Introduction

1.1 Essays on urban amenities and location choice

During the past decade, having higher education has become increasingly common among both males and females in the US and in Europe. In 2006 one quarter of the people had received a degree in higher education in the Netherlands (which includes a university degree or a degree of a School for Higher Vocational Education). In 1981 this was only 18 per cent, see Table 1.1.

A person with higher education often has a spouse who has also invested in human capital. Costa and Kahn (2000) refer to couples, of which both members have received a higher education, as ‘power couples’. The number of power couples has increased rapidly in the Netherlands. In 1981 only 5 per cent of households consisted of power couples, while in 2006 this percentage had increased to 10 per cent. The last line of Table 1.1 shows another

1 The process of people choosing their spouse is called ‘assortative mating’. In this process, people do not act randomly but they select a spouse on the basis of particular factors. The characteristics in question can be various, such as age, religion, family background, or education. People with similar characteristics often marry one another (Becker, 1991; Stevens-Long, 1988.)
important trend in the Netherlands, but also in the rest of Europe and the US. That is, if we divide households on the basis of the number of working persons, we see that in 1981 the majority of households were single-earner households (67 per cent). However, especially as a result of labour market participation of women, the share of single-earner households decreased to 30 per cent in 2006. Nowadays the majority of households consist of double-income households.

The highly-educated have distinct residential preferences. For example, the literature is full of evidence that the location decision of the highly-educated population is influenced by the presence or absence of amenities (Glaeser et al., 2000; Clark et al., 2002; Whisler et al., 2008). Gottlieb and Joseph (2006) find that PhD graduates are particularly responsive to amenities when making their locational choices. There is also evidence that the higher-educated population itself becomes an amenity that attracts other high-educated migrants (Waldorf, 2009; Gottlieb and Joseph, 2006; Whisler et al., 2008). Hence the higher-educated population itself is thus self-propelling and (because of the high migration propensities of the higher-educated) can rapidly transform the regional and local population.

**Table 1.1 Household trends in the Netherlands 1981-2006 (in percentages)**

<table>
<thead>
<tr>
<th>Share of the education level</th>
<th>1981</th>
<th>2006</th>
</tr>
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<tbody>
<tr>
<td>Person with a low education</td>
<td>82.2</td>
<td>73.8</td>
</tr>
<tr>
<td>Person with a high education</td>
<td>17.8</td>
<td>26.2</td>
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<thead>
<tr>
<th>Share of households, by educational level</th>
<th>1981</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single, low-educated</td>
<td>11.85</td>
<td>31.07</td>
</tr>
<tr>
<td>Single, higher-educated</td>
<td>5.20</td>
<td>10.51</td>
</tr>
<tr>
<td>Couple, both partners low-educated</td>
<td>61.25</td>
<td>35.29</td>
</tr>
<tr>
<td>Couple, one spouse higher-educated</td>
<td>16.59</td>
<td>13.26</td>
</tr>
<tr>
<td>Couple, both partners higher-educated ‘power couples’</td>
<td>5.11</td>
<td>9.88</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Share of households, by labour market participation</th>
<th>1981</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single worker</td>
<td>17.05</td>
<td>30.24</td>
</tr>
<tr>
<td>Single-earner household</td>
<td>66.59</td>
<td>29.33</td>
</tr>
<tr>
<td>Double-income household</td>
<td>16.36</td>
<td>40.42</td>
</tr>
</tbody>
</table>

Source: Housing Needs Survey 1981 and 2006, own calculations. In order to be qualified as higher educated an individual should have completed higher vocational training or have obtained a university degree. A person is defined as working if he or she works 12 hours or more a week.

In regional development human capital plays a crucial role. Human capital consists of the knowledge, skills and experience which a person can acquire. Education and job experience can thus be seen as investments in human capital. As human capital flows into a region, productivity rises, the labour market becomes more efficient, and the flow of information
and innovations increases in that region (Simon, 1998; Moretti, 2004). Losing the higher-educated is expected to eventually take a toll on local and regional economies. It is therefore not surprising that among policy makers, cities, regions and countries, the competition for highly-educated residents is fierce. It is therefore important to examine which factors affect the location choices of the higher-educated.

Part I of this thesis focuses on the relationship between household characteristics and their residential choice. Special attention is given to what are called ‘power couples’, of which both members couples are higher-educated. Part II of the thesis looks more deeply at the costs and benefits of the provision of urban amenities (and disamenities), and analyses whether the supply of an urban amenity: namely, parks and public gardens, and an urban disamenity: namely, aircraft noise, are optimal.

