. The Athens LUZ has experienced a dramatic increase in population (+26.7%).

Southern Europe also presents a variety of experiences. Athens seems to be an exceptional case, perhaps unique, with a very high rate of growth combined with an above average rate of sprawl. Larissa in Greece and Nicosia in Cyprus are also growing quickly but in these cases growth appears to have been more successfully contained within the core city area. Each of the Italian conurbations sampled are suffering population decline and in the cases of Rome and Taranto, experiencing significant amounts of sprawl at the same time. The two Portuguese conurbations are growing with quite high rates of sprawl.

Figure 2.1. shows the conurbations by type according to whether their growth and sprawl trends. The conurbations fall into four groups. One small group are managing growth with containment. That is to say, the density of population in the core city is increasing faster than that of the conurbation as a whole. These are found in two zones; northern Europe and parts of Southern Europe under Greek cultural influence. A second small group, comprising only two conurbations, both in Southern Europe, are experiencing decline with containment. They are shrinking inwards with the population of the core city being maintained whilst the outer urban areas decline.

The largest group are growing and sprawling at the same time. This includes conurbations from all zones except Northern Europe, with Western and Central Europe being particularly well represented. Finally there is a group of conurbations that is both declining and sprawling. Here the density of population in the core city is falling faster than that of the conurbation as a whole. The majority of this group are located in Eastern Europe, although a number of UK and Italian conurbations are also represented. The size of the conurbation seems, at this level of analysis, to have very little influence on sprawling.

Figure 2.1. Conurbation types: growth and sprawl.

2.2. Urban trends in the case study cities.

There is a great variety of demographic and economic conditions and trends within the countries of the European Union which have an impact on urban sprawl. Table 2.4 provides some basic data about the countries we have studied.

There are considerable variations in population density between these countries. The United Kingdom and Germany each have population densities more than double those of any other country studied. Poland is close to the EU average with Austria, Greece and Slovenia rather below this figure. Sweden is very sparsely inhabited with an average density only one-tenth that of Germany or the UK. However, these initial impressions need to be adjusted to take account of the fact that in some of these countries: Greece and Sweden and parts of Austria in particular, much of the land is undevelopable. This forces urbanisation into selected areas in which the densities obtained are often similar to those of urbanised areas elsewhere in Europe.

Table 2.4. Population and economic trends across selected European countries

	Population, 2003	Population density, 2003 (Inhabitants per km ²)	Projected increase in population 2005-2020*	Average number of persons per private household, 2003	Gross Domestic Product per capita, 2003, in Purchasing Power Standards (PPS) EU25=100
European Union (EU25)	454,580,100	117.5	+1.92%	2.4	100
Austria	8,102,200	98.5	+3.70%	2.4	120.3
Germany	82,536,700	231.2	+0.12%	2.1	108.2
Greece	11,006,400	83.7	+2.70%	2.6	81.0
Poland	38,218,500	122.2	-2.63%	3.1	46.9
Slovenia	1,995,000	99.1	0.00%	2.6	75.9
Sweden	8,940,800	21.8	+6.7%	2.1**	115.7
United Kingdom	59,328,900	244.3	+5.0%	2.3	116.5

Source: Eurostat yearbook 2005, various tables.

*Author's calculation from Eurostat data.

** Author's estimate

The projected increase in population gives an indication of the extent to which each country has to cope with pressures for additional urbanisation and housebuilding. This pressure is mediated by household size: the lower it is, the more dwellings will be required. Hence Sweden and Germany with an average household size of 2.1 pph must provide 476 dwellings to accommodate every 1,000 people, whereas Poland with 3.1 pph need provide only 323 dwellings. This also affects the type of dwellings required, with smaller households more likely to accept apartment dwelling and urban living, whilst larger households are more likely to have preferences for houses with gardens and suburban locations.

Each country's per capita Gross Domestic product (GDP) gives an indication of its relative purchasing power and therefore its economic capacity to provide the required dwellings and infrastructure, whether through market mechanisms or by means of direct state expenditure. Here the richer countries of northern and western Europe are clearly at an advantage.

Thus whilst both Sweden and Austria have some of the strongest rates of growth in households and demand for dwellings, both are in a strong economic position and have well-established planning systems to control and deal with the problems of urban growth and sprawl. Although household growth in the UK is quite strong it is also regionally imbalanced with most growth forecast in the south and east of the country. Poland, Germany, and Slovenia are each anticipating population decline or only very modest growth, so the pressures for urbanisation should be limited. In contrast, with a population growth rate above the EU average and relatively weak economic and planning capacity, Greece may be facing the most problematic future in terms of accommodating urban growth and controlling urban sprawl. Table 2.5 provides more data on the socio-economic profile of the seven case study areas.

