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Housing, the Compact City and Sustainable Development: Some Insights From Recent Urban Trends in Switzerland

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2010 winner of the ENHR Bengt Turner Award. The aims of the Bengt Turner Award are to encourage new researchers to write papers on housing and urban issues linked to the topics of the European Network for Housing Research (ENHR) working groups, to increase awareness of ENHR, and to keep alive the memory of Bengt Turner.

ABSTRACT *One of the debates on the sustainability of housing revolves around the spatial dimension of human settlements and the influence of location and urban morphology on resource and energy consumption. Urban sprawl has often been criticised and this has led to the promotion of the model of the compact city as an alternative in many countries. Based on empirical data on urban trends in Switzerland, this paper discusses three critiques that are usually made of the model of the compact city. These critiques relate to its feasibility, its social consequences and its environmental implications. The paper concludes that the model of the compact city seems workable in the context of a growing population group whose residential aspirations are oriented towards centrality and proximity.*

KEY WORDS: Housing, compact city, sustainable development. residential mobility, urban regeneration, Switzerland

Introduction: Housing and the Sustainability Agenda

Sustainability has been on the political agenda for more than two decades, as demonstrated by the organisation of international summits such as the United Nations Conference on Environment and Development in Rio de Janeiro (1992) and the United Nations Climate Change Conference in Copenhagen (2009). There has been a wide-ranging discussion on the implementation of sustainable development, most notably concerning issues related to agriculture, mobility, industry, tourism and housing.

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Debates on the environmental sustainability of housing have addressed two main issues: the technical aspects of housing and the spatial dimensions of housing. The first of these has led to the definition of construction guidelines in order to reduce the ecological footprint of housing. These guidelines concern issues like the life cycle of building materials and the choice of heating and lighting systems in order to encourage limited resource and energy consumption. Such principles have been implemented in the creation of eco-buildings, eco-neighbourhoods and low-carbon cities.

The second of these concerns, the spatial dimensions of human settlements, will be addressed in this paper. Central to this issue is the impact of location and of urban form upon the consumption of energy and resources (notably through mobility practices). Debates on these questions have tended to focus on trends in urbanisation and urban morphology, and have resulted in the promotion of the compact city as an alternative to the model of the sprawl (or dispersed) city.

Urban sprawl – or the rapid demographic growth of suburbs with a low density pattern – has become by far the most dominant trend in urbanisation since World War II (European Environment Agency, 2006). Yet it has been strongly criticised from an environmental point of view because it implies a high level of land consumption (particularly problematic since soil is a non-renewable resource) and automobile dependence (Newman & Kenworthy, 1999; Kahn, 2000; Squires, 2002; Cieslewicz, 2002). Thus to regulate urban sprawl, the alternative model of the compact city has been promoted (Ewing, 1997; Frey, 1999; Holden, 2004). It has been argued that the densification of the built environment would slow down urban sprawl and limit both resource and energy consumption by reducing the role of the car and increasing the number of trips made on foot, by bicycle or by public transport (Fouchier, 1997; Newman & Kenworthy, 1999; Holden, 2004). Several planning principles underlie the compact city model, which is characterised by relatively high residential density and mixed land uses, the regeneration of brownfield sites, raising the height of existing buildings, functional mixing, the joint development of public transport systems and new settlements, etc. From a demographic point of view, the compact city aims to increase the population of cities by building new dwellings on underdeveloped sites contained within the urban fabric.

These principles have increasingly come to the fore in debates on land-use planning policies in many countries.[1] In the United States, for example, anti-sprawl movements appeared in the 1990s (Burchell & Shad, 1999), resulting in the formation of groups campaigning for smart growth and growth management. These groups call for a renewal of land regulation in order to take into account the environmental impact of urban sprawl. In England, the government promotes urban renaissance and has committed itself to a target of 60 per cent of new housing to be built on brownfield sites (Urban Task Force, 1999). In Switzerland also, the federal government has defined guidelines for spatial development more in line with sustainability. As a part of its strategy to implement sustainable development, it plans to stabilise the urbanised

surface at the current level of 400 square metres per capita (Federal Office for Spatial Development, 2005; Swiss Federal Council, 2008).

An intense debate has been ongoing for more than 15 years over the supposed advantages of the compact city as well as the drawbacks that might come along with it (Breheny, 1992; Frey, 1999; Jenks *et al.*, 1996; Holden, 2004; Dubois & Van Criekingen, 2005; Tallon, 2010; Dempsey, 2010). Dubois and Van Criekingen (2005), for example, identify three main sets of critiques that I wish to address in this paper: the feasibility of the compact city, its social implications and its environmental consequences.