1.2 Changing demand for residential location and urban amenities

The increase in welfare has led to a changing demand for housing and its environment (VROM-raad, 2007). Costa (1997) shows that, between 1950 and 1990, the share of personal income in the United States spent on transportation and housing rose from 24 per cent to 35 per cent. This result can be interpreted as an increase in the demand for housing services in order to get a desirable place to live. Studies into time use by the Netherlands Institute for Social Research (SCP) show that there is a clear trend towards the city becoming a popular place to spend leisure time. From the mid-1990s activities that are mostly located in cities, such as ‘fun shopping’ and visits to cafés and restaurants, theatres, and other cultural amenities, became increasingly popular especially for the higher-educated. Such shifts in recreational behaviour are also found in the use of the Amsterdam parks. The Big Greenery Study (Gadet and Smeets, 2009) shows that, over the period 1996 to 2008, the use of Amsterdam’s greenery by its residents almost doubled.

The increase of household welfare is especially applicable for couples. Due to the increase of the labour participation of women, most of the time couples are in a better financial position than singles. Even if one spouse only works two or three days, and the other spouse works full-time, then they still have a higher income than singles. However, if both spouses are working, the location choice is more difficult. By living in the same residence couples have to cope with the fact that both spouses are geographically constrained in the labour market (Frank, 1978; Costa and Kahn, 2000). This complex work-
home relation is expected to be even more severe for the higher-educated. Jobs requiring a high level of education have a lower spatial density than jobs requiring a low level of education (Simpson, 1992). As a result, workers with specific skills have to be more flexible spatially. Costa and Kahn (2000) argue that the facilities that dense urban labour markets offer are especially attractive for highly-educated couples. Several studies have confirmed that the highly-educated prefer to live in cities. Urban amenities, better job opportunities, higher wages, learning opportunities are mentioned in the literature as explanatory facts for this trend (Borjas et al., 1992; Glaeser, 1999; Green, 1997; Costa and Kahn, 2000).

The increase in welfare also increases the demand for individual choices rather than joint choices. The demands for floor area, layout, and appearance are higher. In addition, connections with other places are becoming more and more important, due to the increase of the value of time. Moreover, people are willing to travel further for work, living and recreation. Hence, the location choice is no longer simply more connected to the working place, but depends on developments in the labour market, mobility, ICT, and the spatial planning policy of the government (VROM-raad, 2007).

1.3 Land use planning and the supply of urban amenities

Spatial planning produces a variety of local amenities. It ‘produces’, for example, open space, and it regulates the provision of industrial land use and separates it from residential land uses. From an economic point of view, the key justification for the implementation of spatial planning is that the allocation of amenities or parcels of land by private markets leads to inefficient, inequitable, or otherwise undesirable social outcomes. In the densely populated Netherlands it is not surprising that the Dutch government has opted for a rather strong involvement in the regulation of land use and of residential construction. A broad range of goals has been formulated over the course of time, such as the strong positioning of the Dutch city system in an international context, improvements to the international accessibility of cities and main ports, nature conservation, the reservation of sufficient space for residential and industrial purposes, and the achievement of spatial diversity and variety. In addition to these objectives, related to the public interest, there are, of course, the interests of individuals living in the dwellings, or waiting for a dwelling to be constructed (Rietveld and Wagendonk, 2004). After WWII the shortages on the housing market, especially in the large cities in the Randstad, were a severe problem and the focus was on building new houses. However, the economic growth and the corresponding increase on the welfare of the population soon led to another demand for houses other than the supply of high-rise buildings. There was an increasing demand for more differentiation within the urban environment. In particular, the
middle- and higher-income groups requested a single-family home with a garden. Smaller towns in the more rural areas in-between those large cities were expanding in population. This process, which is called suburbanization, was a serious threat to the ‘Green Heart’ planning concept with its circular pattern of cities separated by green buffer zones around them. The objective to preserve as much of the volume of open space as possible in the main parts of the country became one of the goals of the government (for example, see VROM 1974, p.p. 130-132 and 151-153; VROM 1990, p. 20; VROM 2001, p. 139).

The concept of ‘clustered deconcentration’ was introduced, and was designed to direct the suburbanization to a few municipalities in the neighbourhood of the four large Randstad cities. By designating a number of new towns3 (which had specific targets concerning the number of dwellings that should be built within a specific time-slot) and suppressing the development of residential areas in other rural municipalities, the national government wanted on the one hand, to facilitate the demand for single-family dwellings in green areas, and, on the other to preserve the open space in the direct surroundings of the large cities. However, the development of the new towns led to an increased deterioration within the large urban cities. There, the construction of new houses stagnated, and the quality of the stock of dwellings inherited from the beginning of the 20th was poor. The answer to this problem was a new concept: the ‘compact city’. In the compact city concept, dwellings are built in higher densities and with a greater diversity of dwellings than before. The objective is to build 40 per cent of the newly-built housing in existing urban areas. It is applied to open spaces within the existing cities or in areas being restructured. Often industrial sites are converted into (mixed) residential areas. Additionally, the large cities demanded space for urban expansion (known as uitleggebieden) to be able to develop an attractive urban environment on the fringes of the city.

The government has achieved some success in its policy objectives. