Chapter 11
Urban Planning: Residential Location and Compensatory Behaviour in Three Scandinavian Cities

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Abstract Within the literature on sustainable urban development, the dominant view is that dense and concentrated cities produce lower environmental strain than do sprawling and land-consuming cities. But is there a danger that environmentally favourable urban planning solutions will be counteracted by oppositely working mechanisms? In the literature, two partly related main types of such effects have been particularly discussed: (1) A greater amount of leisure travel (including flights) when people save money and time from living in an urban context that does not require much daily-life travel; and (2) increased vacation home ownership and use as a compensation for dense daily living environments. These counteracting mechanisms include genuine rebound effects as well as compensatory effects resulting from perceived unsatisfactory characteristics of 'eco-efficient' residential environments. In practice, the demarcation between rebound effects and compensatory mechanisms resulting from ecological modernization strategies in urban planning is often blurred. This chapter draws on research carried out by the author in Norwegian and Danish cities and compares this against international literature on the topic. The paper concludes that rebound effects exist, counteracting to some extent the effects of resource-saving principles in urban planning. Avoiding such effects seems impossible unless the purchasing power decreases. The existence of rebound effects should, however, not prevent us from seeking to develop our cities in as environmentally friendly ways as possible.

Keywords Residential location · Daily travel · Long leisure trips · Compensatory travel · Compact city · Rebound

Since the concept of sustainable development entered the international political agenda with the UN publication 'Our Common Future' in 1987, a large amount of research has been addressing the topic of sustainable urban development. The currently dominant understanding of urban sustainability as well as sustainable

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development in general is confined within the paradigm of ecological modernization, according to which environmental sustainability can (and should) be achieved without abstaining from continual economic growth. The key to making this possible is an assumed decoupling of growth in production and consumption from negative environmental consequences through more efficient resource use and cleaner technologies (often referred to as increasing eco-efficiency).

For urban development, the challenge of decoupling lies in finding ways to accommodate growth in the building stock and ensuring accessibility to facilities while reducing negative environmental impacts resulting from the construction and use of buildings and infrastructure. Within the literature on urban sustainability, dense and concentrated cities are predominantly considered to produce lower environmental strain than do sprawling and land-consuming cities (CEC 1990; Jenks et al. 1996; Newman and Kenworthy 1999; Næss 2001).

However, critics have argued that environmentally favourable urban planning solutions run the risk of being counteracted by oppositely working mechanisms resulting from the same solutions. In the literature on sustainable urban development, such effects are often referred to as compensatory behaviour (e.g. Kennedy 1995; Holden and Norland 2005), referring to a wish to compensate for perceived negative side effects of the new eco-efficient solutions. The term 'rebound effects' is less frequently used about such counteracting mechanisms, although some of the mechanisms referred to might actually belong to this category (Vilhelmson 1990). Here, rebound effects are understood as reductions in expected gains from new technologies that increase the efficiency of resource use, cf. earlier chapters in this volume. In practice, the demarcation between rebound effects and compensatory mechanisms resulting from ecological modernization strategies in urban planning is often blurred. This chapter will therefore deal with both rebound effects and compensatory mechanisms, yet with the main emphasis on the former.

In the literature on urban sustainability, rebound effects and compensatory mechanisms have mainly been discussed in terms of environmentally undesirable effects of residential location strategies otherwise considered to minimize energy use, greenhouse gas emissions and land consumption. The purpose of this chapter is to illuminate the extent to which such effects can actually be found in a Scandinavian urban context.

The main hypothesized rebound effect is a greater amount of leisure travel (including flights) when people save money and time from living in an urban context that does not require much daily-life travel (Vilhelmson 1990; Schafer and Victor 1997). The assumed mechanism is that the time and money people save by travelling shorter distances to daily and weekly, 'bounded' destinations result in an accumulated 'surplus' of time and money providing an opportunity for longer leisure trips.

In addition comes a plausible indirect rebound effect resulting from lower public and private expenses on infrastructure and buildings in dense cities due to more resource-efficient spatial organization. The surplus thus saved can be spent on environmentally harmful consumption and investments. This latter type of rebound effect will not be addressed empirically in this chapter.

The main compensatory mechanisms mentioned in the urban sustainability literature stem from a wish to escape from the eco-efficient urban environment because of perceived negative side effects of these environments. People who are dissatisfied with their dwelling and its surroundings will, it is assumed, spend a large proportion of their leisure time elsewhere. Notably, residents of dense urban areas are believed to be, so to speak, 'forced' for psychological reasons to make leisure trips in order to compensate for lack of nature in their residential environments. Increased use and ownership of second homes may be also part of this effect. (Kaiser 1993; Kennedy 1995; Berg 1996; Holden and Norland 2005).

As mentioned above, the demarcation between rebound and compensatory effects is blurred. In debates about ways to 'decouple' economic growth from environmental degradation, eco-efficiency increase and substitution are often referred to as the main strategies. While the former concept means 'getting more from less', i.e. reducing the resource input and environmental impact per unit produced, substitution refers to a change of consumption pattern from environmentally harmful to less environmentally harmful product categories (e.g. spending money on culture instead of material consumption). Whereas an inner-city apartment is clearly a more eco-efficient type of residence than a detached single-family house in a car-dependent suburb, many people would say that a flat in an apartment building is a completely different 'product' from a detached house. A sustainability strategy of replacing the building of detached suburban houses with the erection of inner-city apartment buildings could thus be seen as a form of substitution rather than as a technological eco-efficiency improvement. Increased consumption on other items resulting from such substitution (which could in some sense also be considered as a 'sufficiency' practice') would then not be rebound effects in a strict sense. Moreover, the effects themselves may be difficult to categorize distinctly as either compensatory or rebound. For example, increased leisure travel among inner-city apartment dwellers might result from money saved due to low need for car ownership and daily-life motorized travel, but it could alternatively be due to a wish to escape from a daily neighbourhood with little greenery. In practice, the effect could be a combination, where a rebound effect made the increased leisure travel possible while a compensatory effect accounted for its motivation.

Some previous research has attempted to illuminate the above-mentioned possible mechanisms. Comparing families with children living in the downtown area of the Swedish city of Gävle (68,000 inhabitants), a small urban settlement (3000 inhabitants) and a rural village in the same region, Tillberg (2001) found the longest leisure trips by car during the weekend among the inner-city residents and the shortest ones in the small urban settlement. However, over the whole week, the distance travelled by car on leisure trips was practically the same in inner-city Gävle and the small urban settlement, and the rural village residents travelled consider ably further. Total travel distances were considerably longer in the rural village and shortest in the inner city, with the small urban settlement in-between. Schlich and Axhausen (2002) have compared travel behaviour between residents of inner-city Zurich and two peripheral suburbs. They found more frequent trips to leisure activities away from home both among downtown dwellers and among the inhabitants of a traffic-exposed suburb, compared with those in a suburb not exposed to traffic nuisances. However, the overall distance travelled in connection with leisure activities was shortest when living in the inner city. Some other studies have found the frequency of flights to be higher among respondents living close to the city centre, also when demographic, socioeconomic and attitudinal variables are taken into account. Such a tendency was found in the metropolitan areas of Copenhagen (Næss 2006a), Oslo (Holden and Norland 2005) and the Danish city of Aalborg (Nielsen 2002), but not in the little Danish town of Frederikshavn (Næss and Jensen 2004).

