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Urban Shrinkage in Leipzig, Germany

Research Report, EU 7 FP Project Shrink Smart (contract no. 225193), WP2

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Shrink Smart –
The governance of Shrinkage within a European Context

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Urban shrinkage in Leipzig, Germany

Research report

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Preface

This document represents a research outcome of the 7 FP project "Shrink Smart – The Governance of Shrinkage within a European Context" (May 2009 – April 2012). It summarizes information and data with respect to urban shrinkage, its characteristics and dynamics over time in the city of Leipzig. The report covers in general the time period between the late 1980s (to consider also the situation in the late GDR time) and today. It mainly uses municipal data; moreover, official planning documents and other reports issued by the city of Leipzig are used as well as scientific literature. The report represents, despite its embedment into the project logics of Shrink Smart, a stand-alone document which can be used independently from other project documents and deliverables.

It is the aim of project Shrink Smart to study the role of policies and governance systems in different types of shrinking urban regions. It is based on comparative case studies from seven urban regions throughout Europe with a focus on shrinking urban regions in eastern and southern Europe that will provide a basis for analyzing different trajectories of shrinkage, understanding main challenges for urban planning and elaborating alternatives for urban governance.

This research report was published first and foremost for the following reasons:

- to make the research results of the project accessible to a wider audience,
- to provide a collection of data and information on urban shrinkage in Leipzig in English language and
- to offer research evidence for a further discussion on shrinkage and its consequences in Leipzig.

Leipzig, January 2011

The authors

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1 EXECUTIVE SUMMARY

Leipzig looks back on a long-term period of shrinkage that lasted from the 1960s to the end of the 1990s. The political change after 1989 led to a rapid deindustrialization and breakdown in employment and, as a result, a mass out-migration towards western Germany bringing about a dramatic acceleration of population losses. From 1989 – 1998, Leipzig lost about 100,000 inhabitants, that is, 20 per cent of its total population. The main reasons for the recent population losses were the (job-related) out-migration to western Germany (starting right after 1990), a state-sponsored and thus artificially initiated suburbanization (that had its peak from the early mid-1990s until 1997), and demographic ageing (decrease in birth rates – a continuous process). The main reason for out-migration was the loss of jobs due to deindustrialization (loss of tens of thousands of jobs in the industrial sector in the early 1990s). In 1999, Leipzig enlarged its administrative territory. In this way the city ceased to lose inhabitants due to these reforms; the reform coincided with the stabilization of the city in terms of population size bringing with it positive migration balances and a vibrant in-migration. After 2000, Leipzig saw a turnaround, that is, a re-growth of the population after decades of shrinkage. Since 2000, Leipzig has had positive migration balances with the hinterland and in general. Research speaks about reurbanization tendencies that are prominent in Leipzig as one of only a few big cities in eastern Germany (see below).

Although the population is no longer decreasing, Leipzig is still today faced with the consequences of urban shrinkage, and will also be faced with them in the future. The consequences are first and foremost housing and commercial vacancies, demolition, oversupply of infrastructure, brownfields and the perforation of the urban grid. Leipzig is characterized by the close neighbourhood of stabilizing and shrinking neighbourhoods in the city. Vacant and/or unused lots, wastelands and new forms of "urban wilderness" exist in many places all over the city. In other words: urban shrinkage continues to play a role within the city, but not all neighbourhoods or districts are affected by it. Moreover, Leipzig will face a new wave of urban shrinkage within the near future: after 2015, household numbers will start to decrease; additionally, the reservoir of current in-migration (age groups 20 – 40) will decrease due to ageing. Today, Leipzig is not a shrinking city anymore when one only looks at the total population numbers; but urban shrinkage is an important topic for the city (coping with its consequences, dealing with shrinking neighbourhoods within the city) and this will also be true within the near future (new wave of shrinkage due to ageing and decrease in households).

Since 1990, socio-spatial separation and segregation in the city have advanced and the widespread socio-economic mix of many residential areas has decreased. Segregation has, however, not reached extreme values yet. It is most visible in its socio-economic dimension (income, share of unemployed). Socially weak households are concentrated in different parts of the city, mainly in some traditional old built-up workers' areas as well as in parts of the prefab district Leipzig-Grünau. In the public debate, Leipzig is often mentioned as a "boom town" or "lightening house" within

the eastern German “ocean of shrinkage”. The public perception is mainly of the story of stabilization and reurbanization of the city after the losses in the 1990s. Subsequently, it becomes more and more difficult to discuss urban shrinkage although urban planners already know about the processes that will lead to new population losses in a few years.

The phenomenon of urban shrinkage is perceived in Leipzig mainly through the “lens” of the housing market perspective; its appearance relates to (residential and commercial) housing vacancies (which reached their peak in 2000 with 62,500 vacant flats or 20 per cent of the total stock). Housing vacancies are not a new phenomenon in the city, which already had a vacancy rate of about 10 per cent in 1989 (25,000 vacant flats). However, after the 1990s, vacancies grew due to oversupply and no longer due to the poor technical conditions, which was the reason for their existence in GDR times. Therefore, the city has a vibrant interest to make people stay in the city as well as to attract new residents to counteract the vacancies (apart from demolitions). In this vein, the city offers, for instance, suburban-like housing in the inner city (town houses) as an alternative to suburbanization. Housing vacancies are a very visible consequence of urban shrinkage, a fact that led to the programme *Stadtumbau Ost* (urban restructuring) in 2002. Other appearances of shrinkage are the oversupply of infrastructure and the high number of (inner-city) brownfields that have to be prepared for re-use (either commercial, residential, or recreational as parks, playgrounds or urban woodlands). Population losses were ignored by municipal planning and urban policy throughout the 1990s, although there were already voices pointing to the visible decline and rising numbers of vacant flats. Shrinkage as a term and debate became an issue in Leipzig only after the report of a federal commission in 2000 that highlighted the housing supply surplus as an urgent problem in the new German federal states. From that time onwards, Leipzig developed different strategies to cope with shrinkage and to adapt the built structures to the declining demand using federal subsidies to demolish vast numbers of vacant flats. The deconstruction of housing and infrastructure concentrates on prefab districts in the western part of the city although vacancy rates are still highest in the old built-up stock. At the same time, Leipzig pursues a strategy of “active” population policy to persuade people to stay in the city and to attract new residents. Among others, town houses are being built, ownership within the existing stock is financially supported, and interim uses are advanced to both maintain vacant stock and keep vacant lots “working”.

Concerning the future, Leipzig will be faced with contradicting trends: on the one hand, the city will try to sustain itself as a re-growing city with a positive migration balance and a young in-migration that counteracts the ageing process. Thus, a support of its role as a university city and an investment-friendly urban policy is probable; on the other hand, the city will see a new wave of population loss after 2015, that is, when household numbers will start to decrease regardless of in-migration. The potential in-migration groups will become smaller and smaller due to ageing – it is possible that the city will enforce efforts to attract older age groups as “reurbanites”, i.e. those who suburbanized in the 1990s and cannot get along with their daily wants and needs in suburbia because of a lack of amenities and services

there. This scenario could become true in one or two decades, i.e. exactly at a time when the quantitative resource of young in-migrants will significantly decrease; for the city it would bring about the need to adapt the urban space and services ever more to the needs of the elderly.

2 REASONS AND PREMISES OF URBAN SHRINKAGE

Introduction

This report describes the process of shrinkage as it has occurred within the city of Leipzig. It examines the reasons, dynamics and patterns of change as well as the consequences for different fields of urban development and planning. The period covered in the report runs from the 1980s to the present day; in particular cases, longer or shorter time periods are considered. Over this time, Leipzig has moved from a (more or less rapidly) shrinking city until the late 1990s to a point where its population stabilized and even returned to a slight growth during the last few years. Today, Leipzig is no longer a shrinking city. When one looks only at the total population numbers, Leipzig represents one of a few large cities in eastern Germany that have undergone reurbanization processes (Haase, A. et al. 2010). However, urban shrinkage continues to be an important topic for the city. The city is still facing the consequences of long-term shrinkage and will have to cope with it during the years to come. At the same time, shrinkage still affects some parts of the city and will also do so in the future. Moreover, Leipzig awaits a new wave of shrinkage due to ageing and a decrease in households after 2015.

Leipzig is the second largest city in the eastern part of Germany after Berlin. About 500,000 inhabitants live on nearly 300 square kilometres of land. Named the "mother of all trade fairs", Leipzig is a traditional centre of commerce (Figure 1.1). In recent years, the city has become an important site of the vehicle and automotive components industry (e.g. Porsche since 2002, BMW since 2005) and an international logistics node (European hub of DHL since 2007). Furthermore, Leipzig hosts a number of institutions of higher education (with about 37,000 students) and research. The university is the second oldest in Germany (founded in 1409, Figure 1.1). The city disposes of a broad cultural heritage and events (Gewandhaus Orchestra, Bach Festival, Wave Gothic Festival). The urban appearance of Leipzig is mainly characterised by more than 12,000 residential buildings with 110,000 flats (35 per cent of the total number) from the time between 1870 and 1918, the so-called *Gründerzeit* or *Wilhelminian style* building stock, which is seen as architectural heritage.

Leipzig looks back to a long-term period of shrinkage, which lasted from the 1960s to the end of the 1990s. The political change after 1989 that led to a rapid deindustrialization and breakdown in employment and – as a result – a mass out-migration towards western Germany brought about a dramatic acceleration of population losses. From 1989 to 1998, Leipzig lost about 100,000 inhabitants, that is, 20 per cent of its total population. Fundamentally there are two underlying causes

for Leipzig's population decline from the 1960s to the 1980s: firstly out-migration of population towards the new industrial development cities in the northern and eastern parts of the GDR (see also Kress 2008), and secondly the poor housing and environmental conditions due to dilapidation and neglect that drove people out of the city in the search for more attractive places to live. The main reasons for the recent population losses were the (job-related) out-migration to western Germany (starting right after 1990), a state-sponsored and, in this way, artificially initiated suburbanization (that had its peak from the early mid-1990s until 1997), demographic ageing (decrease in birth rates, a continuous process). The main reason for out-migration was the loss of jobs due to deindustrialization (loss of 10,000s of jobs in the industrial sector in the early 1990s). As a result of population decline, a housing surplus developed, and enormous rates of housing vacancies emerged (Figure 1.1).

Figure 2.0.1: Leipzig – images of a city: a) the city from a bird's eye view; b) dilapidation in Leipzig's city centre in the late 1980s; c) demolition of housing; d) vacant housing; e)) old, newly built and re-used structures in close proximity; f) re-structured industrial landscape with loft/attic housing and riverside

Source: Dieter Rink, Annegret Haase and Matthias Bernt, Armin Kühne

Materials and methods

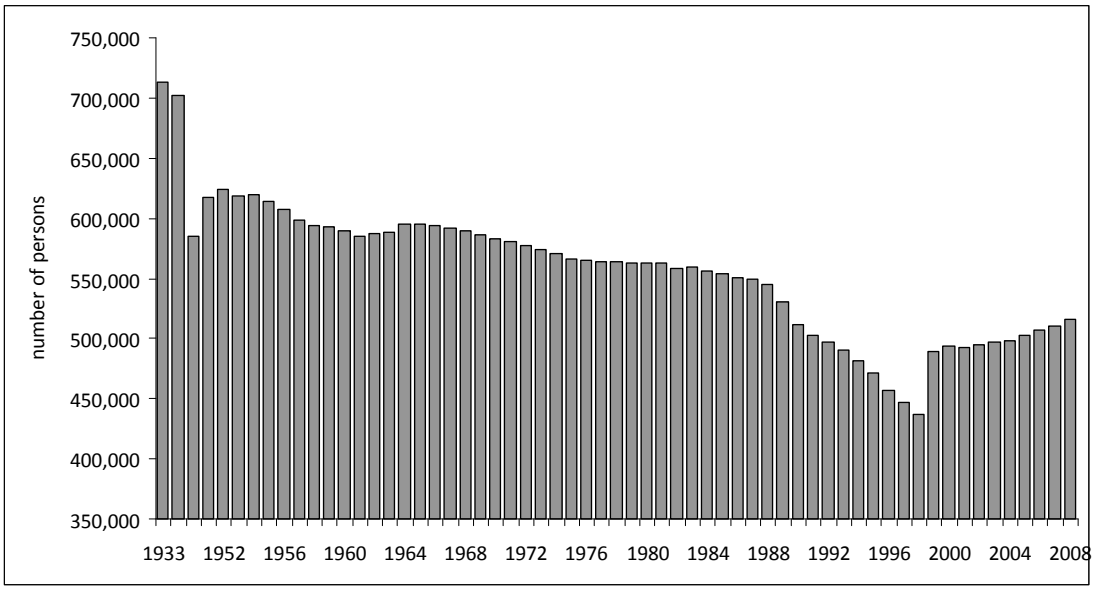
The report covers in general the time period between the late 1980s (to consider also the situation in the late GDR time) and today. To look back to the late 1980s it is necessary to correctly assess the impact of the political turnaround in 1989 and the German reunification in 1990. Depending on particular topics, the time period considered may vary and also cover longer or shorter periods. The report refers to the city of Leipzig as a whole and – in particular cases – to parts of the city, single districts or neighbourhoods. Since urban shrinkage affects single parts and districts of the city in a different way and we find growing and stabilizing areas close to those losing inhabitants and showing high vacancy rates, the view beyond the overall city level is necessary.

The report mainly uses municipal data. Furthermore, official planning documents and other reports issued by the city of Leipzig are used as well as scientific literature. In some cases, expert interviews were carried out to gather knowledge that was not available by using data and documents. In other cases, expert interviews helped to properly interpret and understand the data and documents. The references for the interviews are given in the report. A full statistical database is provided at the end of this document in the form of Tables.

2.1 Demographic development

Leipzig reached its maximum population in 1933 with 713,470 inhabitants. It saw a rapid population growth during the period of industrialization after 1880. At that time, the city prepared to become a city with a population over a million. This vision ended soon after due to the persecution of the Jewish population, the Second World War and out-migration to the western parts of Germany in the aftermath of the war (LCC 2009, A-12). It has only been very recently that Leipzig, due to municipal amalgamations, started to regain inhabitants. Figure 2.1.1 gives an impression of the population development in the last 75 years.

Figure 2.1.1: City of Leipzig – population development 1933-2008



Source: UFZ database

To describe and understand the development of population Figures from the 1960s to the 2000s, the history of Leipzig makes it necessary to consider three time lines: firstly, the period before the fall of the Iron Curtain in 1989, secondly, the period between 1990 and 2000 and thirdly, the period since 2001.

Long-term urban shrinkage in the second part of the 20th century

Before World War II, Leipzig was one of the five largest cities in Germany. As a result of the Second World War, the population decreased by more than 100,000. After the division of Germany and Europe as a consequence of the war Leipzig lost most of its former national and international economic importance. In the 1950s especially, young and qualified people in particular out-migrated to the western part of Germany. There was an almost balanced in- and out-migration after the establishment of the Berlin Wall in 1961. Yet between 1951 and 1989 Leipzig lost nearly 58,000 inhabitants by migration (32,800 people alone in 1989 and 1990) and more than 48,000 by the negative natural development (Table 2.1.1). To a large extent out-migrants went to the newly developing industrial cities in other parts of the former GDR. Birth rates were higher than in western Germany but – also due to the birth-rate slump caused by the pill in the end of the 1960s and liberal abortion politics – below replacement level.

Table 2.1.1: Natural population development and balance of migration of Leipzig 1951-1990

	1951-60	***1961-70***	***1971-80***	***1981-90***	***1951-90***
Natural population development	-6,700	-4,400	-26,200	-11,300	-48,600
Balance of migration	-21,200	-1,300	+4,800	-40,000	-57,700
Total population development	**-27,900**	**-5,700**	**-21,400**	**-51,300**	**-106,300**

Source: Kabisch, S. et al. 2008

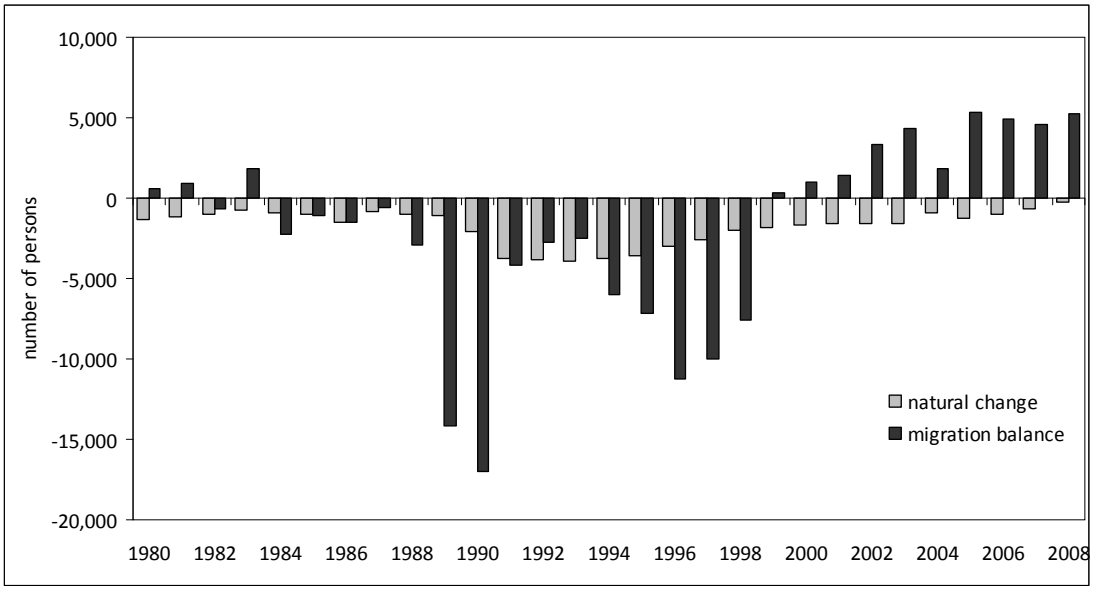
In comparison with the 1930s, by 1990 the city had lost a quarter of the inhabitants due to the German separation. At the beginning of the 1990s, there were 511,000 residents.

New dimension of urban shrinkage and ageing in the 1990s

The 1990s were characterized by a (further) dramatic decline in population (until 1998: loss of almost 100,000 people). The main reasons were the radical fall of the birth rate after the reunification of Germany, the constant migration to western Germany (due to the poor economic situation) and to suburbia. The population density declined from 3,600 inhabitants to 2,400 inhabitants per square kilometre. Figure 2.1.2 shows the population development from 1991 to 2000.

In the first half of the 1990s, 20,000 more people died than were born. In 1995, a Total Fertility Rate of 0.77 children per woman was measured in eastern Germany, which presented the world's lowest value (Federal Statistical Office Germany 2003). After the mid-1990s, also in Leipzig, the situation improved: by the millennium the number of live births increased up to 7.3 per 1,000 inhabitants.

Figure 2.1.2: City of Leipzig – natural population development and migration balance 1980-2008



Source: UFZ database

The ethnic composition changed decisively. In 1989, almost 20,000 foreigners (which is the official term in German statistics) had lived in the city, mainly from socialist countries like Vietnam, Mozambique or Angola. Most of them had to leave Germany after the reunification. While in 1990, just 9,000 foreigners lived in Leipzig, at the end of the 1990s there were nearly 27,000 foreigners (5 per cent of the entire population) mainly from Vietnam, the Ukraine, Russia, Poland and Iraq. While in- and out-migration during the second half of the 1990s were both at their highest level, even in this period of time the migration balance was moderate (Figures 2.1.4 and 2.1.5, see also Philipps and Rink 2009). In 2007, approximately 32,800 foreigners were living in Leipzig, which amounted to 6.4 per cent of the inhabitants (LCC 2008b, 5). In addition 10,000 ethnic Germans came from Eastern Europe to Leipzig who are not registered as foreigners. Subsequently, almost every 10th inhabitant (49,321 persons) had, independently from his/her nationality, in 2007 a migration background. The foreign population is, on average, 9 years younger than the German population; with 68 women to 100 men the gender balance is the opposite of that of the German inhabitants (LCC 2009, A-17; LCC 2008e, 72, 77-78).

In the first half of the 1990s, a massive suburbanisation process started too. The main period of suburbanization was short; it lasted from 1994 to 1997 (Figure 2.1.3 and 2.1.5; see section 2.3 of this report). From 1996 to 1998 almost 30,000 people left Leipzig for its surroundings (LCC 2001a). The situation changed in 1999. During the 2000s, Leipzig benefitted from a positive migration balance, which is mainly due to a higher in-migration, although suburbanization processes continue at a modest level (Nuissl and Rink 2005). In-migration (currently about 4 – 5,000 persons per year) is mainly borne by younger age groups (18 – 25 years, partly also 25 – 30 years), and, at a modest level, also by older age groups (65+). In-migrants stem mainly from other regions in eastern Germany and (at a more modest level) from abroad. The migration balance with the western parts of Germany continues to be negative although it no longer reaches the rates of the 1990s.

Due to the drop of the birth rate and the selective out-migration, especially of younger people, the ageing process gained a special dynamic. Since 1990 the proportion of children under 15 years (out of the total population) has been decreasing from 17 per cent to less than 10 per cent nowadays. At the same time the proportion of people aged 65+ increased from 16 per cent to nearly 22 per cent. Looking at the index of ageing (Table 2.1.2), it becomes obvious that while in 1990 there were 90 people of aged 65+ per 100 children, in 2006 the number was already 220. The average age of the population increased from 40 to almost 44.

Table 2.1.2: Demographic indicators of ageing for Leipzig 1990-2006

	1990	*1995*	*2000*	2006
Share of people 0-14	17.0	13.8	11.2	9.9
share of people 15-65	67.5	69.8	70.6	68.3
Share of people 65 and older	15.5	16.4	18.2	21.8
Youth dependency rate (0-14/15-64, per cent)	25.2	19.8	15.9	14.6
Age dependency rate (65+/15-64, per cent)	23.0	23.5	25.7	31.9
Index of ageing (65+/0-14, per cent)	91.5	118.3	161.7	218.7
Average age	40.0	41.8	43.8	43.9
Number of people aged 65-79	57,600	55,500	68,300	85,200
Number of people aged 80+	21,900	21,500	21,300	25,100
Number of people aged 65+	79,500	77,000	89,600	110,300

Source: Kabisch, S. et al. 2008

New direction of population development in the 2000s – stabilisation and "gentle" growth

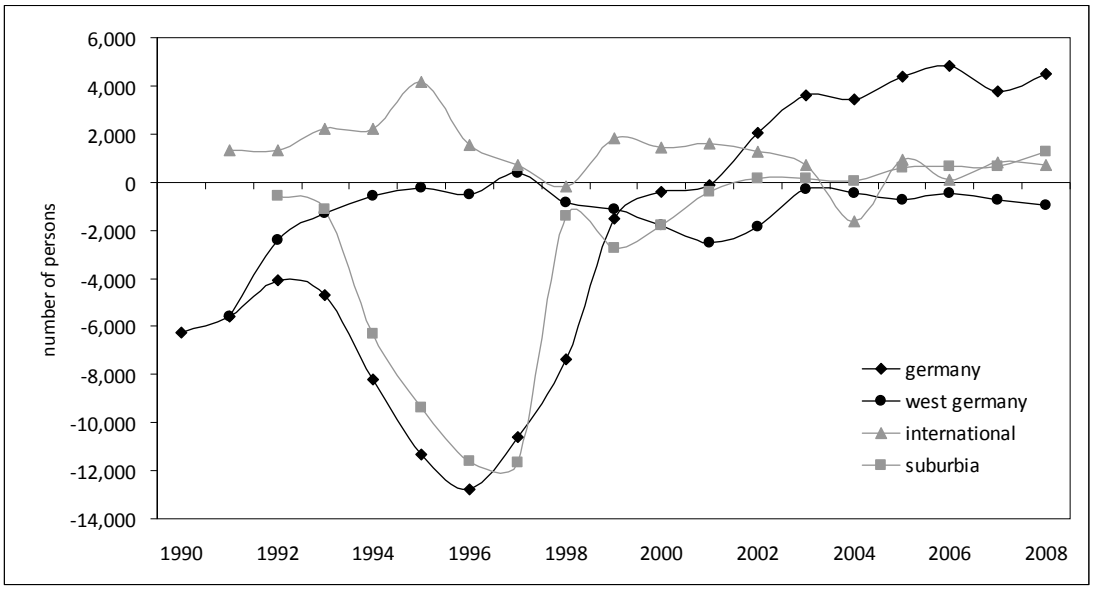
The administrative reform of 1999/2000 led to a considerable increase in the number of inhabitants. Since that time, Leipzig has seen a continuous growth of its population. In 2005, the city crossed – again – the border of 500,000 inhabitants. At the end of 2007, Leipzig had 510,512 inhabitants (LCC 2009, p. A-12).[1] The population density saw a further decline (from 2,400 inhabitants in 1998 to 1,700 in 2007) per square kilometre since the new territories were former suburbs of Leipzig and much less densely populated than the core city.