The first critique of the compact city is its feasibility from the point of view of both supply and demand in the housing market. On the supply side, the potential for densification in urban areas may be too limited to curb urban sprawl. On the demand side, the compact city may be said to be unworkable because it runs counter to the desires of residents (Gordon & Richardson, 1997). Some scholars have even termed this kind of planning undemocratic:

> Such a prevention of dispersed city growth could only be implemented by draconian interventions which could hardly be achieved in our democratic, freedom-orientated society and would represent encroachments on the self-determination of the communities and of people, on the land property market, the traffic and transport economy and the free choice of residence which could not be democratically legitimized through constitutional law. At present, only undemocratic countries can still enforce a compact city. (Sieverts, 2003, p, 123)

The second critique focuses on the social implications of densification and rather contradicts the previous argument, stating that the compact city is seen as desirable (i.e. compatible with residential aspirations) but would not be neutral from a social point of view (i.e. the densification and regeneration of central areas would benefit only a well-off minority). Emelianoff (2007), for example, found that eco-neighbourhood projects in Europe usually focus on the middle to upper classes, given the cost involved in renting or buying the dwellings created by the projects. Theys (2002) also argues that the 'zero-default city' (a city with a very high quality of life) would be financially inaccessible to most people and would therefore deepen social inequalities. Several other researchers also have stressed the impact of urban change on social equality, highlighting the risks involved in initiating or reinforcing gentrification processes.[2] The Urban Task Force's report on urban renaissance in England, for example, has been qualified as a 'text-book gentrification' by Lees (2003), who argues that its policy statements prioritise a back-to-the-city move by the new middle class at the expense of other social groups. Other studies also have shown that gentrification leads to various forms of displacement and to social polarisation (Davidson & Lees, 2005, 2010).

The third critique of the compact city relates to its environmental consequences. This urban form is not necessarily compatible with the requirements of sustainable development, since it may imply an increase in traffic congestion and pollution, and a decrease in the quality of life (Breheny, 1995). Functional mixing (designing areas to be used for both housing and economic activities) would not automatically reduce motorised traffic since it would concern only the small minority of urban dwellers who still experience the unity of time, place and work. For most other inhabitants, the functional division of space has made it almost impossible to work near their place of residence (Sieverts, 2003). Some argue that the benefits of proximity promoted by the model of the compact city are at odds with current trends:

> The revolution in information processing and telecommunications is accelerating the growth and dispersion of both economic activities and population, possibly moving towards the point where "geography is irrelevant". Yet at the same time, many planners (and policymakers) advocate "compact cities" as an ideal in contrast to the reality of increasingly spread-out metropolitan development. (Gordon & Richardson, 1997, p. 95)

A further dimension to the critique with regards to the environmental impact of the compact city is that the rationale underlying this model focuses on everyday mobility, but does not take into account other forms of mobility. In reality, people living in a central location may go on holiday more often and/or engage in extra leisure activities in order to compensate for the business of life in the city, thereby generating additional journeys (Holden, 2004).

This paper interrogates these critiques of the compact city model, with Switzerland as a case study. It is based on research projects that analysed the demographic evolution of Swiss cities, with a focus on migration flows into and out of cities (providing a way of measuring a city's residential attractiveness for different population groups), and assessments of recent regeneration projects (residential motivations; strategies of investors; and role of local authorities. These research projects provide a framework within which we may discuss the three sets of critiques mentioned above.[3]

However, this discussion cannot be comprehensive given the multiple dimensions of the compact city and of its implementation. Other aspects of the debate – such as the question of social interaction, the difference between physical density and perceived density, the acceptance of neighbouring communities, and the impact on air pollution and traffic volume – were out of the scope of the current research, which deals more specifically with the demographic and residential dimensions of the model of the compact city.

The methods and sources used in this paper, as well as certain features of the Swiss context, are presented in the next section. Critiques addressed to the compact city regarding its feasibility, its social consequences and its environmental implications are then evaluated on the basis of empirical data on Swiss cities. To conclude, the

main principles of the compact city in relation to these issues will be reviewed and assessed.

Context and Methodology

Switzerland has a highly integrated, polycentric urban system which reflects the federal and decentralised political organisation of the country. According to the official definition, the urban system is composed of 55 core cities and their respective functional areas, where a 'city' is the municipality (the political entity) at the core of the urban region and is therefore larger than the city centre. Suburbs are defined according to functional and structural criteria, such as the percentage of commuters (Schuler *et al*., 2005).

This paper includes results relating to 25 cities which in 2000 contained over 1.5 million people.[4] These cities constitute the main centres of the country, correspond to the densest areas, and each present the most common attributes of urbanity. The demographic evolution and residential attractiveness of these cities have been analysed in respect to data from two secondary sources. First, information has been extracted from population censuses conducted each 10 years until 2000, in order to draw conclusions about the characteristics and residential behaviour of city inhabitants. Our second source, the Swiss Annual Population Statistics, provides further data on the resident population since 1981.

The paper also draws on analysis of recent regeneration projects in Swiss cities, using two case studies: Neuchâtel and a district of Zurich. Data were collected in the form of questionnaires sent to homes that had been built between January 2001 and August 2007 in the two cities. A total of 493 and 630 surveys were sent to Neuchâtel and Zurich respectively, with response rates of 46.3% and 44.8%.[5] This empirical material enables us to determine the profile of the residents, their residential motivations and their mobility practices.