Table 2.5. Socio-economic profile of selected cities.

	Athens	Leipzig	Liverpool	Ljubljana	Stockholm	Vienna	Warsaw
Population, 1991 a)City b)LUZ	a)772,072 b)3,072,922 ^a	a)542,512 b)940,822	a)475,600 b)1,438,000	a)272,650 b)470,641	a)674,452 b)1,641,669 ^b	a)1,539,848 b)2,062,969	a)1,644,515 b)2,300,000 ^c
Population, 2001 a)City b)LUZ	a)789,166 b)3,894,573	a)493,052 b)912,064	a)439,476 b)1,362,004	a)270,506 b)488,364	a)750,348 b)1,823,210	a)1,550,123 b)2,121,704	a)1,609,780 b)2,631,902
Economic structure of region ^d	Agr 0.9% Ind 24.1% Ser 75.0%	Agr 2.5% Ind 32.2% Ser 65.3%	Agr 0.7% Ind 26.8% Ser 71.9%	Agr: 8.4% Ind 37.5% Ser 55.8%	Agr: 2.5% Ind 22.5% Ser 74.9%	Agr 4.8% Ind 24.8% Ser 70.3%	Agr 18.5% Ind 24.4% Ser 57.0%
Regional unemployment rate	8.7%	17.6%	4.9%	17.6%	5.7%	4.2%	17.6%
Regional GDP per capita EUR = 100	82.3	73.3	103.3	51.3	114.8	130.7	45.6
Experience of change	Growth of core city and conurbation, substantial sprawl	Decline of core city and conurbation, substantial sprawl	Decline of core city and conurbation, slight sprawl	Slight decline of core city, growth of conurbation, some sprawl	Growth of core city and conurbation, no sprawl	Slight growth of core city and conurbation, some sprawl	Slight decline of core city, growth of conurbation, slight sprawl
Average household Size	2.62	1.81	2.34	2.59	1.62	1.97	2.23
Percentage of households that are 1-person households	31	45	37	28		45	38
Percentage of households	53	10	53	78		23	16

living in owner occupied dwellings							
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Source: EC Urban Audit. Except: a, Urbs Pandens Athens team; b, Stockholm City Council Statistics Year Book, 2006; c, Authors' estimate; d, Regional Trends, 2006 Table 2.3

LUZ = Larger Urban Zone – essentially the agglomeration but see The Urban Audit (<http://www.urbanaudit.org/>) for a precise definition.

The conurbations fall into three groups. The first group includes Athens and Warsaw which are experiencing rapid growth in the conurbation combined with a substantial increase in sprawl. The characteristic of this group might be said to be economic growth combined with a relatively weak planning system. The second group comprises Ljubljana, Stockholm and Vienna, which are experiencing growth in the conurbation but more modest increases in sprawl. Here economic growth is combined with more successful controls over urban sprawl. The third group comprises Leipzig and Liverpool, which are experiencing decline in the conurbation combined with strong controls over (or weak pressure for) urban sprawl. Here relatively weak urban economies are combined with successful controls over urban sprawl. Nevertheless, Liverpool is still, with Athens, one of the most sprawling cities in the study.

The pressure for urban sprawl is also influenced by other factors including employment structure, income levels (GDP per capita), unemployment, household composition and housing tenure. Again differences can be seen between these cities.

Leipzig and Ljubljana both lie within regions containing a greater than average ratio of industrial employment than is the norm in Europe today. It may well be that these cities still have to go through further structural economic change in the move towards more service-based economies. Such change is likely to have the opposing effects, experienced in Liverpool in the 1980s, of creating socio-economic and environmental pressures for outward

migration whilst at the same time releasing urban land that can be re-used for residential purposes. The high proportion of agricultural employment in Poland is also likely to be sharply reduced in future, creating pressures for rural to urban migration that will lead to urban growth and sprawl.

There is a significant difference in the wealth and income of these cities. Vienna and Stockholm are affluent cities with high levels of GDP per capita and low unemployment rates; Liverpool too (despite the poverty of the city) is in a relatively prosperous region. In these cities the market demand for additional housing space may be more stimulated than the other four cities that lie in less affluent regions.

The core cities of Leipzig, Stockholm and Vienna all have an average household size below 2.00 combined with more than 40% of households comprising only one person. These are populations for whom high levels of urbanity (the compact city) are likely to prove acceptable. At the other extreme, the core cities of Athens and Ljubljana each have an average household size above 2.5 and very low proportions of single person households (only 28% in Ljubljana). These populations are more likely to seek suburban living environments. Tenure also plays a part as sprawl tends to be associated with owner occupation. In the core cities of Athens, Liverpool and Ljubljana the majority of households are owner occupiers, in sharp contrast with the other cities studied.