Since the mid-1990s the birth rate increased thus reducing the birth deficit, but the TFR is, nevertheless, very low with 1.2 children per woman (2007). The number of deaths exceeds the number of births, which brings about a negative balance of the natural population development (LCC 2009, A-13). The migration balance gradually became positive (Figure 2.1.2 above). Since 2002 migration has been compensating for the negative natural population development. Since 2006, however, also the number of out-migrations has increased again. During the mid 1990s, Leipzig faced big losses of population in favour of its hinterland. During the 2000s, the dynamics of suburbanization, however, considerably declined and became more and more

[1] To a certain degree this has also been the effect of the introduction of a new tax on second residences.

outweighed by a new in-migration from adjacent municipalities including a "back-to-the-city" movement of some suburbanites who left the city in the 1990s, or their children, for educational or professional purposes. This has led to a slightly positive migration balance of the city and its hinterland in recent years (LCC 2009, A-14).

Figure 2.1.3: In- and out-migration 1990-2008 according to target region

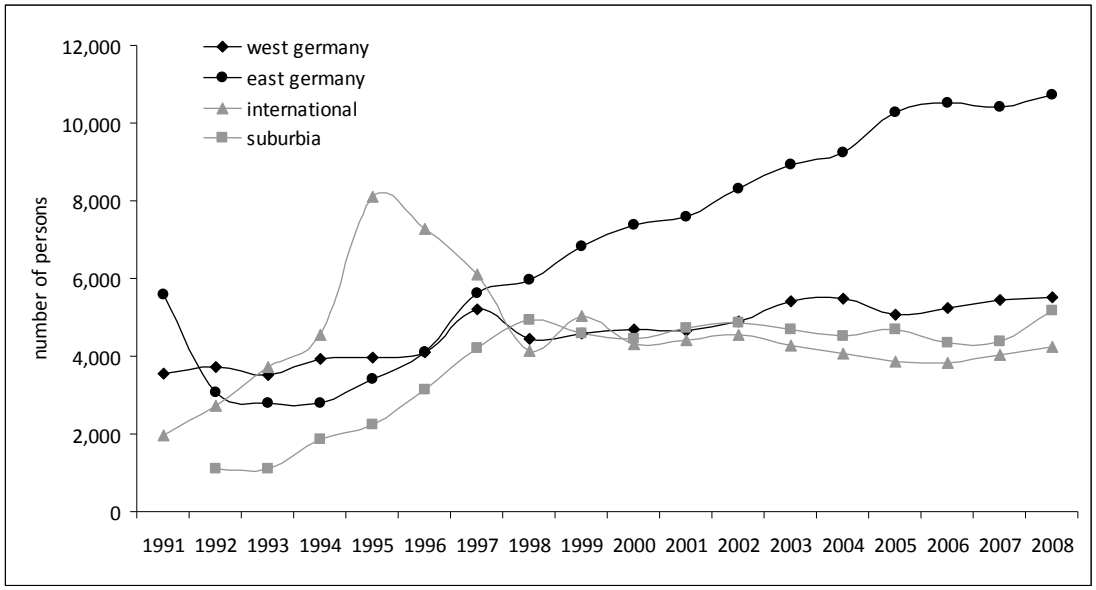


Source: UFZ database

Leipzig is growing mainly due to in-migration of people aged between 18 – 30 years from east German regions and the surroundings of the city (Haase, A. et al. 2010; Figure 2.1.4 and 2.1.6). The universities and schools of higher education are a major factor of attraction. The number of students increased between 2000/01 and 2006/07 from 31,000 to 37,000. This new trend of positive net migration has been slowing down the ageing process. While there is a continuous slight out-migration of people aged between 30 – 65 years (among them many family households with dependent children), there have been first signs of an in-migration of older age groups (65+) in the last few years. The average age is constant at around 44 years. Above all, inner-city areas profit from the growth in the younger population.

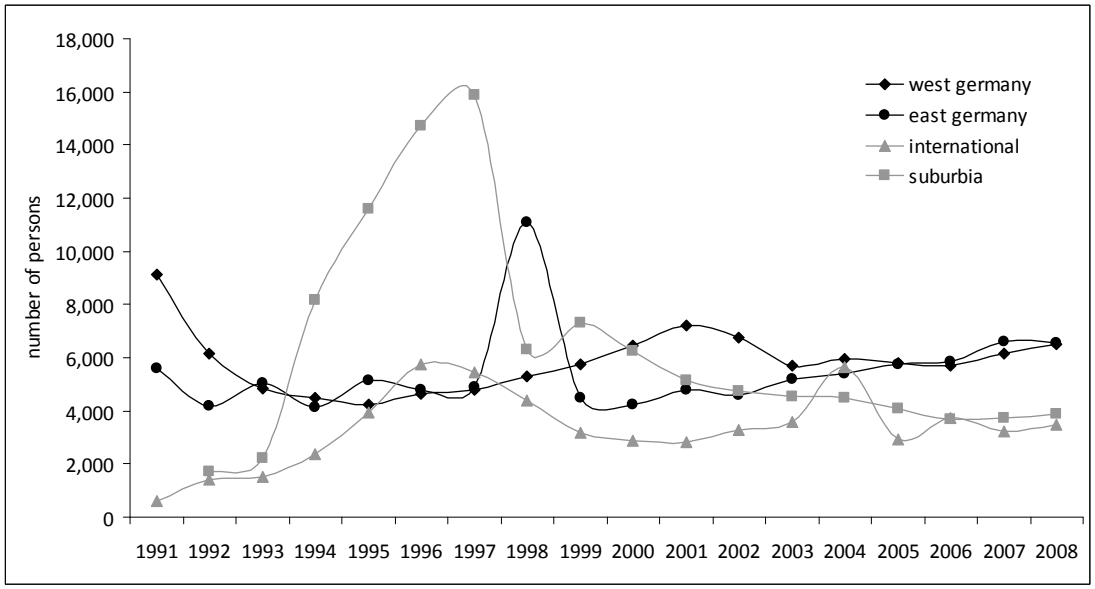
According to a questionnaire survey among in-migrants that was first carried out in 2007 by the city of Leipzig, in-migrants have an above-average educational level but, at the same time, many of them dispose of only at a limited income. This is due to their status as students or early-stage professionals. There is also a group of better-off households among the in-migrants that is (proportionally) higher than among the long-term inhabitants. The reasons for in-migration relate mainly to qualification, labour and private reasons but also to Leipzig as an attractive place to live. 18 per cent of the surveyed in-migrants represent "back-to-the-city" migrants, 30 per cent of them stemmed from hinterland municipalities of Leipzig (LCC 2009, A-17).

Figure 2.1.4: In-migration 1991-2008 according to target region



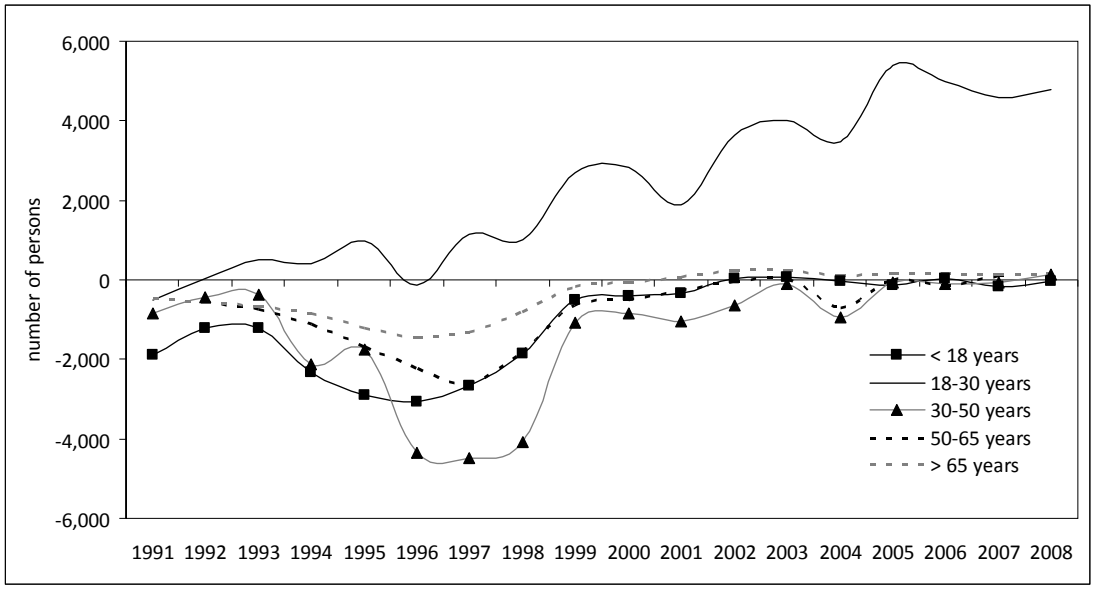
Source: UFZ database

Figure 2.1.5: Out-migration 1991-2008 according to target region



Source: UFZ database

Figure 2.1.6: In- and out-migration by age groups 1991-2008



Source: UFZ database

The future – moderate population growth and ongoing ageing

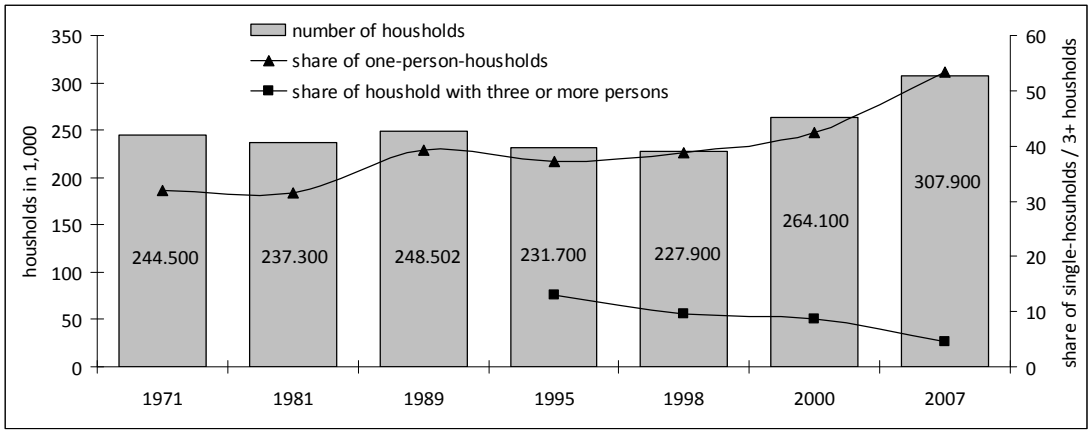
According to demographic projections, there will be a moderate population growth until 2020. Different forecasts suggest that the population will reach approximately 530,000 inhabitants. Demographic change in the surroundings of Leipzig and other regions, associated with the process of ageing and shrinkage, leads, however, to a decreasing potential of in-migration. The deficit of births in Leipzig cannot be compensated for by in-migration in the long term. In a mid-term period, the population of Leipzig will certainly decrease again. Yet the number of elderly people (80+) will decisively increase, alone between 2006 and 2020 from 25,000 to 44,000 people (LCC 2003d), which will comprise 8 per cent of the total population. Subsequently, the age rate will increase by 35 per cent in 2027. After that date, increase rates will be considerably lower. The youth rate will not decrease further; it will increase from the current level of 15 per cent to 18 per cent until 2017 and remain at that level during the following decade. The existing projections do not forecast a new wave of population decline in Leipzig in a mid-term perspective (LCC 2009, A-18). This has to be critically reflected set against the expected decline in household numbers and the decrease of in-migration potential due to ageing as well as the decline of the age groups that bear Leipzig's in-migration in the future.

Households

The number of households declined by 8 per cent from 1989 to 1998 (from 249,000 to 228,000 (see also Steinführer et al. 2009, Figure 2.1.7). Compared to the population decline (18 per cent) this is more moderate, which is mainly due to the downsizing of the mean size of households (from 2.1 in 1989 to 1.7 in 2007, Figure 2.1.8). The number of households increased again during the 2000s. Currently, the

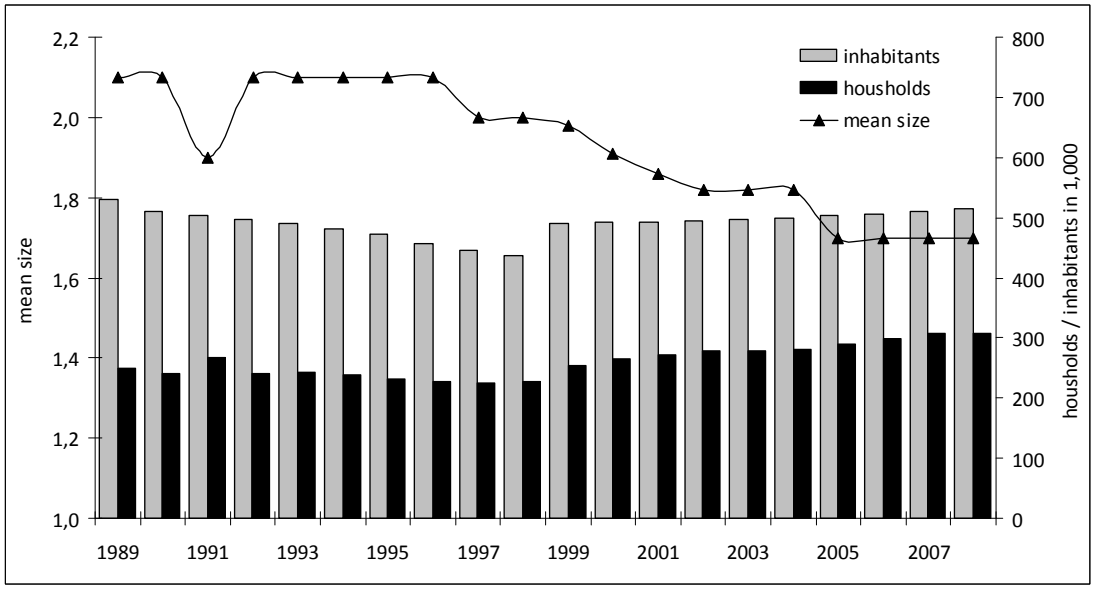
number of households is, with 308,000, considerably higher than in 1989 although the population is still lower (510,000 inhabitants instead of 530,000). Since 2001, the number of households has been affected by positive population development. The increase of one-person households is significant due to the growing number of young people (students, young professionals).

Figure 2.1.7: Development of households, single and 3+ households 1971-2007



Source: UFZ database

Figure 2.1.8: Development of population, households and mean household size 1989-2008

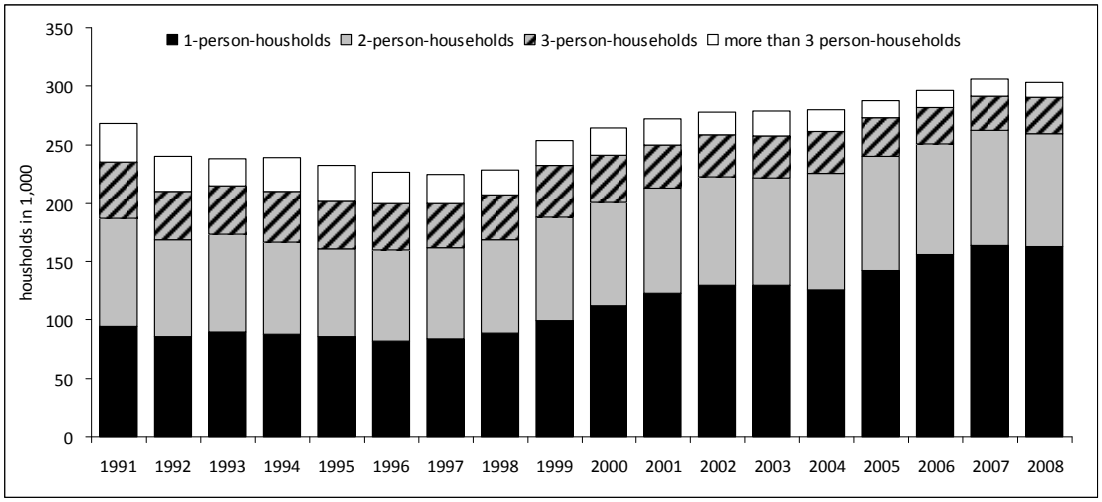


Source: UFZ database

As for the housing market, it needs to be pointed out that not all of these people actually live alone – among the younger age groups, flat sharing with typically one to three others is very common (Steinführer and Haase 2009). The statistic counts around 35,000 one-person households which were rented to people under the age of 35 in the year 2000 and more than 65,000 in the year 2006. In 2007, the proportion of one-person households was 53 per cent. The striking increase of one-person households since 1994 has to be seen also in relation to the reform of

unemployment and social benefit regulations (*Hartz IV*). The trend towards downsizing is reflected also by the continuously decreasing share of 3+ households.
The share of one- and two-person households has continuously increased and meanwhile exceeds 85 per cent (Figure 2.1.9). Whilst in 1995 31 per cent of Leipzig's inhabitants still lived in a household with 3 and more persons and 13 per cent in a household with 4 and more persons, these proportions decreased to 14 and 5 per cent by 2007 (LCC 2009, A-17).

Figure 2.1.9: Size distribution of households 1991-2008



Source: UFZ database

Summary

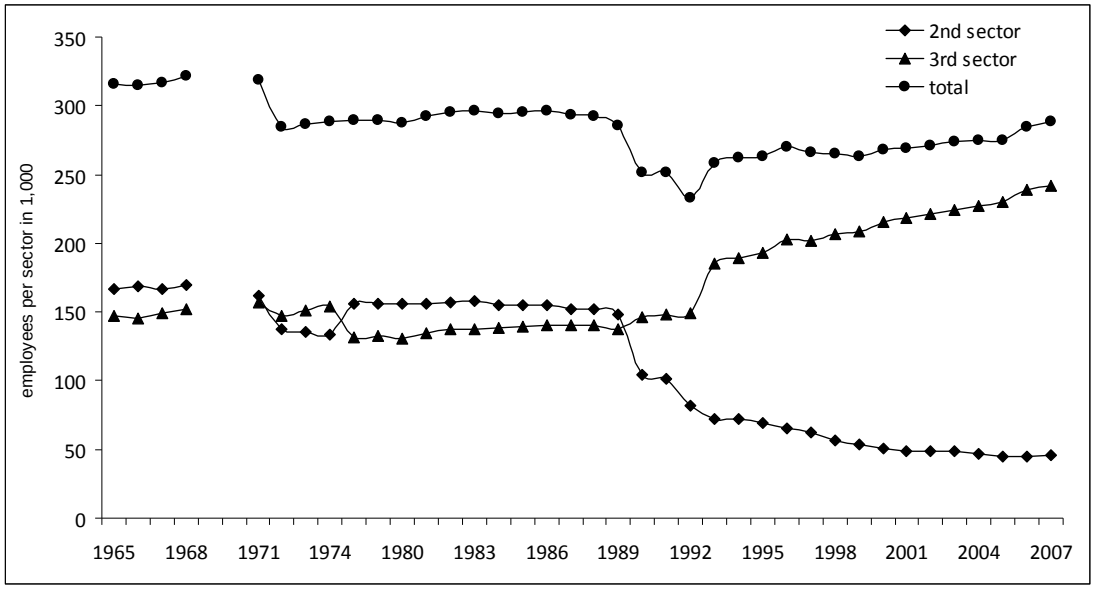
Seen from a long-term perspective, Leipzig has developed from a long-term shrinking city (from the 1960s to the late 1990s) to a stabilizing city with slight population growth that will be limited in time. It represents one of the most striking examples of a large shrinking city during the time of the GDR. Its loss of about 100,000 inhabitants between 1989 and 1998 (as a result of the systemic change) was mainly due to job-related out-migration and suburbanization. During the 2000s, however, this trend stopped: recently, Leipzig has seen population stabilization or even a slight growth by "young" in-migration, which builds on an education-related influx of people in the 18 – 30 age group, a potential that will decrease in the near future as a consequences of ageing. At the moment, the city represents, however, one of the most prominent examples of reurbanization of eastern Germany although its natural development has remained negative since 1989. The number of households decreased more slowly than the population. During the 2000s Leipzig again saw a growth in household numbers. The main reason for this was downsizing. Leipzig's ageing has been attenuated by young in-migration in recent years. Until today, there is, however, a coincidence of population losses and gains in particular districts, which pushes forward socio-spatial differentiation and increases levels of residential segregation (see section 3.1 of this report).

2.2 Economic development

The city of Leipzig has a long history as a centre of industry, administration, science and trade. Traditionally it was the location of the Leipzig trade fair which served large parts of Central Europe as well as being the location for publishers, the polygraph industry, foundries, machine building, and the textile industry and the fur trade. In the times of state socialism Leipzig remained one of the most important locations for industrial activities that accounted for about one tenth of the whole industrial production of the GDR. Besides already existing branches, mining and energy production as well as machine building (Baukema, Takraf), the electronic industry (RFT), and the chemical industry were expanded. Thereby, Leipzig hosted important control functions, as it housed the headquarters for 16 *Kombinate* (state companies with a usually dominant role for a particular branch).

As a consequence of German monetary union and the subsequent privatisation, nearly all of these existing functions were liquidated in a very short period of time, mainly between the summer and fall of 1990, and the economic basis literally disintegrated. Until the mid-1990s Leipzig's industry alone lost 80,000 jobs (Figure 2.2.1). As deindustrialisation was accompanied by "de-administration" (liquidation of administrative structures) the result of these simultaneous developments was an immense loss of jobs, which have not been able to be absorbed by new developments up to now. In addition to jobs, the liquidation of the planned economy also led to the loss of nearly all command and control functions and facilitated a dependent economic structure. Altogether this economic shock was decisive for the weak economic basis of Leipzig in the last two decades and has not yet been absorbed.

Figure 2.2.1: Development of employment according to sectors 1965-2007

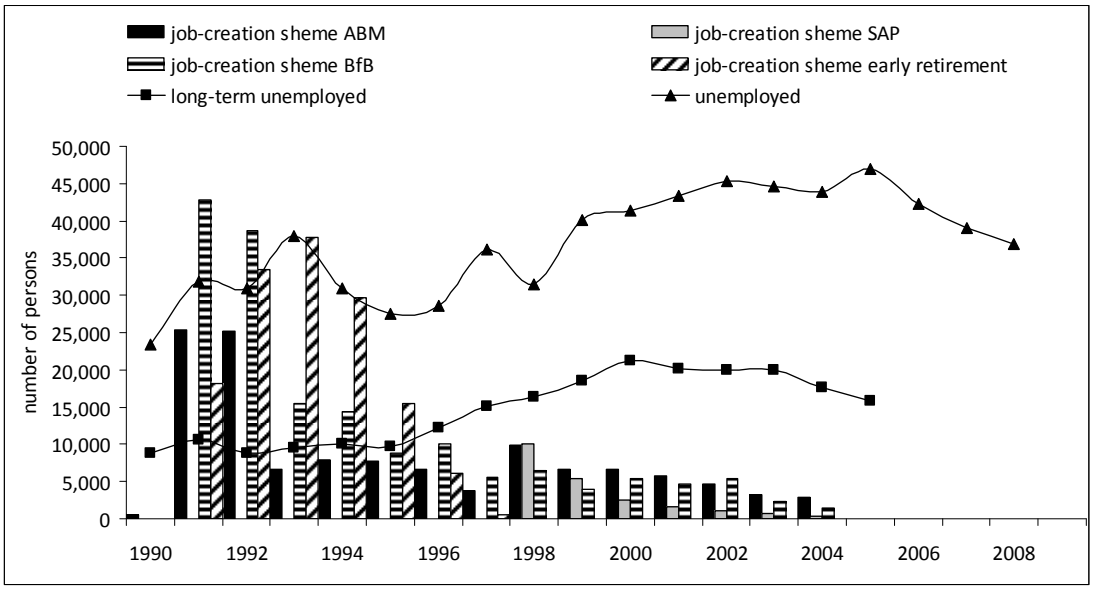


Source: UFZ database

The consequence is not only a downturn in the overall number of jobs available, but also a change from industrial to service-sector occupations. Interestingly, these

service sector activities are only connected to industrial activities to a very minor degree (no research etc.), but for the major part are very much dependent on public sector transfers (like with water suppliers, medical services, universities). Moreover, the secondary sector is to a large degree dominated by the construction industry, which held more than half of the jobs in the late 1990s. Since then, due to oversupply in the housing market, construction activities have considerably cooled down and the share was down to about one quarter. Nevertheless, it needs to be emphasized that altogether, those secondary sector activities that remained after the collapse of the industry in the early 1990s, are to a large extent characterized by low wages and precarious contracts. As a consequence, unemployment is nearly double the national average (usually between 17 and 20 per cent in the last decade). The official Figures were considerably reduced by a number of labour-market related policies (like job-creation schemes, early retirements, retraining measures), mostly in the early 1990s, but since these policies were considerably weakened unemployment even gained ground in the 2000s. This also led to an increase in the share of permanently unemployed persons, which has never fallen under 40 per cent of the unemployed since 2002 (Figure 2.2.2).

Figure 2.2.2: Unemployment and job-creation schemes 1990-2008



Note: The data series ends in 2004 not because of a termination of all measures but due to a lack of data as a result of social reforms including a restructuring of job-creation measures.

Source: UFZ database

Publicly applauded successes like the opening of a BMW branch, or the expansion of logistic services at the airport, thus only had a minor influence on the labour market and have been countered by ongoing job losses in the construction industry and from other employers. Also, the economic structure shows considerable differences. In Leipzig, construction firms, public health-, social and educational services, public administration and infrastructure suppliers hold the lion's share of the job market. All these branches are dependent on public transfers. High volume enterprises in Leipzig are the regional broadcasting station (MDR), the municipal utility company, the public water supplier, as well as the municipal housing company.

However, in the last decade Leipzig managed to attract some branches of West German companies, which can be seen as a sign of economic revitalization and reindustrialisation. Showcase examples of this are car producers like Porsche (400 jobs, and additional 400 jobs in supply-companies), BMW (2,500 jobs, adding up to 5,200 together with suppliers and partners). Moreover, closely connected to the airport and in close proximity to the highway, a logistics cluster has developed, with companies like Quelle, Amazon, and DHL. All these economic activities are concentrated at the northern fringes of the city. Although the establishment of these companies in Leipzig has been an undisputable success, it needs to be emphasized, that many of these activities have proved to be fairly vulnerable in the face of the current economic crisis. Both BMW and Porsche have considerably downsized their personnel, and Quelle is currently being completely liquidated. In addition to car-building and logistics, Leipzig has had some successes in other sectors too. Most of all, medicine, the university, and a number of scientific institutes play a key role in the local job market that has been expanded in the last years.

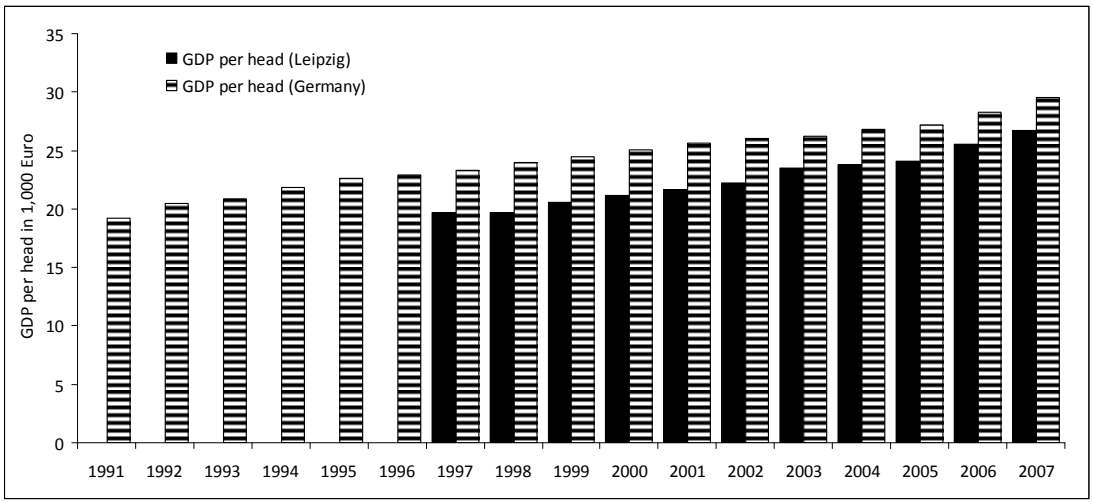
Table 2.2.1: Large investment in Leipzig and its region since 1990 (investments > 200 million Euro)

Project	Time period	Estimated total investment in Mio. €
Mainly public investments (urban fringe)		
Medical Scientific Centre including Heart Clinic	1992-1996	1,500
New Leipzig Fair	1993-1995	2,060
Leipzig airport	1993-2007	1,340
Mainly private investments (urban fringe)		
Quelle mail-order warehouse	1992-1995	500
Central German Office and Administration Centre, Schkeuditz	1992-1996	500
Porsche/car production	2000-2009	280
BMW/car production	2002-2005	1,400
DHL Logistics	2006-2008	300
Investments in inner Leipzig		
Deutsche Telekom, including district office	1992-1995	580
Technical infrastructure (gas, electricity, water)	1993-1994	1,000
Redevelopment and preparation of enterprise areas	1993-1996	1,200
Various media-related projects of urban renewal	1993-1996	900
Main station, Leipzig Mall	1996-1998	260
Media-city/MDR	1998-2002	250
University Leipzig, hospital	2004-2014	214
City-tunnel	2005-2012	900

Source: UFZ database

Despite all efforts to attract new investments, the GDP per capita in Leipzig is lower than the German average (Figure 2.2.3). The city and its region are not able to close the gap between the local level of GDP and the national average. The reasons for this are related to the fact that the regional economy is too weak and that there are too few innovative enterprises and R&D activities in the region.

Figure 2.2.3: GDP in Leipzig and Germany 1991-2007



Source: UFZ database

To summarise, it can be said that Leipzig's economy is still burdened with the collapse of the industrial basis in 1990. Yet important investments have been carried out, mainly with the help of public subsidies. The results, though, are split: On the one hand, the job-basis could be expanded with projects like the expansion of medical complexes and the university, the establishment of a headquarters for the regional broadcasting station, as well as the opening of numerous scientific institutes. On the other hand, notwithstanding population growth, the losses of the 1990s have not yet been absorbed, unemployment rates remain high and wages paid in large parts of the expanding service sector (i.e. logistics, supplier firms of BMW or Porsche car manufacturers, shopping complexes) are notoriously low. Leipzig thus represents a split labour market with a weak economic base that is, to a considerable degree, dependent on public transfers.

2.3 Settlement system

Leipzig represents a compact city with a comparably small territory. Most parts of the core city are densely built. The city centre is surrounded by a "first ring" of old built-up residential areas, which represent today the heart of Leipzig *Wilhelminian style* or *Gründerzeit* has built heritage. Leipzig saw a first wave of enlargements of its territory at the end of the 19th century when many of today's traditional working and middle class districts of the "second ring" became part of the city. During the period of industrialization in the second half of the 19th century, mixed zones of industrial and residential use emerged holding simpler flats for craftsmen and workers in the eastern and western parts of the inner city. From the beginning of the *Gründerzeit* (from 1870 up to the beginning of the First World War in 1914), Leipzig's population rose from 106,000 to 624,000. Most of these industrial outskirts were incorporated at this time, which considerably contributed to the growth of the city in terms of inhabitants and space.

During the time of the GDR, the city's territory saw a further growth, not in the form of suburbanization like in the western parts of Germany but in the form of the building of new residential settlements and – from the late 1960s onwards – large (prefabricated) housing estates on the outskirts of the city. The biggest of the latter is Leipzig-Grünau in the west of the city, on which building started in 1979 and it was planned for 100,000 inhabitants. Some western scholars have coined the building of large housing estates at the fringes of socialist cities as a "peculiarly socialist" form of suburbanization (see Couch et al. 2005). After 1989, postsocialist transition ushered in a period of subsidised suburbanization or even urban sprawl with several shopping malls, business parks and residential neighbourhoods spreading, in this order, into the city's outskirts and the suburban towns and villages. To understand this development, the period after 1990 will be described in the following in four phases (see Nuissl and Rink 2005).

1990 – 1992: The beginning of suburbanization

Immediately after the opening of the borders in 1989, thousands of investors came to the still existing GDR and endeavoured to gain a foothold in the emerging market. As far as the real estate, retail and housing sectors were concerned, their interest was mainly focused on the fringes of the major urban centres. This influx of capital affected, in particular, Leipzig's suburbia since it was part of a big agglomeration, and thus part of one of the most promising regional markets in eastern Germany (Nuissl and Rink 2005). The first suburban investments to arrive were shopping malls, soon to be followed by the costly but subsidised preparation of enterprise zones in almost every municipality around the city (Figure 2.3.3). The development of residential areas started a little later (Herfert 1996). This development led to the simultaneity of decay in the inner city and "new developments" in the surrounding areas (Doehler and Rink 1996).

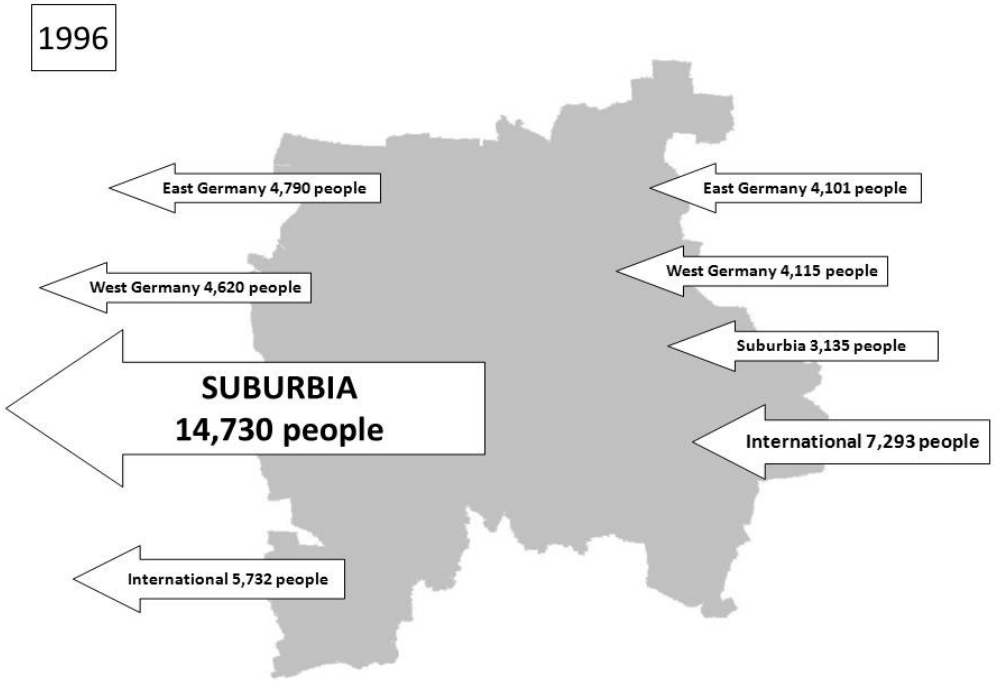
1992 – 1996: The rise of residential suburbanization

From 1992 onwards Leipzig experienced a period of considerable residential suburbanization which reached its peak by the end of 1996 (Herfert and Röhl 2001, Figure 2.3.1). This can largely be attributed to two influencing factors that diminished the quality of life in the inner city during that period. On the one hand, large parts of the old housing stock remained in a bad condition (partly due to restitution). As a result, there was still a lack of acceptable housing in the inner city and hence a considerable difference in rents for decent dwellings between the city and the outskirts. In particular, rents for the few refurbished homes were fairly high. On the other hand, although rapidly improving, the environmental quality was still low, especially in the inner parts of Leipzig (Nuissl and Rink 2005).

Residential sprawl was only possible because real estate companies and investment funds provided a growing supply of housing on the urban fringe, making suburbia a place where people could afford to instantly improve their standard of living. The

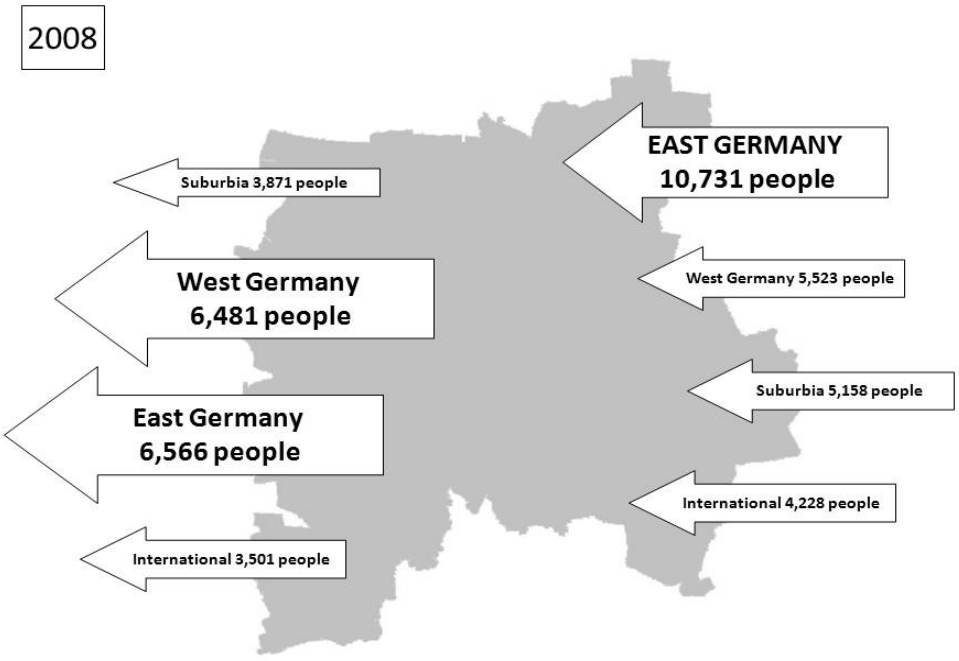
suburban dwellings are mostly still possessed by the investors; the rates of home ownership are unusually low. Apart from single-family houses, 2- to 4-storey apartment blocks became a typical suburban building (Figure 2.3.4). However, several "residential parks" characterised by this type of architecture were afflicted by a high rate of vacant housing from the outset (Herfert and Röhl, 2001). All in all, Leipzig, like the whole of eastern Germany, developed a type of urban sprawl that is rather different from the idea that the main driving force of urban sprawl is "suburbanites" fulfilling their desire to live in detached housing in a non-urban environment. It was not the suburban surroundings that were considered a pull-factor. It was the unattractiveness of the inner city that was considered to be a push-factor (Haase, A. et al. 2010). "The residents were not necessarily fleeing from the city into greener areas; they were forced into the surrounding areas due to a lack of alternatives [...]. Almost half of the Leipzig greater metropolitan area inhabitants changed their residence, even though they would have – under similar conditions – preferred to have remained in the city; this even refers to home-owners as well" (Herfert and Röhl 2001, 154). Both large housing estates as well as the *Gründerzeit* districts had been the origins of these suburbanites. Suburbanization was driven by young families and also by older households aged 50 – 65 years.

Figure 2.3.1: Pathways of suburbanization around Leipzig 1996



Source: Thomas Arndt (map) and UFZ database

Figure 2.3.2: Pathways of suburbanization around Leipzig 2008



Source: Thomas Arndt (map) and UFZ database

Figure 2.3.3: Commercial suburbanization: the Paunsdorf Centre

Source: Thomas Arndt

Figure 2.3.4: Residential suburbanization

Source: Thomas Arndt

1997 – 2000: The "comeback" of the core city

The short-term dynamic of residential suburbanization pulled back once again as early as 1997 (Herfert 2002). In 1997, for the first time since 1989 the flow of residential suburbanization no longer increased. Rather than occurring by chance, this development reflects the completion of the first round of transformational dynamics. Most importantly, temporary fiscal instruments and programmes, which had proved tremendously conducive to urban sprawl, ran out in the second half of the 1990s. In addition, municipal administrations and regional planning authorities managed to catch up on their planning backlog. Hence, the regulations imposed by planning authorities in order to contain the use of land for urban purposes became increasingly effective (Nuissl and Rink 2005).

In 1999 Leipzig enlarged its administrative territory. In this way, the city ceased to lose inhabitants and re-gained some of those who were lost through suburbanization in the mid 1990s. Furthermore, the ongoing resolution of restitution claims enabled the effective renewal of inner city districts, which, as of the mid-1990s, greatly improved the inner-city environment as a whole and increased the supply of refurbished inner-city dwellings. The successful (re-)establishment of a couple of shopping malls and one big department store (with another one currently under construction) in Leipzig's city centre contributed further to this resurgence of the inner city. Step by step, the construction and conditions of the residential environment improved in the second half of the 1990s in many inner-city

neighbourhoods, and they slowly began to attract inhabitants (Figure 2.3.5). Subsequently, the inner city became both a cheaper and a more attractive place to live and finding a good home there was no longer more difficult or more expensive than in suburbia. At the end of the 1990s, Leipzig entered the phase of reurbanization (Steinführer et al. 2009; Haase, A. 2008). A surplus of in-migration, mostly from other regions in eastern Germany, led to positive migration balances throughout the 2000s (Figure 2.3.2). From the end of the 1990s until the mid 2000s, most of the inner-city districts underwent processes of repopulation, rejuvenation and ethnic diversification (Table 2.3.1), processes that have endured until today. Consequently, the housing markets in the central and the peripheral parts of the urban region levelled out (Steinführer, 2004). At the same time, the character of residential development in suburbia began to change. The single-family house became predominant, as a slowly growing number of comparatively well off households had managed to accumulate the financial resources necessary to acquire property in the preceding years (Nuissl and Rink 2005).

Figure 2.3.5: Renovated inner-city housing

Source: Annegret Haase

Table 2.3.1: Socio-demographic indicators of selected inner-city districts of Leipzig

District	Part of the city	Mean age	Inhabitants < 40 years	Youth dependency rate	Age Dependency rate	Share of foreigners	Population development 1999-2005
Altlindenau	West	37.5	59%	15.3	16.6	7.5%	+12%
Lindenau	West	36.9	64%	13.6	16.4	9.9%	+14%
Plagwitz	West	40.6	56%	12.0	23.1	5.9%	+23%
Anger-Crottendorf	East	39.2	56%	16.7	22.7	7.0%	+15%
Neustadt-Neuschönefeld	East	37.2	60%	15.3	17.0	16.4%	+10%
Reudnitz-Thonberg	East	38.5	60%	13.5	20.4	7.6%	+6%
Volkmarsdorf	East	37.9	56%	16.7	17.6	14.8%	-5%
Schleußig	South-West	35.9	64%	19.2	14.1	4.4%	+26%
Südvorstadt	South	37.9	63%	12.8	19.1	4.5%	+26%
Gohlis-Süd	North	38.6	57%	16.3	19.0	7.7%	+28%
Leipzig	**-**	**43.1**	**47%**	**13.3**	**28.7**	**5.1%**	**+3%**

Source: Steinführer et al. 2009, updated

The last ten years: consolidation, re-growth or perforation?

After 2000, Leipzig saw a turnaround, that is, a consolidation of its population and even a slight re-growth after several decades of shrinkage. Since 2000, Leipzig has had positive migration balances with the hinterland and in general. Urban research speaks about reurbanization tendencies that are especially prominent in Leipzig as one of only a few big cities in eastern Germany).[2]

Accordingly, the flow to suburbia appears to have come to a halt. Migration between Leipzig and its hinterland is more or less balanced and, except for a few major investments (BMW in 2002 – 2005, Quelle in 1992), there have been no more peripheral development projects. Moreover, the population Figures of the inner city districts have been growing since the late 1990s, which brings Leipzig into its new role as an "island of stability" in a widely shrinking landscape of eastern Germany. Reurbanization tendencies are – compared with other East Germany cities – especially prominent in Leipzig (Herfert 2002; Haase, A. et al. 2010). At the same time, the population of some parts of suburbia has been declining in the last years. The demand for suburban housing has dropped considerably, leading to growing differences between the more and the less attractive segments of the suburban housing market. In addition, many suburban office blocks planned and built in the

[2] Reurbanization as an emergent process can be recognised in eastern Germany, particularly in some large cities which represent university and commercial hubs. It appears in the form of both increased in-migration into the city as well as decreased out-migration from the inner city. The in-migration from outside is dominated by students and early stage professionals. At the neighbourhood level, this is reflected in the high demand for young and, to a very high degree, non-conventional household types. This trend has stabilised in this regard since roughly 2000 (Haase, A. et al. 2010).

expectant times of the 1990s are still vacant, and some of them are shortly to be demolished (Nuissl and Rink 2005).

The abatement of urban sprawl in and around Leipzig is taking place against the background of a highly relaxed real estate and housing market and considerable rates of housing and commercial vacancies (see section 3.4 of this report). This oversupply makes investments to redevelop urban brownfields or to refurbish the decaying buildings that remain hardly economical. It has thus supported the onset of a process of "perforation" in the urban fabric (Lütke-Daldrup 2001): while some districts have stabilized and even gained population (recent research identified those districts as a "young reurban cluster", see Kabisch, N. et al. 2010), others are still losing population and face high rates of unused housing and urban land. In other words: "If there had not been so many developmental activities in suburbia creating a huge surplus of buildings and building land, the problem of urban perforation nowadays would be much less serious." (Nuissl and Rink 2005, 130)
To counteract suburbanization and high vacancy rates in the inner city, it was the intention of the municipality to make people stay in the city. Next to federal, state, and EU financial grants, a programme for subsidized owner-occupied housing in the inner city started in 2001 represented a case in point to show the top-down urban development. Originally intended as a strategy to support the formation of owner-occupied housing in the old building stock in need of renovation, the construction of new buildings developed over time, in the form of the "town houses", and became a visible trademark of the programme. By end of 2007, 312 households were supported and 153 new town houses and 159 condominium apartments had been completed (LCC 2008c, 49). The target of appealing to mostly families was for the most part realised – but not to keep potential suburbanites in the city. According to qualitative studies, the owner-occupiers in this specific housing stock) comprised city-minded dwellers for whom a move into the surroundings would never have come into question (Kausch 2007, 88-90). In this sense, the programme adds to the stabilisation and structural differentiation of the inner city. The numbers show that it represents no more than a niche-market, which is attractive and feasible only for families of middle to higher income groups.

Concerning the future, Leipzig will be faced with contradicting trends: on the one hand, the city will try to sustain itself as a "re-growing" city with a positive migration balance and a young in-migration that counteracts the ageing process. On the other hand, the city will see a new wave of population loss after 2015, that is, when household numbers will start to decrease regardless of in-migration and the potential (younger) in-migration groups will become smaller due to ageing (see section 2.1 of this report). The city will probably enforce efforts to attract older age groups as reurbanites, i.e. those who suburbanized in the 1990s and will face difficulties concerning their daily wants and needs in suburbia because of a lack of amenities and services there. This could become true in one or two decades (Haase, A. 2008; Köppen 2005; Glasze and Graze 2007). Finally, it has to be emphasised that the simultaneity of urban sprawl and shrinkage was a major challenge to urban policy-making and planning for cities like Leipzig, and will continue to be in the future (cf. Nuissl and Rink 2005).

3 IMPACTS AND CONSEQUENCES OF URBAN SHRINKAGE

3.1 Patterns of segregation and social cohesion

The specifics of Leipzig: "postsocialist segregation" and housing market supply surplus

To understand the development of socio-spatial differentiation and today's patterns of socio-spatial segregation in Leipzig[3], one has to consider two facts:

1. Leipzig's socialist past and its impact on segregation and
2. the specifics of its "supply surplus" housing market.

During the period of state socialism, as a consequence of the absence of both a private housing market as well as state controlled systems of housing provision, there was a low level of socio-spatial differentiation and segregation. Typical forms of segregation under socialism in Leipzig were the concentration of older people in the city centre, representatives of the socialist *nomenklatura* households in villa areas and some professional groups (teachers, technical intelligence) in prefab estates. The little community of foreigners who had jobs as contract workers from other socialist countries or who studied at Leipzig university was strictly separated from the locals in dormitories. The same was true for the Soviet soldiers and officers who lived in closed housing complexes and the barracks.