This chapter focuses on the possible counteracting effects of living in dense inner-city urban settings in terms of leisure travel and second home ownership and use. Will inner-city residents carry out more and longer leisure trips reducing or counteracting the environmental gains of low daily-life motorized travel? And will they increase their ownership and use of second homes, with the additional land consumption and transportation resulting from a multi-home lifestyle? The chapter draws on research carried out by the author in Norwegian and Danish cities, especially two studies of residential location and travel in the metropolitan areas of Copenhagen (Næss 2006a) and Oslo and Stavanger (the latter an on-going study, cf. Næss 2015a).

Copenhagen and Oslo (with populations within their continuous urban areas of 1.3 million and 0.96 million, respectively) are interesting cases as both cities and city regions have expressed high sustainability ambitions and have for a long time had a focus on land use planning that can reduce the need for car travel. Especially Oslo has for several decades pursued (and is still pursuing) a quite consistent urban containment policy, with a population density increase within the continuous urbanized land of 29 % over the period 1985–2011 (Næss et al. 2011a, b; Næss 2014). Copenhagen metropolitan area has for several decades pursued a policy of channelling urban development to areas adjacent to urban rail stations and has since a decade ago revitalized its famous Finger Plan in order to prevent urban development outside the main public transport corridors (Næss et al. 2011a, b), combined with considerable recent densification in the central parts of Copenhagen. Distinct from Copenhagen and Oslo, Stavanger metropolitan area is a population-wise smaller and more polycentric urban region consisting of the two previously separate cities of Stavanger and Sandnes and with a large employment centre developed in the 1980s and 1990s situated in-between. The continuous urban area of Stavanger-Sandnes has about 210,000 inhabitants. The historical centre of Stavanger is still the dominant centre of the region.

In the next section, the methods of the studies will be briefly outlined. Thereupon, the ‘baseline’ eco-efficient urban spatial characteristics that might give rise to rebound effects will be presented, with a focus on impacts of residential location on weekday travel and land consumption in each of the three cases. In the subsequent sections, the occurrence and importance of the following potential rebound effects will be discussed: Travel by car in the weekend, long-distance non-work trips, private flights, and second-home access and use. After a discussion of the empirical findings, some brief concluding remarks round off the chapter.

11.1 Methods of the Three Case Studies

The two research studies providing the main empirical input of this paper show clear methodological similarities, following a mixed methods research design sometimes referred to as 'The Explanatory Qualitative-Quantitative Method' (Næss 2015b). So far, this approach has been applied and gradually developed further in studies of residential location and travel in the cities/urban regions of Frederikshavn, Copenhagen, Hangzhou, Oporto and most lately Oslo and Stavanger. Distinct from mainstream rebound studies, which tend to concentrate on aggregated data, our approach focuses on the individual actions underlying any aggregate-scale patterns characterized as rebound effects. An important strength of this research design is its better ability to identify causal mechanisms than in studies relying on the comparison of macro data at a national or regional scale. This is especially so because the qualitative interviews provide insight into the backgrounds, motivations and justifications that agents draw on when they make transport-relevant decisions about their participation in activities, location of these activities, modes of transportation and the routes followed. These transport rationales make up important links in the mechanisms by which urban structures influence travel behaviour (Næss 2005, 2013).

The Copenhagen Metropolitan Area study included 17 qualitative interviews with residents living in five different (inner-city and suburban) neighbourhoods, a questionnaire survey comprising 1932 respondents from 29 selected residential neighbourhoods, and a travel diary follow-up survey completed by 273 of the respondents of the first survey. Since data collection in 2001, different aspects of the results have been published in journal articles and books over the subsequent years (see, for example, Næss 2005, 2006b, 2009), including one article addressing particularly the issue of 'compensatory leisure travel' (Næss 2006a). The data collection of the Oslo and Stavanger studies took place in the summer of 2015, and only parts of this material have so far been analysed. Altogether, 33 qualitative interviews were carried out, 17 of which in the Oslo area and 16 in the Stavanger area. Around 3400 persons fully or partially completed the common questionnaire for the two cases. The gross samples were drawn randomly among inhabitants living within broadly defined distance belts around the centres of Oslo, Stavanger and Sandnes, respectively, supplemented with inhabitants of new housing projects in each city region identified by main developers and realtors. Some respondents turned out to have moved away from the case regions and were therefore excluded. The samples used in the analyses consisted of 1992 persons in the Oslo case and 1373 in the Stavanger case, totalling 3365.

In each of the three city cases, the interviews, each lasting for 1–1.5 h, were audio recorded and transcribed. Due to missing answers to some questions, the survey material used in subsequent multivariate analyses includes a lower number of respondents than the number of returned questionnaires. More details about the methods of each study can be found in the publications cited above and in forthcoming articles on residential location and travel based on the Oslo and Stavanger studies. The purpose of the present paper is not to once again present the methodology and bring the main results of these studies, but instead to highlight some aspects that can help shedding light on any rebound effects of transport-reducing residential location.

11.2 Residential Location: Impacts on Daily-Life Travel Behaviour and Land Consumption

Apart from various environmental impacts of residential location in the form of travel (see below), land consumption is another important part of the ecological footprint of housing development. There are clear centre-periphery gradients in land consumption per capita in all the three city cases, with lower land consumption in the inner than in the outer parts (Table 11.1).

The smaller difference between inner city and suburb in Stavanger than in the two other city regions must be seen in the light of the smaller population size of the former city. Its dense inner city therefore covers only a part of the distance belt within the 5 km range from the centre.

A number of studies have found that energy consumption and CO_2 emissions from transportation decrease with higher density for the city as a whole (Newman and Kenworthy 1999; Næss 1993; Næss et al. 1996; Lefévre 2010). An even higher number of studies have found that suburbanites tend to travel longer distances for daily-life purposes than their inner-city counterparts and carry out a higher proportion of their travel by motorized modes, especially the private car (see Næss 2012 for an overview). This tendency is also evident in our three case cities. Focusing on travel by car over the weekdays from Monday to Friday, Fig. 11.1 shows that residents of the outer suburbs of each metropolitan area travel 2–3 times longer distances by car than those living close to the main city centre. In this figure as well as in the figures presented later in the paper, the respondents have been divided into groups according to the distance from their dwelling to the centre of each city region, with approximately similar numbers of respondents in each distance belt. Since there is considerable difference in car travel distances between those living in the innermost parts of the inner distance belt and those living four or five kilometres away from the city centre, the actual differences in car travel between central and peripheral locations are even larger than what can be seen in the graphs.

Table 11.1 Approximate[a] land consumption (m^2) per inhabitant in the local areas of respondents living within different distance belts from the city centres of Oslo and Copenhagen

Oslo, 2015				Stavanger, 2015				Copenhagen, 2001			
0–6 km	6–13 km	13–22 km	Over 22 km	0–5 km	5–9 km	9–15 km	Over 15 km	0–6 km	6–15 km	15–28 km	Over 28 km
62	154	190	247	147	194	204	230	58	131	286	317

[a]Land consumption in Oslo and Stavanger-Sandnes measured per inhabitant within the 100 × 100 m grid unit within which the residence is located; in Copenhagen within the demarcation of the specific residential area

