Suburban Crisis? Demand for Single Family Homes in the Face of Demographic Change

Stefan Fina, Simone Planinsek und Philipp Zakrzewski

English abstract

In the former Western German states, a third of the single- or two-family houses – 22 percent of all dwellings – was built in the years from 1949 to 1978. Considering the lifecycle of this housing stock and current socio-demographic trends, the viability of affected neighbourhoods looks uncertain. Demographic processes like aging and population decline are well underway, albeit with some spatial variance. On top of the reduced demand for single homes caused by these processes, societal changes are also leading to new lifestyles that affect housing choice. Household structures are adapting to more diverse ways of living in today's society. The corresponding housing preferences have triggered an increased demand for urban living space, with a tendency towards concentrations around Germany's economic hotspots.

Neighbourhoods in regions of unfavourable demographic and economic conditions are facing these risks with particular significance. At the same time, problematic stocks area also present in certain sub-areas or municipalities of generally successful regions. On a local scale, there will be communities that benefit from these developments and others that will be negatively affected. On the regional and national scale, we expect islands of growth within shrinking regions, and vice versa. It is foreseeable that not only economically disadvantaged, but also above average performers will have to deal with difficult market conditions for an ever increasing vacant housing stock. Adverse settings like unsuitable locations, deficiencies in the structure, or excessive energy consumption of buildings, as well as the negative perception of a neighbourhood can add up to a compound of problems for an area. The worst case scenario would be a downward spiral of vacancies and abandonment, devaluation, deterioration and decline of an area – development paths that have so far been unheard of in the context of the single family home sector in Germany.

Our contribution starts off by conceptualizing the research matter: the social, demographic and economic root causes of the developments described above and the foreseeable consequences. For this purpose, we analyze the building and dwellings databases of the Federal Statistics Offices, and provide an overview over the magnitude and geographical extent of potentially affected housing stocks. An analysis of the present national housing stock provides the starting point for indicator-based modeling of risk areas on the municipal level in selected states. Finally, we raise the question on how to address these issues and conclude with some deliberations about possible strategies for urban renewal in peripheral single family home areas.

Demographic change, housing stock, suburban development, single-family homes, real estate oversupply

Zusammenfassung

Suburbia in der Krise?

Auswirkungen des soziodemografischen Wandels auf die Einfamilienhausbestände

In den alten Bundesländern ist jedes dritte Wohngebäude ein zwischen 1949 und 1978 errichtetes Einfamilienhaus – in diesem Gebäudebestand befinden sich 22 Prozent der Wohnungen Westdeutschlands. Die Einfamilienhäuser dieser Epoche werden zukünftig verstärkt von soziodemografischen Veränderungsprozessen betroffen sein, denn hier steht derzeit bzw. in den kommenden Jahren ein Generationenwechsel bevor. Allgemein vollzieht sich eine teilräumlich unterschiedlich ausgeprägte Schrumpfung und Alterung der Bevölkerung, infolgedessen sich das demographisch bedingte Potenzial für die Einfamilienhausnachfrage in den nächsten Jahren verringern wird. Zudem führt der gesellschaftliche Wandel zu qualitativen Veränderungen der Nachfrage. Die allgemeine Pluralisierung von Lebensmodellen und Wohnwünschen äußert sich in veränderten Haushaltsstrukturen sowie in der räumlichen Verschiebung der Wohnungsnachfrage zugunsten stärker verdichteter Räume, so dass urbane Wohnformen zunehmend an Bedeutung gewinnen.

Besonders gefährdet sind Wohngebiete in Regionen mit ungünstigen demografischen und wirtschaftlichen Rahmenbedingungen. Aber auch in prosperierenden Regionen kann es Teilräume oder einzelne Gemeinden mit problematischen Beständen geben. Bezogen auf einen lokalen Betrachtungsmaßstab bedeutet dies, dass sich unter den bestehenden Wohnquartieren eines Ortes Gewinner und Verlierer herausbilden werden, in regionaler und überregionaler Perspektive ist mit Wachstumsinseln in Schrumpfungsregionen zu rechnen und vice versa. Es ist daher absehbar, dass nicht nur in Regionen mit ökonomischen Problemen sondern auch in wirtschaftlich erfolgreichen Bundesländern eine steigende Anzahl von Kommunen mit Vermarktungsschwierigkeiten im Eigenheimbestand zu kämpfen haben wird. Nachteile wie ungünstige Lageeigenschaften, bauliche oder energetische Mängel sowie Imageprobleme können sich zu gewaltigen Problemkomplexen potenzieren. Im ungünstigsten Fall drohen Leerstand, Wertverlust, Vernachlässigung und Verfall – Entwicklungen, die im Einfamilienhaussektor in Deutschland bisher weitgehend unbekannt sind.

Der Beitrag thematisiert die demografischen und sozioökonomischen Ursachen dieser Entwicklung sowie die sich daraus ergebenden absehbaren Konsequenzen. Auf Basis der Gebäude- und Wohnungszählung von 1987 wird ein Überblick über den Umfang und die geographische Lage der potenziell gefährdeten Bestände gegeben. Dazu wird eine kreisscharfe Bestandsanalyse auf Bundesebene sowie eine daraus resultierende gemeindescharfe Modellierung in den ausgewählten Bundesländern vorgenommen. Zuletzt werden Fragen zum Umgang mit dieser Problematik aufgeworfen und erste Überlegungen zu den Möglichkeiten des Stadtumbaus in peripheren Einfamilienhausgebieten aufgezeigt.

demografischer Wandel, Wohnungsbestand, suburbane Wohnquartiere, Einfamilienhäuser, Angebotsüberhänge

Introduction

In former West Germany, a third of the housing stock consists of single-family homes (SFHs) built between 1949 and 1978, amounting to 22 percent of all dwellings. Today, considering the life-cycle of these buildings and current socio-demographic trends, their viability looks uncertain. As the population ages and birth rates decline, demand for SFHs wanes as well. In addition, different life-style choices among the newer generations are leading them to prefer different types of housing.

Suburban and rural areas, which present unfavourable economic conditions compounding the effects of these socio-demographic trends, may bear the brunt of this wave of obsolete housing. Even in generally successful regions, there exist pockets that will suffer disproportionately from these trends. Indeed, some areas are characterised by a dichotomy of growth and shrinkage, sometimes in close vicinity. On the local scale, some communities will benefit from these developments even while others are negatively affected. Therefore, not only economically disadvantaged regions, but also those with high growth rates like the state of Baden-Württemberg, should expect to adjust to the decline in demand for SFHs and a rise in vacancy rates.

SFHs are generally privately owned and owner-occupied, which limits the ability of national and local policymakers, as well as the real estate market, to address the problem. In addition to processes of deflation and devaluation of vacant buildings, the effects could extend to infrastructure service provisions in these areas. As these areas already possess relatively low building and population densities, the efficiency of these systems will be further reduced with depopulation. In some municipalities, demand for housing is currently still high. However, building activities to meet that demand will only add to the long-term oversupply caused by changing demographics. Although the general trends are well known, short-term planning and economic interests tend to obscure awareness of their effects on the local level, which will be damaging from a variety of perspectives, including ecological, economic, social and urban development.

In sum, the key objective of this study is to comprehensively assess the risks and challenges that post-war[1] SFHs areas will face in the coming decade, and to open the discussion of how to deal with these issues. We discuss strategies of revitalisation, conversion, or demolition – not only for the housing stock in question but also for the urban areas they occupy.

Background

The analysis of urban development in general and changes to the building stock in particular is an important aspect for the understanding of future housing market and housing policy challenges. In this context, the built environment can be seen as a form of "materialised memory", inherited from previous societies. Due to the persistence of urban structures, we are obliged to manage the existing urban fabric even if parts of these structures and buildings are not suitable for current needs. For example, 20th century urban growth has been unprecedented in speed, scale and scope, leading to massive suburbanization in the light of seemingly inexhaustible fossil fuels and unlimited automobility. Tomorrow's society inherits the task to adapt the resulting urban structures to different circumstances. Not only rising energy prices and the need to reduce emissions indicate that restructuring will be inevitable: changes to the social, demographic and economic environment will play a role as well. Some researchers argue that the development towards a "knowledge economy" will strengthen the development of core cities and city regions (cf. Bürkner 2007; Häussermann, Läpple u. Siebel 2008; Siedentop 2008). If these predictions hold true, many suburban locations and peripheral regions are likely to be affected negatively.

Looking at the wider historic background it can be said that postwar urban development in West Germany was subject to many different influences at the time when the houses were built. In the years following World War II, reconstruction and reduction of housing shortages was given top priority (Harlander 1999, p. 235 et sqq.). During that phase, small housing estates (in German "Kleinsiedlung") characterised by tiny houses were often complemented by small animal stables and a kitchen garden for self-sufficient food production (ibid., p. 261 et sqq.). Later, growing affluence and social advancement led to changes in housing requirements, and eventually became manifest in an enormous expansion of single family housing areas during the 1960s and 70s.

There are various factors that influenced the trend towards living in suburban single family homes (SFHs). It remains uncertain whether or not the American dream of owning a house and driving a car had a major impact. What we know for sure is that clerical-conservative circles have been committed to the idea that homeownership of broad levels of the population was the best remedy to resist communist seduction. In this context, the promotion of homeownership has been an important pillar of West German housing policy from the very start (ibid. 1999, p. 264; 274). Apart from the aspects of cold-war politics, social trends like the wish for privacy and owning a house as a symbol of success gained importance as well.

In addition, great influence on urban development can be attributed to the liberal and democratic social system. A comparison between East and West German urban development prior to the reunification clearly demonstrates the impact of free market factors on the extent of suburbanization. The liberty to choose the place of residence, in combination with the strong autonomy of municipalities in terms of land use planning, results in competition between cities and territorial authorities for inhabitants. In contrast, only selected cities and towns of the GDR were being developed, according to the national (economic) planning policy. High-density housing estates formed a new edge of the still compact cities. The remaining towns and villages had been excluded from any considerable urban development. Apart from high-density developments in West German core cities, urban growth of this period was characterised by low density housing estates as well, spreading throughout the country, from the biggest city to the most remote village. As a result of increasing land consumption for housing, industry and infrastructure, many of the more prosperous regions gradually turned into sprawling urban agglomerations (cf. Sieverts 1998). Alonso revealed the inherent logic of urban housing markets in 1964 when he described the choice of residential location as a means of optimising cost-

[1] In the context of this paper, the term "post-war period" refers to the years 1949 to 1978.

benefit-balance. He assumed that people generally seek to live in central locations but have to balance their desired standard of housing against the costs of land and transport. Due to a convex land price curve with the highest land prices near the city centre, residential land use tends to shift from the core to the fringe or even more remote locations (Maier u. Tödtling 2006, p. 129 et sqq.).

In summary it can be said that the processes described above clearly correspond with the so called "cyclical urbanisation model" which classifies four distinct stages of urban development: urbanisation, suburbanisation, deurbanisation, and reurbanisation (van den Berg et al. as cited in Maier u. Tödtling 2006, p. 159 et sqq.; Siedentop 2008). The phase of suburbanisation is characterised by a decrease of inner city population, and at the same time population growth in first tier suburbs. The single family housing areas of the 1960s and 1970s represent the major constituent of post-war West German suburbanisation. During the 1980s and 90s suburbanization reached its peak and started to decrease. The following phase of desurbanisation saw a continued loss of attractiveness for both inner cities and suburban areas. Population growth in this period took mainly place in remote locations, partly outside the city regions. More recently, signs of an incipient transition towards reurbanisation have been recognized, suggesting that the stage of desurbanisation is phasing out (Siedentop 2008). If the reurbanisation trend is going to last – although comprehensive evidence is not available at present – many suburban single family housing areas are likely to experience additional negative impacts on population numbers and attractiveness in general, some may face accelerated decline.

It is clear that this model cannot be simply applied to the general urban development in Germany. Instead, it needs to be explored in the context of a spatial differentiation of the problem dimensions and current challenges.

For example, there is ample evidence that demographic change will affect all sectors of German society in the coming decades. In particular, the population of former East Germany is aging and declining at such a high rate that vacancies in the housing sector have already become a serious issue. In response, the national government has launched a 2.5 billion Euro programme to restructure urban forms (in German: "Stadtumbau Ost") that is set to run from 2002 to 2009 (Bundestransferstelle Stadtumbau Ost 2009). It is designed to stabilize the housing market through building demolition and urban renewal (Häussermann et al. 2008, p. 206).

During the period of the German Democratic Republic (GDR), private residential development was strictly limited. As a result, today's housing oversupply there predominantly concerns rental housing. In Western Germany, on the other hand, the SFH housing stock is largely privately owned. Further, much of this region is still feeling the effects of the population influx from former East Germany and from abroad, as well as the higher birth-rates among immigrant populations. Despite this general population growth, socio-demographic change is still causing housing oversupply in some Western German regions (BMVBS/BBR 2008b). Consequently, from 2002 to 2007, the German federal government initiated a 30 million Euro Western counterpart to its Eastern urban renewal scheme (in German "Stadtumbau West") as a pilot project (Bundestransferstelle Stadtumbau West 2009).

The following data illustrates the factors that will cause this increasing oversupply of low-rise housing. Assuming that first-time home buyers are usually aged between 25 und 45 (Palotz 2004, p. 25), those who bought their houses during the 1950s, 1960s and 1970s belong to the birth cohorts 1905-1935, 1915-1945, and 1925-1955. Assuming further that owner-occupiers stay in their SFH until the age of 85, periods of ownership change are due to take place between 1990-2020 for buildings constructed during the 1950s, between 2000-2030 for houses built during the 1960s, and between 2010-2040 for SFHs from the 1970s.

Part of the group of homebuyers mentioned above was born during the baby boom of the Nazi-era. The high number of births that followed between 1955-1970 is labelled the „demographic echo" of this baby boom. After 1970, the number of births dropped dramatically, on the one hand because of the smaller size of the following parent generation, on the other hand due to decreasing birth rates. As a result of the trend towards one-child families and childlessness, the fertility of the population of West Germany dropped far below replacement level. Regarding the reuse of 1950s-1970s SFHs, much of the housing demand generated by the post war baby boomers has already been met by new SFH construction during the 1980s-1990s. Hence, potential buyers of second hand property will mainly belong to the following post baby boom generation.

This generation is not only characterised by its relatively small size, but also by an increasing socio-cultural differentiation, expressed by a larger variety of living arrangements and family forms. The decline of the nuclear family and the corresponding growth of single person, single parent and dink ("double-income-no-kids") households have reduced the attractiveness of SFHs compared with urban dwellings (Häussermann 2007). It can therefore be expected that the amount of second hand SFHs will far exceed the number of potential buyers in the near future.

Nevertheless, single-family housing oversupply is not expected to appear all over the country. Instead, prosperous regions will continue to experience housing shortages for the foreseeable future. There is a risk that certain single family housing areas will turn into segregated neighbourhoods for the poor and underprivileged. Structurally weak areas are also more likely to suffer from a drop in demand. These include old industrial or disadvantaged rural regions, which are already seriously affected by out-migration and an aging population (BMVBS/BBR 2008b). Particularly buildings in "unfavourable" residential locations or neighbourhoods with image problems are at risk of vacancies, especially if they are poorly insulated and of low quality construction. Among other things, unfavourable locations are characterised by poor public transport connections, as well as a lack of job opportunities and community facilities (Hesse u. Scheiner 2007). Disadvantages of old homes may include cramped space as well as costly and time consuming garden maintenance. In combination, these factors can cause a resale problem and a downward spiral of underutilization, vacancies and decline.