Each of the case study cities is now described in more depth.

Athens

Athens is the capital of Greece and the country's economic and administrative centre. In 2001 about 30% of the population of Greece lived in the Athens conurbation. There is a

sharp contrast between the very intensely developed and densely populated core city of Athens and the low density of development found in the surrounding urban region. Athens is an ageing city. Inhabitants under 16 have decreased both in relative and absolute terms. On the other hand, the economic activity rate is high (64%) and the city has proved an attractive destination for immigrants (17% of the population are non-EU nationals). Athens was never a highly industrialised city and today its economic base is heavily service-oriented. More than two out of three jobs are in the tertiary sector, with finance, insurance and real estate being particularly strong. Nevertheless, the unemployment rate was around 9% in 2001 (Urban Audit, 2006).

Throughout the second half of the 20th century Athens experienced heavy environmental problems, especially traffic-related air pollution. In 1995 Athens had some of the highest pollution levels of any large European city according to the European Environment Agency (2001). These environmental problems put a major strain on the inhabitants and their health conditions as well as on the planning authorities to cope with the problem.

Over recent years the whole of Greece has been eligible for funding as an EU Objective 1 priority region, as well as through the Cohesion Fund. Athens has benefited through the construction of major infrastructure such as a new airport, a new underground metro system and a series of new highways. Much of the city's infrastructure was significantly upgraded for the Olympic Games, held in Athens in 2004. These investments have had an important influence on urban sprawl.

Culturally, the city features important ancient monuments, such as the Acropolis. It has a lively cultural scene, particularly in theatre, with many national and international festivals. The most recent new construction is the Athens Concert Hall, and in the future, a new Acropolis museum, a new Opera house and a Museum of Modern Art are to be built. In the

years prior to the Olympic Games in 2004, a 'Cultural Olympiad' was held to reinforce the cultural significance of the games.

Figure 2.2. Athens

The Athens conurbation is governed by two tiers of local government, made up of municipalities and prefectures. There are over 90 municipalities, one of which is the City of Athens. The City of Athens surrounds the historic centre, and includes the traditional business and retail centre of the city. There are also four prefectures within the conurbation. In an effort to build an all-encompassing metropolitan authority, a supra-prefectural authority has been created, covering most of the conurbation.

Despite recent changes and a trend towards de-centralisation of authority, the municipalities and prefectures of Athens do not hold significant powers. The municipalities are responsible for services such as recreational and cultural amenities, minor infrastructure, limited social welfare services, parks and sanitation, and have a limited right to levy property taxes. However, the central government authorities and a large number of sectoral service agencies, still handle planning, development, environmental and other major issues such as transport and sanitation.

The historical experience of sprawl in Athens can be seen as a series of waves of development. The first big wave started in the early 1920s when many thousands of refugees from Asia Minor set up homes outside the existing built up area of Athens. A second wave of inward migration occurred when population flowed from rural Greece towards the capital in search of an escape from rural poverty. They too settled on cheap peripheral land at the edge of the city. From the early 1980s well into the 1990s urban sprawl was fuelled by a wave of out-migration of middle class residents from Athens seeking

relief from the city's infamous pollution problems. They built new settlements and converted second homes changed into permanent dwellings.

Today in Greater Athens the hotspots of urban sprawl are to the East of the agglomeration, on the Mesogeia plain, where investment in the new airport, motorway and suburban railway infrastructure have opened up the area for urbanisation. Until the early 1980s Mesogeia had remained a relatively agricultural area with served by a few small scattered towns. The only urban sprawl was some ribbon development along the main arteries into Athens and a few isolated developments that had 'leapfrogged' beyond the urban fringe. Today the area is rapidly expanding with heavy investment in new housing, industrial and commercial developments.

Leipzig

Leipzig is situated in the Free State of Saxony in eastern Germany. It lies at the heart of the densely populated Leipzig-Halle urban region. The population of the city stood at just under half a million in 2001. But the agglomeration has been in decline since 1989, mainly due to a falling birth-rate and heavy out-migration to other regions.

Historically, Leipzig has been known as an important mercantile city for many hundreds of years. The Leipzig Trade Fairs have been internationally known since medieval times. Together with the neighbouring city of Halle, the area experienced heavy industrialisation in the first part of the 20th century, which gave the region its distinctive character. The chemical industry and open-cast mining (for power generation) were the most important industrial sectors. The economy flourished but the natural environment and landscape suffered.