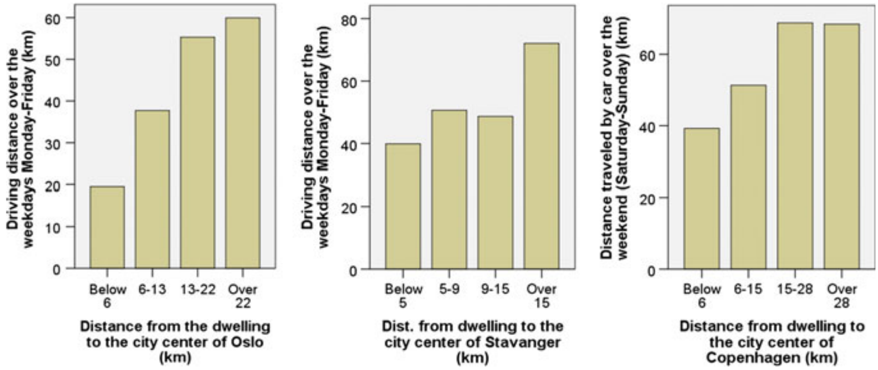

Fig. 11.1 Distances travelled as car driver (Great Oslo, to the *left*, and Stavanger, in the *middle*) and as car driver or passenger (Greater Copenhagen, to the *right*) over the five weekdays (Monday–Friday) among respondents living within different distance belts from the main city centre of each metropolitan area. $N = 1654$ (Oslo), 1132 (Stavanger) and 1798 (Copenhagen)

Needless to say, the amount of car travel on weekdays is influenced not only by the location of the dwelling. A number of individual characteristics also play a role (together with the general economic, social, political and cultural conditions of a society). However, after conducting statistical control for a range of socioeconomic and demographic factors,[1] residential location stands out with considerable influences on car travel. In all the three city regions, the distance from the dwelling to the main city centre is the residential location variable showing the strongest influence (Beta values of 0.324, 0.232 and 0.166, respectively, in the Oslo, Stavanger and Copenhagen case, $p = 0.000$ in all cases). In Oslo and Stavanger, these effects are also stronger than the effects of any of the demographic and socioeconomic variables. Like proximity to the main centre, living at a short distance from the closest second-order centre also contributes to reduce car driving, but with smaller effects than those of the distance to the main centre (Beta values for Oslo, Stavanger and Copenhagen of 0.059, 0.121 and 0.080, respectively). The stronger effect of the distance to second-order centre in Stavanger reflects the more polycentric structure of this urban region. The distance from the residence to the closest local centre shows generally weaker and more uncertain effects, especially in Stavanger (Beta values for the three respective city regions of 0.047, 0.017 and 0.065).

For most travel purposes, people do not necessarily choose the closest facility, but rather they travel a bit further if they can then find a better facility. This is especially true as regards workplaces. Travel distances therefore depend more on the location of the dwelling relative to large concentrations of facilities than on the distance to the closest facilities. People who live close to the city centre have a large

[1]Age, gender, workforce participation, income, education level, and number of children in the household aged below 7 and 7–17.

number of facilities within a short distance from the dwelling and therefore do not have to travel long, even if they are very selective as to the quality of the facility. Since travel distances are often short, inner-city residents also carry out a higher proportion of trips by bike or on foot.

In all the city cases, similar patterns as for car travel were also found for total weekday travel distances and commuting distances. Travel by non-motorized modes showed the opposite tendency, with longer walking and biking distances travelled by inner-city residents than suburbanites, and a much higher share of the total travel distance accounted for by these modes. Furthermore, distances travelled for a number of non-work daily-life purposes tended to be considerably shorter when living in a central part of the metropolitan area. Both in Greater Oslo and in the Stavanger-Sandnes area, residents living in central areas tend to travel shorter distances than their more peripherally residing counterparts to reach places for entertainment and culture, restaurants or cafes, grocery stores, sites for physical exercise, private services such as banks or hairdressers, libraries and religious buildings. The same applies to the distances travelled to places where passengers are picked up or dropped off. Proximity to the main city centre, the closest second-order centre as well as to a local centre contributes to reduce the above-mentioned trip distances. Inner-city dwellers, who usually live close to the main city centre as well as several local centres, therefore tend to travel considerably less than suburban residents for intra-metropolitan leisure and other non-work activities.

As shown above, the direct environmental and climate benefits of dense urban development are evident—but what about counteracting rebound and compensatory effects?

11.3 Weekend Driving

The Copenhagen interviews conducted in 2001 showed some examples of mechanisms that might lead to less weekend travel when living in a low-density residential environment. These mechanisms must be considered ‘compensatory’ rather than rebound effects in a resource efficiency sense. The following statement by an interviewee who had moved from an apartment to a row house with garden is illustrative:

> When we lived in a flat, then we were much more out. Then we went to Klampenborg [an area with a park in a northern suburb] and to the seaside… after we have got a [row] house, … we aren’t so much out because we haven’t such a [need], the children can play out in the street and they have their playmates and they have grown bigger and we have the garden, haven’t we. … [When we lived in a flat,] we were almost out every weekend for some activity (female support educator, 47 years old, living in an old row house close to the city centre of Copenhagen).

This mechanism is, however, countered by other mechanisms. The quantitative material of the Copenhagen study indicates that inner-city dwellers travel longer

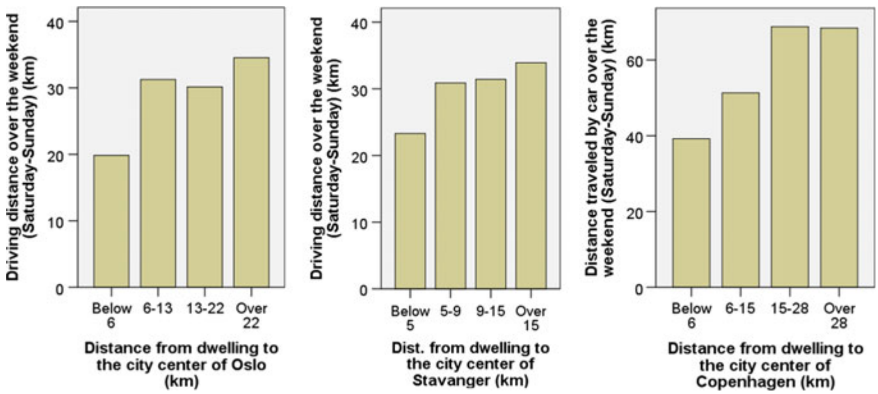

Fig. 11.2 Distances travelled as car driver (Greater Oslo, to the *left*, and Stavanger-Sandnes, in the *middle*) and as car driver or passenger (Greater Copenhagen, to the *right*) over the weekend (Saturday–Sunday) among respondents living within different distance belts from the main city centre of each metropolitan area. N = 1654 (Oslo), 1132 (Stavanger) and 1798 (Copenhagen)

distances to reach recreational forests and shores but visit such areas less often than their suburban counterparts. Moreover, trips to green areas are not the only, or dominant, part of leisure travel. Many of the out-of-home leisure activities that people engage in take place in typical urban settings, cf. above.

Total travelling distances during the weekend are therefore considerably longer among suburbanites than among those living close to the city centre. This is especially so for car travel, since suburbanites are more frequent car users than inner-city dwellers. In line with this, Fig. 11.2 shows how the distances travelled by car during the weekend are considerably longer among residents living in the peripheral than in the central parts of the metropolitan areas of Oslo, Stavanger as well as Copenhagen.

This holds true also when taking into consideration the influences of a number of socioeconomic and demographic characteristics of the respondents (Table 11.2). The absolute values of the standardized regression coefficients, shown in bold italics, indicate the relative strength of each variable. High income, being male, high age, small children in the household, a high education level and workforce participation all show effects in terms of increased weekend driving distances in one or more of the three case regions. The location of the dwelling relative to the main city centre is, however, the variable showing on average the strongest influence (measured by the standardized regression coefficients) across the three case regions, with strong and statistically significant effects in each city region. In Stavanger and Copenhagen, there are also tendencies of more weekend car travel when living far away from the closest second-order centre, but these effects are weaker and statistically significant only in Stavanger.