Neuchâtel is a medium-sized city (33,000 residents; 80,000 including suburbs) located in the French-speaking part of Switzerland. The developments studied were mainly located near the city centre and the train station, and included some redeveloped industrial buildings, but mainly newly built developments of different sizes on brownfield sites or on vacant land. Zurich, on the other hand, is a German-speaking city and the largest urban centre in Switzerland (359,000 residents; 1,132,000 including the suburbs). Research conducted there focused on a residential area close to the centre called 'Zurich West', previously one of the most important industrial areas of the city but de-industrialised in the 1980s. Since the late 1990s, Zurich West has seen the construction of a series of new housing developments of a hundred units or more. These two case studies were chosen in order to cover two different urban contexts (a medium-sized city and a residential area within a metropolitan centre) and because 'Ecoparc' (the main regeneration project in Neuchâtel) and Zurich West are regarded as best practice in densification in Switzerland.

In Switzerland, the model of the compact city was first promoted by the Federal State, which has defined guidelines for a general policy on spatial development.[6] Principles supported by the Federal State include the regulation of urban sprawl and the promotion of a more compact urbanisation. These principles coincide with the interests of some real estate investors and local authorities which, at the institutional level, have the largest say over spatial planning. City authorities facilitate regeneration through the use of planning tools, such as increasing the density allowed, resoning industrial into mixed-use areas, and occasionally instigate processes of collaborative planning between stakeholders (Rérat *et al*., 2010b). Local authorities do not invest directly in residential projects, and regeneration initiatives tend to be financed by private actors such as institutional investors (insurance companies or pension funds), real estate companies, building companies, stock market listed property groups, cooperatives, etc.

The official statistics, the surveys conducted in Neuchâtel and Zurich and the results of various other studies, as well as theoretical discussions of urban sprawl, are used in the next section of this paper in order to discuss some of the critiques addressed to the compact city model regarding its feasibility and desirability, its social consequences and its environmental implications.

Assessment of the Compact city Model in the Context of Urban Dynamics in Switzerland

Feasibility of the Compact City

The question of feasibility of the compact city can be broken down into two main issues: the potential for densification in central areas and the desirability (or attractiveness) of such an urban form for residents. With regard to the potential for densification in Switzerland, a national research programme on land use found that it would be theoretically possible to satisfy the total demand for housing space for 20 years within the existing built environment and even in existing buildings (Häberli *et al*., 1991). This would represent a stock of about 120 million square metres of usable areas (in attics or adjacent unused buildings, for example), where two million dwellings could be created. Another survey, conducted in 2004, estimated the potential of former industrial sites in Switzerland equal to 17 million square metres, which is equivalent to the total area of the city of Geneva, where 190,000 people live and 140,000 work (ODT & OFEFP, 2004). Of these 17 million square metres, 40 per cent were concentrated within the medium and large cities, indicating huge potential for the development of central areas. A second, more precise, survey counted 350 brownfield sites in Switzerland, totalling 18 million square metres (Wüest & Partner, 2008). This total is higher than the result found in 2004, despite the fact that numerous densification projects have been carried out in the meantime. On the whole, these studies give a first indication that there is real potential to increase the number of

dwellings within the built environment of cities. Yet this will eventually depend on the density allowed by planning authorities, and also on the strategies employed by land owners and investors.

More than the question of the physical potential for densification, the main critique of the feasibility of the compact city is its supposed incompatability with residential aspirations and with the logical outcome of the market (Gordon & Richardson, 1997; Sieverts, 2003). One of the observations usually supporting this argument is the demographic decline of core cities and the growth of suburbs, which have in many contexts been occurring for several decades. In the case of Switzerland, according to population censuses, the 25 largest cities lost one-tenth of their inhabitants (−10.5 per cent; −191,176) between 1970 and 2000, whilst the suburbs registered high growth rates (+36.2 per cent; +764,556).

However, in order to discuss the feasibility of the compact city, it is necessary to move beyond a discussion of demographic evolution by taking into account the underlying mechanisms of urban sprawl. Of the numerous interpretations of the choices made by residents to live in the suburbs (Bourne, 1996), two overall categories can be identified (Mieszkowski & Mills, 1993; Adams *et al*., 1996). The first explains urban sprawl as the outcome of people's desire for residential amenities, stressing, for example, the push factors of core cities (such as pollution or noise, giving rise to expressions such as 'flight from blight' or 'urban exodus') and/or the pull factors of suburbs (proximity to nature, type of habitat, access to home-ownership, rural nostalgia, etc.). This view has been dominant in many contexts, such as the United States (see Beauregard, 2003, about the 'voices of decline') and Switzerland (Salomon Cavin, 2005). Figure 1, which is taken from official publications, illustrates this perspective, clearly linking push factors (in this case traffic, congestion and road enlargement in cities) and pull factors (quality of life in the 'countryside') with a 'flight from the city' and the 'vicious circle' of urban sprawl.

At first glance, such an interpretation seems to be an adequate explanation for the demographic loss of cities, and by the same token to back up the argument that the compact city is neither workable nor desirable. Yet in reality, this view does not take into account the full complexity of urban development. This is particularly the case in Switzerland, where most core cities are characterised by a housing shortage (the proportion of vacant dwellings is indeed very low; in Zurich, for example, it accounted for only 0.07 per cent of the housing stock in 2005).