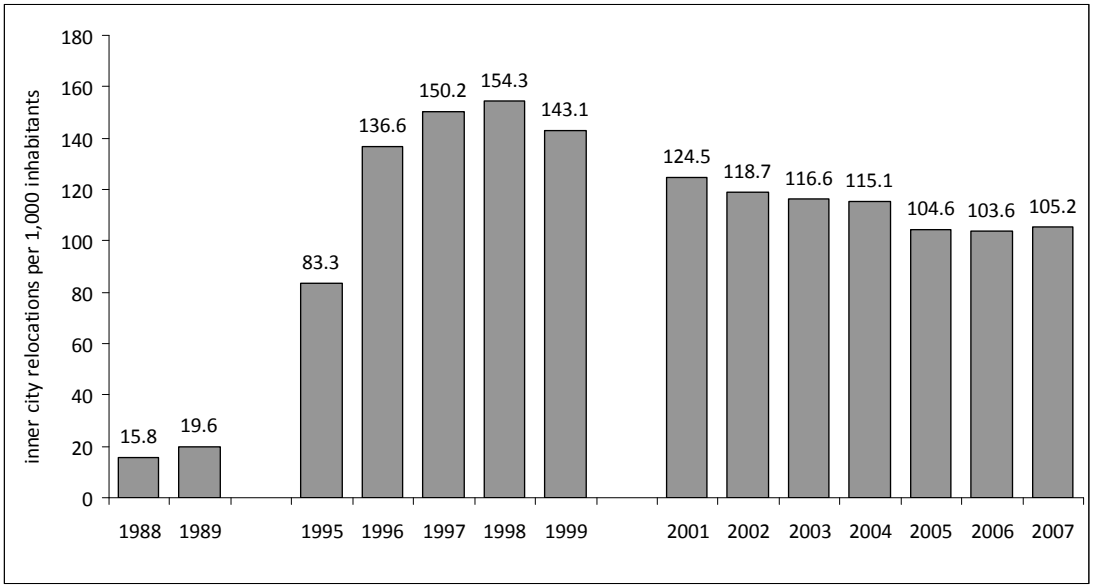
After 1989 the situation changed. As a consequence of population decline and an oversupply of flats due to renovation, newly built housing and increasing vacancies in the 1990s, Leipzig developed to be a housing market with a supply surplus (see also section 3.4. of this report). The emergence of housing vacancies led to falling rents/prices and a greater choice in terms of housing for a variety of residential groups. Subsequently, residential mobility increased and was at its highest level at the time when the housing vacancies reached their top numbers (in 2000). During the 2000s, residential mobility then decreased but remained at a level that is above that of comparable western German cities with a demand surplus housing market (Figures 3.1.1 and 3.1.2).

We understand supply surplus as a situation where there are more inhabitable dwellings than households available on the housing market. The supply is, subsequently, higher than the demand (Rink et al. 2010). Since most studies on socio-spatial segregation refer to the context of housing markets with demand surplus, the question whether supply surplus changes processes of differentiation and patterns of segregation has been under-researched up to now. The few existing studies are contradictory in their assumptions or conclusions and say either that the segregation under the conditions of supply surplus at the city level is stronger or that it is – in the same context – weaker. Some studies underline that the level of

[3] For the definition of processes of socio-spatial differentiation and patterns of socio-spatial segregation as a result of these processes see Rink (1997).

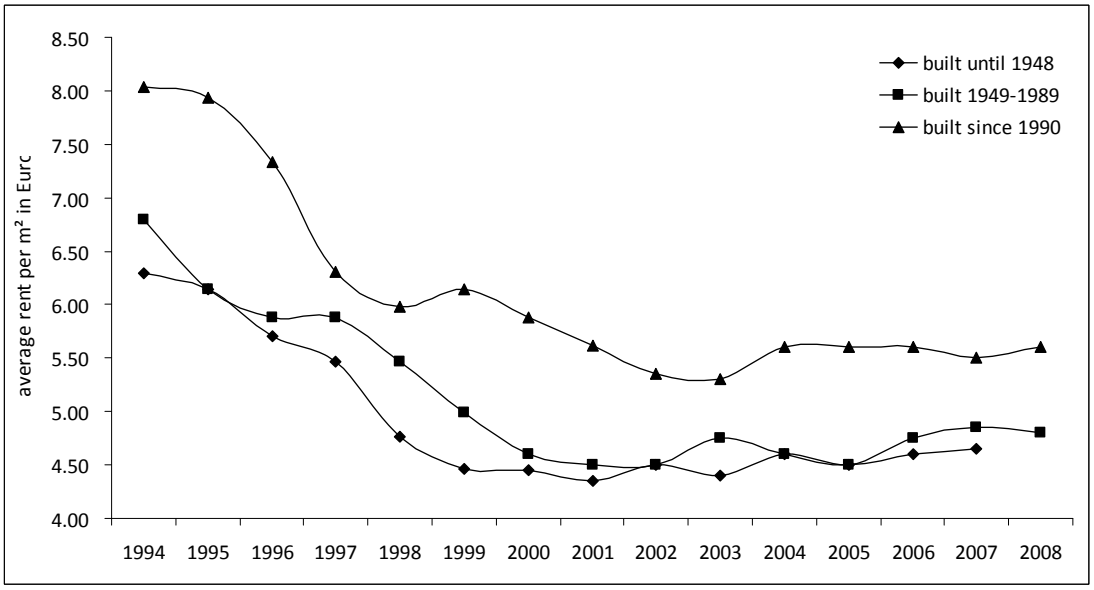
segregation of certain population groups (low income households, unemployed, older people, migrants) is more pronounced in cities with housing vacancies and a declining population.

Figure 3.1.1: Residential mobility in Leipzig 1988-2007



Source: UFZ database

Figure 3.1.2: Monthly net-rent in Leipzig according to date of construction 1994-2008



Source: UFZ database

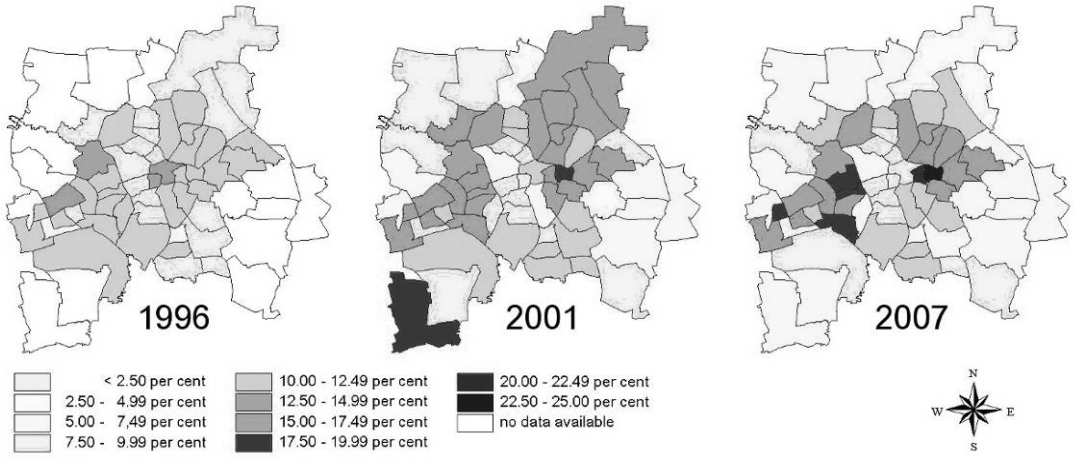
"Postsocialist" differentiation, re-arrangements and segregation

Looking at the period from 1990 to today, socio-spatial differences between the districts in Leipzig have increased (Rink 1997). These distinct processes of socio-spatial differentiation have not, up to now, produced a "clear" picture of "postsocialist" segregation in Leipzig. In the following, we present selected results of

research that has been carried out in the last few years (Rink et al. 2010, Großmann et al. 2009). We use maps and correlations at the district level and show indices of segregation for the total city level. The maps show the development of spatial concentrations of certain residential groups over time on the scale of urban districts; the correlations relate district values to each other. The segregation indices, finally, relate specific residential groups to the entity of all other residents of the city (based on urban districts). We are well aware of the limits of the applied approach: We cannot use them to picture small-scale differences, we can show aggregate data for urban districts but not for residential groups, the differences are limited to administrative boundaries and do not provide any explanation of causes and the logics or dynamics of the processes behind.

Residential segregation in Leipzig is strongest in its socio-economic dimension. Figure 3.1.3 shows that socio-economic segregation at the district level (operationalised through the unemployment rate) was already visible in the mid 1990s. In 2001, the (north-)eastern and western parts of the inner city as well as the large housing estate Grünau had developed as the foci of unemployment – those districts that also show high rates of housing vacancies (see section 3.4 and especially Figure 3.4.5 of this report). This picture was consolidated and strengthened until 2005. Generally, the difference between the districts became more pronounced up to today. While until 2005 unemployment also rose, the recent years have brought a decrease in unemployment, but not in the level of socio-economic segregation. The latter is increasingly impacted by selective in-migration as a consequence of a rising impact of the market and the renting policy of particular owners/housing companies as adjustment factors: while some areas with a high socio-economic status see a better-off in-migration, poorer people move to districts where there is already a concentration of low income households.

Figure 3.1.3: Social segregation (% unemployed) in Leipzig 1996, 2001, 2007

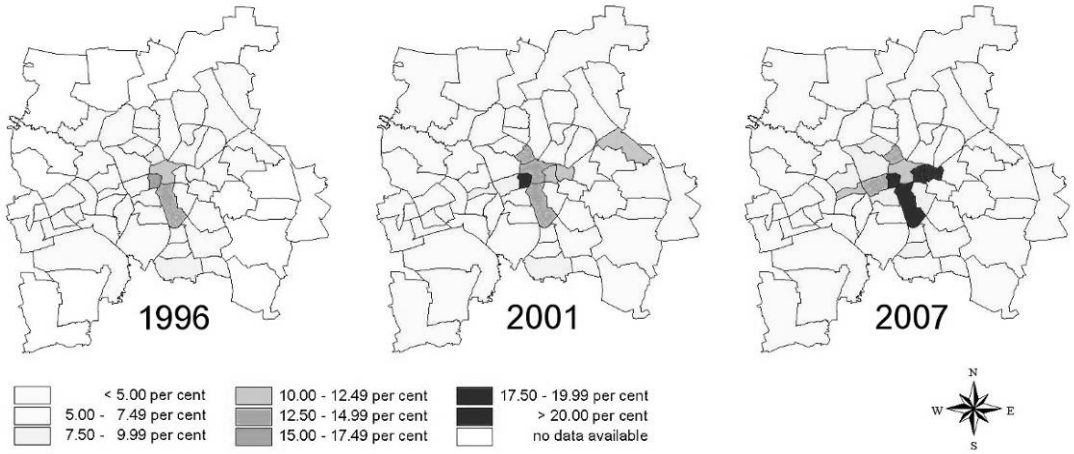


Source: Großmann et al. 2009

Socio-economic segregation is, in many cases, in line with segregation according to education. There is a considerable concentration of population with a low educational level in those parts of the city that are characterized by high shares of unemployment and low income households as well as high shares of housing vacancies (above-average proportion of pupils with learning difficulties or who stayed down a year as well as pupils at secondary modern schools/*Hauptschule*, below-average recommendations for the secondary school/*Gymnasium*, cf. LCC 2008e, 83-89).

Ethnic segregation shows both persistent and newly emerging patterns (Figure 3.1.4). The community of migrants – or foreigners as they are called commonly in the German debate – in Leipzig changed in the 1990s since some of the contract workers from the state socialist time left the city while others came. Since the mid 1990s, Leipzig has seen continuously increasing numbers of migrants; their share rose from 1990 to 2007 from 8,700 (1.7 per cent) to 33,000 persons (6.4 per cent, representing the highest share of migrants of an East German city except Berlin). Many of Leipzig's migrants are first generation migrants. We can observe two trends concerning the concentration of migrants in urban space: on the one hand, there is a continuation of socio-spatial patterns that already existed in the 1980s, i.e. the concentration of migrants in the city centre and the area south-east of the city centre with many students' residences. On the other hand, new socio-spatial patterns have emerged from the second half of the 1990s onwards, that is, the development of "migrants" areas' in the inner east of Leipzig where their share amounts to 18 – 20 per cent of the population. Migrants living in these areas stem mainly from Vietnam, Russia, Iraq, Ukraine and Poland. The spatial distribution over the city as a whole shows that there is a concentration of migrants and persons with "migration background" (see section 2.1 of this report) in the inner city as well as in the large housing estate Grünau (which is probably due to the precarious income situation of many households with migration background and the possibility of finding cheap housing in Grünau, cf. LCC 2008e, 73-75).

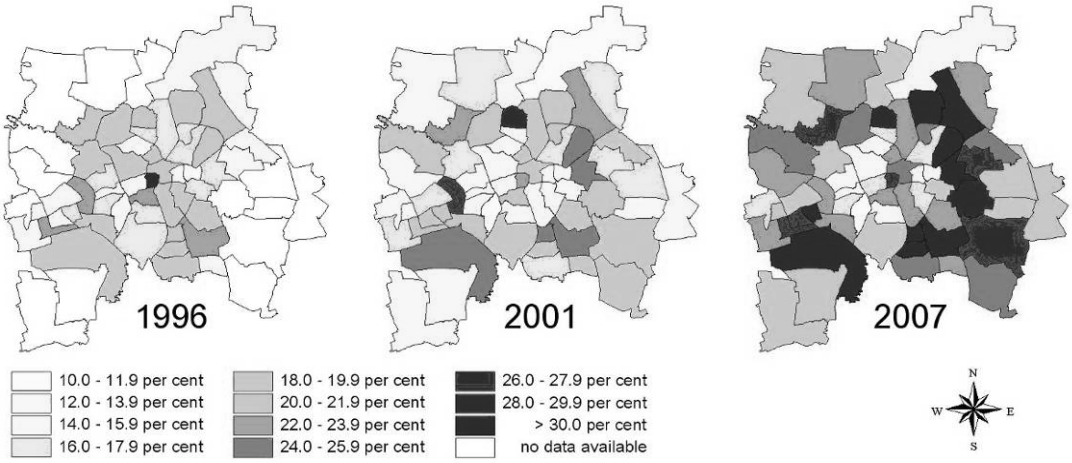
Figure 3.1.4: Ethnic segregation (% migrants) in Leipzig 1996, 2001, 2007



Source: Großmann et al. 2009

Looking at the age-specific segregation, one sees a changing pattern during the 1990s and 2000s, at least concerning the distribution of older people in the city (Figure 3.1.5). Generally, Leipzig is a rapidly ageing city (see section 2.1 of this report). The index of ageing (the relation 65+/0 – 14) increased from 91.2 in 1990 to 220.2 in 2006 (Kabisch, S. et al. 2008, 17). While in the early 1990s the city centre was the "oldest" district, all other districts did not show remarkable differences. This situation has changed during the 1990s and 2000s. The reasons are to be found in the overlap of two processes: on the one hand, a rejuvenation of the city centre and most of the inner-city districts (reurbanization) and, on the other hand, an advancing ageing of the residential areas of the "second ring" due to the out-migration of younger people to suburbia and the inner city (at a moderate level until today) and an advancing ageing in place in the affected districts, which show a share of 65+ population of >25 or even >30 per cent (LCC 2008e, 54). To put it differently: the pattern of the concentration of older people of the early 1990s no longer exists. There is a high dynamics of change, although the newly evolving pattern has to consolidate to really become a longer-term characteristic of the "second-ring" districts.

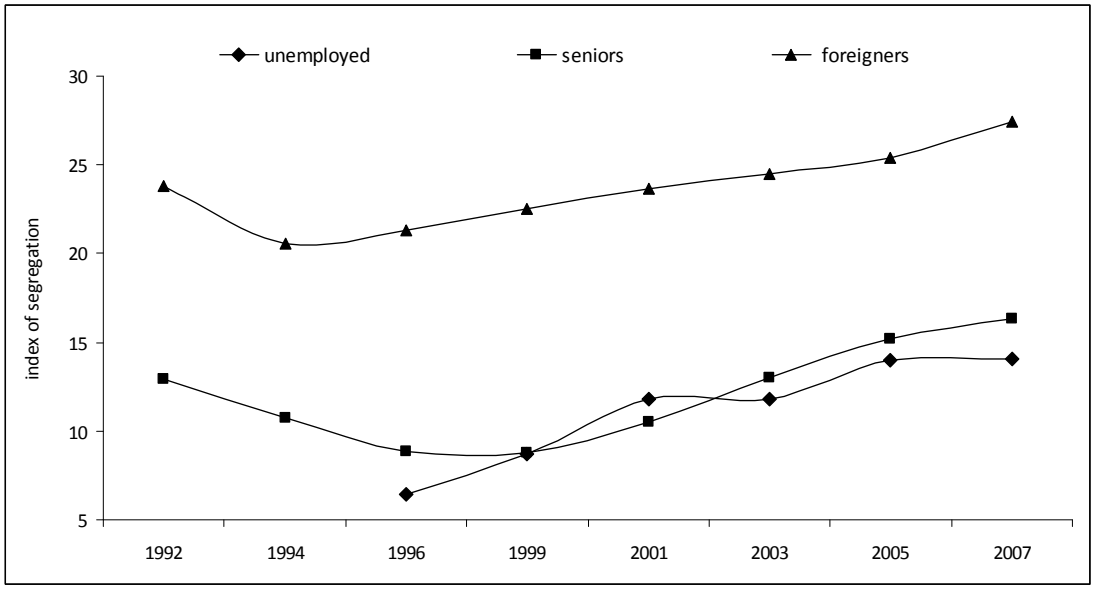
Figure 3.1.5: Age-specific segregation (% 65+) in Leipzig 1996, 2001, 2007



Source: Großmann et al. 2009

Figure 3.1.6 shows the development of segregation indices for Leipzig. The values neither show striking levels nor a high dynamic of growth or decline. It has to be emphasised that the values do not start with "zero" in 1990, which clearly shows that there was already socio-spatial segregation in the GDR. Compared to other European cities, the overall level of segregation is still moderate in Leipzig. There is an increasing value of the segregation of unemployed. Migrants, as a group, show the strongest segregation but this value has not dramatically changed since 1990. What the value does not show is, however, the character of the segregation of migrants that partly changed during the 1990s and 2000s (see above).

Figure 3.1.6: Segregation indices for Leipzig 1992-2007



Note: The data relate to the territory of the 48 districts Leipzig had until 1998. The enlargement of the city's territory due to an administrative reform in 1999 was not considered for this calculation.
Source: Arndt 2008

Impact of urban shrinkage on socio-spatial segregation

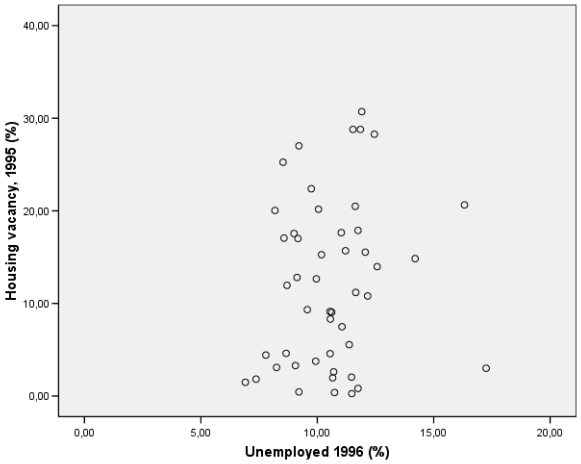
What impact does urban shrinkage have on the development of socio-spatial segregation? To assess direct impacts is not easy; we operationalized urban shrinkage by making an estimation of vacancy rates (including both buildings on and off the market) and correlated it with the share of unemployed, migrants and 65+ inhabitants to get an initial idea of its influence on socio-spatial inequality. Figures 3.1.7 a) and b) show that while there was no correlation between vacancy rates and the level of unemployment in 1996, in 2003 there was a clear connection (Pearson correlation 0,156 and 0,783**). Many unemployed people are living in urban districts with high vacancy rates and vice versa. It has to be clearly pointed out here that the above mentioned consolidation or up-grading of some areas of the (old built-up, inner) city led to the (exclusionary) displacement of low income households into those areas where they can find appropriate housing for moderate costs (see Marcuse 1985).

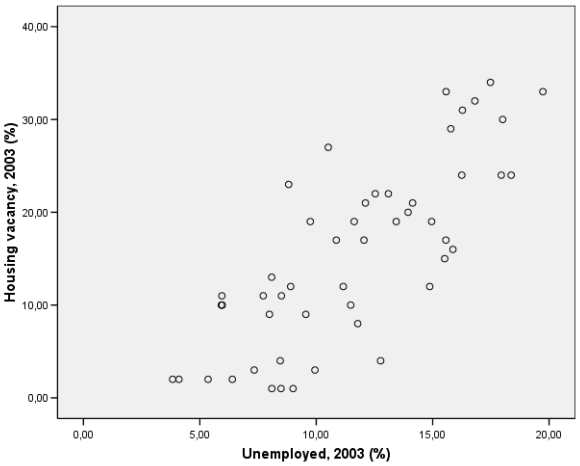
The correlation between the share of migrants and vacancy rates ranges around a middle level. One could conclude that in those districts where (relatively) many migrants are living we also find above-average vacancy levels and vice versa (Figures 3.1.7 c) and d)). However, compared with the first correlation, the significance of the values is much lower. In contrast to the group of unemployed, the value of the correlation did not change from 1996 to 2003 (Pearson correlation 0,334* and 0,441**). There is no correlation between the distribution of specific age groups of 65+ or 0 – 14 over the districts and the proportion of vacancies, either in 1996 or in 2003 (Pearson correlation -0,050 and -0,156). This means that although we have a clear concentration of 65+ population in the "second-ring" districts in the 2000s, this

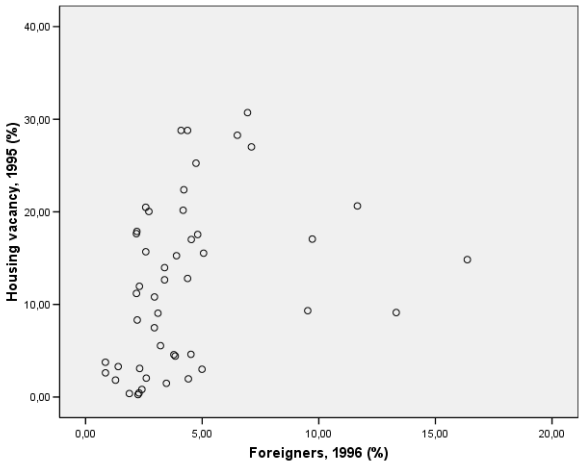
is more related to ageing and specific out-migration (of younger households) from these districts than to urban shrinkage as the former did not lead to high vacancy rates (Figures 3.1.7 e) and f)).

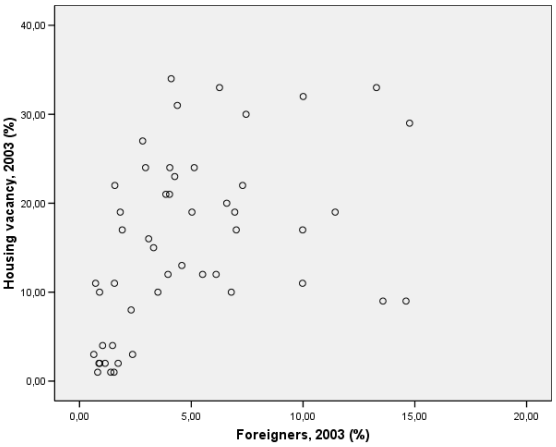
According to our current knowledge, we conclude that there is an impact of supply surplus on the dynamics of residential segregation, but not on all its dimensions. While the surplus of supply is strongest in the socio-economic dimension, we find both persistent and new patterns with respect to ethnic segregation and a high dynamism and changing patterns for the 65+ dimension of age-specific segregation. There is a certain postponement of the impact of housing vacancies on re-arranging or changing patterns of residential segregation since the supply surplus with its consequences (low housing costs and greater choice) had to be there before a rise in residential mobility could start. This means that although Leipzig is no longer a shrinking city, it shows the characteristics of a housing market with supply surplus and, because of this characteristic, urban shrinkage has an impact on the patterns of segregation and on processes of socio-spatial differentiation. Since today's differentiation is driven mainly by selective in-migration and no longer by selective out-migration like in the 1990s, attraction factors of the districts and their housing offers come more into the focus, be it in the form of choice or constraints. In the 2000s, the increasing segmentation of the housing market has led to housing shortages in particular areas or segments whereas supply surplus remains in others (not all areas have a supply surplus). Generally, the supply surplus context represents a dynamic one: whilst the 1990s were the phase of re-arrangement of the housing market, the 2000s were the phase of a certain consolidation of patterns that had evolved in the late 1990s as well as new restrictions (Rink et al. 2010).