During the communist regime industry continued to be an important part of the city's economy but after German re-unification, and the structural adjustments forced upon the area by the transition to a market economy, much of this industry collapsed. Between 1989 and 1995 the number of jobs in industry fell by 70%, whilst since 1989 more than 50,000 jobs have been created in banks, insurance companies and private services. Today the economy of the city has moved from one dominated by industry, to one more dependent on services. These rapid structural changes have led to high levels of unemployment. Nevertheless in recent years the city has seen some new investment in manufacturing industry, notably in the car industry, engineering, media and communication technology.

Today the regeneration of the city is clearly visible and it is regaining its historic role as a city of trade fairs, music, and as a financial centre in eastern Germany. The city is also an important educational centre with the University of Leipzig being the second oldest in Germany. The city offers a variety of cultural events and activities, most notably the Neues Gewandhaus concert hall, the Leipzig Opera House, theatres, variety halls, art galleries and museums, together with high quality parks, sport and leisure facilities. Following the district reform in 1992 Leipzig is divided into 10 municipal boroughs and 63 smaller municipal districts. The council is made up of 71 members, who are elected every five years.

Situated in the eastern part of Germany, the former GDR, Leipzig was almost ignorant of the problem of urban sprawl until the Berlin wall came down. Since 1989 the city has experienced several phases of sprawl. The first phase was mainly induced by commercial sprawl immediately after the opening of the German-German border. Thousands of investors came, developed land and erected buildings to exploit the business possibilities and take advantage of the new market. From about 1992 until 1997 there was a period of rapid peripheral residential development as household forsook the poor quality inner city housing in favour of newly built suburban housing containing modern amenities. Restitution

problems and lack of funding had severely limited the rate at which inner city housing could be improved or replaced with modern apartments.

Figure 2.3. Leipzig

After 1997 the trend of moving towards the suburbs started to decline. Restitution claims began to be resolved out and investment started to flow into the urban regeneration process. New retail and leisure facilities increased the competitiveness of the inner city against the suburbs. Only the development of single-family houses continued to sprawl into the countryside. Since then suburbanisation around slowed dramatically. However, the development free for all of the 1990s has left an oversupply of dwellings and commercial premises both in the inner city and in suburban locations.

Liverpool

During the 19th and early part of the 20th century, Liverpool was the second most important port in England. The population of the conurbation peaked at over 1.8 million in the mid 20th century but since the 1960s changing patterns of trade and the introduction of new technologies reduced employment in the port and port-related industries. Structural changes in industrial demand and lack of competitiveness lead to further reductions in the local manufacturing sector whilst processes of concentration and centralisation saw the loss of tertiary sector jobs. By 2001 the population of the conurbation was a little over 1.4 million and the proportion living in Liverpool, the core city, had fallen from about 43% in 1961 to only 33% in 2001. However, in the last decade a combination of stronger restrictions on peripheral development and the implementation of powerful urban regeneration programmes have brought this decline under control. There are now clear indications of recovery in the

local economy, and some stabilisation in population change. Today the very great majority of housing development occurs within the existing urban area.

Figure 2.4. Liverpool and Wirral

Liverpool's economy today is service orientated with a fifth of those employed in Liverpool working in the banking and finance sector and a further fifth in distribution. Only one job in eight is in manufacturing industry. The public service, health and education sectors are the largest employers. However, despite recent improvements in economic performance, Liverpool remains one of the most deprived cities in the UK. Merseyside was granted EU Objective 1 priority status in 1993, which was renewed in 1999.

The city has a significant higher education sector with over 40,000 students at its three universities. In recent years the city centre has benefited from major redevelopment projects that have improved its environment and amenities. Liverpool has more museums and galleries of national status and more 'listed buildings' than any other area outside London. The Pier head was granted UNESCO 'world heritage' status in 2005. Liverpool has also played an important role in the history of contemporary music and was the home of Merseybeat and the birthplace of the Beatles. Leisure and cultural industries are also growing in importance and the city has been designated European Capital of Culture, 2008.

Liverpool forms part of the Merseyside County Area, a conurbation which is made up of five local authorities – the City of Liverpool and the boroughs of Sefton, Knowsley, St. Helens and Wirral. The City of Liverpool is made up of 30 wards, represented by 90 elected councillors, and is responsible for a wide range of services including: planning and regeneration, waste collection and disposal, schools and nurseries, social housing, road maintenance, parks and gardens, and social services.

Wirral, which has been the focus of closer investigation in our project study, lies opposite Liverpool on the west bank of the Mersey. It had a population of around 312,000 people in 2001. The commercial and civic heart of Wirral is in Birkenhead, which lies directly across the Mersey from Liverpool and to which it is connected by road and railway tunnels. The majority of economic activity is to be found in Birkenhead and along the Mersey shore. Employment has historically been based around the docks and dock-related industries such as ship-building and food processing. Today these traditional industries have declined, giving way to a more diverse and service-orientated economy.