The second theory regarding the demographic decline of core cities and the growth of suburbs, although not mutually exclusive with the first one (based on residential amenities), is called 'natural evolution theory' (Mieszkowski & Mills, 1993; Adams *et al*., 1996). Natural evolution theory highlights the demand for new housing and more land, and states that this can be explained by two phenomena: the decreasing size of households and the increase in residents' purchasing power. The first of the two is part of a wider trend called the 'second demographic transition' (Van de Kaa, 1987; Lesthaeghe & Neels, 2002).

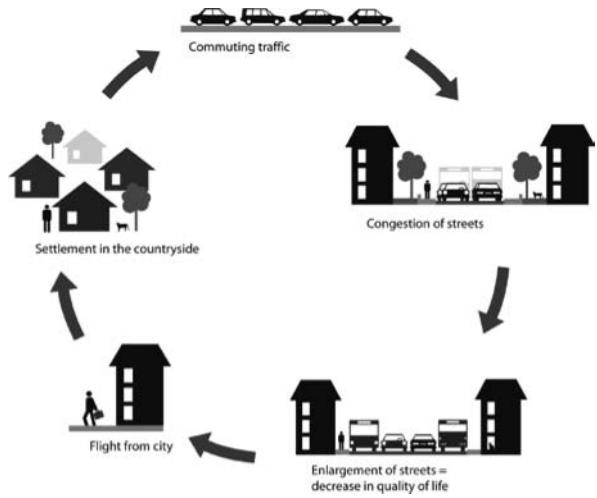

Figure 1. The vicious circle of agglomeration traffic.[7]

In order to understand the population evolution of core cities, it is necessary to consider the mechanisms of the second demographic transition, which are mainly characterised by an ageing population and the destabilisation of the nuclear family (two married heterosexual adults with children). The declining fertility rate, the postponement of marriage, the instability of couples and the longer life expectancy imply on the one hand a decrease in the average household size, and on the other hand a disparity between the pace of population growth and the (high) rate of increase in the number of households (Ogden & Hall, 2000, 2004; Bunting, 2004). Yet this has been so little studied within the field of urban studies that it has come to be considered 'the silent dimension of urban change' (Buzar *et al.*, 2005). Nevertheless, the number of households is of utmost importance. As it is determined by the number of people sharing a house, it is an indicator that enables us to link demographic phenomena with trends in the housing market. Non-traditional households are usually small and adult-centred (in contrast with families that are children-centred), and their increase in number corresponds to an increase in demand for residential locations in central areas (Frey & Kobrin, 1982; Fishman, 1999).

Such trends are clearly observable in Switzerland (Table 1). As already mentioned, the 25 largest Swiss cities lost one-tenth of their population between 1970 and 2000, while the number of households increased by 15 per cent. This apparent contradiction is explained by a reduction in the average household size (from 2.5 persons in 1970 to 1.9 in 2000), which is in turn the consequence of a differentiate evolution according to the kind of household. Over these three decades, the number of one-person households doubled while the number of three-person and larger households declined. This is

Table 1. Evolution of the number of households and inhabitants in 25 cities (1970–2000)

	In absolute number	In percentage
1-person households	+194,752	+100.9%
2-person households	+16,974	+7.7%
3-person households	−43,273	−34.1%
4-person and more households	−59,814	−38.2%
Total number of households	+108,639	+15.6%
Population	−191,176	−10.5%

Sources: Population censuses.

explained both by the second demographic transition and by the fact that cities attract small adult-centred households whilst families tend to settle in suburbs.

In addition to their declining size and their migratory movements, households now tend to occupy larger housing units than was the case some decades ago, as a result of their increased purchasing power. For example, the proportion of two-people households living in four-room dwellings (three bedrooms and a living room) increased from 15.7 per cent in 1970 to 28.7 per cent in 2000 in the 25 cities taken into account. The proportion of people living alone in three-room apartments increased from 17.5 per cent to 32.2 per cent during the same period.

On the whole, these results do not lead to a straightforward conclusion with respect to the debate on the feasibility of the compact city. On the one hand, some favourable trends may be identified. The population of Swiss cities decreased between 1970 and 2000 because their housing stock was too limited to meet the rising demand for housing space (as postulated by 'natural evolution theory'). The rising purchasing power of residents and the decreasing size of households have led to a steady rise in housing space consumption, which explains the apparent contradiction between the diminishing population of cities and the expanding housing market and housing shortage. Thus urban sprawl did not simply occur because people began to prefer the suburbs, but also due to the lack of housing within cities. The resulting image of central areas is more positive than has been found in some of the literature (as exemplified by Figure 1), therefore supporting the feasibility of the compact city. This interpretation is reinforced by the demographic turnaround observed in the years after 2000, which comprised a growth in population within Swiss cities of 5.4 per cent (84,038 people) between 2001 and 2008 (Rérat, 2012).

On the other hand, certain elements of the compact city underline the difficulty of implementing the model. First, between 2001 and 2008, the suburbs continued to experience positive demographic evolution (+8.2 per cent; +233,319), and this at a higher rate than in the cities. Thus it is clear that the new growth of cities (or reurbanisation) does not spell the end of urban sprawl, which remains the dominant spatial dynamic.[8] Second, larger housheholds, such as families, tend to leave the core

cities. It is difficult to quantify this, however, since the data available are not sufficient to measure the role of choice (residential aspirations) and of constraint (economic resources and housing availability) in their behaviour. Third, the rise in housing space consumption represents a limiting factor in densification. In fact, if the occupation of dwellings had remained constant between 1970 and 2000,[9] the 25 cities studied would have grown by more than 500,000 inhabitants as they developed their housing stock. This number represents a significant proportion of the total suburban growth (+36.2 per cent or +764,556 inhabitants during the same period). It is therefore clear that any further city densification projects will need to overcome the problem of rising housing space consumption, which is likely to continue into the future.

Social Implications of the Compact City

The second critique of the compact city focuses on the social implications of densification. As noted in the introduction, it somewhat contradicts the previous argument, insofar as it asserts that the compact city is desirable and attractive only to a minority of households that can afford to live in a central and regenerated neighbourhood. In order to interrogate this issue, some of the aspects of gentrification processes in Switzerland will first be discussed.

Population censuses offer contrasting views of gentrification in Swiss cities. In the late 1990s, they were still characterised by a negative migration balance among higher socio-professional categories (SPC+), indicating that gentrification was not a generalised phenomenon on the scale of the urban system. Yet the situation is more nuanced when placed in a historical and geographical perspective. There was far less migration of SPC+ from the cities in the 1990s than in the 1970s, and in some cases there was a clear reversal of trends (such as in Zurich). Since the 2000 census, it is clear that the renewed attractiveness of cities for SPC+ has strengthened, as this category is distinctly over-represented in recently built dwellings. Thus new-build gentrification is emerging as the main expression of the renewed residential attractiveness of Swiss core cities for the middle to upper classes.

Surveys conducted in Neuchâtel and Zurich West show that the socio-economic status of residents living in dwellings resulting from densification and regeneration projects is clearly above average (Tables 2 and 3). For example, the level of education is considerably higher: 50.7 per cent of adults living in new homes in Neuchâtel, and 67.4 per cent in Zurich West, have university qualifications or equivalent (whilst the same is true of slightly less than one-quarter of the population of the two cities overall). Other indicators, such as income level, declared occupation, rental costs and proportion of home-owners, also suggest that the economic resources of this population are above average, again indicating new-build gentrification. In contrast, people with low qualifications are barely present in these new housing units. Data from the 2000 census shows that the over-representation of the SPC+ in new buildings

Table 2. Education level of the population under study in the city of Neuchâtel

	Total population (2000)	Population living in dwellings built between 1995 and 2000 (2000)	Population living in dwellings built between 2001 and mid-2007 (2007)
Low (compulsory school)	32.4%	26.9%	5.6%
Intermediate (apprenticeship or college)	44.0%	43.9%	43.7%
High (university or equivalent)	23.6%	29.2%	50.7%

Sources: Population censuses and own surveys.

Table 3. Education level of the population under study in the city of Zurich and in the district of Zurich West (*)

	Total population (2000)	Population living in dwellings built between 1995 and 2000 (2000)	Population living in dwellings built between 2001 and mid-2007 (2007) (*)
Low (compulsory school)	28.8%	19.0%	1.4% (*)
Intermediate (apprenticeship or college)	46.3%	45.9%	31.2% (*)
High (university or equivalent)	24.9%	35.1%	67.4% (*)

Sources: Population censuses and own surveys.

increased between the 1990s and 2000s, revealing a growing tendency in the real estate market to produce housing for this particular population group.

New-build gentrification in Switzerland is a process led by capital in the sense that it is only private actors who invest in building projects (Rérat *et al.*, 2010b). The high status of new developments is a result of several factors, such as land price, building standards, additional costs related to urban areas, and the production of high-quality and therefore expensive property. In general, local authorities have an ambivalent attitude towards new-build gentrification. On the one hand, they have defined planning documents to facilitate the construction of housing and are interested in attracting wealthy taxpayers in order to increase their tax revenue. On the other hand, no major public investment is found in regeneration projects (unlike in the United Kingdom for example [Cameron, 2003]) so that it is inappropriate to talk about state-led gentrification in Switzerland. Moreover, some cities may try to regulate new-build gentrification by privileging non-profit organisations (such as cooperatives) or by negotiating social housing shares with investors, although these measures concern only publicly owned land.

In relation to the debate about densification, how should this tendency towards new-build gentrification and the social selectivity of regeneration operations in Swiss cities be interpreted? It could first be explained by the functioning of the real estate market, which is concerned mainly with offering newly built housing to the wealthy classes. It could also be argued, however, that it is evidence of a general evolution towards the renewed attractiveness of cities for the middle to upper class. If so, the possibility of an eviction effect among the lower class cannot be excluded, as will be more thoroughly discussed in the conclusion.