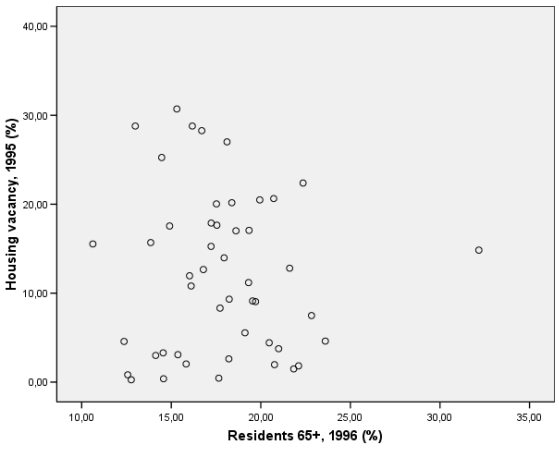
Figure 3.1.5 a)-f): Correlation between share of housing vacancies and share of unemployed persons (a) and b)), foreigners (c) and d)) and 65+ population (e) and f)) 1996 and 2003

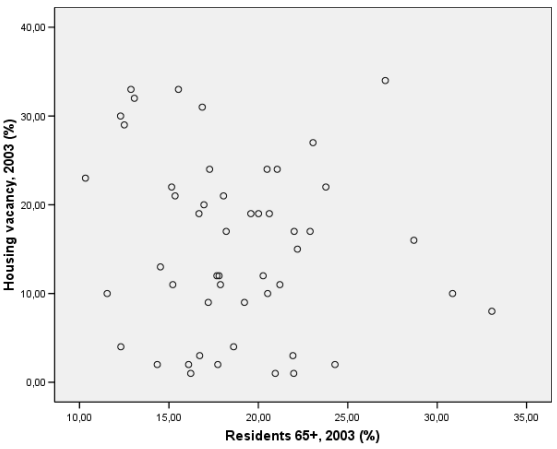










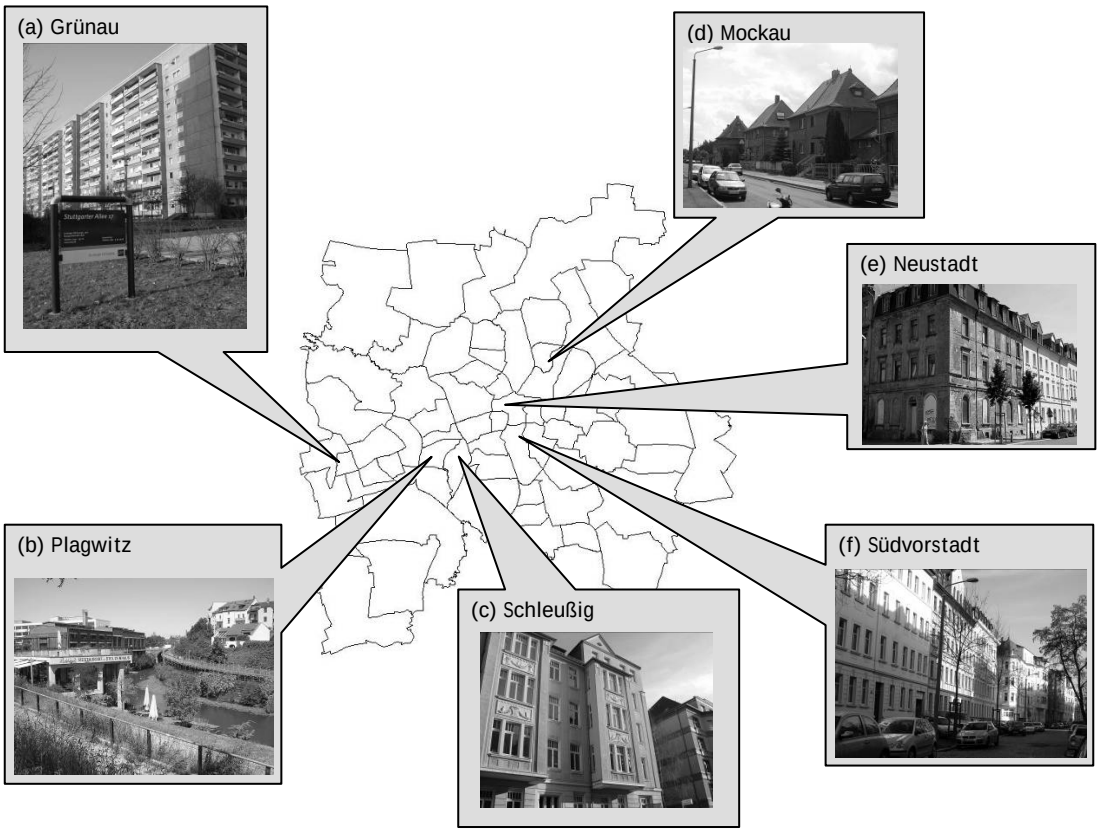


Source: Großmann et al. 2009

The district and small-scale level

Patterns of segregation are clearly visible at the district level. In some cases, they relate even to a more small-scale level (parts of districts, neighbourhoods) or go beyond the (administratively assigned) borders of districts. There are considerable differences between inner-city old built-up districts. While some of them (Waldstraßenviertel, Gohlis-Süd, Schleußig, Plagwitz) have undergone up-grading and gentrification processes, others (Neustadt-Neuschönefeld, Volkmarsdorf, Reudnitz) have become increasingly areas where low-income households, unemployed persons and migrants are concentrated. Districts where social exclusion plays a role are to be found not only in the inner city but also in the large housing estates (Leipzig-Grünau). In most cases, physical dilapidation, housing vacancies and demolitions go hand in hand with high proportions and concentration processes of low-income households. This is partly a result of municipal policies (about where to house social welfare recipients). Processes of "de- and re-mixing" are happening, either by ageing in place in many "second-ring" districts (Marienbrunn, Abtnaundorf, Sellerhausen, Mockau) and by repopulation and rejuvenation in districts undergoing reurbanization after massive losses in the 1990s (Südvorstadt, Connewitz, Neustadt-Neuschönefeld, Altlindenau). Figure 3.1.6 shows examples of such pathways of Leipzig's urban districts.

Figure 3.1.8: Districts of Leipzig – The map shows the administrative borders of Leipzig's urban districts and some examples of districts mentioned in the text: a) Grünau; b) Plagwitz; c) Schleußig; d) Mockau; e) Neustadt-Neuschönefeld; f) Südvorstadt.



Source: Thomas Arndt (map layout and photo d), Annegret Haase (all other photos)

3.2 Business and employment

This document follows the logics of the research of Workpackage 2 of the 7 FP EU project Shrink Smart which was mentioned in the introduction. In the project, the local economic development is discussed as a cause for urban shrinkage; local business and employment represent an arena of impact of urban shrinkage. With the aim to improve readability of this report, chapter 2.2 of this document discusses both the economic development of Leipzig as a causal factor for shrinkage, and the development of business in Leipzig as a consequence of shrinkage. Subsequently, chapters 2.2 and 3.2 go as one.

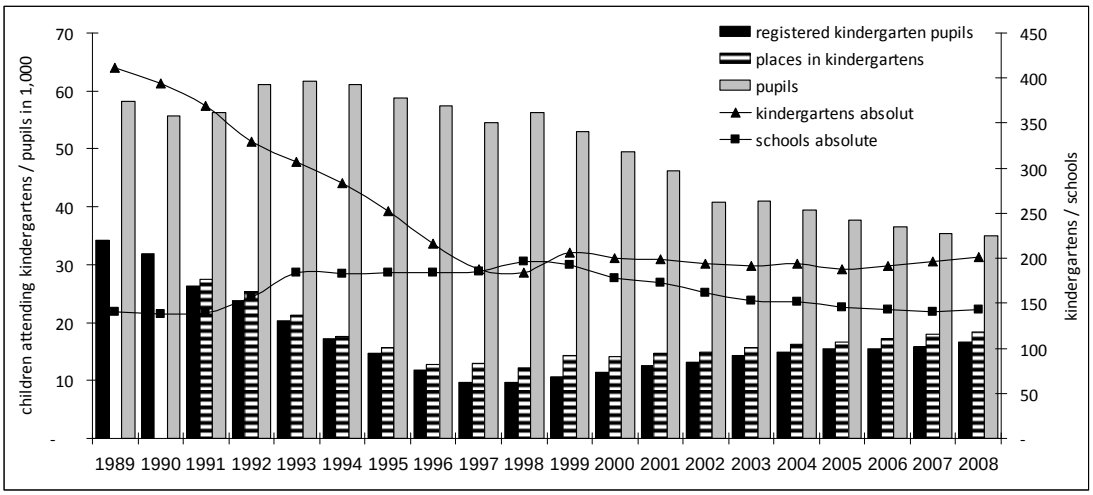
3.3 Social infrastructure and education

Urban shrinkage has an impact on the demand for social infrastructure: while the demand for social amenities decreases in areas with population outflow and high shares of housing vacancies, it increases in stabilizing and growing areas, mainly due to selective in-migration (e.g. of young families to particular districts, see also sections 2.1 and 3.1 of this report). Subsequently, the distribution of much social infrastructure is characterized by areas of under- and oversupply across the city's territory. Urban shrinkage does not generally mean supply surplus, it means, in the case of Leipzig, a selective pattern of district-related under- or oversupply. The main challenge for the municipality for the coming years will be to adapt the supply to the areas of demand.[4] The demand for schools decreased during the 1990s and 2000s; subsequently, several schools had to be closed.

The number of kindergartens decreased from 412 (1988) to 184 (1998). In 1999, it increased to 206 due to the administrative reform to decrease again to 202 in 2008 (Figure 3.3.1). The numbers include all kindergartens, both public and private. Private kindergartens have emerged only since 1989 and are possibly to be found mainly in better-off neighbourhoods. The number of places decreased from 27,000 (1991) to 18,000 (2008), and the number of registered children from 36,000 (1987) to 17,000 (2008). The supply of kindergartens differs over the city's territory and the fulfilment of demand differed in 2005 between 80 and 140 per cent in the individual districts. The social report (2008) distinguishes three types of districts: those with undersupply (below 90 per cent), those with balanced supply and demand (90 – 120 per cent) and those with oversupply (>120 per cent). While districts with undersupply are to be found mainly in the northern and southern districts of the inner city that see in-migration of a younger population (north-south-axis along the floodplain forest areas), the oversupply is concentrated in the prefabricated areas of Grünau and Paunsdorf in the west and north-east of the city where we have either high vacancy rates (in the case of Grünau) or an increasing concentration of social welfare recipients (in the case of Paunsdorf) (LCC 2008e, 35-37, Figure 3.3.2).

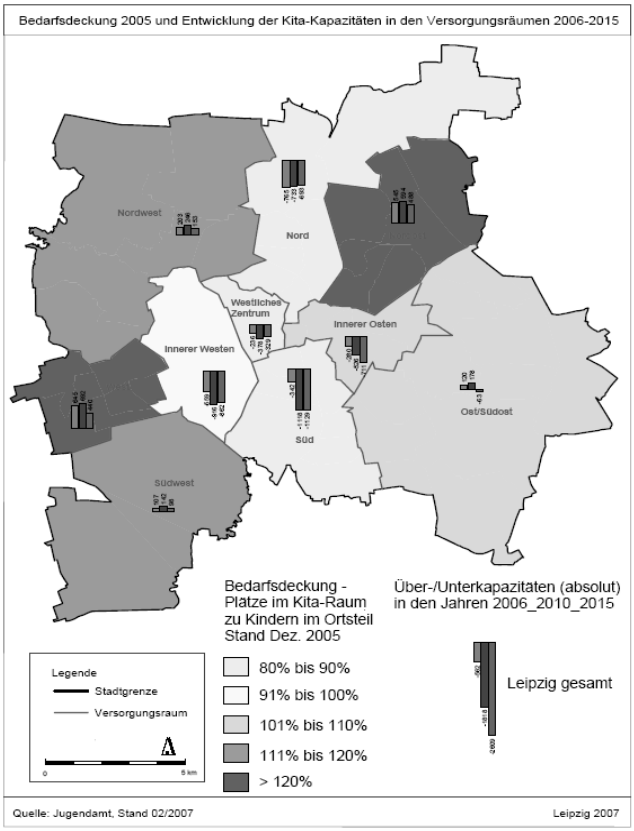
[4] This information is based on an interview with representatives of the urban planning unit of Leipzig in December 2009.

Figure 3.3.1: Places in and attendants of kindergartens and schools in Leipzig 1989-2008*



*From 2001, the number of kindergartens also includes nurseries at schools.
Source: UFZ database

Figure 3.3.2: Fulfilment of demand for kindergartens in Leipzig for the period 2006-2015



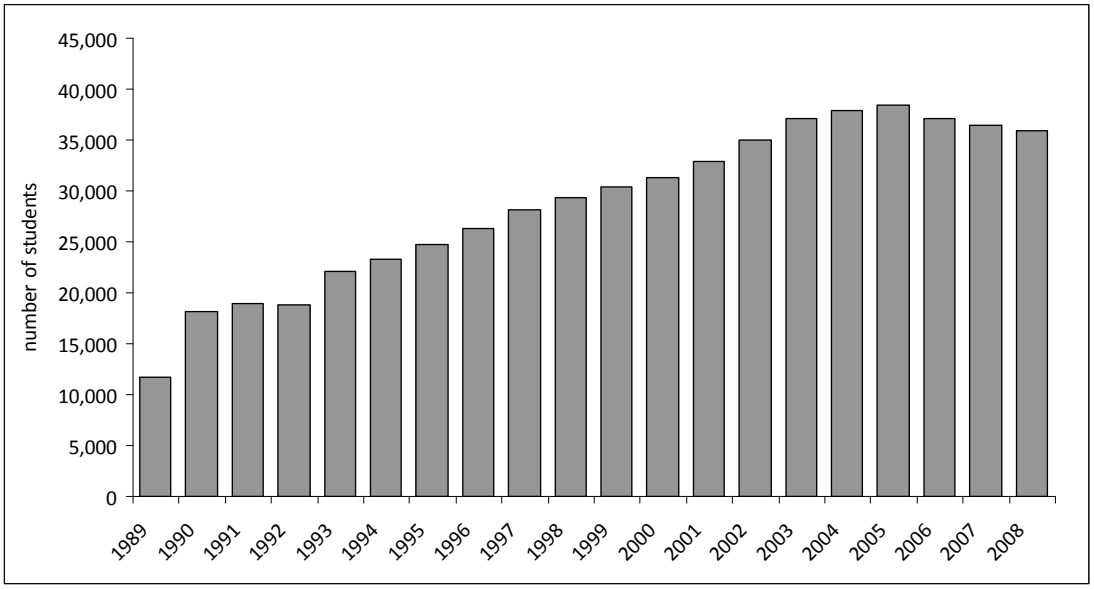
Source: LCC 2008e, 36

The number of pupils in Leipzig's schools decreased from 1989 (58,000) to 2008 (35,000), mainly as a consequence of out-migration and suburbanization (of families with dependent children) (Figure 3.3.1). The number of schools increased from 1985 to 1998 from 135 to 197 and decreased afterwards to 143 in 2008. Due to the decreasing demand, schools of different types (primary and secondary schools) had to be closed. In recent years, a slight increase in numbers of pupils in primary schools can be observed (LCC 2008e, 79-80). There is a considerable concentration of

education related problems in those parts of the city that are characterized by high shares of unemployment and low income households as well as high proportions of housing vacancies (above-average proportions of pupils with learning difficulties or who stayed down a year, as well as pupils at secondary modern schools/ *Hauptschule*, below-average recommendations for the secondary school/ *Gymnasium*, cf. LCC 2008e, 83-89 and section 3.1 of this report).

The number of apprentices increased during the 1990s and remained stable at about 25,000 during the 2000s. The share of adolescents who did not find an apprenticeship recently rose from 3 to 10 per cent from 2002 to 2007. Most of them attended the *Hauptschule* or *Realschule*. In line with the overall trend, the level of unemployment of the young in Leipzig has undergone a decrease during recent years. The number of students at Leipzig's university started to rise considerably after 1989, until this time it was approximately 12,000. In 2005, it reached a peak with 38,500 students, in 2008 the number slightly decreased to 36,000 (Figure 3.3.2). Since the 2000s, students and apprentices have constituted a considerable potential for inner-city reurbanization and population gains from in-migration in Leipzig (counteracting urban shrinkage) This potential will, however, decrease in the future due to fact that the age group 18 – 30 will decrease during the next years.

Figure 3.3.3: Development of number of students in Leipzig 1989-2008



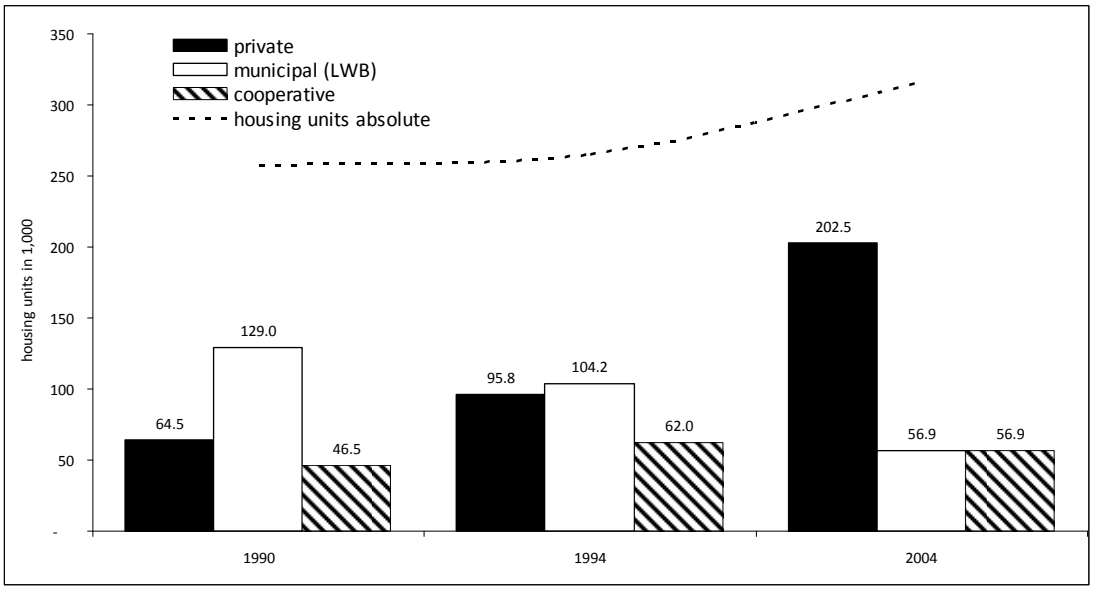
Note: The numbers relate to the respective winter term, e.g. 2005 = winter term 2005/2006.
Source: UFZ database

The number of doctors in private surgeries and hospitals increased from 1989 to 2008. The same is true for the number of surgeries – there was an increase from 568 in 1992 to 991 in 2006. At the same time, the supply of doctors as well as of surgeries improved with the number of doctors increasing from 4.2 to 5.7 (per 1,000 inhabitants) from 1988 to 2006, and the number of surgeries increasing from 1.1 to 2.0 from 1992 to 2006.

3.4 Housing

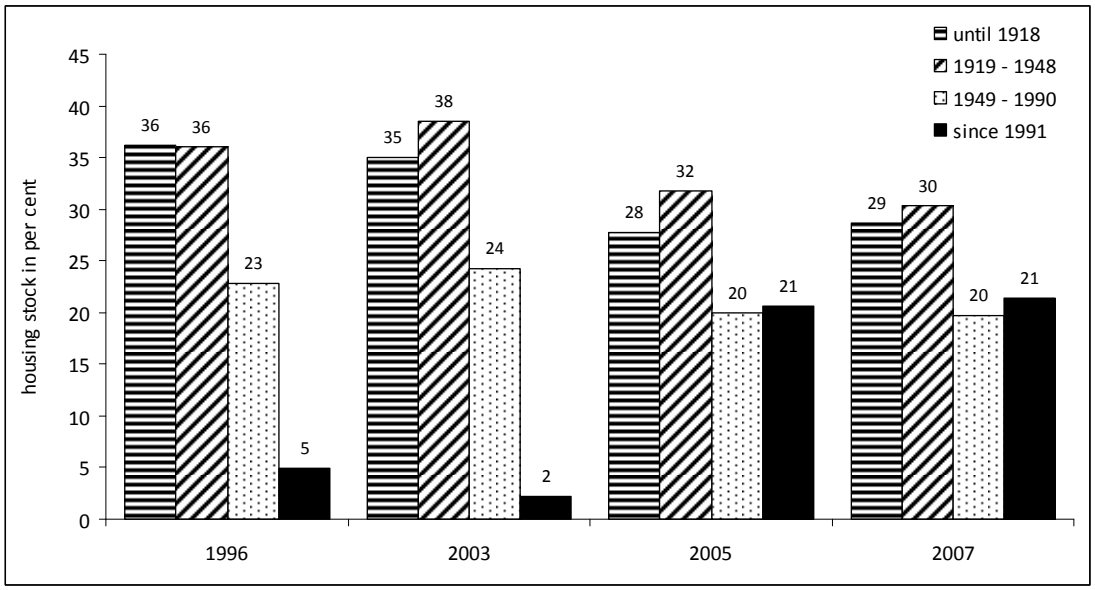
The discussion about shrinkage in Leipzig is dominated by the housing market perspective. Residential vacancies were the origin of any debate about shrinkage in East German cities – the term itself came largely into discussion in relation to housing vacancies or housing surplus. A federal commission dealt with that phenomenon in 2000. The mayor of Leipzig (at that time) was the head of this commission, which illustrates quite well the importance and scope of the vacancy problem, especially for Leipzig. Housing vacancies, and especially vacancies in renovated housing stock, became the talking points of urban shrinkage, not only in Leipzig but in the whole of eastern Germany. Research and planning speaks of "tenants' markets" (seen from the perspective of the demand side) or "housing markets with supply surplus" (seen from the perspective of both the supply and the demand side). Other dimensions of urban shrinkage are possibly underestimated because of the importance of the vacancy issue. Leipzig's housing stock is dominated by multi-family residential buildings, with the majority being built before 1948. The majority of houses are privately owned (64 per cent), 17 per cent belong to the municipal housing company, and another 17 per cent to less than a dozen housing cooperatives (Figures 3.4.1 and 3.4.2).

Figure 3.4.1: Leipzig's housing stock 1990-2004 according to ownership



Source: UFZ database

Figure 3.4.2: Leipzig housing stock 1996-2007 according to date of construction

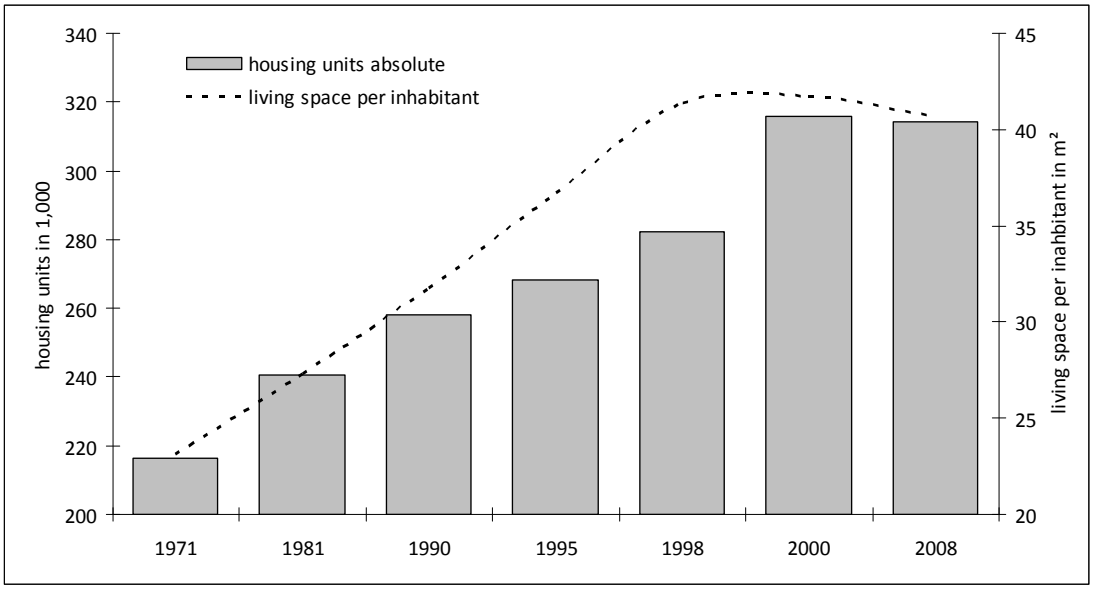


Source: UFZ database

Until the early 1990s, the housing market in Leipzig was characterised by an extreme lack of dwellings and very poor housing conditions. More than half of the buildings were built before 1918. Lack of maintenance was a severe problem and, until the 1990s, many apartments did not have a bathroom and a separate toilet. In 1989 about 10 per cent of the flats (25,000 in total) were vacant since they were not habitable. During the GDR time, the housing stock grew due to newly built housing on the outskirts of the city. From the late 1960s onwards, large-scale prefab housing estates were built; the largest of them being Leipzig-Grünau in the west of the city. Between 1970 and 1990 about 40,000 new dwellings were built in Leipzig (Figure 3.4.3), most of them in Leipzig-Grünau.