Urban sprawl in Wirral is an established and mature phenomenon. Over the last 100 years the settlements of (sprawling) west Wirral have developed, firstly as a result of the railways, and more recently as a result of the growth in car-ownership. The causes of sprawl in Wirral are much the same today as they were in the past. Outer Wirral is perceived as offering 'a better quality of life'. It is perceived as being quieter, lower in crime, with better amenities and accessibility to the countryside and coast. It has also become increasingly accessible due to transport infrastructure (railways and roads) and the growth in car-ownership. It can also be shown that households are purchasing housing in outer Wirral as an investment. However, in recent years the combination of strong 'green-belt' policies in outer Wirral with 'urban regeneration' policies in inner Wirral has dramatically reduced the rate of urban sprawl.

The 'problems' caused by sprawl in Wirral include spatial social segregation, a decentralised urban form which generates high numbers of car journeys and the loss of rural land. On the other hand urban sprawl in Wirral has provided a good quality of life for those in outer Wirral. There are problems of urban deprivation and social exclusion in parts of inner Wirral but there is evidence that recent programmes of urban regeneration have had some success.

Ljubljana

The city of Ljubljana is strategically located at the cross-roads between Central Europe, the Mediterranean and South-East Europe. The most intensive period of growth in modern times was from 1948 to 1991 when the population of the city rose from 123.000 to 273.000 inhabitants, mainly due to industrialisation and immigration from other parts of Slovenia and other former Yugoslav republics. After Slovenia's independence in 1991 Ljubljana became one of the smallest capital cities in Europe.

Ljubljana is one of the central and eastern Europe's most economically successful cities. The economy of the city is highly dependent upon producer and consumer services: trade, transport, business and finances, and public administration. The urban region generates 35% of the country's GDP. Unemployment increased during the transitional period but is below the country's average.

From the 1950s to the end of 1994 the city of Ljubljana was administratively divided into five municipalities/communes. The local government reforms in Slovenia in the 1990s transformed the capital city of Ljubljana administratively and spatially. The territory was reduced from 902 to 272sq.km and consisted of only one administrative unit – the City Municipality of Ljubljana and 9 surrounding municipalities.

Urban sprawl in Ljubljana has been seen most visibly in the post-socialist years. In the 1990s a population decline was observed for the first time in the city of Ljubljana (and the agglomeration) showing the shift from urbanisation to counter-urbanisation. Recently there has been a decline of population in the core city of Ljubljana, stagnation in the agglomeration, but population growth in other municipalities in the urban region.

Figure 2.5. Ljubljana

One of the most important historical reasons for urban sprawl is the existence of a number of small rural settlements and secondary employment centres in the Ljubljana which had the capacity to accommodate a growing number of commuters from the central city. This residential pattern (i.e. self-built owner-occupied single family houses in rural settlements) was supported by the socialist housing policies between 1960-1990 (i.e. "urbanisation of countryside"). The private ownership of land and public subsidies for owner-occupied single-family houses, relatively good provision of roads and infrastructure, and the quality of landscape all contributed to urban sprawl.

The changes after 1991 accelerated urban sprawl. The privatisation of housing; 1994 local government reforms; the system for local tax revenues; deferred planning regulations; higher incomes and intergenerational equity; increased car ownership; highway investments and changing lifestyles were all influential.

The city provides a high quality of life. But in the past decade the effects of urban sprawl can be seen in increases in air and noise pollution. Other important consequences of sprawl include increased land consumption, surface sealing and ecosystem fragmentation, environmental pollution and the loss of local identity. Spatial social differentiation is still low, but conflicts are increasing between the traditional population and the new residents.

Stockholm

Stockholm is the capital city of Sweden, located on 15 islands and the mainland where Lake Mälaren enters the Baltic Sea. Around one-fifth of the population of Sweden live in the conurbation, whose population has grown steadily by about 1% annually over the last

decade. The modest population growth anticipated in the country in the coming years is almost entirely fuelled by immigration and therefore likely to be concentrated in Stockholm and the other major cities. During the 20th century the built-up area of Stockholm County has expanded faster than the increase in population. This process, however, has slowed over the last two decades as policy has shifted in favour of concentration in already developed areas.

Figure 2.6. Stockholm and Värmdö

The region also provides one-fifth of total employment and almost a quarter of the gross national product. The economy of Stockholm is growing faster than that of the rest of Sweden. The local economy is very much based on the service and telecom industries. Electronics play an essential role, with the suburban borough of Kista being among the world's most important IT hubs and the telecommunication company Ericsson being the best-known example. One characteristic feature is the high knowledge content in the production sector. Most of the capacity for higher education and research in the region is located in the centre and north of Stockholm.