Environmental Impact of the Compact City

The third group of critiques is related to the environmental impact of the compact city and claims that it would not necessarily be compatible with the requirements of sustainable development. This section will address more specifically the question of mobility practices related to the compact city.[10]

Several studies have found the same general pattern in the links between urban form and mobility practices in Switzerland that has been highlighted by studies in other contexts (see introduction). For example, it has been shown that the motorisation rate increases when density decreases (Bochet, 2005), and that the less dense a municipality is within an urban region, the more important the car is and the less use is made of walking, cycling and public transport (Rérat, 2005).

The questionnaires used in this study provide information about the residential motivations and mobility practices of the inhabitants of new dwellings in Neuchâtel and Zurich West. Some important findings emerged which are particularly relevant to the debate on the compact city. When asked about factors influencing their choice of residence, inhabitants first stressed the characteristics of the dwelling (such as its

Table 4. Percentage of people aged six and above holding a public transport pass, and percentage of households owning a car

	Neuchâtel	Zurich West	Core cities	Suburbs	Switzerland
National pass	12.7	19.1	8.8	5.5	6.2
Half-fare card	38.3	59.0	29.1	27.0	26.5
Regional pass	18.9	47.9	9.6	6.0	6.2
Car	86.2	59.2	66.9	87.8	81.2

Source: Own surveys and micro-census 'transport'.

size, tenure status, location or view) and then the convenience of city life. The latter is based on the physical proximity of urban amenities and infrastructures (to give one example, 60.7 per cent and 71.6 per cent of the labour force are employed within the boundaries of the core cities of Neuchâtel and Zurich respectively). In addition, the surveys show a growing trend among the middle to upper classes to value proximity and to use modes of transport other than the car, such as walking, cycling and public transport. The role of the car is thus reduced, and accessibility via this mode of transportation is usually considered less important.

One indicator of the mobility practices of the inhabitants of the new dwellings is the percentage of households owning public transport passes (see Table 4).[11] In comparison to the population of Switzerland as a whole, and to those living in core cities or the suburbs, people living in new dwellings in Zurich West and in Neuchâtel are proportionally more likely to have a public transport pass. This is particularly the case in Zurich West, where the proportion with a national pass (giving access to the entire railway network and to bus and tram networks in the city and region) or a half-fare card (which offers a 50 per cent discount off all individual fares) was more than double that observed in the core cities. The difference is even clearer with regard the regional pass, which people in Zurich West are five times more likely to possess. In Neuchâtel, the differences are less marked but the percentages are very clearly above the rest of the core cities (+32 per cent for half-fare card bearers, +44 per cent for national pass bearers and +97 per cent for regional pass bearers).

These results show that households who have the financial means to choose from a wide range of locations in which to live often decide to live in central city locations, and that they value urban characteristics such as proximity, density and alternative modes of transport to the car (Table 4). What is observed here is a reclaiming of the advantages of proximity that were thought to have disappeared with the dynamics of urban sprawl (Rérat & Lees, 2011).

However, two observations remain to be made on this matter. First, the majority of households still own a car. If in Zurich West the percentage of households owning a car (59.2 per cent) is lower than in the core cities of Switzerland (66.9 per cent), the number observed in Neuchâtel (86.2 per cent) comes close to what is observed

nationally in the suburbs (87.8 per cent). Second, an important minority of the inhabitants are interurban commuters, i.e. they live in one core city and work in another (21.4 per cent in Neuchâtel and 9.8 per cent in Zurich West). In other words, although mobility has become more localised, the majority of the inhabitants of the new dwellings do not abandon the car. Instead, they want to be able to choose between different modes of transportation according to their needs. Some even appear to be hypermobile (such as the interurban commuters), which raises the question of the ecobalance of long-distance commuting, even if the great majority of them use trains.

Discussion and Conclusion

Urban sprawl is often criticised given its environmental, social and economic impacts. In reaction to the sprawl city, the model of the compact city is seen as more compatible with the criteria of sustainable development (Breheny, 1992; Jenks *et al.*, 1996; Ewing, 1997; Frey, 1999; Newman & Kenworthy, 1999; Holden, 2004). Several planning principles underlie this urban form, such as the densification of the built environment and the regeneration of urban derelict lands, which have influenced the debates on spatial development in a wide range of countries. From a demographic point of view, the model of the compact city implies an increase in the population of cities through the construction of new dwellings in the potential contained within the built environment. Three sets of critiques have been identified in the literature by Dubois and Van Criekingen (2005): (1) the feasibility of the compact city is guaranteed neither in terms of the potential contained in the urban fabric nor in terms of residential aspirations (this model would run counter to the preferences of households who favour urban sprawl and low-density housing); (2) the compact city is socially selective (regeneration and densification projects may generate gentrification processes and increase social inequalities); and (3) the compact city does not necessarily result in more environmentally friendly mobility practices (in terms of energy and resource consumption). These three critiques are addressed by this paper on the basis of the demographic evolution and residential attractiveness of cities in Switzerland.[12]

The new demographic growth of Swiss cities in the years after 2000 is a strong indicator of the feasibility of the compact city and shows that central areas can indeed be attractive to residents. Other indicators – such as the very low proportion of vacant dwellings, the increase in the number of households and the changing residential behaviour of some sections of the middle and upper classes – reinforce this interpretation. The same can be said of the success of residential developments resulting from densification and regeneration projects. Unlike claims that densification would involve undemocratic practices and would run counter to residential aspirations (Gordon & Richardson, 1997; Sieverts, 2003), urban regeneration is essentially market-led in Switzerland since the construction of new dwellings is confined to private investors, while local authorities prescribe planning documents defining the allocation, density, etc. of certain areas so as to facilitate real estate projects.