Table 11.2 Factors influencing the logarithm of the driving distance[a] over the weekend (Saturday–Sunday) among respondents in the metropolitan areas of Oslo and Copenhagen

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)			Level of significance (*p* values), *T* values in parentheses		
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Copenhagen 2001	Oslo 2015	Stavanger 2015	Copenhagen 2001
Residential location variables						
Logarithm of the distance (in km) to the main city centre	0.836 ***0.280***	0.554 ***0.202***	0.357 ***0.179***	0.000 (10.63)	0.000 (5.96)	0.000 (5.00)
Logarithm of the distance (in km) to the closest second-order centre	0.063 ***0.024***	0.230 ***0.085***	0.153 ***0.064***	0.317 (1.00)	0.010 (2.57)	0.080 (1.75)
Logarithm of the distance (in km) from the dwelling to closest local centre[b]	0.089 ***0.027***	−0.002 **−0.001**	0.045 ***0.029***	0.275 (1.09)	0.985 (−0.02)	0.358 (0.92)
Control variables[c]						
Personal annual income (in Oslo and Stavanger measured in classes of income; in Copenhagen measured in 1000 DKK)	0.301 ***0.265***	0.234 ***0.256***	0.001 ***0.164***	0.000 (7.81)	0.000 (5.89)	0.000 (5.56)
Gender (female = 1, male = 0)	−0.532 ***−0.101***	−0.425 ***−0.098***	−0.280 ***−0.069***	0.000 (−4.26)	0.000 (−3.15)	0.007 (−2.68)
Age	0.025 ***0.158***	0.015 ***0.110***	0.004 ***0.027***	0.000 (5.61)	0.001 (3.30)	0.385 (0.868)
Number of household members below 7 years	0.394 ***0.086***	0.197 ***0.053***	0.281 ***0.078***	0.000 (3.62)	0.076 (1.78)	0.004 (2.90)
Workforce participation	0.291 ***0.051***	0.471 ***0.096***	0.248 ***0.052***	0.097 (1.66)	0.010 (2.58)	0.081 (1.74)
Education level (in Oslo and Stavanger 5-level scale; in Copenhagen 2-level scale)	−0.050 ***−0.024***	0.087 ***0.053***	0.056 ***0.012***	0.357 (−0.92)	0.112 (1.59)	0.424 (0.800)

(continued)

Table 11.2 (continued)

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)			Level of significance (p values), T values in parentheses		
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Copenhagen 2001	Oslo 2015	Stavanger 2015	Copenhagen 2001
Number of household members aged 7–17	0.118 ***0.032***	0.015 ***0.006***	0.047 ***0.021***	0.501 (0.67)	0.843 (0.20)	0.670 (0.43)
Constant	48.53	28.25	−3.00	0.000 (5.40)	0.001 (3.22)	0.000 (-5.13)

Oslo: N = 1516, Adj. R^2 = 0.258; Stavanger: N = 1000, Adj. R^2 = 0.193; Copenhagen; N = 1436, Adj. R^2 = 0.117

[a]In the Oslo and Stavanger studies, the variable includes only travel as car driver. In the Copenhagen study, distance travelled as car driver as well as car passenger is included

[b]In the Copenhagen study defined as the closest S-train station

[c]In the original analyses, possession of driver's license for car, and whether or not the respondent has moved to the present dwelling less than 2 years ago (Oslo and Stavanger) or 5 years ago (Copenhagen) were included among the control variables. Since none of these variables showed significant effects while at the same time a considerable number of respondents had missing values for these variables, they were omitted in the final analyses in order to keep the number of respondents included in the analyses as high as possible

Table 11.3 Factors influencing the frequency of long-distance trips[a] over the last month among respondents in the metropolitan areas of Oslo, Stavanger and Copenhagen

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)			Level of significance (*p* values), *T* values in parentheses		
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Copenhagen 2001	Oslo 2015	Stavanger 2015	Copenhagen 2001
Residential location variables						
Logarithm of the distance (in km) to the closest second-order centre	0.065 ***0.041***	0.076 ***0.040***	−0.070	0.130 (1.52)	0.254 (1.14)	0.563 (0.34)
Logarithm of the distance (in km) to the main city centre	0.019 ***0.010***	−0.001 ***-0.001***	−0.077	0.726 (0.35)	0.987 (−0.02)	0.425 (0.64)
Logarithm of the distance (in km) from the dwelling to closest local centre[b]	0.007 ***0.003***	0.001 ***0.001***	−0.024	0.904 (0.12)	0.984 (0.02)	0.732 (0.12)
Control variables[c]						
Personal annual income (in Copenhagen: measured in 1000 DKK, in Oslo measured in classes of income)	0.104 ***0.152***	0.115 ***0.182***	0.0015	0.000 (3.98)	0.000 (3.93)	0.000 (21.50)
Number of household members below 7 years	−0.146 ***−0.053***	−0.249 ***−0.097***	0.094	0.050 (−1.96)	0.003 (−3.02)	0.467 (0.53)
Number of household members aged 7–17	0.014 ***0.006***	0.031 ***0.017***	−0.296	0.813 (−0.24)	0.580 (0.55)	0.008 (7.05)
Education level (in Oslo and Stavanger 5-level scale; in Copenhagen 2-level scale)	0.000 ***0.000***	0.010 ***0.008***	0.329	0.996 (0.01)	0.812 (0.24)	0.032 (4.63)
Age	−0.005 ***−0.052***	−0.009 ***−0.098***	0.013	0.102 (1.64)	0.007 (2.70)	0.043 (4.09)
Gender (female = 1, male = 0)	−0.005 ***−0.001***	−0.019 ***−0.006***	−0.249	0.957 (−0.05)	0.849 (−0.19)	0.087 (2.93)

(continued)

Table 11.3 (continued)

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)			Level of significance (p values), T values in parentheses		
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Copenhagen 2001	Oslo 2015	Stavanger 2015	Copenhagen 2001
Workforce participation	−0.149 ***−0.043***	−0.157 ***−0.046***	0.257	0.211 (−1.25)	0.248 (−1.16)	0.216 (1.53)
Constant	−8.06	−16.12	−1.497	0.188 (−1.32)	0.015 (2.45)	0.113 (2.51)

Oslo: N = 1581, Adj. R^2 = 0.013; Stavanger: N = 1059, Adj. R^2 = 0.022; Copenhagen; N = 1531, Nagelkerke R^2 = 0.074

[a]In the Oslo and Stavanger study, the variable refers to the number of trips to destinations further than 100 km from the dwelling during the last month. In the Copenhagen study, the variable refers to whether or not the respondent made any trips to destinations outside the island of Zealand during the last week. Commuting trips and official trips are not included in any of the cases

[b]In the Copenhagen study defined as the closest S-train station

[c]In the original analyses, possession of driver's license for car, and whether or not the respondent has moved to the present dwelling less than 2 years ago (Oslo and Stavanger) or 5 years ago (Copenhagen) were included among the control variables. Since none of these variables showed significant effects while at the same time a considerable number of respondents had missing values for these variables, they were omitted in the final analyses in order to keep the number of respondents included in the analyses as high as possible

Table 11.4 Factors influencing the number of private flights (Oslo case) and flight-based holiday trips (Copenhagen case) over the last twelve months among respondents in the metropolitan areas of Oslo and Copenhagen

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)			Level of significance (p values), T values in parentheses		
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Copenhagen 2001	Oslo 2015	Stavanger 2015	Copenhagen 2001
Residential location variables						
Logarithm of the distance (in km) to the main city centre	−0.289 ***−0.123***	−0.270 ***−0.099***	−0.118 ***−0.139***	0.000 (−4.01)	0.006 (−2.75)	0.000 (−3.82)
Housing type (single-family house = 1, other = 0)	0.104 ***0.024***	0.314 ***0.073***	0.061 ***0.035***	0.409 (0.83)	0.023 (2.28)	0.217 (1.24)
Logarithm of the distance (in km) to the closest second-order centre	−0.094 ***−0.046***	−0.088 ***−0.033***	0.034 ***0.033***	0.088 (−1.71)	0.344 (−0.95)	0.351 (0.93)
Logarithm of the distance (in km) to closest local centre[a]	−0.011 ***−0.004***	0.029 ***0.010***	0.019 ***0.028***	0.879 (−0.15)	0.742 (0.33)	0.355 (0.93)
Control variables[b]						
Personal annual income (in Oslo and Stavanger measured in classes of income; in Copenhagen measured in 1000 DKK)	0.225 ***0.250***	0.251 ***0.278***	0.001 ***0.245***	0.000 (6.69)	0.000 (6.08)	0.000 (8.54)
Number of household members below 7 years	−0.504 ***−0.140***	−0.535 ***−0.147***	−0.243 ***−0.159***	0.000 (−5.30)	0.000 (−4.64)	0.000 (−6.05)
Number of household members aged 7–17	−0.277 ***−0.097***	−0.278 ***−0.108***	−0.140 ***−0.120***	0.000 (−3.69)	0.001 (−3.40)	0.000 (−4.77)
Gender (female = 1, male = 0)	0.471 ***0.114***	0.435 ***0.102***	0.122 ***0.071***	0.000 (4.31)	0.002 (3.08)	0.005 (2.82)
Age	−0.024 ***−0.149***	−0.019 ***−0.143***	−0.003 ***−0.049***	0.000 (−6.18)	0.000 (3.98)	0.110 (−1.60)

(continued)

Table 11.4 (continued)

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)			Level of significance (p values), T values in parentheses		
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Copenhagen 2001	Oslo 2015	Stavanger 2015	Copenhagen 2001
Education level (in Oslo and Stavanger 5-level scale; in Copenhagen 2-level scale)	0.050 ***0.031***	0.076 ***0.046***	0.161 ***0.093***	0.284 (1.07)	0.183 (1.33)	0.000 (3.52)
Workforce participation	−0.294 ***−0.065***	−0.062 ***−0.013***	0.038 ***0.019***	0.054 (−1.93)	0.747 (−0.32)	0.513 (0.66)
Constant	−45.16	−35.00	1.148	0.000 (−5.76)	0.000 (−3.71)	0.000 (4.47)

Oslo: N = 1512, Adj. R^2 = 0.091; Stavanger: N = 1027, Adj. R^2 = 0.089; Copenhagen; N = 1542, Adj. R^2 = 0.112

[a]In the Copenhagen study defined as the closest S-train station

[b]In the original analyses, possession of driver's license for car, and whether or not the respondent has moved to the present dwelling less than 2 years ago (Oslo and Stavanger) or 5 years ago (Copenhagen) were included among the control variables. Since none of these variables showed significant effects while at the same time a considerable number of respondents had missing values for these variables, they were omitted in the final analyses in order to keep the number of respondents included in the analyses as high as possible

Table 11.5 Factors influencing the number of visits to secondary home(s) over the last twelve months among respondents in the metropolitan areas of Oslo (N = 1512, Adj. R^2 = 0.055) and Stavanger (N = 1027, Adj. R^2 = 0.073)

	Unstandardized coefficients (above), standardized coefficients (below, bold italics)		Level of significance (*p* values), *T* values in parentheses	
Metropolitan area and year of investigation	Oslo 2015	Stavanger 2015	Oslo 2015	Stavanger 2015
Residential location variables				
Logarithm of the distance (in km) to the main city centre	−0.093 ***−0.007***	−2.414 ***−0.126***	0.830 (−0.22)	0.001 (−3.44)
Logarithm of the distance (in km) to the closest second-order centre	0.944 ***0.079***	−1.061 ***−0.056***	0.004 (2.89)	0.111 (−1.60)
Housing type (single-family house = 1, other = 0)	0.322 ***0.012***	2.653 ***0.088***	0.668 (0.43)	0.007 (2.70)
Logarithm of the distance (in km) from the dwelling to closest local centre	0.888 ***0.057***	−0.115 ***−0.006***	0.038 (2.07)	0.854 (−0.19)
Control variables[a]				
Age	0.088 ***0.118***	0.199 ***0.212***	0.000 (3.72)	0.000 (5.86)
Personal annual income (measured in classes of income)	0.899 ***0.171***	0.497 ***0.078***	0.000 (4.48)	0.092 (1.69)
Workforce participation	−2.327 ***−0.088***	−0.776 ***−0.022***	0.011 (−2.56)	0.569 (−0.57)
Number of household members below 7 years	−1.210 ***−0.057***	0.650 ***0.025***	0.033 (−2.13)	0.429 (0.79)
Gender (female = 1, male = 0)	1.325 ***0.055***	−1.245 ***−0.041***	0.042 (2.03)	0.217 (−1.24)
Education level (5-level scale)	−0.180 ***−0.019***	−0.708 ***−0.061***	0.520 (−0.64)	0.083 (−1.74)
Number of household members aged 7–17	−0.243 ***−0.015***	0.393 ***0.022***	0.587 (−0.54)	0.500 (0.68)
Constant	172.9	461.8	0.000 (3.69)	0.000 (5.99)

[a]In the original analyses, possession of driver's license for car, and whether or not the respondent has moved to the present dwelling less than 2 years ago were included among the control variables. Since none of these variables showed significant effects while at the same time a considerable number of respondents had missing values for these variables, they were omitted in the final analyses in order to keep the number of respondents included in the analyses as high as possible

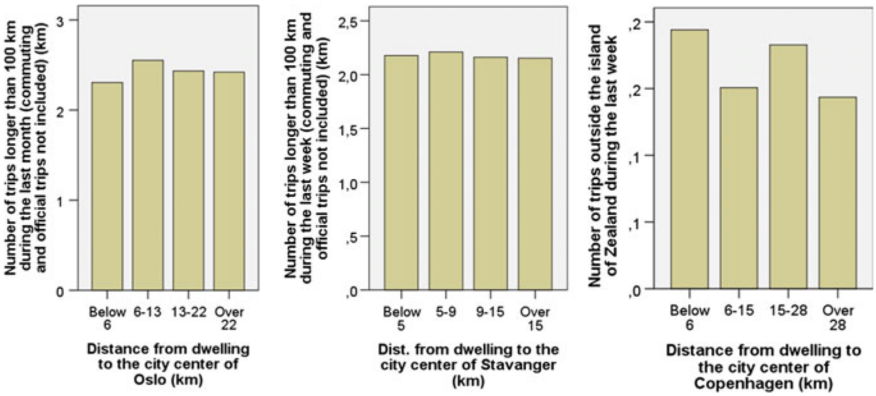

Fig. 11.3 Number of long-distance trips over the last month among respondents living within different distance belts from the city centres of Greater Oslo (to the *left*), Stavanger (in the *middle*) and Greater Copenhagen (to the *right*). Long-distance trips are defined as trips to destinations further than 100 km from the dwelling in the Oslo and Stavanger cases and as trips to destinations outside the island of Zealand in the Copenhagen case. Commuting trips and official trips are not included in any of the cases. N = 1850 (Oslo), 1132 (Stavanger) and 1914 (Copenhagen)

11.4 Long-Distance Trips

In neither of the three city regions, the frequency of long-distance non-work trips seems much affected by residential location. As can be seen in Fig. 11.3, there are very small differences in the average number of non-work trips longer than 100 km between the different distance belts in the Oslo and Stavanger cases. In Copenhagen, where the question posed was about trips outside the island on which the city is located, the frequency of such trips is higher among inner-city dwellers, but the pattern across distance belts is somewhat unclear. Controlling for socioeconomic and demographic characteristics, we find no significant effects of residential location (Table 11.3).