Problems characteristic of many large cities also exist in Stockholm. Although unemployment in the core city was only 3% in 2001, there are higher levels of unemployment among specific social groups and housing segregation has increased in recent years.

Stockholm is home to many cultural institutions including the Royal Opera, the Stockholm Philharmonic Orchestra, the Royal Dramatic Theatre, more than 60 museums and 70 halls for performances and musical events. A New Modern Art Museum was built on the island of Skeppsholmen. In 1998, Stockholm was the European Capital of Culture, hosting more than 1,000 cultural events.

The region comprises 26 municipalities with common interests in the fields of employment, housing, leisure activities and transport under the direction of a regional planning authority. Swedish municipalities enjoy extensive local governance responsibilities. Stockholm City Council is responsible for schools, childcare, social services, city planning, local infrastructure (streets, parks, lighting), building permits, health and environment protection. The city is divided into 12 boroughs, each run by a District Council with resources from the City Council.

Stockholm has a very popular inner city. Stockholmers clearly favour a dense and walkable environment. However, this demand has pushed prices up and forced low income groups outwards, especially towards the public housing in the suburbs. The city centre serves as the 'living room' for the whole region. The recent growth of Stockholm has not meant that sprawl, defined as an increase in land-use, has accelerated. Stockholm is situated in a landscape with plenty of water, which has affected the physical enlargement as well as the regional planning. Over the last twenty years much of the new development has taken the form of conversion or expansion of existing premises or the re-use of vacant and derelict land. The rising intensity and cost of living in the city is one of the reasons why summer houses in the area around Stockholm are increasingly being used as permanent accommodation. About 1.000 summer houses a year are transformed into permanent dwellings. One could say that Stockholm has a process of demographic sprawl instead of land-use sprawl. Although surface sealing does not increase so rapidly there are still adverse effects through increases in traffic and pressure for new and expanded infrastructure in the new areas of permanent living.

The population of Värmdö, situated to the eastern fringe of Stockholm, has increased by 50% over the last ten years and it is expected to double over the next twenty to thirty years. As the fastest growing municipality in Sweden it provides an interesting case for the study of urban sprawl. Värmdö is partly on the mainland but much of it comprises islands in

Stockholm's archipelago in the Baltic Sea. There are currently around 30.000 permanent residents but in summer this number is increased by a holiday population living in about 15.000 summerhouses. Transformation of summer houses into permanent homes is increasing the population by about 500 persons a year. This is leading to problems with water supply, sewage, social service provision, traffic and public transport.

Vienna

Vienna is Austria's capital and its economic and cultural centre. The city has a population of 1.6 million within a conurbation of 2.2 million. Following a decrease during much of the 'cold war' period, the city's population has been rising over the past two decades. The reasons lie in increasing immigration and an improvement in the birth rate.

Since 1989 the local economy has benefited from the opening of the borders to eastern European countries, especially the Czech Republic, Slovakia and Hungary. Although Vienna still has a significant industrial sector (including electrical engineering, consumer electronics, food, transport, mechanical engineering, and metal-processing) manufacturing employment has decreased and now accounts for only 12% of all employment. Service employment is increasing. High-quality public and private services are well represented. City tourism is also playing an increasing role in the city's economy, with the majority of visitors coming from outside Austria.

Figure 2.7. Vienna

The city is home to five universities and three arts and music academies. Additionally, there are a number of colleges (Fachhochschulen) and non-university research institutions, such as the Academy of Sciences. The city hosts 30,000 students. Due to its history Vienna has

a rich cultural heritage and an internationally renowned tradition in music, literature and art. There are opera houses, concert halls, theatres, museums and festivals, many of them of international reputation. The city centre has UNESCO 'world heritage' status.

The Austrian constitution guarantees municipalities the right to self government and a right to levy taxes. Vienna has a city council which is elected for a period of five years. Each of the 23 districts within the city has a district parliament, which is also directly elected. The city administration has extensive responsibilities including city planning, and the provision of infrastructure and services (e.g. kindergartens, schools, waste and water management).

The first developments around Vienna regarded as sprawl started in the 1960s. They were induced by business activities and followed by residents which over the years built up to become a dense urban structure to the south of the city. Vienna and its surrounding areas are extremely interwoven, especially with regard to the labour market, which increasingly has become a single regional travel to work area. Nearly 12% of persons employed in Vienna live in the surrounding areas of Lower Austria and 20% of persons employed in the surrounding areas of Lower Austria live in Vienna.

As in Stockholm the central city has become a much sought-after residential location offering a very dense but high quality living environment and vibrant cultural life. There are however, inner urban areas beyond the central city that display a number of social and economic problems.