The viability of affected neighbourhoods depends on strategies to upgrade the second hand housing stock for the requirements of a new generation, including all aspects of a changing real estate market. These strategies will have to aim at a comprehensive consolidation of resi-

dential properties, including the demolition of SFHs where necessary. Otherwise entire areas run the risk of abandonment, deterioration and devaluation. Previously, urban renewal focused on densely populated urban settings. In the future, it will also take place in suburban and rural areas. Ownership patterns in these areas pose a particular problem. As a result, a large number of private homeowners will have to collaborate to find viable solutions (Karsten et al. 2007).

A review of the relevant literature reveals how controversial the implications of socio-demographic change for the single family housing stock continue to be. Recent housing market outlooks present conflicting forecasts of medium term SFH demand in Germany. On one hand, the authors of the study "Economy and Housing in Germany" (in German "Wirtschaft und Wohnen in Deutschland") conclude that continuous household growth will result in high demand for SFHs throughout Germany until 2020. In this view, the SFH market would not become saturated until at least 2020 (Simons et al. 2005).

On the other hand, a real estate outlook for 2020 published by the Federal Office for Building and Spatial Planning (in German „Wohnungsprognose 2020") expects decreased demand for SFH from 2010 onwards, due to demographic change (Bundesamt für Bauwesen und Raumordnung 2006). A regional survey on "Housing Supply Reactions to Changes in Housing Demand in North Rhine-Westphalia until 2025" (in German "Veränderung der Wohnungsnachfrage und Reaktion des Wohnungsangebots in Nordrhein-Westfalen bis 2025") reveals that the supply of SFHs for resale will exceed total SFH demand by the year 2013 (which includes that for both new and resale homes). According to these figures, theoretically there would be no need to built new SFHs in NRW[2] after 2013 (Möller 2006). However, recent variations in real estate prices indicate that the level of demand varies between regions, and that these differences will become more pronounced in the future.

A range of journal articles provide a more general social sciences perspective. They focus on the effects of social change, as well as new family and living arrangements, on SFH neighbourhoods. One author points out that families might prefer urban to suburban or rural living because of advantages like centrality, a wider variety of services and facilities, increased mobility with public transport, and the resulting efficiency gains. This is especially important for single parents and families where both parents work (Häussermann 2007).

According to other authors, automobile dependency will become a major disadvantage of suburban and rural SFH areas in the future (Hesse u. Scheiner 2007). With the population aging, this phenomenon will be exacerbated. With old age, residents will suffer from reduced mobility and be less able to live in peripheral areas. Though advances in health and transportation are expected to extend the driving fitness of people to an older age in the future, the problems associated with aging (loss of vision, limited mobility, decreasing social networking) will merely be postponed. In sum, suburban and rural life will eventually present marked inconveniences, in particular when access to services is restricted to automobiles (Oeltze u. Bracher 2006). Other disadvantages are road traffic related air pollution and traffic noise – issues that used to be exclusively inner city problems.

A third type of relevant literature is comprised of recent case studies of the aging SFH districts in several Western German cities. These focus on socio-demographic dynamics for different types of dwellings and residential areas, analysed for the various stages in the neighbourhoods' lifecycle (Temple 2005; Feifel 2007). They also present some strategies designed to deal with SFH areas facing an uncertain future. We will elaborate on the applicability of these findings later on in this article, particularly in light of the results of the empirical analysis.

Methodology

The key objective of the chosen methodology was to identify risk areas for the aging SFH housing stock. The concept of the study is based on two different scales of observation: the counties of all former Western German states and the municipalities of four selected Western German states (Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate and Baden-Württemberg). The aim of this approach is to identify scale-dependant characteristics. It is also the method best suited to the data available: comparative data on SFH building age exists for the 328 former Western German counties. A complete set of disaggregated statistics on housing, demography and land use can be obtained for about 4.800 municipalities in the four selected states. Housing data, however, only contained building age for all buildings, but not specific data differentiating between single-family and other housing forms.

First, at the "big picture" scale, the study uses the county data to show the spatial variation of the post-war SFHs, and the underlying structural conditions ('county type') as defined by the Federal Office for Building and Spatial Planning. The resulting maps will be discussed in the "Empirical Results" section. In the second step, a detailed analysis of municipality data uses a multi-criteria approach to provide a comprehensive risk assessment[3]. The criteria are built around the three topics: "housing", "demography", and "land use." They represent the problem dimensions described in the "Background" section: the aging housing stock ('housing') in the context of demographic change ('demography') and the adverse effects of a suburban setting ('land use').

Table 1 shows the measures that were used to quantify these problem areas. Reading from left to right, the first column shows the 'topics' that potentially influence an areas configuration in terms of the problem description. From these, relevant indicators have been extracted (please see table 3 for more details on relevance). The corresponding implementation for database calculation can be seen in column three. For the statistics on building age (post-war building stock) the year 1987 in column four represents the time when this particular database was established through surveys, all other years refer to the year for which the data is valid.

Building, population, and land use data were obtained from the Federal Statistics Offices. The accessibility indicator was calculated using GIS, based on average driving times for the national and regional street network to the near-

[2] Nearly a quarter of the West German housing stock is located in North Rhine-Westphalia, Germany's most densely populated state.

[3] The risk assessment described in this section was adopted from the methods developed by Berke et.al (2003, pp. 188).

Indicator development for risk assessment

Topic	Indicators	Operationalisation	Year
Housing	Structure of the building stock	Percentage of post-war single home building stock (of today's buildings)	1987, 2004
	Household size proxy (pop / dwelling stock)	Number of people per dwelling	2004
		Change in household size proxy	1996-2004
Demo-graphy	Population	Population change	1996-2004
	Age structure	Percentage of people over 65	2004
	Migration	Balance of migrants aged 25-50, as a percentage of total population	2004
Land use	Density	Urban density	2004
		Change in urban density	1996-2004
	Centrality	Distance (driving time) to nearest high order central place (over 100 000 people only	2007

Tab. 1: Indicator development for risk assessment
Source: own design

est 'High Order Central Place'. This is a term used to categorise urban areas for planning purposes. These places are defined in the regional development plans of state governments. The street network was sourced from the Federal Office of Geodesy and Cartography.

Due to the vast differences in area, municipality statistics were aggregated to a uniform grid of cells (5 x 5 km) using area-weighted transformation routines in a GIS. For further analysis, the resulting set of cells was classified into 'urban core', 'densely urbanised', and 'rural' areas according to the high level spatial classification of the Federal Office for Building and Spatial Planning. This distinction was necessary to differentiate between the levels of urbanisation in the subsequent risk assessment. Here, all indicator values were compared to the average of their class (for example: urban density compared to the average urban density of all cells in the 'urban core' class). An indicator was considered to add to the risk when its value was above the average (land use and population variables) or below zero (migration balance). A higher weighting (5 x) was applied to the key variables 'share of post-war buildings' and 'share of SFHs', since they are the focal points of this analysis. As a result, each cell received an accumulated risk value, ranging from 0 to 20.

The visualisation of these values uses three classes: high risk (values 15 and above), medium risk (values 10 to 15), and low risk (lower than 10). An additional distinction was made for the post-war building periods (1949-1957, 1958-1968, 1969-1978) to allow for a more detailed timing assessment for the calculated risk. The results of this analysis will be discussed in detail later on.