The feasibility of the compact city is not straightforward given that housing space consumption per capita has been steadily increasing due to the rise in purchasing power and the reduction of the average household size occurring in the second demographic transition. This trend is not slowing down, however, as shown by the evolution of dwelling occupation and housing needs. In relation to the objectives of the compact city, it is necessary that densification compensate for and overcome the rising demand for living space and that the built environment contains enough potential. This criterion was not met between 1970 and 2000: if the occupation of dwellings had been constant during these three decades, then the 25 cities under study should have counted 500,000 more inhabitants in 2000 following the development of their housing stock.

From a social point of view, the surveys conducted in Neuchâtel and Zurich West show that the socio-economic status of residents living in new dwellings is clearly above average, indicating that densification projects have tended to lead to new-build gentrification processes (Davidson & Lees, 2005, 2010; Rérat *et al*., 2010a). In contrast, people with low qualifications are barely present in the new housing units. These results correspond with other studies on eco-neighbourhoods (Emelianoff, 2007).

The impact of these new-build gentrification processes remains relatively uninvestigated. On the one hand, the phenomenon is limited in quantitative terms but can be explained to some extent by the 'normal' functioning of the real estate market, which involves the provision first and foremost of newly built housing for the wealthy. Some positive outcomes can also be underlined: these new projects allow cities to retain or to attract new inhabitants (and therefore tax-payers), to balance their social structure with that of their suburbs (to avoid the over-representation of socially vulnerable categories) and to relieve pressure on the housing market in a situation of shortage. Seen in this light, it appears that new-build gentrification in Switzerland is not part of a large-scale process of gentrification and is not likely to engender the eviction of poorer classes from core cities.

On the other hand, new-build gentrification could be interpreted as an indication of a general evolution towards the renewed attractiveness of cities for the middle to upper classes. In this case, gentrification would not remain limited to new buildings on vacant or former industrial land, but could concern existing housing and therefore may indeed generate the eviction of low-income residents. As housing specifically intended for the lower classes is limited in Switzerland, this category is mainly provided for by 'de facto social housing' (i.e. housing which has become affordable over time and which is largely situated in core cities). It can be argued that new developments such as these could act as a spearhead for more classic gentrification processes. In the absence of specific public action encouraging the implementation of densification policies that take into account the social dimension, the increased attractiveness of cities and the functioning of the free market could exert additional

pressure on housing rents and vacancies, and may therefore have repercussions for the social composition of Swiss cities in the years to come.

In terms of environmental impact, and more precisely in terms of mobility, a positive correlation between density and more sustainable mobility practices has been observed in the case of Switzerland (Bochet, 2005; Rérat, 2005), as supported by the international literature (Fouchier, 1997; Newman & Kenworthy, 1999; Holden, 2004). Our survey on the residential motivations of the new urban dwellers reinforces the desirability of such models of urban sustainability, because it shows that the residents, who had the financial means to choose from a wide range of locations, preferred to live in central city locations. This is because of the value that they attach to urban characteristics such as proximity, density and alternative modes of transport to the car, and can be interpreted as a reclaiming of the advantages of proximity (Rérat & Lees, 2011) that were thought to have disappeared with the dynamics of urban sprawl. However, some inhabitants of new dwellings also seem hypermobile. Most of them own a car and an important minority work in a core city other than the one in which they live. This last point raises the question of the ecobalance of long-distance commuting despite the fact that, most of these commuters travel by train.

The results presented in this paper demonstrate that the model of the compact city is workable in the context of a growing population group whose residential aspirations are orientated towards centrality and proximity, a phenomenon that is not limited to Switzerland but has also been observed in other contexts (Hjorthol & Bjornskau, 2005; Bromley *et al*., 2007; Daniluk & Ley, 2007). There are three important caveats worthy of mention, however. First, urban sprawl is still the dominant spatial dynamic given the residential behaviour of families and the rising living space consumption. Second, housing projects issued from densification and regeneration operations are socially selective and are addressed mainly to the middle to upper classes ('new-build gentrification'). Third, mobility practices show that the inhabitants of new dwellings value proximity but that some are potentially hypermobile.