11.5 Flights

Some authors have found a higher frequency of flights among central-city residents (Holden and Norland 2005; Næss 2006a; Ornetzeder et al. 2008). Especially Holden and Norland have pointed at this correlation as a serious challenge to the sustainability of urban densification strategies. In my own study of Copenhagen metropolitan area, I also found such a correlation, but it was difficult to find any plausible causal explanation. I therefore concluded that the relationship was most likely produced by lifestyle factors disposing certain segments of the population both for preferring inner-city living and visits to large cities abroad (Næss 2006a).

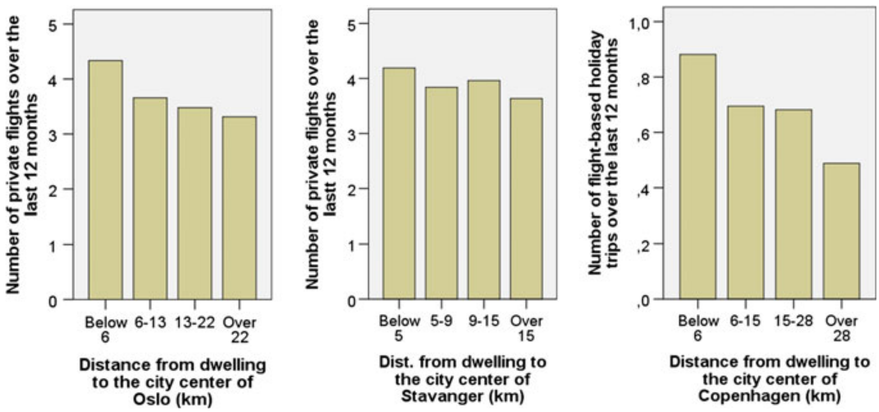

Fig. 11.4 Number of private flights (Oslo and Stavanger cases) and flight-based holiday trips (Copenhagen case) over the last twelve months among respondents living within different distance belts from the city centres of Greater Oslo (to the *left*), Stavanger-Sandnes (in the *middle*) and Greater Copenhagen (to the *right*). $N = 1849$ (Oslo), 1285 (Stavanger-Sandnes and 1932 (Copenhagen)

The new material from Oslo and Stavanger adds to the Copenhagen findings about the association between inner-city living and higher frequency of private flights. Distinct from the Copenhagen study, where the questions asked of the respondents were about the number of flight-based holiday trips, the Oslo and Stavanger questionnaire asked about the number of private (i.e. non-work) flights over the last twelve months. As can be seen in Fig. 11.4, the number of such flights is higher among respondents living close to the city centres of Oslo as well as Stavanger, yet with a less clear pattern in the latter case. The difference across distance belts is not directly comparable with the Copenhagen case, where only flights making up the main part of a holiday trip were included. There does seem, however, to have occurred a quite substantial increase from 2001 to 2015 in the overall amount of flights, regardless of residential location.

When taking into consideration the effects of socioeconomic and demographic variables (Table 11.4), a statistically significant effect of the distance from the dwelling to the main city centre remains in all three cases, with more flights the closer to downtown the respondents live. In the Stavanger case, we at the same time see a tendency of more frequent flights when living in a single-family house.

As might be expected, the number of flights is influenced by a number of socioeconomic and demographic factors. In all three cases, the number of flights tends to get higher if the respondent has high income, none or few children in the household, and/or is female. In the Oslo and Stavanger cases, we also find a tendency of more flights among younger persons and in Copenhagen among person with a long education.

One possible mechanism consistent with the hypothesis of compensatory travel could be that people living in urban settings where outdoor recreation opportunities are poor fly to tourist resorts in order to perform such activities. However, in all three city regions, the number of flights is very weakly related to the proximity of the dwelling to the closest green recreation area of 10 ha or more. Controlling only for socioeconomic and demographic variables, the effects of the distance to such a green area on flights are rather weak ($p = 0.034$ in Oslo, 0.066 in Stavanger and 0.064 in Copenhagen), and not at all statistically significant when comparing respondents living at similar distances from the main city centre, second-order centre and local centre in the Oslo and Stavanger cases. In Copenhagen, there is still a weak but uncertain effect ($p = 0.071$). A similar pattern is found for the statistical relationships between living in a single-family house and the number of flights. A very weak and uncertain flight-reducing effect can be found when controlling only for socioeconomic and demographic variables ($p = 0.139$) in the Oslo case. If also adjusting for the distance from the dwelling to the different categories of centres, the effect of single-family house on flights disappears. In Stavanger and Copenhagen no such effects can be seen, and in Stavanger there is even a weak tendency of increased flight frequency among single-family house dwellers ($p = 0.023$) when controlling for socioeconomic and demographic variables as well as for the location of the residence relative to urban centres.

The effects of inner-city dwelling on flights shown in Table 11.4 thus leave us with a conundrum. Let us therefore turn to the qualitative interviews to see if they can show any mechanisms plausibly having produced these effects.

11.5.1 Narratives About Flights by Interviewees Living in Different Geographical Contexts

A soon-to-be retired interviewee in Oslo living with his wife very close to the city centre (and the main railway station) pointed to easy access to the airport shuttle train as one of the benefits of their new residential location:

> We live close to everything here in Bjørvika – we just take the lift downstairs and then we are at the airport train platform. (Couple living in the Barcode downtown housing area, Oslo).

It is still hard to see that this opportunity would really be important to many inhabitants' decisions on whether or not to make flights, except maybe for a few very spontaneous trips.

A statement by one of the interviewees of the Copenhagen study may give another clue:

> And then we've also spent our vacation doing up our house. Last year it was the gutters, you know, and this year we dug up the entrance…. So the holiday is spent on that, you know…. Both money and holiday disappear. Sure, we take them from the same purse. (Male janitor, 55 years old, living in a single-family house in a suburb 27 km from the city centre of Copenhagen).

Conversely, a Stavanger interviewee who had moved from a relatively centrally located single-family house to a suburban apartment stated:

> …it had to be an apartment; this was why we moved from the house, because we have a cabin in the southernmost part of Norway, and we wanted to use it as much as we wish. And not feel that we should now be at home mowing the lawn or … oh, who's watering the flowers or … oh, now we need to stain the walls again this year, or…. And during the winter half year we fancy travelling, and if we just find out that now we find a cheap air ticket to that place; then we only lock the door here, and then this apartment manages itself" (female shopkeeper, 50 years old, living in an apartment 8 km from the city centre of Stavanger).

Apparently, living in a single-family house can tie up time and money preventing the residents from making at least some of the (often flight-based) holiday trips that they would otherwise have made. This is in line with the hypothesis of rebound flights, as the above-mentioned vacation-trip-reducing mechanism when living in a single-family house will not be present among inner-city dwellers.