Empirical results

Table 2 gives an overview of the total number of post-war buildings that will potentially be affected by the problems described in the "Background" section. For each of the former Western German states it shows the number of buildings in 2005 (column 2), the number of SFHs for the construction periods 1949-1957, 1958-1968, and 1969-1978 (columns 3, 4, 5), their sum (column 6) and the proportion of post-war SFHs of today's total building stock (column 7). In terms of former Western Germany's total, the significance of post-war buildings and SFHs is obvious: of 14.8 million buildings, 9.3 million are SFHs. A further breakdown by building age shows that from these, 36 % were built in the post-war period from 1949 to 1978. Although the level of construction activities differs across the states, the general trend is that construction of SFHs intensified in the years after 1957.

The city-state of Berlin shows a striking difference. There, the post-war SFHs comprise a significantly lower proportion of today's building stock (see column 'share of total'). This is certainly an effect of the unique development constraints Berlin experienced in that time.

Figure 1 (left) is a map showing the spatial variation of post-war SFHs for the former Western German counties. In order to put the distribution into context, the corresponding map on the right of figure 1 allows for comparison with the (highest level) county classification of the Federal Office for Building and Spatial Planning. Although the SFH is not a

Building statistics for former Western German states 1949-1978

State	Number of buildings [thousands]					Share of total [%]
	Total 2005	Single family homes				
		1949-1957	1958-1968	1969-1978	1949-1978	
Baden-Württemberg	2 262	187	307	289	783	35
Bavaria	2 834	223	401	410	1 034	36
Berlin	307	6	15	15	37	12
Bremen	132	14	18	12	44	33
Hamburg	233	26	33	15	74	32
Hesse	1 295	112	198	187	497	38
Lower Saxony	2 031	182	348	317	848	42
North Rhine-Westphalia	3 585	334	485	426	1 244	35
Rhineland-Palatinate	1 097	86	150	134	370	34
Saarland	295	42	45	33	120	41
Schleswig-Holstein	724	63	107	102	272	38
Germany (West)	**14 795**	**1 276**	**2 107**	**1 939**	**5 323**	**36**

Tab. 2: Building statistics for former Western German states (in thousands)
Source: State Office of Statistics Baden Württemberg, on behalf of the Federal Statistics Offices of the former Western German states

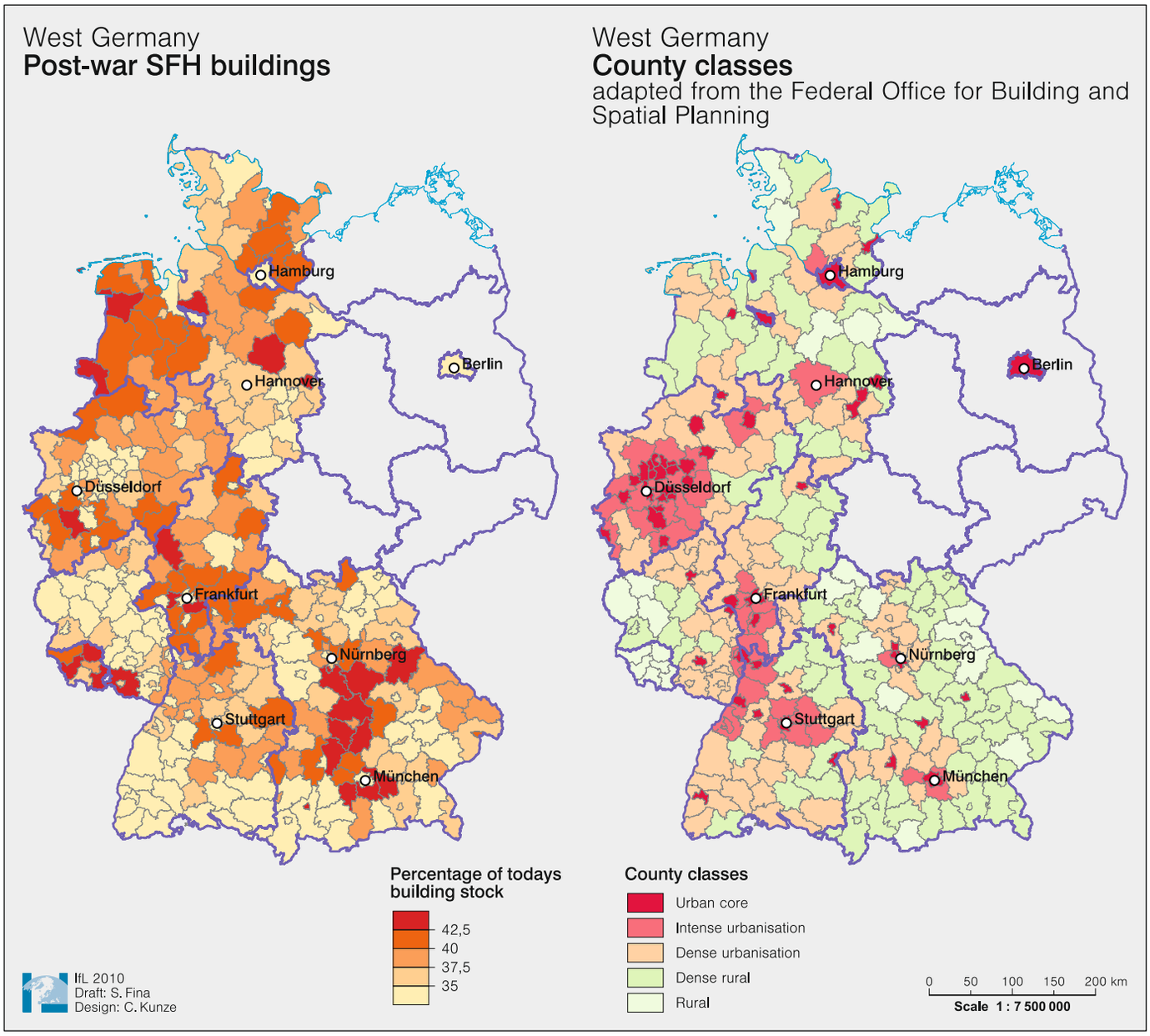


Fig. 1: Left: Post-war SFH buildings (% of today's building stock); Right: County classes adapted from the Federal Office for Building and Spatial Planning

Data source: State Office of Statistics Baden Württemberg, on behalf of the Federal Statistics Offices of the former Western German states (SFH data), Federal Office of Cartography and Geodesy Frankfurt (counties), Federal Office for Building and Spatial Planning (county classification system)

housing form known for high occupancy rates, the highest shares (40 % and above) can predominantly be found in counties described as densely and intensively urbanised, with the notable exception of some denser rural areas in central Bavaria and north-western Lower Saxony. Urban cores, however, have distinctively low shares of SFHs of the post-war years, which is due to the land constraints in urban settings, where more efficient housing forms dominate.

This initial result can be interpreted as an effect of the SFHs being the stereotypical housing form of suburban development, which has mostly taken place in the vicinity of highly urbanised developments. However, the result must also be seen in the context of the aggregation level on the county scale, where the co-existence of suburban and highly urbanised housing forms produces comparatively high average densities. The exceptions of central Bavaria and north-western Lower Saxony show that SFHs of the post-war era can also be found in rural counties. In essence, the results indicate that a more disaggregated view of the interaction between urbanisation levels and building age is required.