The opening of the borders to the east has made the suburbs to the south-east and north-east of the city more attractive and therefore vulnerable to urban sprawl. A planned improvement of the traffic infrastructure will give a further impulse to development. With a rising population, improved accessibility and cheaper prices on the periphery there are considerable pressures for both residential and commercial urban sprawl. The proximity of

the border with the state of Lower Austria brings about various problems including competition for development and difficulties in co-ordinating planning processes, which exacerbate the impact of these pressures. As in Sweden there is some conversion of former summer houses to permanent homes, especially amongst retired people.

Warsaw

Warsaw, the capital of Poland, is located in Mazowieckie province, in East-central Poland. The city of Warsaw has a population of about 1.6 million inhabitants (2000) which is about 4% of the total population of Poland. The city of Warsaw covers an area of 512 square kilometres and is divided into 18 districts. The conurbation includes more than 2.5 million people in a sprawling agglomeration that stretches up to 40 kilometres from the city centre.

Figure 2.8. Warsaw

The city has had a turbulent history throughout the 20th century. Virtually destroyed during World War II, the city was rebuilt under the post-war socialist regime. The old town was painstakingly rebuilt during the 1960s and 1970s and is now a UNESCO 'world heritage site'.

Warsaw today boasts a developing service sector economy including first class universities and cultural facilities. There is a strong commercial sector, although manufacturing suffered badly after the opening up of the economy to western market forces after 1989.

The central city remains a popular residential location. Environmental conditions in central Warsaw are good compared with many other cities. The city does not yet appear to suffer some of the inner city problems that characterise many northern European cities. Despite often stated preferences for a house with garden there has been only limited out-migration

from Warsaw to the suburban zones. In recent years the rate of growth of the suburban population is below that of previous decades. However, changes such as the gradual improvement of the metropolitan transportation system and rising real incomes are likely to stimulate urban sprawl in the future.

Problems caused by sprawl include the development of previously greenfield land on the periphery whilst it is estimated that there are still around 100 km² (20% of the total area of the city) available for redevelopment within the existing urban area.

Warsaw experienced urban sprawl during the 1950-2000 period with an increasing share of its population located in suburban areas of the city. Łomianki and Nadarzyn, two suburban communities, are a focus for more detailed study in Warsaw. Here the well-educated and wealthy predominate among newcomers. Residents' views on urban sprawl are mixed. Disadvantages are seen in higher land prices, further burdens on the local infrastructure, rising crime rates, a growing differentiation in lifestyles and the disappearance of local ties. But on the other hand sprawl has brought investment, construction work, more spatial order and a more aesthetically pleasing urban form.

2.3. Conclusions.

The population structure of Europe is changing: growth is slow and heavily dependent upon in-migration, and households are getting smaller. These changes are increasing the proportion of the population living in urban areas. At the same time these urban areas are decreasing in density. Increased affluence, more owner occupation, increasing social tensions and the search for 'quietude' encourage demand for urban sprawl, especially among families.

A few cities, notably in northern Europe, are coping well with these pressures and have strong planning systems that are able to achieve 'contained growth' without sprawl. Some cities in south-eastern Europe are also facing similar patterns of development but probably as a result of historic and cultural pressures rather than as a result of planning policies. But elsewhere in Europe sprawl, whether accompanying growth or decline, remains a problem.

The context for change varies considerably between each of our case study cities. Athens is something of a special case where sprawl has historically been fuelled by waves of immigration, urban environmental pressures, and more recently, heavy investment in infrastructure at the periphery of the city. The cities of eastern Europe illustrate the impact of transition from socialist to free-market economies, with its effect on local economies, social patterns and planning systems. Liverpool and Leipzig show the pressures for suburbanisation and sprawl even when the local economy and population are in decline. Stockholm and Vienna have strong planning systems with well-developed patterns of urban living, but their very affluence creates pressure for sprawl, particularly through the acquisition and occupation of second homes. Each of these different situations is investigated in more detail in the next four chapters.

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Appendix: Patterns of growth and sprawl across European cities