However, more and appropriate apartments were needed due to the rising number of households, increasing comfort needs, the shrinking size of households, and the dilapidation of the old housing stock (see above). This situation changed decisively after 1990. Supported by massive state-aid incentives, tens of thousands of old buildings were renovated and new dwellings built. In 2000, 14 per cent of all dwellings (43,000) in Leipzig were less than 10 years old. At the same time around 75 per cent of the old housing stock had been renovated.

Figure 3.4.3: Housing units and living space per inhabitant 1971-2008



Source: UFZ database

Since the population and, more importantly, also of the households decreased (see section 2.1 of this report), such a mixture was bound to go wrong. Thus a new gap between supply and demand emerged which resulted in an extreme increase in housing vacancies. In 2000, there were an estimated 62,500 unoccupied flats (more than 20 per cent of the entire housing stock), around 70 per cent of them in old built-up buildings (Table 3.4.2). The effects of such high vacancy rates are highly problematic – both for property owners and for the affected neighbourhoods. Thus, lack of maintenance, security problems, and perforation of the urban fabric proved to be among the top problems for old-building neighbourhoods, visible to everyone. Losses of profit, devaluation of vacant sites, lower prices, reduced mortgage values and greater marketing expenditures are keywords that describe the effects on real estate markets.

Interestingly, the allocation of vacancies over the city and the housing market segments is fairly unbalanced – though rather on a micro- than on a macro-scale. Contrary to public opinion it is not only peripheral prefabs that are subject to high vacancy rates, but moreover vacancies are also concentrated in under-maintained historical buildings, simple structures and along main roads, even if these are located in favourable neighbourhoods. Furthermore, property structures play a crucial role in dealing with vacancies. The main instrument in dealing with residential vacancies has become a public subsidy scheme called *Stadtumbau Ost* (urban restructuring "East") which has supported the demolition of vacant houses since 2001 (see also Bernt 2009). With the help of this programme 10,211 apartments were demolished between 2001 and 2007, most of them (70 per cent) in buildings in large housing estates that had been built during the GDR time (Table 3.4.1). At the same time, new constructions were completed in the city and its surroundings so that housing surplus was only partly resolved by demolitions. From the end of the 1990s onwards, the population of Leipzig has increased and consequently housing demand is growing, especially in central historic areas. As a consequence, vacancies have

decreased to a level of around 43,000 apartments (60 per cent of these being on the market).

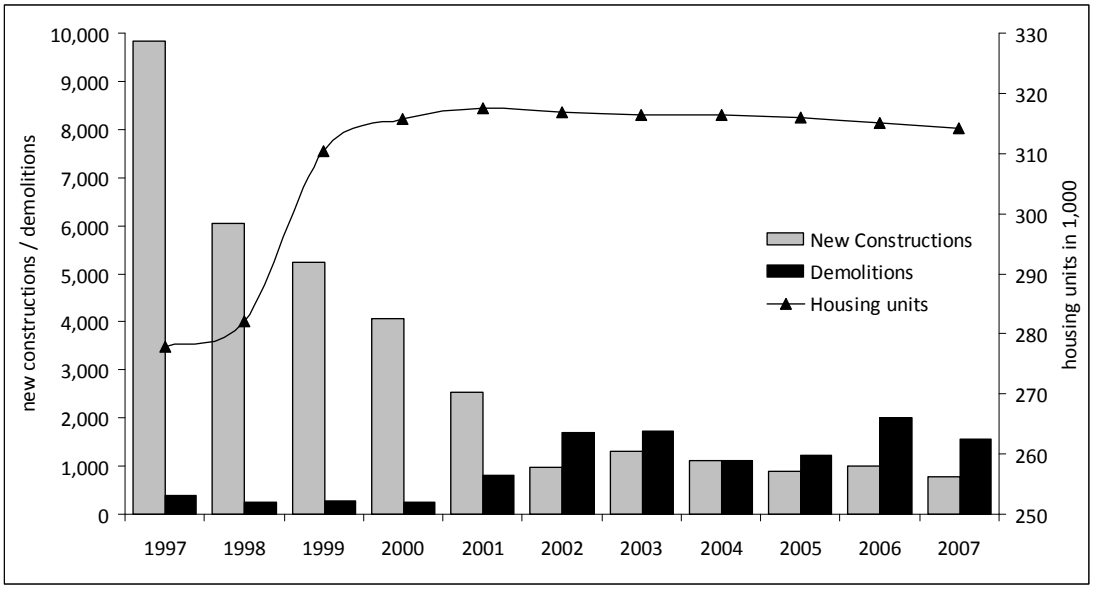
Table 3.4.1: Development in Leipzig's housing stock 1997-2007

	1997	1999	2001	2002	2003	2004	2005	2006	2007	1997 to 2007
Housing units total	277,812	310,329	317,439	316,763	316,358	316,358	316,027	314,223	314,223	+36,411
New constructions	**13,891**	**9,086**	**n.a.**	**2,124**	**n.a.**	**2,429**	**1,935**	**1,948**	**1,347**	**+32,760**
in Leipzig	9,845	5,236	n.a.	984	n.a.	1,112	881	1,016	782	+19,856
in the region	4,046	3,850	n.a.	1,140	n.a.	1,317	1,054	932	565	+12,904
Demolition	**400**	**288**	**798**	**1,687**	**1,731**	**1,128**	**1,231**	**2,080**	**1,556**	**- 11,390**
vacancies	57,000	68,000	68,000	64,000	60,000	57,000	53,000	48,000	43,000	n.a.
per cent	25.5	21.9	21.4	20.2	19.0	18.0	16.8	15.2	13.7	n.a.

Source: UFZ database

The supply surplus led to a decreasing scope of building completions, but only in the mid 2000s. The number of building completions, that had reached high levels up to then, considerably decreased from 1997 – 2001 (from 10,000 to 2,500 units per year, LCC 2008e, 17). During the 2000s it remained at a very low level (around 1,000 units per year) and was exceeded in scope by demolitions that amounted to over 1,000 units per year and reached over 2,000 in 2006.

Figure 3.4.4: Housing units, new constructions and demolitions in Leipzig 1997-2007



Note: The increase of the number of housing units in 1999 was a result of an administrative reform that enlarged Leipzig's territory
Source: UFZ database

In Leipzig's suburban zone, the number of building completions decreased after 2001 and remained at a very low level until the end of the 2000s (below 1,000 units per year). Demolitions in the suburban areas, by contrast, saw an increase from 2002 onwards. In some years their number even exceeded the number of building completions (LCC 2008c, 12-13). While the stock of multi-storey buildings decreased from 2001 – 2007 by 2.3 per cent, the stock of detached houses increased by 12 per

cent. This clearly shows the focus on demolitions and the on-going suburbanization (although a percentage of detached housing has also been built within the city).

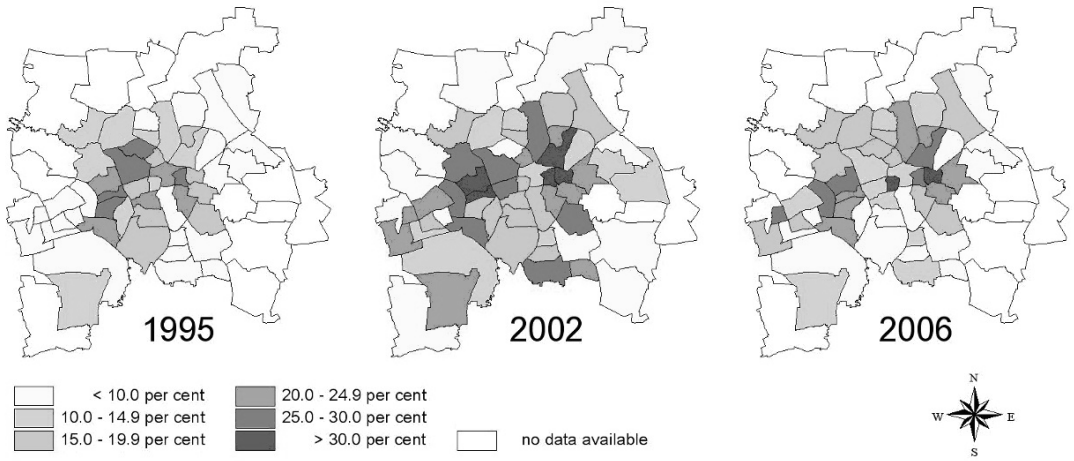
While demolition took place mainly in prefab housing areas, newly built housing was erected on the outskirts of the city; the housing stock in most of the pre-war inner-city areas remained unchanged. Newly built housing there was mainly due to inner-city detached housing (*Stadthäuser*). Urban shrinkage never affected the whole territory if the city in the same manner (see also LCC 2008e, 18).

Table 3.4.2: Development of housing vacancies in Leipzig 2002-2007 in relation to construction age

	Housing stock		Vacancies 2002		Vacancies 2007		Change 2002-2007		
Date of construction	2002	2007	Total	Per cent	Total	Per cent	Total	Per cent change	Per cent of stock
Until 1948	175,000	171,813	47,000	27	32,000	19	-15,000	-32	-8
1949 - 1990	100,228	95,631	15,000	15	9,500	10	-5,500	-37	-5
Since 1991	46,535	51,779	2,000	4	1,500	3	-500	-25	-1
Total	321,763	319,223	64,000	20	43,000	13	-21,000	-33	-6

Source: UFZ database, Monitoringbericht 2008, 15

Figure 3.4.5: Vacancy rates in Leipzig's districts 1995, 2002, 2006



Source: Arndt 2008

On analysing statistics some important characteristics about the development of Leipzig's housing stock become clear. Firstly, contrary to the development of households, the housing stock was expanded by more than 36,000 flats (which made up 11.6 per cent of the total stock in 2007) in the time examined. Secondly, the peak of new constructions occurred in the late 1990s when these were heavily subsidized. Since 2000 construction activities have considerably decreased, yet more so in the city than in its surroundings. Moreover, it is only very recently that more new housing units have been built inside the city than outside (which can be interpreted as a trend of reurbanization). Thirdly, although demolitions helped to tackle oversupply, they hardly matched new constructions. In the period from 1997 to 2007 newly constructed housing units comprised 174 per cent of the number of

demolished ones. If new constructions in the region are added, nearly three times as many flats have been built as demolished (Figure 3.4.7).

Figure 3.4.6: Vacant housing

Source: Annegret Haase

As a consequence of both population decrease and housing stock increase, Leipzig represents an urban housing market with a sustaining supply surplus. The period where housing vacancies reached the highest percentages was also characterized by the highest level of housing mobility in the city, a housing mobility that was much higher than in western German cities that have no supply surplus housing markets (Steinführer et al. 2009). Around 2000 – due to many vacant flats also in newly renovated buildings and moderate rents – it was possible for a wide range of residential groups (including those with a limited income) to move and look for appropriate housing.

The problem of housing vacancies does not affect all parts of the city. While some districts do meanwhile have almost next to no vacancies, others continue to suffer from shares of more than 30 per cent vacancies. In some neighbourhoods, whole streets, parts of streets or neighbouring buildings or blocks are vacant (see Figure 3.4.5 and 3.4.6). In many cases, the districts hit by vacancies also represent those with a high presence of low income groups and high levels of unemployed persons and other disadvantaged social groups. This “coincidence” of social and urban or built patterns has consolidated over the 2000s (see Figure 3.4.5 above and section 3.1 of this report). Or, to put it differently, urban shrinkage relates to particular patterns of segregation of the urban space, building stock and residing population.

Figure 3.4.7: Demolition of Housing

Source: Matthias Bernt

Housing vacancies do not only represent one of the most dramatic and visible impacts of urban shrinkage in Leipzig. This also presents one of the top priorities to be solved or improved for local urban planners. The city of Leipzig tries to counteract the housing vacancy problem with different counter-strategies, although they refer to specific places and residential groups and cannot be seen as a general alternative to demolition as the main instrument to balance the housing market. Some examples of these strategies are:

- The municipality supports instruments that encourage people to stay in the city and counteract a further out-migration into the suburban zone. The support of owner-occupied housing in old built-up stock or newly built detached housing in the inner city forms a part of this reurbanization policy (the so-called *Selbstnutzer* programme, see section 2.3 of this report). It is mostly better-off households (families and couples) who benefit from these incentives, and according to research, most of them never did plan to move to the suburbs. Most of the programme sites are located in attractive inner-city districts, only few of them are to be found in areas especially hit by urban shrinkage. Therefore, the *Selbstnutzer* strategy has to be seen as a niche project that will not be the solution for mass vacancies in Leipzig (Steinführer et al. 2009; Bernt 2009).

- In 2004, the city and a civic association (*HausHalten e.V.*) cooperated in order to maintain vacant buildings along big streets. The flats in such "guardian" houses are given to associations and initiatives that use the rooms for their activities. One flat is continuously inhabited by a "guard" who cares for the house. In this way, the buildings are kept in a habitable state and do not run the risk of dilapidating further and being demolished. Currently 12 "guardian houses" exist in Leipzig, mostly along big streets in western, eastern and northern inner-city districts particularly hit by urban shrinkage and housing vacancies.

- Some years ago a model was developed in Leipzig about how to keep vacant plots from further dilapidation: the so-called *Gestattungsvereinbarung* is an agreement between the owner of the plot and a user who uses the plot for a given time with the acceptance of the owner (see in more detail section 3.6 of this report).

According to the results of the municipal survey in 2007, the mean living space per person increased to 44.4 square metres. Compared with 1993, it increased by almost 10 square metres per inhabitant or by 27 per cent. The main reason for this increase relates to the downsizing of households. A consequence during the last few years was a constant rise of the expenditures for housing in relation to the monthly income from 17 per cent in 1993 to 34 per cent in 2006 (LCC 2008e, 19-20).
The problem of residential vacancies is closely connected to other trends which characterize more recent developments in Leipzig's housing market:

- As the population shrinkage goes hand in hand with an aging of the population providing adequate housing is becoming a more severe problem. Due to the different age structure of neighbourhoods, this is especially the case in prefab neighbourhoods of the 1960s and 1970s – which at the same time have become the focus of demolitions and housing market renewal.

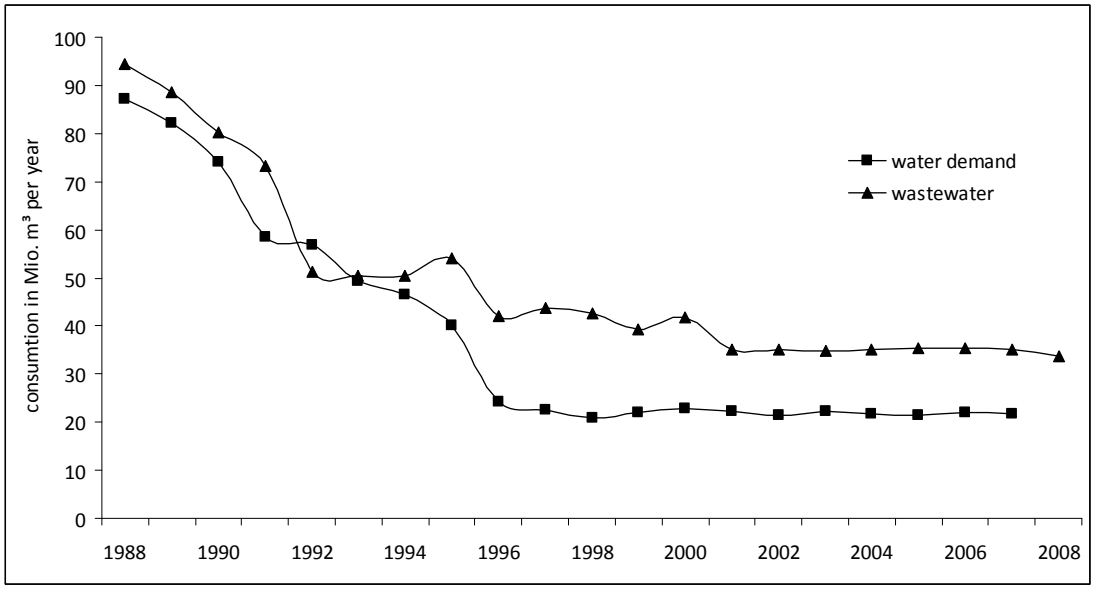
- The number of poor households has increased tremendously in the last couple of years. Altogether 79,000 households (28 per cent) are estimated to be poor, and thus the demand for small and inexpensive apartments has increased. As these are more concentrated in peripheral prefab areas, social segregation is becoming a more relevant problem.

- The scope of housing vacancies and related processes of socio-spatial differentiation in the city (see above) was driven mainly by out-migration in the 1990s. Since 2000, it is mainly in-migration that drives further socio-spatial differentiation between the urban districts. Subsequently, the housing policy of owners comes more and more into focus as a driver of the allocation occupancy of stocks in terms of socio-economic characteristics of the tenants and processes of social streamlining and exclusion. This will have implications for the housing market policy and urges a further observation of stocks, their owners and interests.

3.5 Technical infrastructure

The consequences of population losses in Leipzig are not only widespread housing vacancies, but also a falling demand for water, as well as wastewater and garbage disposal, central heating and public transport. Water demand has thus fallen from 87 Mio m^3 per year (1988) to 21 Mio m^3 (2007), residual waste disposal from 187,300 tons to 79,082 tons in the same period, the number of public transport passengers per day has reduced by nearly two thirds, the demand for central heating has gone down from 2,212 Gwh/year (1990) to 1,554 Gwh/year (2008). Together with more modern technologies, population loss has thus effectively reduced the demand for infrastructural amenities (Figure 3.5.1).

Figure 3.5.1: Water and waste water demand 1988-2008



Source: UFZ database

However, the situation is fairly complex and can only be understood against the background of the historic development of the city. The essential parts of Leipzig's infrastructural grid were built at the beginning of the 20th century, at a time when population growth was taken for granted and an increase in the number of inhabitants to a level of one million was expected. Moreover, as described above, Leipzig experienced a dramatic change of its settlement structure in the 1990s, with considerable consequences for infrastructure provision:

- deindustrialisation led to the closure of existing industries with an inner-city location, new companies tended to open in peripheral rather than in central locations,
- new constructions were for the most part placed in suburban locations,
- large-scale sales structures also tended to be built at the fringes, often in close proximity to freeways.

Thus, the collapse of large industrial customers together with better technologies and population losses has reduced the overall consumption of water to less than a quarter in the course of one decade. As both the length and the diameters of the

piped networks have been dimensioned to manage the peak water consumption, this leads to a situation whereby the utility system is considerably oversized in relation to recent consumption. Additionally, the grid to be managed by the water companies grew enormously and the networks for piped drinking water and wastewater increased from 3,607 km (1988) to 5,748 km (2007). To quote a planner from Leipzig's municipal water company: "We have the demand of 1945, with a network of the 1990s."[5]

This situation leads to numerous technical problems (Koziol, 2004, 122-123) and presents a danger for the quality of the water supply. In order to maintain technical and hygienic standards, additional technical measures, such as flushing, a reduction in the tubes' diameter, pressure increase, makeshift pipes, etc., are necessary. In the face of imminent quality problems, the adjustment of plants and networks becomes more and more urgent. Although these adjustments are technically unproblematic in most cases, they cause serious problems from an economic point of view. They generate high additional expenses, while revenues have declined. Moreover this need for additional expenses comes at a time when water suppliers have just made huge investments in the last decade. Since the 1990s investments have not yet been depreciated, a high number of companies and associations find themselves in a situation in which they have to put up with both a reduction in profits as well as having to pay off high liabilities. Moreover, often the peripheral prefab housing estates, hence the areas with younger, better maintained and less depreciated networks are often the focus of large scale urban renewal programmes that include demolitions, whereas inner city areas with significant maintenance backlogs have to be maintained. At the same time, suburbanisation leads to a lower consumer density, which increases the fixed costs of the supply companies.

The situation is especially problematic in Leipzig because the water network has, at least in the central parts, reached an age where the end of the usage period has been reached and considerable investments are needed to make sure that future requirements can be met. Paradoxically, the need for redoing the existing grid is thus most pressing in those areas that are to be consolidated in the future, whereas the network in the peripheral prefab estates (that was mainly built in the 1970s) is still functioning effectively. Against this background the uncertainty about future settlement structures becomes an immense problem for infrastructure suppliers who need to place investments within a very long-term perspective. Moreover, connecitivities play an immense role in piped networks, so that large-scale planning, instead of piecemeal incremental changes is necessary from a technical point of view. Infrastructure suppliers, and within them most of all the water and wastewater company, thus regularly call for more coordination and long-term planning. In practice this has, however proved to be hard to achieve.

[5] The interview was hold in 2007.

3.6 Land use and environmental quality

New land uses in the city of Leipzig and the surroundings

The city of Leipzig is a compact city – compared to its number of inhabitants, it has only a small territory and is, therefore, densely built. This brings about consequences for the land use. The city experienced only little urban sprawl in the post-Second World War period, except for the building of a few big housing estates on the urban fringes. These estates are very densely built and they are well connected with the city centre via public transport. During the 1990s, the creation of a number of small- and medium-scaled as well as some big residential and commercial extensions occurred at the urban peripheries and in the wider surroundings. Subsequently, the city sprawled despite its considerable population loss (see sections 2.1 and 2.3 of this report, Nuissl and Rink 2005). Generally speaking, the share of the built environment increased in comparison to the situation before 1989. More space was dedicated to housing and commercial purposes.

Table 3.6.1: Land use in Leipzig over time

Year	Total area	Built-up areas and related open spaces	Recreation areas	Municipal traffic areas	Arable Land	Forest	Water
1996	29,173	7,165	1,238	3,004	13,651	1,795	611
2000	29,754	7,718	1,455	3,297	13,176	1,631	559
2004	29,760	8,244	1,680	3,476	12,183	1,703	551
2008	29,736	8,393	2,434	3,505	11,298	1,938	849

Source: UFZ database

As the Table shows for the period 1996 – 2008, the land use structure changed over time (Table 3.6.1). One can observe an increase in built-up and traffic areas, whereas the share of arable land decreased. The changes of the built-up areas in relation to the period before 1996 were remarkable, especially between 1996 and 2000 as well as between 2000 and 2004 (7 and 6 per cent). At the same time, the share of forests and water surfaces increased too, mainly due to the conversion of former opencast mines into lakes and recreational areas.

Emergence of brownfields in the city

At the same time – as a consequence of the deindustrialisation process – a high number of brownfields emerged in the city. On the one hand, these are brownfields that result from the breakdown of industry in the western and northern parts of the city. These constitute especially industrial brownfields, but commercial, railway and military brownfields as well (Figure 3.6.1). For the past several years brownfields have appeared, on the other hand, as a result of the demolition of houses in the inner city too, especially in the prefab housing estates but also in inner-city old built-up districts (Figure 3.6.2). In the course of urban restructuring, approximately 30 ha of brownfields have emerged since 2000 as a result of the demolition of housing. As

a result of these processes, Leipzig faces a high number of brownfields. The city is, subsequently, forced to find solutions for a new use or re-use of them. As Figure 3.6.3 shows, an increasing number of urban brownfields came into new or re-use during the last years. In 2007, about one third of all existing (former and current) brownfields was under new use. There are various forms of re-use both for the long-term and interim uses.