Finally, the implementation of the model of the compact city raises some broad questions about public policies and the role of local authorities. Three of these will be mentioned here as a prompt to further debate. First, urban regeneration is a complex, and usually not spontaneous, process involving a wide variety of actors (investors, developers, land owners, neighbouring communities, etc.). In order to cope with this complexity, there is need for planning processes based on projects (rather than on plans) and on collaborative approaches (rather than on hierarchical organisations). Second, as stated above, market-led urban regeneration projects are socially selective. In the case of Switzerland, some local authorities have allocated plots of their land to foundations or cooperatives on considerably favourable terms. By relinquishing profits and calculating rent according to costs, these institutions offer apartments at lower prices than those determined by the free market. In other cases, local authorities may negotiate compensation with promoters for leasehold rights via the construction

of a certain stock of social housing under private-public partnerships. This kind of action could be more generalised in order to integrate social equity into densification projects. Third, suburbs are still growing faster than core cities. Whilst the principles of the model of the compact city (such as densification of the built environment, regeneration of brownfield sites and increasing the height of buildings) focus on central areas, the development of suburbs also needs to be rethought in order to take into account sustainability principles. These might include alternative habitat models for the single-family unit, or joint development between public transport systems and new settlements (Williams *et al*., 2010). This is especially the case in the *Greyfields*, the occupied but ageing inner suburbs which are "physically, technologically and environmentally obsolescent and which represent economically outdated, failing or under-capitalised real estate assets" (Newton, 2010, p. 81). Such areas could be intensified through regeneration operations. These three issues for debate not only represent spatial challenges for the implementation of sustainable development, but also need to be addressed by urban and housing scholars.

Notes

1. Contemporary densification strategies are widely claimed to make an important contribution to sustainable development in cities in developed countries. This has not always been the case and other objectives (or other narratives) have been put forward, as shown by Tallon (2010, pp. 27–108) in the United Kingdom. The compact city model is also part of the debate in developing coutries, although cities may be very different to their northern counterparts in terms of demographic dynamics, social polarisation and density (see Dave, 2010).
2. In its classic definition, gentrification designates the physical and social transformation of the existing housing stock in inner-city neighbourhoods (Lees *et al.*, 2008). This definition has been extended to new developments, in which case we speak of new-build gentrification (Davidson & Lees, 2005; Rérat *et al.*, 2010a).
3. These projects included a study called 'Back to the City?' (Swiss National Science Foundation; request 107033) conducted at the University of Neuchâtel (the other researchers involved were Roger Besson, Etienne Piguet and Ola Söderström) and a post-doctoral fellowship in Geography at King's College London (Swiss National Science Foundation; request PBNE11-122788).
4. These cities are: Aarau, Baden, Basel, Bellinzona, Bern, Biel, Chur, Fribourg, Geneva, Lausanne, Locarno, Lugano, Luzern, Neuchâtel, Olten, Schaffhausen, Sion, Solothurn, St Gallen, Thun, Vevey/Montreux, Wil, Winterthur, Zug and Zurich.
5. These projects are regarded as densification projects notably according to two criteria. First, the density of the areas and of the whole cities has increased (this could be measured using indicators such as the number of inhabitants or dwellings in the urbanised or built area). Second, they contrast with the dominant trend of the single detached house, which is typical of low-density suburban development and which comprises 70% of new residential buildings in Switzerland (according to the Federal Statistical Office, 2007).

6. In their typology of planning systems, Newman and Thornley (1996) categorise Switzerland as a member of the 'Germanic family' alongside Germany and Austria. These countries are characterised by a hierarchical planning system with a clear division of tasks and responsibilities between the national, regional and local levels. The federal government gives 'guidelines', but is not able to force regions and municipalities to follow them. The regional and local levels, therefore, are more powerful.
7. This figure is taken from a publication of the Federal Office for the Environment (*Environnement*, 2, 2005). It was first published by the Canton of Bern (*Bulletin d'information pour les clients et les partenaires du Service des ponts et chaussées du Canton de Berne*, 7, 2004).
8. Both trends coexist and do not exclude each other as was postulated by the urban cycle theory (Van den Berg & Klassen 1987).
9. That is to say, if the division of households according to size had been constant between 1970 and 2000 across the housing stock (e.g. same proportion of two-person households living in two-, three-, four-bedroom flats, etc.).
10. It can also be argued that without the construction of new dwellings in core cities (and their new demographic growth), urban sprawl would have been even more pronounced, and that densification operations have therefore reduced land consumption. Another of the questionnaire results shows that the proportion of households having a second home (in most cases a holiday home) is no higher in the population under study (12.39 per cent in Neuchâtel and 14.39 per cent in Zurich West) than in Swiss core cities overall (14.64 per cent) or in the whole country (15.15 per cent), according to the Swiss Household Panel in 2003. Although further research is required, it appears that people who choose to live in a core city are no more likely than average to wish to compensate for that choice by owning a holiday house.
11. The results from the questionnaires can be compared with the micro-census on transport released by the Federal Statistical Office in 2005. However, the latter is less precise and the data are only categorised in terms of the whole country and then in terms of type of municipality (core city, suburb, etc.).
12. Further research is needed to fine-tune results and to address other dimensions of the debate (for example the residential motivations of suburbanites, the trade-offs between different residential contexts, the possible compensatory role of leisure, the question of safety and social interactions, etc.). Moreover, the scales used here – the core city and regeneration projects – are too broadly-defined to take into account the urban design and the macro-structure of the different compact city models (Frey, 1999).

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