As explained in the "Background"-section, this interaction is built around the topics of housing, demography, and land use for the municipalities of four selected states (Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, Baden-Württemberg). The map in figure 2 illustrates the added value of the disaggregated view with one representative for each 'topic' (please refer to table 3 for the full list): on the left hand side, the map shows the same data as figure 1 (left, share of post-war buildings), this time for municipalities. Although this data does not contain the split between SFH and other housing forms, the map clearly shows the high proportion of post-war buildings in the suburban surrounds of the large agglomerations (Rhine-Ruhr area, around Stuttgart) on the one hand,

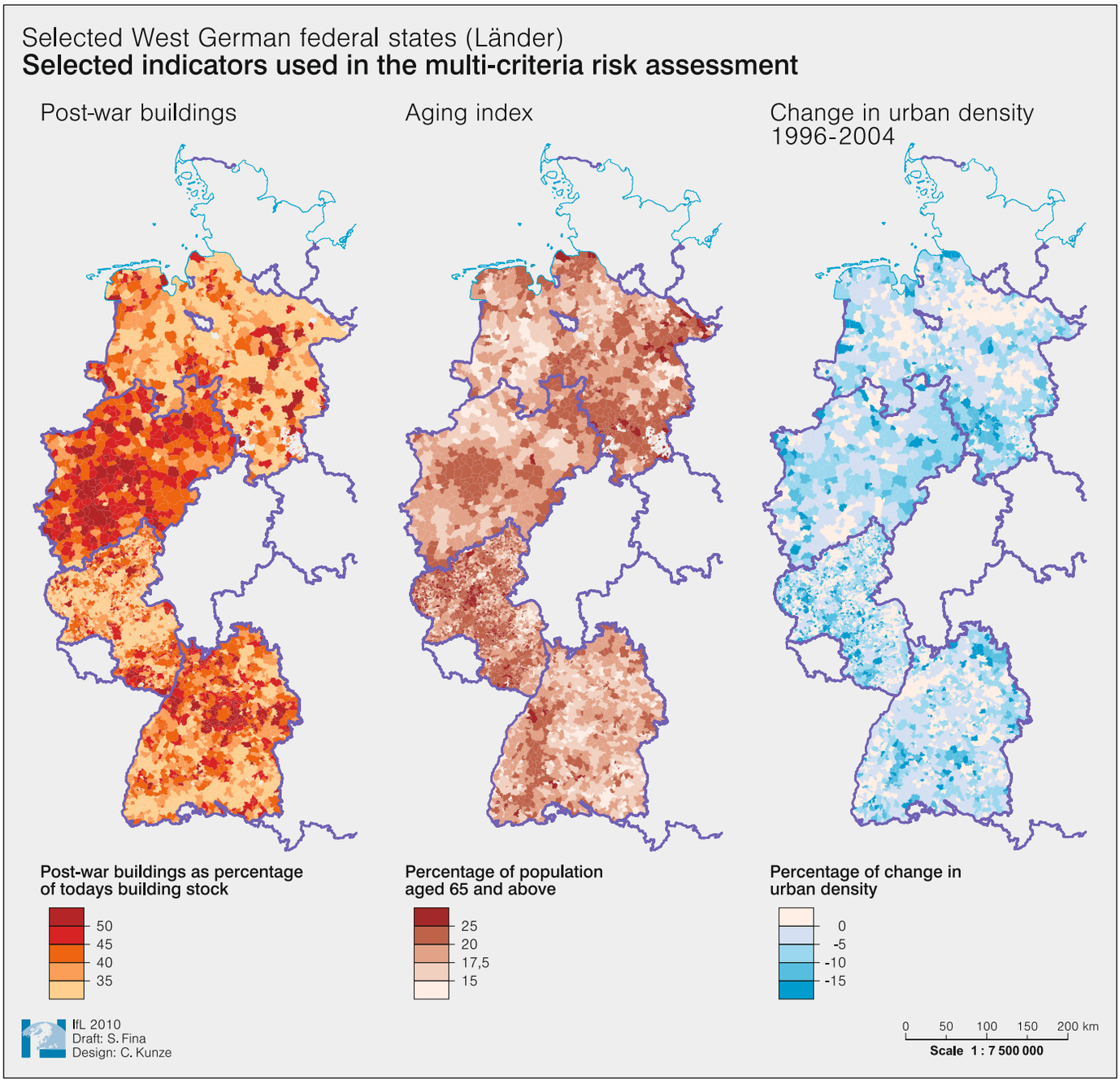


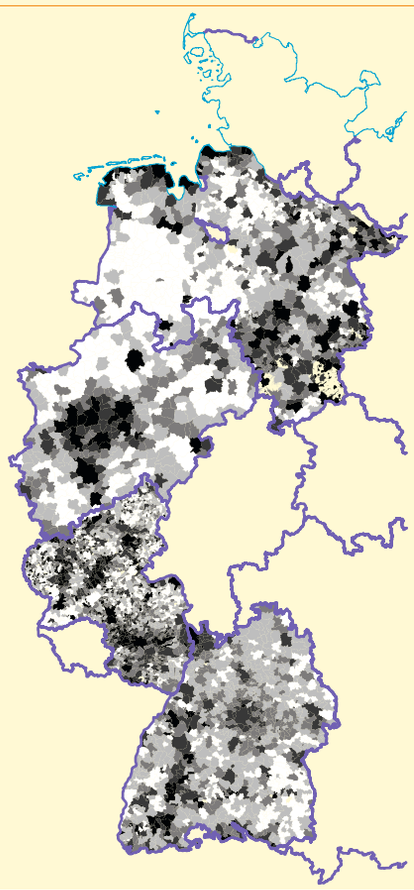
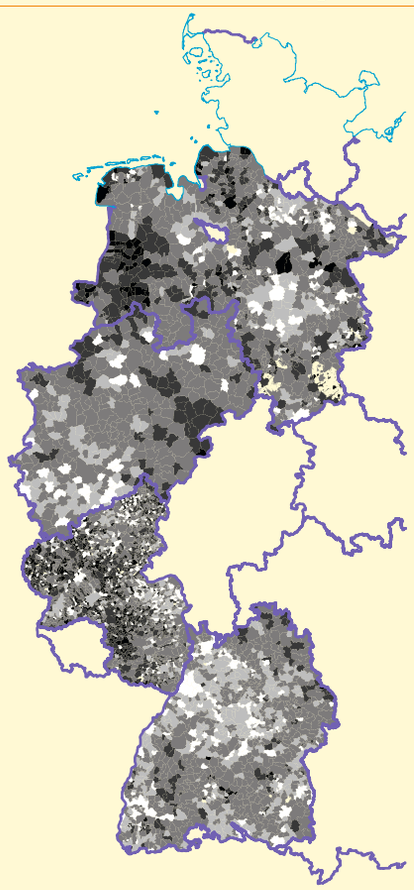
Fig. 2: Selected indicators used in the multi-criteria risk assessment
Data source: State Office of Statistics Baden Württemberg, on behalf of the Federal Statistics Offices of the former Western German states (Post-war buildings), Statistik lokal 2008 CD (statistics data on population, population age and land use, published by the Federal Statistics Office), Federal Office of Cartography and Geodesy Frankfurt (municipalities)

and in rare but distinct concentrations of some remote areas on the other.

This distribution is the starting point for the argument that suburban areas around agglomerations and similar developments around small cities in the periphery face a comparatively high risk of the potential problems caused by demographic change. In order to substantiate the term 'potential' in this context, representative criteria for demography and land use are shown in figure 2 as additional risk factors. The map in the centre shows the distribution of the aging index which is a good indicator for the progress of demographic change on the local level. Generally it can be said that in municipalities with a higher proportion of people aged 65 and above the rate of vacancies in the SFH housing stock is more likely to become problematic in the future (see central map in figure 2). This is particularly the case in southern Lower Saxony, also in the northeast of Lower Saxony, in the old industrial centres of North Rhine-Westphalia, throughout Rhineland-Palatinate and in remote parts of Baden-Württemberg (Black Forest).