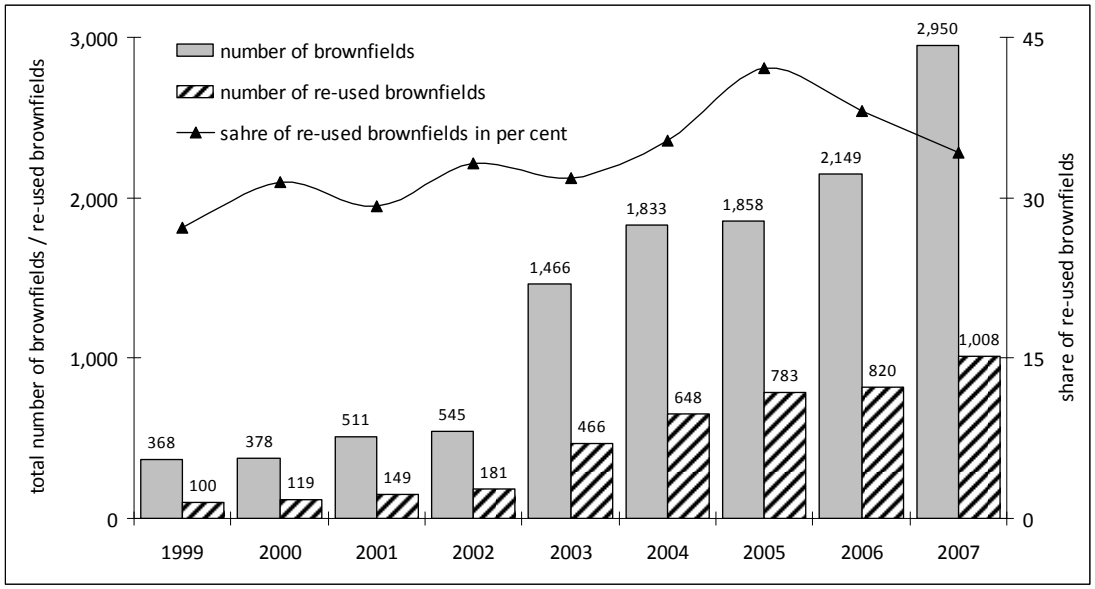
Figure 3.6.1: Post-industrial brownfield

Source: Dieter Rink

Figure 3.6.2: After-demolition brownfield

Source: Dieter Rink

Figure 3.6.3: Brownfields in Leipzig 1999-2007



Source: IGNIS Leipzig 2010

As a consequence of the above mentioned processes, the urban fabric of Leipzig has become more disperse or, to use a new term which was brought into the debate by eastern German urban planners from Leipzig, “perforated”. That also means that the urban fabric is becoming less dense and heterogeneous and that unused urban lands are to be found at many places within a city’s boundaries. The term perforation itself was used in this way during the debate about shrinking cities in eastern Germany (Lütke-Daldrup 2001). The idea of perforation implies that urban areas with strong demographic decline are however sprawling (Haase, D. et al. 2008; Nuissl and Rink 2005). Thus, a heterogeneous mosaic of growing, stabilising and declining urban structures is developing. Perforation affects mainly those areas where there are the most brownfields, be it as a consequence of deindustrialization or demolition of housing stock, for instance in the industrial belt in the west of the city (Plagwitz and adjacent districts) as well as the large housing estate Grünau. In inner-city residential areas, perforation emerges along some main roads where housing stock has been demolished (mostly true for some parts of the inner east of Leipzig).

In general the city of Leipzig follows the vision of the “compact city” and tries to organise the restructuring as a phase out from the periphery to the core. Additionally, the city tries to combine a reduction of land consumption with an improvement of the quality of life. Concerning the new or re-use of urban brownfields, Leipzig gives priority to a “twofold inner-development” instead of to an outer-development (cf. Muschak et al. 2009). This means that generally developments should be concentrated within the city’s boundaries in the form of re-use, redevelopment and densification. There are two strategies for the restructuring of urban brownfields: on the one hand, brownfields are planned to be revitalized. For this purpose, different ideas were developed: loft-housing in former industrial structures, the erection of town houses (detached housing in inner-city locations - *Stadthäuser*) and the interim use of vacant housing and plots (*Gestattungs-*

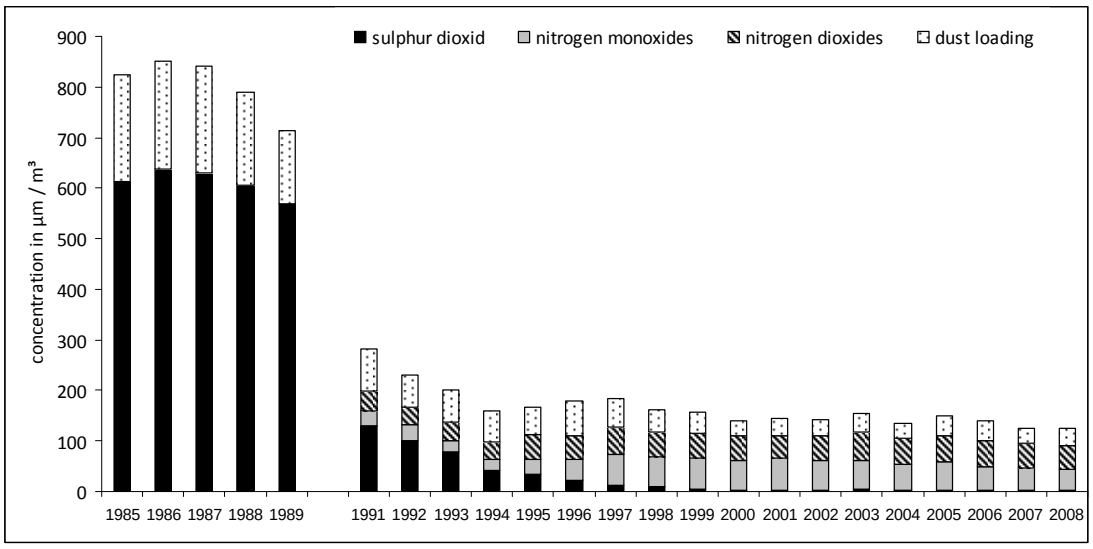
vereinbarungen, *Wächterhäuser*, see also section 2.3 of this report). The *Gestattungsvereinbarung* enables landlords to improve their brownfield areas and to make them accessible to the public for a certain time with financial support from the municipality. On the other hand, some of them should be renaturalized. In this vein urban parks have been created on the sites of former industrial and railway brownfields (Figure 3.6.1). A very recent initiative tests the acceptance of "urban forests" on vacant lots at different places in the city. This idea supports the goal of an improvement of open space services and the urban ecology according to the vision "more green, less density." As a result of all these initiatives, a dynamic system of new open spaces has emerged in Leipzig, which is steadily changing due to new supplies of and demands on urban land. Obviously, the population losses in the last few decades did not lead to a reduction of land consumption in a general manner but rather to a diverse pattern or mosaic of densities and perforation which demands site-specific actions.

Environmental quality

The quality of the environment in Leipzig and the surrounding region was appalling during the period of the GDR. Air pollution was severe due to the regional industries (especially the chemical and energy industries) and the Leipzig-Halle conurbation was one of the most badly polluted regions in Europe. The maximum air-pollution limits for almost all relevant chemicals were by far exceeded. Nowadays, this problem has almost completely disappeared: the level of pollution significantly decreased due to almost complete deindustrialisation (Figure 3.6.4; see also section 2.2 of this report). At the same time, the structure of environmental loads changed significantly: whereas today "classical" pollutants such as sulphur dioxides and particulates no longer cause severe problems, traffic-related pollutants such as benzene, soot, nitrogen oxide and ozone merit critical attention. This is also true for carbon dioxide, although emissions have decreased enormously since 1990 due to deindustrialisation and improvements in both the energy sector and transport technologies. This relates to the considerable increase ("explosion") in the motorisation rate in eastern Germany where car traffic more than doubled after 1989. At the same time, noise pollution caused by traffic has become a problem in the residential areas along and close to the main roads.

Leipzig's population benefited as a whole from the decreasing pollution rates. The new environmental burdens caused by traffic have led to new foci of pollution on a small scale: it is mainly people living along the main transport axes who suffer from these new atmospheric loadings. This has led to two consequences: due to the supply surplus in housing, many flats along the main roads are vacant and quasi un-lettable because of the traffic and noise pollution. If they are inhabited, then it is by low-income households or social benefit recipients who have only a limited choice of where to live.

Figure 3.6.4: Environmental pollution in the city of Leipzig 1985-2008



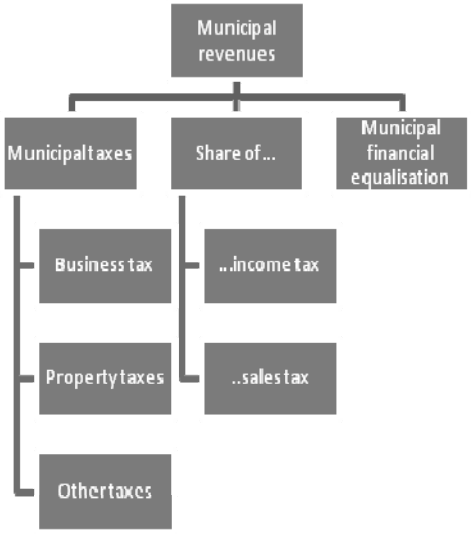
Source: UFZ database (measuring point: Leipzig city centre)

3.7 Municipal finances and budget

Municipal budgets

In Germany, the structure of municipal budgets is fairly formalized, so that opportunities and restrictions are pretty much the same for different cities in relation to shrinkage. In this system main revenues come from three sources (Figure 3.7.1):

Figure 3.7.1: Municipal revenues in Germany



Source: authors' work

Thereby the own revenues can mainly be generated from business taxes (whose structure was changed in favour of municipalities in the early 2000s) and property taxes. Other taxes (entertainment tax, dog tax, fees and concessions) play a minor role. A major part of municipal revenues stems from equalisation schemes that work in the context of the federal state. Thus municipalities receive a share of income and business taxes (which is set in relation to their taxing capacity) and they profit from both committed and uncommitted allocations of funds from upper levels of government (state and federal government), which is calculated by complex codes. Especially for economically weak municipalities these allocations make up for a lion's share of their budget. They are calculated on the basis of population Figures, student numbers, and equalised in relation to the taxing capacity of the particular federal state (*Bundesland*) and the centrality of the respective place.

From this short overview it follows that, although the system of financial equalisation is set effectively reducing the differences in revenues between economically strong and economically weak municipalities, population losses and deindustrialisation severely impact on the revenues of shrinking cities. Business taxes and property taxes, as the main sources of autonomous taxes, are highly sensitive to economic downturns and financial equalisation schemes are (to a large degree) based on population Figures and student numbers. Thus, cities that lose population and economic functions nearly unavoidably lose tax revenues too. This is especially problematic because East German cities are faced with a number of problems on the expenditure side of their budgets. Here, four aspects for the most part form interrelated burdens (Mäding, 2004, 88-89):

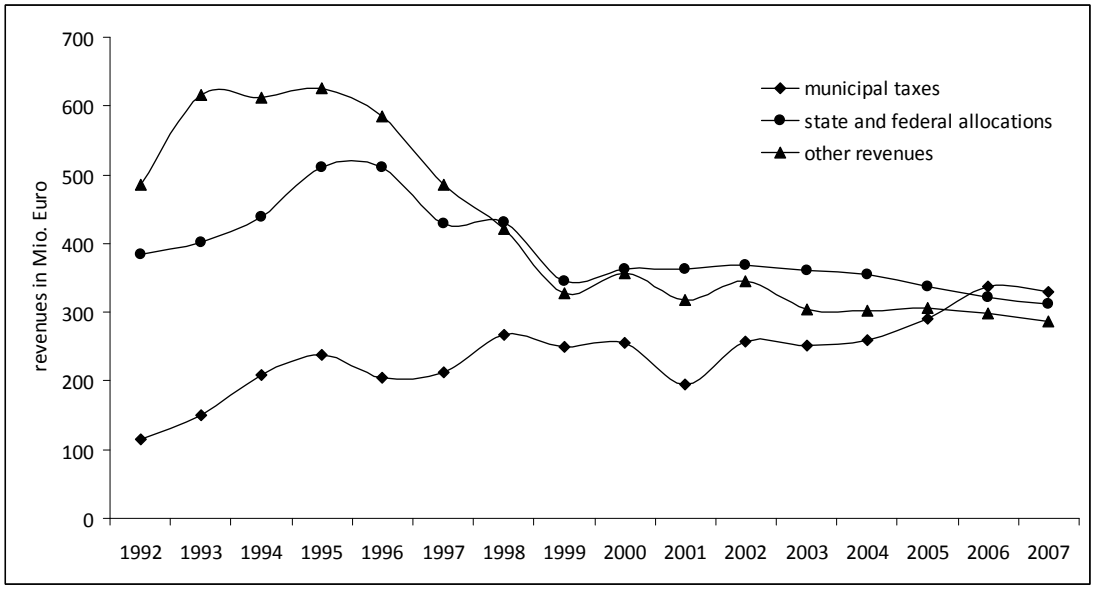
- persistence of expenditures in the event of a dwindling population,
- rising per capita spending owing to the effects of demographic structural changes (ageing, heterogenization, individualization);
- supplementary spending owing to the effects of internal migration (East-West, suburbanisation);
- additional spending in pursuit of an "excessive" attractiveness policy in "cut-throat" competition for residents.

In addition to these factors, municipalities have a legal obligation to provide several services (*kommunale Pflichtaufgaben*), like social welfare, that are required by law and make up the lion's share of expenditures. In this context, the last few years have been characterized by a continuous shifting of obligations for the provision of compulsory services from upper state levels towards municipalities. Most of all welfare benefits have had to be paid by municipalities since the welfare reforms (*Hartz IV*) in 2003. Thus, in addition to "shrinkage-specific" expenditures, municipalities with high unemployment figures are burdened with growing social spending too. Altogether, deindustrialization and population losses thus not only lead to problematic expenditure structures, but, on top of this, they lead to additional costs which the municipalities affected can hardly avoid.

Leipzig's municipal finances: Revenues and expenditures

This situation is nearly paradigmatically reflected in Leipzig's municipal budget all through the years since 1992 (Figure 3.7.2). No data on the budget is available for the time before 1991. The most striking characteristic of the budget in respect to the revenue-situation is that budget appropriations (by the federal government and the state of Saxony) from tax equalisation schemes form the most important source of revenue making up between a quarter and a third of the whole budget. Thereby fund allocation has considerably decreased, by about one third since the early 1990s. At the same time autonomous municipal revenues have increased considerably, both as a consequence of economic recovery and a change in tax laws concerning business taxes.

Figure 3.7.2: Revenues in Leipzig's administrative budget 1992-2007



Source: LCC 1990a-2009a, own calculation

In addition to continuous revenues, Leipzig has enormously profited from earmarked allocations of funds from upper state levels which, nearly every year since 1991, made up around 100 million Euro of Leipzig's spending and were used for the refurbishment of existing infrastructures as well as for large scale projects like construction of a new railway-tunnel, the rebuilding of the university campus, or the renovation of historic monuments. However, incoming revenues hardly matched necessary expenditures throughout the analyzed period. Here, the biggest single items are personnel costs and social welfare. Despite immense wage increases in the period from 1991 until now, the city has managed to reduce the expenses for personnel by one third. This has only been possible through a dramatic reduction of public service personnel, through reorganization of existing administrations, outsourcing, and service-cuts.

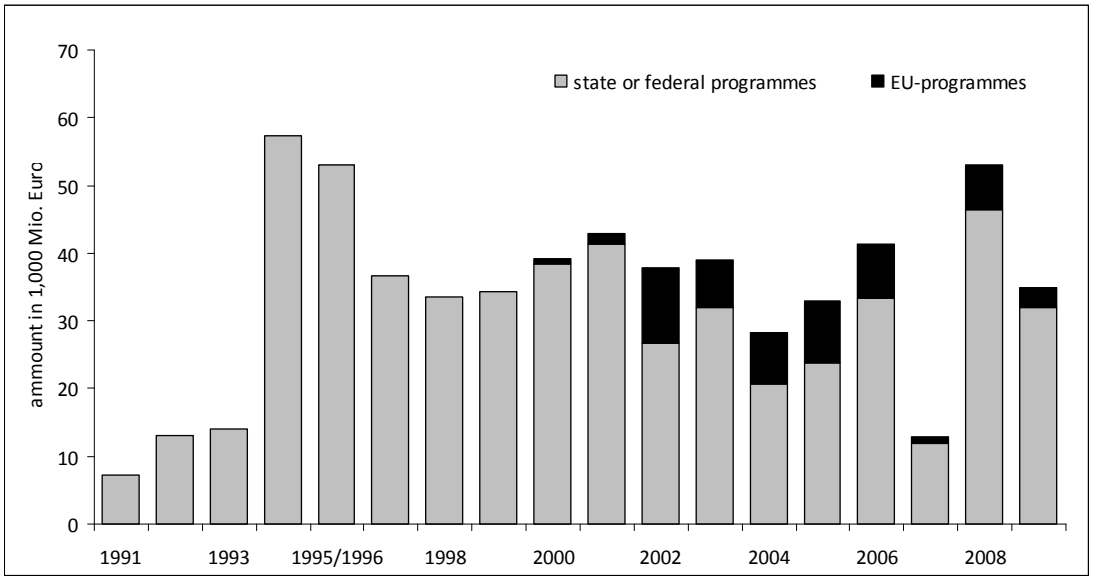
The expenditures for schools have nearly halved, as a consequence of decreasing student-numbers and school closures. Construction expenses have been reduced

extremely. Quite in contrast, expenditures for social welfare remain on a high level. They were particularly high in the early to mid 1990s when unemployment rates rocketed, and since the federal welfare reforms in 2003 when the obligations towards the unemployed were shifted from the federal state towards the municipalities. Altogether, municipal expenses have been considerably reduced from a peak of 1.9 billion Euro in 1995 to a recent level of 1.1 to 1.2 billion Euro. This has been made possible by service cuts, an adjustment of existing infrastructures, and personnel lay-offs. Leipzig is structurally dependent on support from upper state-levels, and regular transfers make up more than one third of the budget. Yet, neither the own tax income, nor the allocations from the federal state, are sufficient to close the gap between expenditures and revenues. As a consequence, Leipzig has had to downgrade public services, as well as take loans and engage in all sorts of bidding procedures and other financial activities (see below).

Utilisation of subsidies

Leipzig has been fairly active in all kinds of bidding procedures for public subsidies and has thus managed to make use of a plethora of programmes for its urban development issues. Figure 3.7.3 shows the usage of altogether 19 programmes from the EU, the federal state, and the state of Saxony that have been applied in the sector of urban development in Leipzig. Altogether the volume of these subsidies makes up about 609 million Euro in the period 1991 – 2009. Compared to the overall volume of spending for construction activities in the same period (3 billion), it is obvious that gaining earmarked subsidies in specific programmes has become "business as usual", without which crucial parts of Leipzig's development could not be financed.

Figure 3.7.3: Funds from programmes for urban development in Leipzig 1991-2009



Source: LCC 2009, authors' calculation

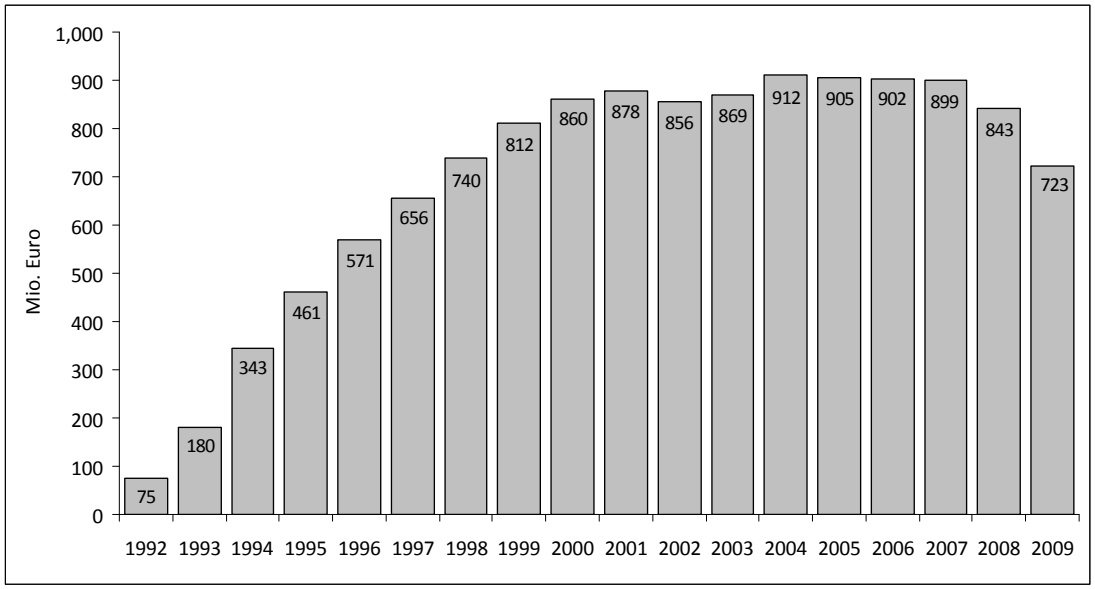
The difficulty with building on external subsidies is, however, twofold: a) as grants are earmarked and subject to complicated bureaucratic and political procedures,

agenda-setting power is shifted towards upper levels of statehood, b) many of the programmes require a co-financing by the municipality, so that, given the tight budget, gaining public subsidies goes hand in hand with additional expenses.

Borrowing and debts

As neither tax equalisation schemes, nor additional subsidies were sufficient to close the gap between revenues and expenditures, Leipzig started as early as 1992 to take loans, primarily for infrastructure projects (like the renovation of schools and hospitals, the construction of streets and bridges). At this time the necessity to go into debt was mainly justified by the immense backlog in nearly all sectors of public life and the need to catch up to the standard of western cities. Thus, until 1996, infrastructure projects were financed using a mix of public grants, own revenues, and municipal loans (Stadt Leipzig 2009, 3). Starting in 1997, this form of financing replaced allocations from the state of Saxony that had been earmarked for the financing of particular infrastructure.
Since that time loans have been primarily used for financing economic development projects, like the New Leipzig Trade Fair (Neue Messe), or the expansion of the airport. As a consequence, the debt load increased continuously between 1992 and 2004 (see Figure 3.7.4), Since the beginning of the millennium, partly as a result of demands from supervising regional agencies and the state of Saxony, Leipzig changed towards a course of strong fiscal austerity and managed to reduce its liabilities. As a result of both considerable municipal borrowing and decreasing population numbers per-capita debt has tremendously increased in the analyzed period. With a per-capita debt level of 1,648 Euro (2008) Leipzig lies at place 5 in the inter-municipal comparison of the twelve biggest German cities and is in the top range (ibid., 8).

Figure 3.7.4: Development of dept level 1992-2009



Source: UFZ database

With the aim of meeting liabilities and making leeway for necessary projects, Leipzig has not only continued to take loans but, moreover, municipal administrations and companies have used innovative, and often highly risky, financial instruments to acquire additional capital. Most of all, Cross Boarder Leasing agreements (CBL) have been used intensively and municipal infrastructure like hospitals, tram-lines, and water pipes have been sold to and leased back from global financial investors. It is only very recently, in the wake of the global financial crisis, that it has become clear that many of the existing contracts imply serious risks – mostly to the disadvantage of the participating municipality.

To summarize, the following conclusions can be made:

- Notwithstanding the system of financial equalisation and allocations of revenues, both autonomous taxes and funds received from upper levels of government are seriously affected by a population decline.

- At the same time expenditures remain on a high level. This is mainly due to an increase in social spending, as a consequence of the miserable economic situation and a number of additional tasks that are caused by shrinkage.

- Thus, a structural gap between falling revenues and high expenditures emerges. Although Leipzig decreased expenditures with the help of strong politics of budgetary discipline, cuts on all sorts of spending and a reorganization of the administration, municipal efforts have proved to be unable to close this gap.

- As a consequence, Leipzig is in strong need of acquiring external resources to finance its projects. Within this context mainly three sources have been used: a) borrowing, b) participation in subsidy programmes from state, federal and EU-levels, c) new financial instruments (CBL), often connected with high risks.

4 ANNEX: DATABASE

The following annex lists all data the Figures in the text are based on (UFZ database).

Figure 2.1.1: City of Leipzig – population development 1933-2008

Year	Inhabitants	Year	Inhabitants
1933	713,470	1979	563,225
1939	702,155	1980	562,480
1945	584,593	1981	562,266
1950	617,574	1982	557,923
1952	624,070	1983	558,994
1953	618,433	1984	555,764
1954	619,830	1985	553,660
1955	613,707	1986	550,641
1956	607,523	1987	549,230
1957	598,909	1988	545,307
1958	593,902	1989	530,010
1959	592,821	1990	511,079
1960	589,632	1991	503,191
1961	585,258	1992	496,647
1962	587,226	1993	490,851
1963	588,135	1994	481,121
1964	594,880	1995	471,409
1965	595,660	1996	457,173
1966	594,099	1997	446,491
1967	591,538	1998	437,101
1968	589,064	1999	489,532
1969	585,781	2000	493,208
1970	582,885	2001	493,052
1971	580,711	2002	494,795
1972	577,495	2003	497,531
1973	574,432	2004	498,491
1974	570,972	2005	502,651
1975	566,630	2006	506,578
1976	564,596	2007	510,512
1977	564,306	2008	515,469
1978	563,980	2009	n.a.

Sources: LCC 1991a-2009a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975).

Figure 2.1.2: City of Leipzig – natural population development and migration balance 1980-2008

Year	Natural balance	Migration balance	Year	Natural balance	Migration balance
1980	-1,293	548	1997	-2,551	-9,983
1981	-1,170	956	1998	-1,998	-7,556
1982	-969	-682	1999	-1,843	315
1983	-766	1,837	2000	-1,676	1,012
1984	-957	-2,272	2001	-1,609	1,453
1985	-1,021	-1,083	2002	-1,584	3,330
1986	-1,537	-1,482	2003	-1,547	4,292
1987	-831	-580	2004	-912	1,843
1988	-1,033	-2,890	2005	-1,218	5,353
1989	-1,107	-15,801	2006	-1,012	4,939
1990	-2,064	-16,403	2007	-664	4,592
1991	-3,745	-4,143	2008	-265	5,221
1992	-3,793	-2,751			
1993	-3,919	-2,484			
1994	-3,726	-6,005			
1995	-3,580	7,167			
1996	-3,025	-11,228			

Sources: LCC 1991a-2009a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975).