City	Total resident population, 1991		Total resident population, 2001		City population as a % of LUZ population, 1991	City population as a % of LUZ population, 2001	Population change 1991 - 2001	Change in % of LUZ population in the core city 1991 - 2001
	City	LUZ	City	LUZ				
Birmingham	1,004,500	2,374,300	977,087	2,335,652	42.3%	41.8%	-1.63%	-0.5%
Liverpool	475,600	1,438,000	439,476	1,362,004	33.1%	32.3%	-5.28%	-0.8%
Leicester	281,500	728,600	279,915	756,139	38.6%	37.0%	+3.78%	-1.6%
Dublin	478,389	1,341,661	495,781	1,535,496	35.7%	32.3%	+14.4%	-3.4%
Cork	127,253	279,487	123,062	311,479	45.5%	39.5%	+11.5%	-6.0%
Limerick	52,083	200,833	54,023	236,334	25.9%	22.9%	+17.7%	-3.0%
Copenhagen	464,773	1,718,805	499,148	1,806,667	27.0%	27.6%	+5.1%	+0.6%
Aarhus	264,136	605,447	286,668	640,637	43.6%	44.7%	+5.8%	+1.1%
Aalborg	155,664	485,787	161,661	494,833	32.0%	32.7%	+1.9%	+0.7%
Stockholm	674,452	1,641,669	750,348	1,823,210	41.1%	41.2%	+11.1%	+0.1%
Berlin	3,465,748	4,866,047	3,388,434	4,935,524	71.2%	68.7%	+1.4%	-2.5%
Leipzig	542,512	940,822	493,052	912,064	57.7%	54.0%	-3.1%	-3.7%
Bonn	298,227	820,858	306,016	879,240	36.3%	34.8%	+7.1%	-1.5%
Weimar	62,750	149,736	63,522	153,868	41.9%	41.3%	+2.8%	-0.6%
Vienna	1,539,848	2,062,969	1,550,123	1,823,210	74.6%	73.1%	+2.8%	-1.5%
Graz	237,810	355,858	226,244	357,548	66.8%	63.3%	+0.5%	-3.5%
Linz	203,044	517,043	183,504	524,444	39.3%	35.0%	+1.4%	-4.3%
Warsaw	1,644,515	2,416,600*	1,609,780	2,631,902	61.2%	61.1%	+8.9%	-0.1%
Prague	1,214,174	1,976,178	1,169,106	1,941,803	61.4%	60.2%	-1.7%	-1.2%
Brno	388,296	738,869	376,172	729,510	52.6%	51.6%	-1.3%	-1.0%
Usti n L	98,178	246,197	95,436	243,878	39.9%	39.1%	-0.9%	-0.8%
Bratislava	442,197	606,351	428,672	599,015	72.9%	71.6%	-1.2%	-1.3%
Kosice	235,160	334,452	236,093	343,092	70.3%	68.8%	+2.6%	-1.5%
Banska By..	83,400	111,244	83,056	111,984	75.0%	74.2%	+0.7%	-0.8%
Budapest	2,016,458	2,583,635	1,777,921	2,453,315	78.0%	72.5%	-5.0%	-5.5%
Miskolc	195,433	288,769	184,125	281,867	67.7%	65.3%	-2.4%	-2.4%
Nyiregyhaza	115,089	214,200	118,795	221,927	53.7%	53.5%	+3.6%	-0.2%

Ljubljana	272,650	470,641	270,506	488,364	57.9%	55.4%	+3.8%	-2.5%
Maribor	119,828	320,800	114,891	310,743	37.4%	37.0%	-3.1%	-0.4%
Athens	772,072	3,072,922*	789,166	3,894,573	25.1%	20.3%	+26.7%	-4.8%
Larissa	114,334	270,612	132,779	282,156	42.2%	47.1%	+4.3%	+4.9%
Kalamata	50,260	166,964	61,373	166,556	30.1%	36.8%	-0.2%	+6.7%
Nicosia	171,600	238,600	200,686	273,642	71.9%	73.3%	+14.7%	+1.4%
Rome	2,775,250	3,761,067	2,546,804	3,700,424	73.8%	68.8%	-1.6%	-5.0%
Taranto	232,334	589,576	202,033	579,806	39.4%	34.8%	-1.7%	-4.6%
Campobasso	50,941	238,958	50,762	230,749	21.3%	22.0%	-3.4%	+0.7%
Lisbon	663,394	2,266,202	564,657	2,363,470	29.3%	23.9%	+4.3%	-5.4%
Porto	302,472	1,013,220	263,131	1,089,118	29.9%	24.2%	+7.5%	-5.7%
Luxembourg	75,833	128,140	76,688	136,625	59.2%	56.1%	+6.6%	-3.1%
Brussels	950,045	1,687,200	973,565	1,750,328	56.3%	55.6%	+3.7%	-0.7%
Gent	230,246	390,861	224,685	395,986	58.9%	56.7%	+1.3%	-2.2%
Bruges	117,063	163,066	116,559	165,575	71.8%	70.4%	+1.5%	-1.4%
Amsterdam	702,444	1,232,488	734,594	1,320,137	57.0%	55.6%	+7.1%	-1.4%
Eindhoven	192,895	657,401	202,397	714,157	29.3%	28.3%	+8.6%	-1.0%
Arnhem	131,703	653,907	139,329	696,162	20.1%	20.0%	+6.5%	-0.1%

Source: Authors' calculation from EU Urban Audit data. * authors' estimate