Figure 2 (right) maps out the decline in urban densities, an indicator that shows where demographic change has progressed to levels that causes densities to drop. Another reason influencing the dynamics could be that new low density residential areas have been developed, resulting in lower average densities. The effect is the same, and visible throughout the mapped states: black and the different shades of grey mark decline (negative values), i.e. in 2004 fewer people were using public services and technical infrastructure than in 1996. This effect can be interpreted as a risk for the viability of the affected areas – following the logic that urban services in general depend on

Summary of indicator results (= inputs for risk assessment)

Measure / Relevance	Map overview
Share of post-war SFHs *See text*	*See figure 2 left*
Number of people per dwelling (as a proxy for household size) Higher values indicate more efficient resource use, but also more options in terms of ownership transfer of the dwelling to the next generation. The values are low (black and dark grey) in and around the urban centres, but also in areas that are affected by depopulation *(see below).* 2,50 2,30 2,15 2,00	
Change in number of people per dwelling Shows the dynamics of the measure above. Declining values indicate that people are moving out of an area, or that demographic change has progressed to a level where population decreases. Black and the different shades of grey indicate decline in the graphic. -2,5 -5 -10 -15 IfL 2010 Draft: S. Fina Design: C. Kunze	

Tab. 3: Summary of indicator results (= inputs for risk assessment)
Data source: State Office of Statistics Baden Württemberg, on behalf of the Federal Statistics Offices of the former Western German states (Post-war buildings), Statistik lokal 2008 CD (statistics data on population, population age and land use, published by the Federal Statistics Office), Federal Office of Cartography and Geodesy Frankfurt (municipalities, street network for accessibility calculations), Federal Office for Building and Spatial Planning (central place hierarchy)

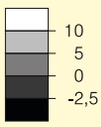
funding from taxes, which in turn relies on a stable density of economically active people. Table 3 summarises the results for the remaining indicators that have been extracted for input into the risk assessment. The graphic overviews of the maps are designed to show higher risk areas in darker shades of grey. It also elaborates on the relevance of each measure in terms of 'risk'.

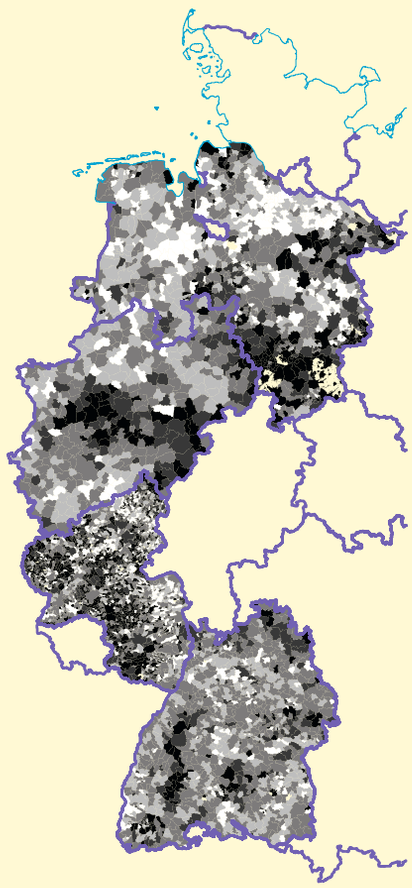
Figure 3 shows the results of the risk assessment for each of the three post-war periods. Since the method required homogeneous spatial units, the map layout uses shades of orange and red for 5x5 km cells of the selected states. Red illustrates areas where the risk factors added to 15 points or above (out of 20), orange shows where the risk lay between 10 and 15 points. The only risk factor that changes for the time periods shown is the share of post-war SFHs, representing a distinct ten year period. All other variables are constant for this assessment. A number of risk areas can be identified for all three periods, namely in south-central Baden-Württemberg, in southern Rhineland-Palatinate, to a lesser degree in northern Rhineland-Palatinate, north of Düsseldorf, and in the central area of Lower Saxony bordering North Rhine-Westphalia. The northern parts of Lower Saxony show more risk areas for buildings constructed in the 1948-1957 period, the north-eastern part also for buildings constructed during 1969-1978. In contrast, Rhineland-Palatinate is generally more affected for buildings constructed in the period 1958-1968, indicating that suburbanisation processes were comparatively high in this time.

In sum, the multi-criteria evaluation implemented here has proved to be suitable to highlight and identify risk areas for the future attractiveness of suburban neighbourhoods characterised by SFHs of the post-war era. Although the method successfully shows high-risk probabilities for some areas, it is certainly not suitable to claim that the same problems could not arise elsewhere.

Population change

Basic measure for the population dynamics in an area. Some areas are still gaining people (light grey), whereas losses of 2.5% and more (black) are visible for example in the old industrial areas of North Rhine-Westphalia, in southern Lower Saxony, and in rural Baden-Württemberg (Black Forest).



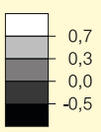


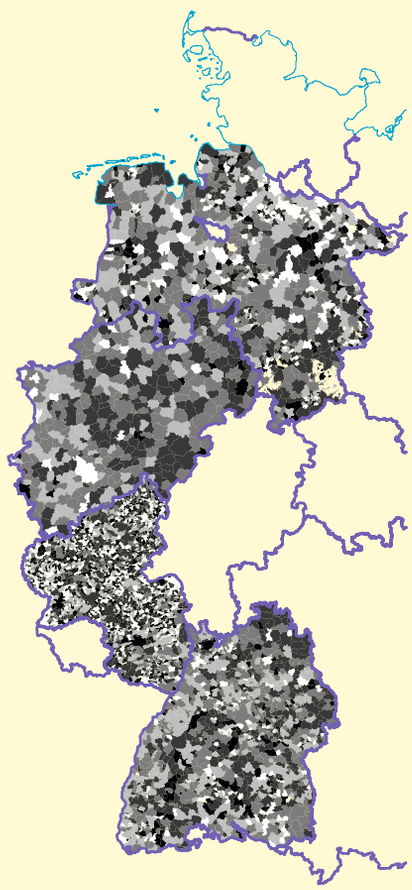
Percentage of people over 65 *See text*

See figure 2 centre

Balance of migrants aged 25-50, as a percentage of total population

People moving in and out of an area in the age bracket of potential buyers for vacant SFHs. Darker shades of grey reflect the imbalance – outmigration is greater than the number of new arrivals for people of this age group.





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Potential strategies

The main challenge in strategy development is the communcition of theories and results from empirical research into the planning practice of local government. Usually, indicators like the aging of the residential population, population density and land use are not monitored comprehensively in small municipalities. The focus is on new residential developments, and planners in local government are not fully aware of the problems demographic change holds in store for the future. It is therefore timely and prudent that local authorities redefine their role in this context. Planners need to take on a leadership role and proactively get involved with new planning policies that address the realities of demographic change. The policies need to be coordinated with long-term sustainable development objectives, and strategic opportunities to plan for an aging population need to be seized upon as and when they occur – whether for new communities or existing ones (Department for Communities and Local Government 2007).

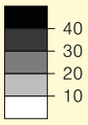
While innovative, but radical solutions like mobile homes have been suggested as a means to satisfy short-term demand and prevent long term oversupply, they are not realistic on a wider scale, at least not in the German context. To prevent new developments, planners should encourage higher population and building densities in the current building stock. However, a detailed analysis of the existing situation is a challenge for municipalities, and the actual densities are not known.