Figure 2.1.3: In- and out-migration 1990-2008 according to target region

Year	Germany	Western Germany	International	Suburbia	Total
1990	-6,270	n.a.	n.a.	n.a.	-17,016
1991	-5,564	-5,574	1,345	n.a.	-4,143
1992	-4,076	-2,427	1,305	-575	-2,751
1993	-4,685	-1,320	2,201	-1,121	-2,484
1994	-8,201	-555	2,196	-6,305	-6,005
1995	-11,323	-248	4,156	-9,365	-7,167
1996	-12,789	-505	1,561	-11,595	-11,228
1997	-10,585	388	683	-11,683	-9,983
1998	-7,345	-847	-211	-1,385	-7,556
1999	-1,531	-1,149	1,846	-2,727	315
2000	-415	-1,802	1,427	-1,777	1,012
2001	-139	-2,524	1,592	-422	1,453
2002	2,068	-1,830	1,262	151	3,330
2003	3,594	-273	698	125	4,292
2004	3,454	-444	-1,611	37	1,843
2005	4,403	-720	950	596	5,353
2006	4,835	-483	104	659	4,939
2007	3,780	-714	812	669	4,592
2008	4,494	-958	727	1,287	5,221

Sources: LCC 1991a-2009a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975).

Figure 2.1.4: In-migration 1990-2008 according to target region

Year	Germany	Western Germany	East Germany	International	Suburbia	total
1990	8,149	n.a.	n.a.	n.a.	n.a.	13,277
1991	9,146	3,550	5,596	1,950	n.a.	11,172
1992	7,932	3,730	3,086	2,707	1,116	10,659
1993	7,434	3,519	2,797	3,735	1,118	11,169
1994	8,540	3,916	2,778	4,557	1,846	13,097
1995	9,638	3,975	3,415	8,113	2,248	17,751
1996	11,351	4,115	4,101	7,293	3,135	18,644
1997	15,014	5,191	5,604	6,107	4,219	21,077
1998	15,350	4,453	5,962	4,151	4,935	19,501
1999	15,982	4,579	6,833	5,033	4,570	21,015
2000	16,521	4,676	7,384	4,319	4,461	20,840
2001	16,956	4,664	7,572	4,409	4,720	21,365
2002	18,090	4,903	8,317	4,552	4,870	22,642
2003	19,015	5,405	8,937	4,259	4,673	23,274
2004	19,253	5,492	9,234	4,053	4,527	23,306
2005	20,026	5,078	10,272	3,852	4,676	23,878
2006	20,126	5,236	10,531	3,843	4,359	23,969
2007	20,227	5,434	10,405	4,023	4,388	24,250
2008	21,412	5,523	10,731	4,228	5,158	25,640

Sources: LCC 1991a-2009a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975).

Figure 2.1.5: Out-migration 1990-2008 according to target region

Year	Germany	Western Germany	Eastern Germany	International	Suburbia	total
1990	14,419	n.a.	n.a.	n.a.	n.a.	29,680
1991	14,710	9,124	5,586	605	n.a.	15,315
1992	12,008	6,157	4,160	1,402	1,691	13,410
1993	12,119	4,839	5,041	1,534	2,239	13,653
1994	16,741	4,471	4,119	2,361	8,151	19,102
1995	20,961	4,223	5,125	3,957	11,613	24,918
1996	24,140	4,620	4,790	5,732	14,730	29,872
1997	25,599	4,803	4,894	5,424	15,902	31,060
1998	22,695	5,300	11,075	4,362	6,320	27,057
1999	17,513	5,728	4,488	3,187	7,297	20,700
2000	16,936	6,478	4,220	2,892	6,238	19,828
2001	17,095	7,188	4,765	2,817	5,142	19,912
2002	16,022	6,733	4,570	3,290	4,719	19,312
2003	15,421	5,678	5,195	3,561	4,548	18,982
2004	15,799	5,936	5,373	5,664	4,490	21,463
2005	15,623	5,798	5,745	2,902	4,080	18,525
2006	15,291	5,719	5,872	3,739	3,700	19,030
2007	16,447	6,148	6,580	3,211	3,719	19,658
2008	16,918	6,481	6,566	3,501	3,871	20,419

Sources: LCC 1991a-2009a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975).

Figure 2.1.6: In- and out-migration by age groups 1991-2008 (balance)

Year	<18 years	18<30 years	25-30 years	30-50 years	50-65 years	>65 years
1991	-1,871	-510	-395	-830	-469	-463
1992	-1,214	27	-16	-423	-559	-582
1993	-1,225	507	290	-377	-730	-659
1994	-2,335	391	-39	-2,109	-1,104	-848
1995	-2,903	382	24	-1,742	-1,701	-1,203
1996	-3,058	-131	-353	-4,355	-2,223	-1,461
1997	-2,650	1,137	-76	-4,479	-2,597	-1,313
1998	-1,849	1,004	86	-4,073	-1,830	-808
1999	-511	2,698	818	-1,073	-645	-154
2000	-400	2,833	632	-841	-502	-78
2001	-321	1,872	-452	-1,032	-277	59
2002	42	3,643	813	-630	-42	227
2003	83	4,016	1,002	-96	44	245
2004	-28	3,462	792	-953	-723	85
2005	-144	5,407	1,378	-59	-13	162
2006	29	4,979	1,328	-100	-122	154
2007	-170	4,599	893	-82	98	148
2008	-36	4,795	893	133	151	178

Sources: LCC 1991a-2009a; Stadt Leipzig, Amt für Statistik und Wahlen (2008): Zuwanderung nach Leipzig 2007.

Figure 2.1.7: Development of households, single and 3+ households 1971-2007

Year	Number of households	1-person-housholds (%)	3+ households (%)
1971	244,500	32.1	n.a.
1981	237,300	31.4	n.a.
1990	248,500	39.4	n.a.
1995	231,700	37.2	30.7
1998	227,900	38.9	25.9
2000	264,100	42.5	23.9
2007	307,900	53.3	15.2

Source: Mikrozensus, Stadt Leipzig: Statistische Jahrbücher 1991-2008.

Figure 2.1.8: Development of population, households and mean household size 1989-2008

Year	population	Households	Mean size
1989	530,010	248,502	2.1
1990	511,079	239,614	2.1
1991	503,191	268,100	1.9
1992	496,647	240,200	2.1
1993	490,851	243,500	2.1
1994	481,121	238,600	2.1
1995	471,409	231,700	2.1
1996	457,173	226,200	2.1
1997	446,491	224,700	2.0
1998	437,101	227,900	2.0
1999	489,532	253,800	2.0
2000	493,208	264,100	1.9
2001	493,052	272,100	1.9
2002	494,795	278,100	1.8
2003	497,531	278,500	1.8
2004	498,491	280,100	1.8
2005	502,651	290,100	1.7
2006	506,578	298,700	1.7
2007	510,512	307,900	1.7
2008	515,469	306,700	1.7

Sources: LCC 1991a-2008a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975); Mikrozensus, Stadt Leipzig: Statistische Jahrbücher 1991-2008.

Figure 2.1.9: Size distribution of households 1991-2008

			One-person households		2-person households		3-person-housholds		4+ person households	
Year	Total	Mean size	Total	Per cent	Total	Per cent	Total	Per cent	Total	Per cent
1991	268,100	1.9	94,700	35.32	92,200	34.39	47,700	17.79	33,500	12.50
1992	240,200	2.1	85,400	35.55	83,500	34.76	41,000	17.07	30,300	12.61
1993	243,500	2.1	89,700	36.84	84,000	34.50	40,400	16.59	24,000	9.86
1994	238,600	2.1	87,900	36.84	79,200	33.19	42,600	17.85	28,800	12.07
1995	231,700	2.1	86,200	37.20	74,400	32.11	40,900	17.65	30,200	13.03
1996	226,200	2.1	81,900	36.21	78,100	34.53	39,400	17.42	26,700	11.80
1997	224,700	2.0	83,500	37.16	78,800	35.07	37,700	16.78	24,700	10.99
1998	227,900	2.0	88,500	38.83	80,400	35.28	37,400	16.41	21,600	9.48
1999	253,800	2.0	99,900	39.36	88,300	34.79	44,000	17.34	21,600	8.51
2000	264,100	1.9	112,200	42.48	88,900	33.66	39,900	15.11	23,100	8.75
2001	272,100	1.9	122,700	45.09	90,300	33.19	36,700	13.49	22,400	8.23
2002	278,100	1.8	129,500	46.57	93,000	33.44	35,700	12.84	19,900	7.16
2003	278,500	1.8	129,400	46.46	91,600	32.89	36,800	13.21	20,700	7.43
2004	280,100	1.8	125,900	44.95	99,200	35.42	35,900	12.82	19,100	6.82
2005	290,100	1.7	142,400	49.09	97,500	33.61	33,500	11.55	14,000	4.83
2006	298,700	1.7	156,000	52.23	94,800	31.74	31,300	10.48	14,100	4.72
2007	307,900	1.7	164,100	53.30	97,700	31.73	30,000	9.74	14,100	4.58
2008	306,700	1.7	162,800	53.08	96,800	31.56	31,300	10.21	12,600	4.11

Source: Mikrozensus, Stadt Leipzig: Statistische Jahrbücher 1991-2008.

Figure 2.2.1: Development of employment according to sectors 1965-2007

Year	1st Sector	2nd Sector	3rd Sector
1965	1,334	167,084	147,460
1966	1,349	168,181	145,447
1967	1,311	166,444	148,820
1968	n.a.	n.a.	n.a.
1969	n.a.	n.a.	n.a.
1970	330	n.a.	n.a.
1971	373	161,389	156,602
1972	n.a.	137,703	146,784
1973	29	135,169	151,319
1974	479	133,390	154,198
1975	1,664	156,354	131,196
1978	1,295	156,196	132,406
1980	1,199	156,155	130,556
1981	1,245	155,953	134,818
1982	1,232	157,177	137,013
1983	1,218	157,985	137,523
1984	1,239	155,065	138,285
1985	1,221	155,113	138,945
1986	1,210	154,712	140,005
1987	1,222	151,939	140,766
1988	340	152,051	140,574
1989	329	148,496	137,040
1990	200	104,400	145,900
1991	2,500	101,100	148,300
1992	1,600	82,300	148,800
1993	725	72,396	184,886
1994	587	72,347	188,857
1995	1,200	69,000	193,300
1996	1,600	65,700	202,400
1997	1,700	62,300	202,100
1998	1,300	56,700	207,100
1999	1,400	53,200	208,600
2000	1,100	50,800	215,900
2001	1,200	49,100	218,300
2002	900	48,700	221,300
2003	900	49,000	224,100
2004	900	46,900	227,500
2005	800	45,100	229,600
2006	800	44,700	238,700
2007	900	45,500	242,000

Sources: LCC 1991a-2008a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975), own calculations.

Figure 2.2.2: Unemployment and job-creation schemes 1990-2008

Year	Unemployed	Long-term Unemployed	Job-creation scheme ABM	Job-creation shame SAP	Job-creation shame BfB	Job-creation shame early retirement
1990	23,371	n.a.	512	n.a.	n.a.	n.a.
1991	31,913	n.a.	25,435	n.a.	42,862	18,090
1992	30,936	n.a.	25,112	n.a.	38,699	33,442
1993	37,905	8,852	6,569	n.a.	15,544	37,730
1994	31,003	10,560	7,864	n.a.	14,458	29,728
1995	27,466	8,893	7,714	n.a.	8,742	15,519
1996	28,625	7,402	6,717	n.a.	10,015	6,060
1997	36,148	10,062	3,708	n.a.	5,545	593
1998	31,559	9,801	9,972	10,138	6,523	n.a.
1999	40,038	12,142	6,606	5,452	3,910	n.a.
2000	41,399	15,167	6,734	2,556	5,427	n.a.
2001	43,402	16,372	5,681	1,624	4,735	n.a.
2002	45,376	18,524	4,683	1,101	5,396	n.a.
2003	44,627	21,162	3,216	644	2,313	n.a.
2004	43,957	20,213	2,854	434	1,464	n.a.
2005	46,870	19,898	n.a.	n.a.	n.a.	n.a.
2006	42,273	20,025	n.a.	n.a.	n.a.	n.a.
2007	39,089	17,701	n.a.	n.a.	n.a.	n.a.
2008	36,808	15,865	n.a.	n.a.	n.a.	n.a.

Sources: LCC 1991a-2008a.

Figure 2.2.3: GDP per head in Leipzig and Germany 1991-2007

Year	GDP per head in Euro (Leipzig)	GDP per head in Euro (Germany)
1991	n.a.	19,186
1992	n.a.	20,431
1993	n.a.	20,872
1994	n.a.	21,871
1995	n.a.	22,636
1996	n.a.	22,909
1997	19,677	23,346
1998	19,740	23,960
1999	20,600	24,511
2000	21,156	25,095
2001	21,641	25,664
2002	22,222	25,984
2003	23,484	26,222
2004	23,751	26,798
2005	24,064	27,190
2006	25,506	28,229
2007	26,695	29,518

Sources: Statistisches Jahrbuch des Freistaats Sachsen, LCC 1991a-2008a.

Figure 2.3.1: Pathways of suburbanization around Leipzig 1996 and 2008

	Year	Germany	Western Germany	Eastern Germany	International	Suburbia
In-migration	1996	11,351	4,115	4,101	7,293	3,135
	2008	21,412	5,523	10,731	4,228	5,158
Out-migration	1996	24,140	4,620	4,790	5,732	14,730
	2008	16,918	6,481	6,566	3,501	3,871

Sources: LCC 1991a-2008a; Staatliche Zentralverwaltung für Statistik, Bezirksstelle Leipzig: Statistische Jahrbücher des Bezirks Leipzig (1970, 1973, 1975).

Figure 3.1.1: Residential mobility in Leipzig 1988-2007

Year	Intra-city relocations per 1,000 inhabitants
1988	15.8
1989	19.6
1990	n.a.
1995	83.3
1996	136.6
1997	150.2
1998	154.3
1999	143.1
2000	n.a.
2001	124.5
2002	118.7
2003	116.6
2004	115.1
2005	104.6
2006	103.6
2007	105.2

Sources: LCC 1991a-2008a; LCC 2001c-2008c.

Figure 3.1.2: Monthly net-rent in Leipzig according to date of construction 1994-2008

Year	Built until 1948	Built 1949-1989	Built since 1990
1994	6.29	6.80	8.03
1995	6.14	6.14	7.93
1996	5.70	5.88	7.34
1997	5.47	5.88	6.31
1998	4.76	5.47	5.98
1999	4.47	4.99	6.14
2000	4.45	4.60	5.88
2001	4.35	4.50	5.62
2002	4.50	4.50	5.35
2003	4.40	4.75	5.30
2004	4.60	4.60	5.60
2005	4.50	4.50	5.60
2006	4.60	4.75	5.60
2007	4.65	4.85	5.50
2008	n.a.	4.80	5.60

Data are given until 1999 in DM, afterwards in Euro.
Sources: LCC 1991a-2008a; LCC 2001c-2008c; LCC 2007e: 21.

Figure 3.1.4: Segregation indices for Leipzig 1992-2007

Year	Index of segregation - foreigners	Index of segregation - seniors	Index of segregation - unemployed
1992	23.81	12.93	n.a.
1995	20.56	10.77	n.a.
1996	21.31	8.83	6.41
1999	22.55	8.79	8.69
2001	23.62	10.53	11.80
2003	24.51	12.98	11.77
2005	25.39	15.22	13.97
2007	27.46	16.30	14.04

The data relate to the territory of the 48 districts Leipzig had until 1998. The enlargement of the city's territory due to an administrative reform in 1999 was not considered for this calculation
Source: Arndt 2008

Figure 3.3.1: Places in and attendants of kindergartens and schools in Leipzig 1989-2008

Year	Places in kindergartens	Registered children	Kindergartens absolute	Pupils	Schools absolute
1989	n.a.	34,319	412	58,77	140
1990	n.a.	31,954	394	55,734	138
1991	27,423	26,365	369	56,205	139
1992	25,289	23,747	330	61,168	157
1993	21,309	20,247	307	61,722	184
1994	17,541	17,241	284	61,151	183
1995	15,740	14,668	252	58,868	184
1996	12,858	11,707	216	57,373	184
1997	12,868	9,630	188	54,452	185
1998	12,239	9,592	184	56,245	197
1999	14,215	10,652	206	52,965	193
2000	14,039	11,490	200	49,550	178
2001	14,619	12,548	199	46,174	173
2002	14,814	13,224	194	40,819	162
2003	15,578	14,378	192	40,914	153
2004	16,187	14,921	194	39,353	152
2005	16,574	15,383	188	37,758	145
2006	17,278	15,448	192	36,481	143
2007	17,920	15,879	197	35,402	140
2008	18,305	16,537	202	35,028	143

Source: LCC 1991a-2008a.

Figure 3.3.2: Development of number of students in Leipzig 1989-2008

Year	Number of students
1989	11,762
1990	18,153
1991	18,885
1992	18,874
1993	22,054
1994	23,343
1995	24,774
1996	26,258
1997	28,204
1998	29,277
1999	30,415
2000	31,260
2001	32,950
2002	34,997
2003	37,092
2004	37,953
2005	38,469
2006	37,136
2007	36,469
2008	35,966

The numbers relate to the respective winter term, e.g. 2005 = winter term 2005/2006.
Sources: LCC 1991a-2008a; IGNIS database.

Figure 3.4.1 Leipzig's housing stock 1990-1994 according to ownership

Year	Housing units absolute	Private	Municipal	Cooperative
1990	257,928	64,482	128,964	64,482
1994	265,367	95,844	104,218	61,990
2004	316,358	202,469	56,944	56,944

Sources: LCC 1991a-2008a; LCC 2001c-2008c.

3.4.2 Leipzig's housing stock 1996-2007 according to data of construction

Year	1996	2003	2005	2007
Until 1918	13,914	15,758	15,252	15,901
1919 - 1948	13,851	17,315	17,471	16,836
1949 - 1990	8,794	10,923	10,953	10,957
Since 1991	1,889	9,980	11,332	11,896

Sources: LCC 1991a-2008a; LCC 2001c-2008c.

Figure 3.4.3: Housing units and living space per inhabitant 1971-2008

Year	Housing units total	Living space per inhabitant (m^2)
1971	216,551	23.1
1981	240,568	27.3
1990	257,928	31.8
1995	268,247	36.7
1998	282,186	41.4
2000	315,701	41.7
2008	314,402	40.7

Sources: LCC 1991a-2008a; LCC 2001c-2008c.

Figure 3.4.4: Housing units, new constructions and demolitions in Leipzig 1997-2007

Year	Housing units	New Constructions	Demolitions
1997	277,812	9,845	400
1998	282,186	6,031	238
1999	310,329	5,236	288
2000	315,701	4,079	253
2001	317,439	2,525	798
2002	316,763	984	1,687
2003	316,341	1,298	1,731
2004	316,358	1,112	1,128
2005	316,027	881	1,231
2006	314,973	1,016	2,080
2007	314,223	782	1,556

Source: LCC 2008c.

Figure 3.5.1: Water and waster water demand 1988-2008

Year	Water demand m³ per year	Wastewater m³ per hour
1988	87.27	94.44
1989	82.11	88.64
1990	74.23	80.22
1991	58.53	73.32
1992	56.88	51.34
1993	49.29	50.39
1994	46.41	50.41
1995	40.19	53.96
1996	24.15	42.10
1997	22.60	43.80
1998	20.98	42.50
1999	22.12	39.20
2000	22.93	41.80
2001	22.31	35.20
2002	21.52	35.20
2003	22.26	34.90
2004	21.83	35.00
2005	21.57	35.50
2006	21.92	35.30
2007	21.81	35.10
2008	n.a.	33.60

The water supply to the end user is given until 1995 in m³/year (calculation: supply divided through 365.5 days 1000; 1m³ = 1,000 litres). The amount of waste water was given until 1996 in m³/hour; calculation: 365.5 days*24hours = 8,772.
Source: LCC 1991a-2008a.

Figure 3.6.3: Brownfields in Leipzig 1999-2007

Year	Number of brownfields	Number of re-used brownfields	Share of re-used brownfields in per cent
1999	368	100	27.2
2000	378	119	31.5
2001	511	149	29.2
2002	545	181	33.2
2003	1,466	466	31.8
2004	1,833	648	35.4
2005	1,858	783	42.1
2006	2,149	820	38.2
2007	2,950	1,008	34.2

Source: LCC 1991a-2008a; IGNIS database.

Figure 3.6.4: Environmental pollution in the city of Leipzig 1985-2008

Year	Sulphur-dioxide* µg/m³	Nitrogen-monoxides µg/m³	Nitrogen-dioxides µg/m³	Respirable dust** loading µg/m³
1985	613.00	n.a.	n.a.	210.70
1986	638.00	n.a.	n.a.	213.20
1987	630.60	n.a.	n.a.	210.80
1988	606.80	n.a.	n.a.	182.70
1989	570.10	n.a.	n.a.	142.30
1990	n.a.	n.a.	n.a.	n.a.
1991	129.17	29.33	40.08	82.50
1992	101.67	30.50	33.58	65.00
1993	77.92	23.50	36.75	62.58
1994	42.44	20.55	35.27	60.64
1995	34.25	30.45	48.64	52.67
1996	23.25	39.58	47.75	68.27
1997	12.45	60.64	53.73	57.50
1998	9.27	58.25	49.42	44.67
1999	5.92	60.50	47.92	43.83
2000	3.00	58.27	48.00	29.40
2001	3.50	62.00	45.17	33.60
2002	3.67	56.75	49.50	32.40
2003	3.73	58.67	55.58	37.10
2004	2.98	50.75	50.75	31.40
2005	3.48	56.00	51.42	38.00
2006	3.10	45.00	53.18	37.34
2007	2.43	44.00	48.42	31.35
2008	2.30	43.00	46.00	34.00

The given values represent mean values per annum based on mean values per months; *1985-1989 the density of emission was given in tons/km² (see LCC 1991a: 141).**the measurement point was the city centre of Leipzig (main railway station). Until 1992 the pollution was calculated in mg/m³ (conversion factor 1mg = 1000 µg); **The values are given for respirable dust loadings with grain sizes <10 µm; from 1993-2001, they represent airborne particles without grain size limits; the measurement point was Leipzig city centre (main railway station).
Source: LCC 1991a-2008a

Figure 3.7.2 Revenues in Leipzig's administrative budget 1992-2007

Year	Municipal taxes in Mio. Euro	State and federal allocations in Mio. Euro	Other revenues in Mio. Euro
1992	114.6	383.9	484.8
1993	150.6	401.8	615.4
1994	207.8	439.1	611.9
1995	237.7	509.9	625.0
1996	203.8	509.9	584.7
1997	212.7	429.9	485.0
1998	268.0	430.2	421.6
1999	249.7	344.8	326.7
2000	255.7	362.3	356.5
2001	195.9	362.4	317.5
2002	257.0	369.0	345.9
2003	251.5	360.0	303.4
2004	258.6	354.7	302.0
2005	291.1	338.3	305.3
2006	336.6	321.3	298.7
2007	329.8	311.7	285.7

Source: LCC 1990a-2009a, own calculations.

Figure 3.7.3 Funds from programmes for urban development in Leipzig 1991-2009

Year	State or federal programmes in Mio. Euro	EU-programmes in Mio. Euro
1991	7,250	n.a.
1992	12,971	n.a.
1993	14,110	n.a.
1994	57,339	n.a.
1995/1996	52,982	n.a.
1997	36,605	n.a.
1998	33,484	n.a.
1999	34,240	n.a.
2000	38,373	875
2001	41,415	1,425
2002	26,726	11,172
2003	31,938	7,030
2004	20,607	7,569
2005	23,796	9,207
2006	33,270	8,064
2007	11,953	950
2008	46,434	6,530
2009	32,060	2,867

Source: LCC 2009, authors' calculations.

Figure 3.7.4 Development of debt level 1992-2009

Year	debt in Mio. Euro
1992	75
1993	180
1994	343
1995	461
1996	571
1997	656
1998	740
1999	812
2000	860
2001	878
2002	856
2003	869
2004	912
2005	905
2006	902
2007	899
2008	843
2009	723

Source: LCC 1990a-2009a

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