A male civil engineer aged 60, living in a suburban apartment in Sandnes 13 km from the city centre of Stavanger, had moved with his wife from a single-family house not long ago. He said that they were finished with 'house with garden'. They had also more or less dropped going to restaurants in Norway, instead opting for extended weekends in metropolises abroad—or trips to mountain areas or bathing resorts in Austria and Greece. The question remains whether this international travelling was induced by their new status as apartment dwellers or the influence was the opposite: that they did no longer appreciate the private garden because their leisure interests had turned in a different direction.

Contrary to the hypothesis that inner-city living will cause more flights than when living in a suburban single-family house, the narratives of a number of interviewees living in single-family houses in the Copenhagen case as well as in the more recent Oslo and Stavanger cases display very extensive patterns of leisure flights. For example, a female translator, 46 years old, living in single-family house 10 km from the city centre of Stavanger told that the family made two to five annual flights to international destinations, mostly large cities combining opportunities for urban cultural experiences and bathing at the seashore. One of the really frequent flyers was a communication worker, 46 years old, living in a single-family house 6 km from the city centre of Stavanger. She and her husband were bound for leisure trips to Krakow next week, thereupon London, New York and Zanzibar in the course of the next few months. Her husband had a lot of flight bonus points that he had to burn—his job in the oil industry entailed a lot of point-producing official trips. She just laughed about the question of whether you would travel abroad on weekend trips more frequently if you lived centrally.

In the Norwegian contemporary context, going for several leisure trips to destinations abroad seems to be the more or less normal pattern, independently of residential location. A retired couple living in an apartment in the central part of a second-order town told that they went on several trips for bridge tournaments at tourist resorts at the Mediterranean Sea in the autumn and winter. There was, however, no indication that their motive for making this kind of trips had anything to do with their residential situation.

Many interviewees explicitly state that they do not consider their holiday locations and airplane travel to be influenced by where in the metropolitan area they live. For example, asked if she thought she would have spent the vacation differently if she had lived in a single-family house area in one of the suburbs of Oslo instead of in her actual apartment 4 km from the city centre of Oslo, a female 32-year-old engineer who had been flying to Budapest and Tallinn last year answered: “I think it might perhaps have been the same … yes, I do think we would have gone on the same kinds of holiday trips.” This statement was by no means uncommon. A female teacher, 35 years old, living in a single-family house 10 km from the city centre of Stavanger explicitly expressed that she would not have taken on more holiday trips if she had lived in the downtown area. Similarly, a male owner of newly established small freight business, 28 years old, living in apartment 2 km from the city centre of Stavanger stated that the location of the family’s dwelling was not important to their travel to destinations abroad. Likewise, a male engineer, 66 years old, living in apartment close to the city centre of Stavanger held that there was no relationship between the location of the residence and their amount of international travelling.

As can be seen above, many interviewees reject the notion that a centrally located dwelling induces more leisure flights. Our material shows a few statements that might be consistent with the hypothesis of rebound flights, where more opportunities for taking on flights arise when you need not do gardening or spend money on refurbishing a single-family house. However, the mechanisms indicated in these interviews seem rather weak and unlikely to produce strong aggregate-level correlations. It could still be that the influence of inner-city living on flights goes unnoticed by some of the interviewees, for example because they do not reflect on how their ability to afford making flights is affected by how much money they spend on daily-life travel. However, the statistical effect of inner-city living on flights might also, at least partly, be non-causal, generated by, for example, lifestyle preferences disposing some people for inner-city living as well as for visit to cities abroad. I will return to some of these issues in the Concluding Remarks section.

11.6 Secondary Homes

Several authors have hypothesized a compensatory effect of inner-city, high-density living in the form of increased secondary home ownership and usage (Dijst et al. 2005; Modenes and Lopez-Colas 2007; Norris and Winston 2010; Strandell and Hall 2015). In our Copenhagen study too, relationships between residential location and access to summerhouses were investigated. Taking socioeconomic and demographic characteristics into consideration, residents of high-density areas were found to own or in other ways have access to a summer house more frequently than people living in low-density areas. The results were, however, a bit contradictory, as people whose primary dwelling was a single-family house had access to summer houses much more frequently than the remaining respondents, especially in the

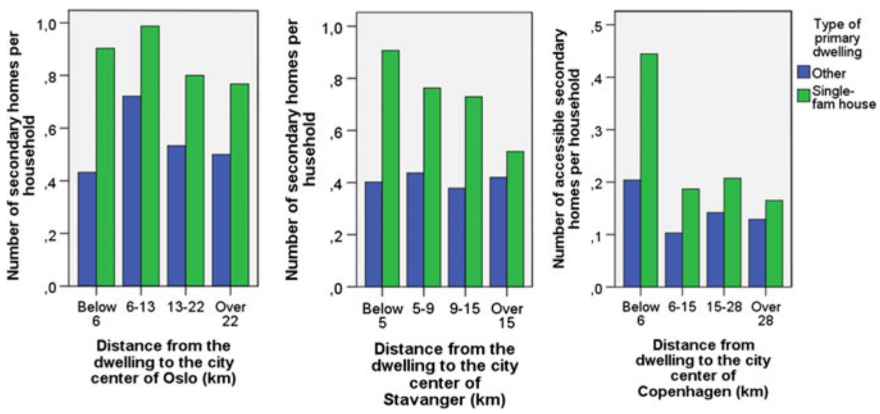

Fig. 11.5 Number of accessible secondary homes among respondents living within different distance belts from the city centres of Greater Oslo (to the *left*), Stavanger/Sandnes (in the *middle*) and Greater Copenhagen (to the *right*, and with different types of primary dwellings). $N = 1826$ (Oslo), 1132 (Stavanger) and 1932 (Copenhagen)

inner city but also within each of the other distance belts. The overall rate of summerhouse access was still clearly higher among those living close to the city centre.

In the new studies in Oslo and Stavanger, respondents were asked about their access to other dwellings than their primary residence, regardless of whether these dwellings were for summer or winter usage or the geographical situation (mountain, forest, shore, city, etc.) in which they were located. As can be seen in Fig. 11.5, people living in single-family homes in Oslo as well as Stavanger have access to secondary homes more frequently than residents of other housing types do. However, while the frequency of secondary home access among single-family house dwellers decreases with increasing distance from the residence to the city centre, there is a slight opposite tendency among those living in other housing types. A multivariate analysis including the same variables as in Tables 11.1, 11.2 and 11.3 showed no statistically significant effect of any of the three residential location variables in either Oslo or Stavanger.

Access to secondary homes does not necessary mean that these facilities are used to any great extent. People may, for example, have inherited a second home without being very enthusiastic users, or they may have inherited a less used second home in addition to the one they normally use. Sometimes such property may also function as an investment object. In the Oslo and Stavanger studies, we also asked about the annual number of visits to each secondary home to which the respondent had access. Among respondents from Oslo metropolitan area, the centre-periphery gradient found for access to secondary homes is reversed when the question is about frequency of use (Fig. 11.6). Respondents living close to the city centre of Oslo make on average considerably fewer trips to secondary homes than their counterparts living in the three outer distance belts. In Stavanger, the situation is

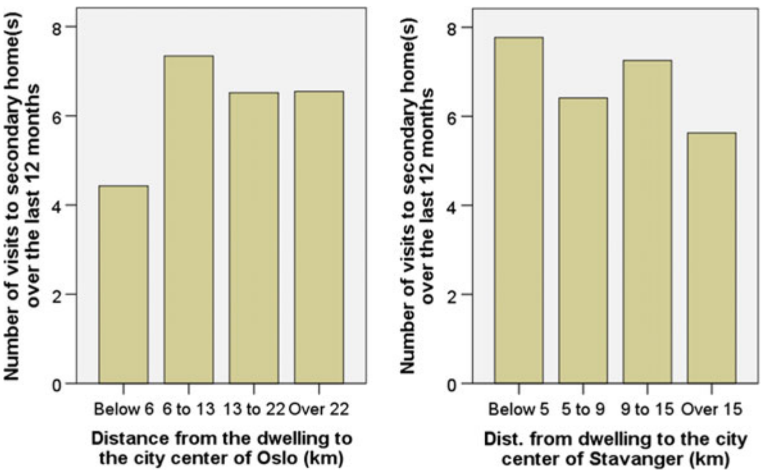

Fig. 11.6 Number of visits to secondary home(s) over the last twelve months among respondents living within different distance belts from the city centres of Oslo (*N* = 1911) and Stavanger (*N* = 1337)

different, with frequencies of use decreasing with increasing distance between the primary dwelling and the city centre.