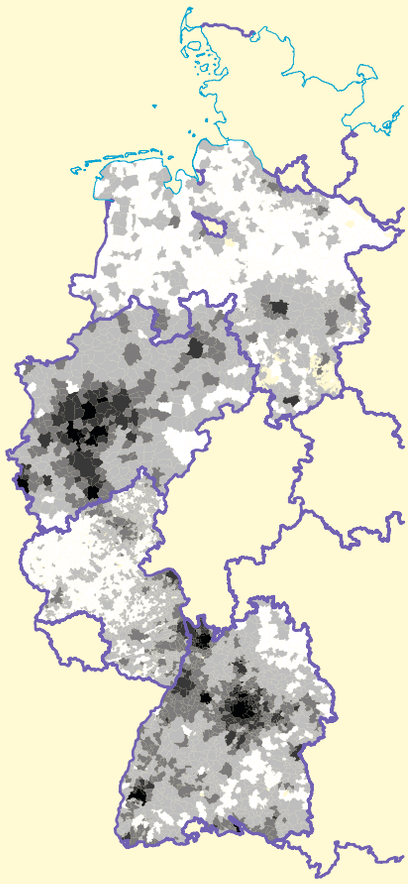
"Empty nesters"[4] and widows often stay in their oversized homes, causing a decline in the average household size (Clark u. Deurloo 2006). This is also known as the "remanence effect" in the German literature, where over-aging and low density of residents correlate (e.g. Spiegel 2007). In consequence, living space per capita, as well as operating expenses per capita, increases accordingly. The most effective solution from a planning perspective would be to create new living space within existing buildings. However, ownership structures and social aspects ("you cannot shift an old tree without it dying") are significant barriers (Gräf 2007).

[4] Parents whose children have moved out of the family home.

Urban density

Urban density is critical for the viability of certain public services and infrastructure (public transport, schools, etc.). The graphic shows that densities are highest around the main agglomerations (Rhine-Ruhr, Stuttgart, Mannheim, Hannover).



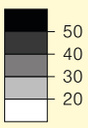


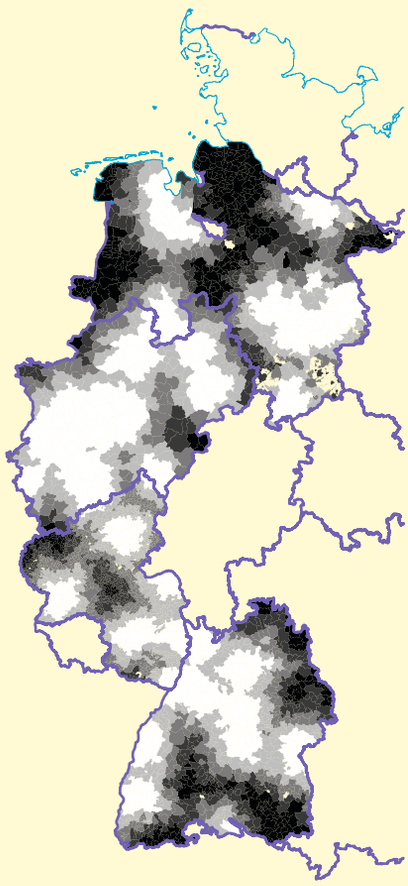
Change in urban density *See text*

See figure 2 right

Distance (driving time) to nearest high order central place (over 100 000 people only)

Areas further away from the locations of central services (population and economic hubs with corresponding services) are considered to face a higher risk.





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In several European countries, legal regulations to prevent long-term oversupply, over-aging and over-consumption are currently being discussed and are, to some degree, about to be implemented. The general aim is to limit new greenfield developments, and to favour inner-city developments over developments at the urban fringe. For example, the UK government's "brownfield" target has been met eight years ahead of schedule. It states that 60 per cent of new developments are to be built on previously developed land and through the conversion of existing buildings (Environment Agency UK 2003). Although this is a good example of legal intervention, long-term policies that aim at the sustainable renewal of affected areas will also have to look at financial incentives for home owners and local government.

From a theoretical point of view, there are three basic options to deal with aging SFH areas at risk of decline: revitalisation, conversion and demolition. All measures aiming at the continuity of residential use fall in the category of revitalisation. Quality improvement strategies that target specific groups become increasingly important, since the living requirements of different household types vary widely (BMVBS/BBR 2008a). Even the needs of families and young couples – being the traditional first-time home buyers – have changed siginificantly since the period when the houses were built. Tiny rooms and cramped layouts, for example, are characteristic of small houses from the 1950s, but don't meet today's standards.

As mentioned earlier, the share of family types that typically lives in SFHs is decreasing considerably. The only way to maintain residential use in neighbourhoods at risk of vacancies is to attract a wider range of household types to reside within these areas. However, the lifestyles and needs of „new" target-groups like the elderly, students or singles differ from those of the original residents. On the one hand, it is crucial to adapt homes and neighbourhoods to meet the needs of an aging population (Feifel 2007; Temple 2005). The population of the SFH areas examined is already overaged and the share of old and very old people living there will continue to grow. On the other hand, it can be fairly complicated to adapt these homes to the needs of aged or disabled persons, since most houses are two storey buildings. Furthermore,

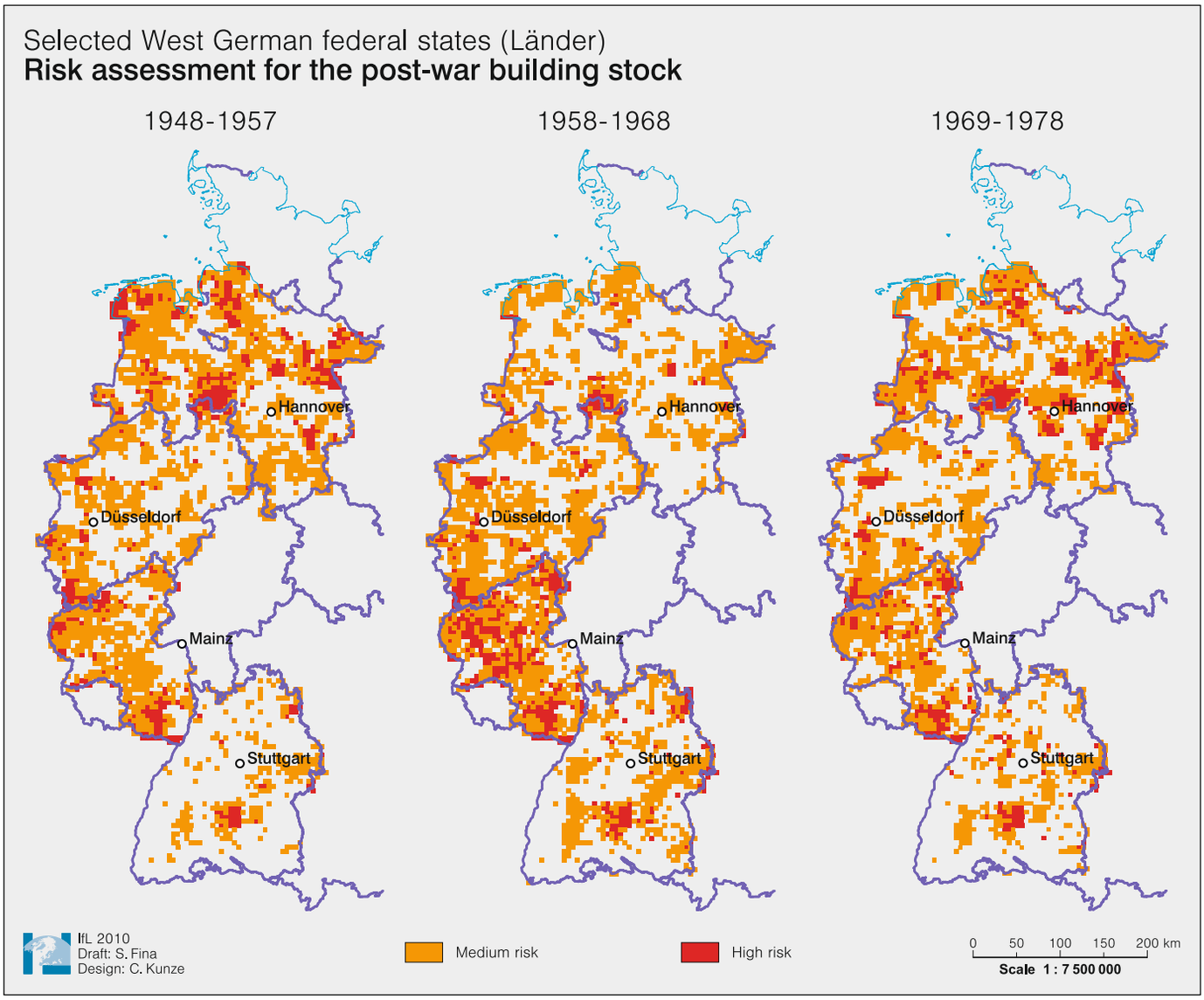

Fig. 3: Risk assessment for the post-war building stock
Data source: derived from data sources described in the main text

"lifetime neighbourhoods" must provide accessible local amenities such as the built environment, infrastructure, public transport, services and shared social space (Department for Communities and Local Government 2007).

Faller (2001) suggests an alternative option, where new housing for the elderly within residential areas is developed. These new buildings are designed to attract elderly home-owners to move from their SFH into locally assisted living facilities. Living space designed especially for older people could also be a role model for rural areas. However, the value of the social network needs to be respected in this context, by providing people with optimal care within a familiar environment. Especially if there are no nursing homes available within the residential neighbourhood, an assisted living community could be a good alternative.

Another possibility would be that medium-income households, which were previously not able to buy a house, move into the neighbourhood. Due to housing oversupply and the resulting drop of property prices, members of this group, often with a migrational background, can easily get onto the "property ladder" (BMVBS/BBR; Temple). Alternatively, the municipality could buy these homes and convert them into social housing. At this stage, property owners unable to find a buyer will be required to put their houses onto the rental market (BMVBS/BBR).

The next possibility would be to find a high-earner willing to buy a run-down SFH in order to redecorate it according to his or her individual liking (Feifel). In this case it would be ideal if the relevant housing estate was centrally located, and renovation was not hindered by housing design regulations. Irrespective of the improvment strategy one chooses – the prevalent reconstruction backlog requires investment in the housing stock in almost every case. Most of the affected SFHs are unlikely to match the potential needs of future residents without reconfiguration. This could range from simple bathroom extensions to the amalgamation or splitting of houses. Whether the floor layout is going to be changed or not – a comprehensive energetic modernisation will be essential. Prior to the 1973 oil price shock, building energy-efficient houses was fairly unusual[5]. According to present-day standards, most of

[5] The Thermal Insulation Ordinance (in German „Wärmeschutzverordnung") which became effective on November 1st 1977 established energy saving building regulations for the first time in Western Germany.

the 1950s-1970s buildings are therefore characterised by insufficient thermal insulation.

Nevertheless, in many cases it will not suffice to simply improve the buildings. Neighbourhood-related issues such as neglected public space or a lack of infrastructure, amenities and services have to be adressed as well. If these disadvantages can be overcome, there is a good chance that image problems or stigmas related to the neighbourhood will change. Ideally, a homogeneous SFH district that is exposed to the risk of decline would be transformed into a diverse and lively residential area where low- and high-income, long-time residents and new arrivals, families and singles, old and young people live together.

In contrast, when the lack of demand indicates that the original residential use of several buildings cannot be sustained, there are two remaining options: firstly, former residential buildings could be converted for other purposes such as shops, cafes, surgeries, nursing services or community centres, essentially turning the neighbourhood into a mixed use quarter. Another upgrade strategy would be to open up empty houses or abandoned property for students, artists or subcultural projects in order to bring a younger population and new lifestyles into neighbourhoods at risk of decline. In the past, affordable work- and living space was frequently found in inner city locations. But today, most of the central districts have been modernised, gentrified and thus became too expensive and unalluring for subcultural movements. Suitable suburbs may be the alternatives that pioneers searching for new niches are looking for, giving the former monofunctional residential area a new image and gradually attract other groups and businesses to relocate (cf. Friedrichs 2000). Although this may be among the more complex options to implement, it is the one that offers the best chances of being effective. Unfortunately, on this route, planners and developers will have to overcome obstacles such as an unfavourable location, resistance of the residents, or a municipality not willing or not able to support this kind of innovative strategy.

Secondly, the systematic depopulation and demolition of the SFHs is the last alternative to prevent an endangered neighbourhood from dereliction (Adam et al. 2006). Even though such a strategy would be very unpopular (and extremely difficult to implement), there are additional positive effects associated with it. For instance, if other areas of a community are at a comparable risk of vacancies, the demolition of dwellings in peripheral locations would certainly help to stabilise population levels in the centre. In order to stimulate these processes, the local authoriy would have to supply additional assisted living facilities and establish internal relocation services for the elderly. Once the last SFH has been demolished – though this might take a long time – the site is ready for renaturation or, if required, redevelopment.

Conclusions

Demographic change is going to cause fundamental changes in the way we live in and plan our residential areas in the future. The top-down study methodology clearly demonstrated that the problem is national, but has very specific aspects on the local scale. Conflicting interests on the local level are often not visible on the regional or national scale since they balance each other out. It is therefore important to monitor the situation within municipalities and settlements. Although the dimensions of the problem are generally undisputed, some local decision makers persist in ignoring the potential (and in some places the present reality) of oversupply of residential buildings, and its effect on the real estate market. The political motivation to enter into a competition for migrating young families, and to promote the image of a young, dynamic, and thriving community is often in stark contrast to the realities of overaging and decline. Although there are some areas that will manage to maintain the economic and social balance in the future, most areas will have to rethink the way they manage their housing stock. In order to improve the understanding of the situation, the empirical results presented here have shown where the problems occur.

The performance of the residential property market is a reliable indicator for the attractiveness of locations and regions. However, it might already be too late for counteractive measures once house prices begin to fall and resale difficulties become common. At this point the question arises as to whether action should be taken at all, or whether the private housing market should be left to the devices of the free market.

The deductive approach presented here is based on the identification and assessment of risk areas for the aging SFH housing stock. There are several reasons to develop planned, proactive arrangements in the best interest of the public, and to avoid a failure of the housing market. The slow death of suburban or rural SFH areas is particularly problematic for municipalities, as population decline implies a loss of tax revenue. Furthermore, the efficient use of public infrastructure will be undermined, and the public perception of the affected communities' image will be damaged. Additionally, it would go against the public interest, if on the one hand the existing housing stock is facing increasing vacancies, and on the other hand new residential buildings are being constructed elsewhere at the same time. Balancing supply and demand will therefore become a major housing policy challenge.

This paper highlights some potential strategies to deal with these issues. The authors are aware of the limitations associated with applying these strategies within the complex ownership structures of private residential developments. Apart from additional research that is currently underway with a number of projects[6], the goal of this study is to make the problems more prominent on the agenda of homeowners, decision-makers, but also of the general public. The task to develop adequate solutions is not just the exclusive domain of experts – it is also a right and duty of civil society.

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Dipl.-Geogr. Stefan Fina
Dipl.-Ing. (FH) Philipp Zakrzewski M.Sc.
Universität Stuttgart
Institut für Raumordnung und Entwicklungsplanung (ireus)
Pfaffenwaldring 7
70569 Stuttgart
stefan.fina@ireus.uni-stuttgart.de
philipp.zakrzewski@ireus.uni-stuttgart.de

Dipl.-Ing. Simone Planinsek
Universität Karlsruhe
Fakultät für Architektur
Institut Entwerfen von Stadt und Landschaft
Englerstraße 11
76131 Karlsruhe