Controlling for demographic and socioeconomic characteristics of the respondents (Table 11.5), the tendency among inner-city Stavanger residents of a higher frequency of visits to secondary homes persists, while the opposite tendency in the Oslo case is not any longer statistically significant. Instead, we find a tendency in the Oslo case of more frequent visits to secondary homes among respondents living far from the closest second-order centre, and a similar, but weaker effect of living far from the closest local centre. The frequency of visits to secondary homes appears to be influenced primarily by age (more frequent visits among older respondents), income (more visits with high income), workforce participation (fewer visits if you are a worker) and whether there are small children in the household (fewer visits if any of the household members is less than seven years old).

The qualitative interviews illustrate that the use of secondary homes can be quite extensive, especially among relatively affluent middle-class people whose children have moved out of home. The above-mentioned 60-year-old male civil engineer living in a suburban apartment in Sandnes told that he spent approximately 80 days annually in his mountain cabin in a snow-rich area suitable for skiing. Another male engineer, 66 years old had a cabin on an island twenty kilometres away from his apartment in the inner part of Stavanger. He stayed there with his wife during most of the period from spring to autumn, commuting from the cabin to his downtown workplace. However, there were no indications in the interviews underpinning the assumption of a causal relationship between inner-city living and increased usage of secondary homes. On the other hand, ownership and use of secondary home may create a need for car ownership among residents who would otherwise not feel any need for having a car. For example, a 71-year-old retired secretary who lived in apartment in the downtown area of Sandnes (a second-order centre in the Stavanger region) told that they 'had everything within walking distance'. She and her husband still had two cars. The reason for this was, she said, that they had a cabin 150 km down the coast where they lived each year during the time from March/April until September/October.

11.7 Concluding Remarks

Our investigations in the metropolitan areas of Oslo, Stavanger and Copenhagen show that certain individual-scale mechanisms exist, counteracting to some extent and among some residents the effects of resource-saving principles in urban planning. Most of these mechanisms could be characterized as real rebound effects, since the sorts of resource-consuming side effects of otherwise resource-saving residential locations are due to money and time saved from such residential locations. We find few, if any, of the compensatory mechanisms hypothesized in the literature, according to which inner-city dwellers make more frequent, long leisure trips in order to escape dissatisfactory residential environments.

Living in a neighbourhood where the need for car travel is low and you find that you do not need to own a car (or at least that you do not need more than one car in the household) may save you from a lot of expenses. What will this money be spent on? Indirect rebound effects due to money saved are probably hard to avoid. As long as the purchasing power remains the same or increases, resource efficiency improvement resulting in money-saving is like squeezing the balloon. Avoiding such effects seems impossible unless the purchasing power decreases. In a situation with economic growth, the metaphoric balloon is on top of that pumped up with more and more gas.

The identified rebound mechanisms in our three metropolitan cases are not very strong, and countervailing mechanisms exist. In some cases, the rebound mechanisms identified in qualitative interviews with individual persons do not manifest themselves at an aggregate metropolitan scale. For example, any rebound effects are not strong enough to change the environmentally favourable effects of inner-city living for weekend travel, where the effect of a central residential location in terms of reducing car travel is nearly as strong as on weekdays. Our material does not show any effects of residential location on the frequency of private long-distance trips either. The above results are in line with earlier findings in Greater Oslo (Næss et al. 1995) and the Danish small town of Frederikshavn (Næss and Jensen 2004).

Any counteracting effects of inner-city living on secondary home access do not manifest themselves in terms of statistically significant relationships. We find some modest effects of residential location on usage of secondary homes, but whereas living peripherally tends to decrease the frequency of visits to secondary homes in the Stavanger case, the effect of living peripherally is the opposite in the Oslo case.

We do find, however, a tendency of more frequent private flights among inner-city residents of all the three case cities. This tendency corresponds with results reported by Holden and Norland (2005). Although many interviewees reject the existence of any causal influence inducing residents of central-city neighbourhoods to make more flights, our interview material shows a few examples of mechanisms that might push in that direction. These mechanisms do not seem to be very strong or affecting the patterns of leisure travel among any great proportion of the population. Moreover, we find no correlation between the frequency of flights and the time spent on commuting, which should logically be expected if the hypothesis of a flight-hindering effect of time spent on barbeques, gardening and house maintenance among single-family house dwellers were true. Controlling for socioeconomic and demographic variables, the frequency of flights is also very weakly related to the proximity of the dwelling to the closest green outdoor recreation area above 10 ha, especially when comparing dwellings located at similar distances to the city centre.

Instead, a plausible mechanism, hinted at by Næss (2006a), might be that that an 'urban' and cosmopolitan lifestyle, prevalent in particular among young students and academics and among middle-class people whose children have moved out of home, contributes both to an increased propensity for flights and to a preference for inner-city living. This cosmopolitan lifestyle seems to be associated with a prioritization of 'urban' activity opportunities such as cinema, theatre, rock concerts, exhibitions, cafes and outdoor restaurants over the rural and secluded life behind the privet hedges of single-family houses. If these assumptions of a tangled urban-cosmopolitan lifestyle are correct, this lifestyle will be a background factor contributing both to an increased propensity for flights and to a preference for inner-city living. This is still a speculative explanation, since the empirical material of our three studies does not illuminate this issue.

In the contemporary Scandinavian context, inflated housing prices in inner-city districts counteracts the money-saving effect of living in an area where the dependence on car travel and car ownership for accessibility to daily activities is low. Partly, the high inner-city housing prices reflect the lower transportation costs associated with inner-city living: people can then afford to pay a higher price for the dwelling, thus pushing market prices upwards (Christaller 1966). Hence, the money released through lower transportation expenses is shifted on to the sellers and financiers of inner-city dwellings, with indirect rebound effects resulting from the investments made by these actors. However, in the central areas of Oslo and Copenhagen, and to some extent also Stavanger, dwellings are on average smaller than in the suburbs. So although the price per square metre of dwelling in Oslo's inner eastern and inner western districts is currently 30–50 % higher than in the corresponding outer parts of the municipality, the actual purchasing prices per dwelling are likely to show a much less steep centre-periphery gradient. It therefore seems plausible that the combined expenses on (primary) housing and daily-life travel will be on average lower among inner-city residents, thus opening for rebound effects based on surplus of money.

Anyway, the existence of possible rebound effects should not prevent us from seeking to develop our cities in the most environmentally friendly ways possible. Creating car-dependent cities in order to, for example, reduce holiday travel is clearly not a viable strategy—taxes and regulations directly targeting the 'rebound activities' are much more efficient.

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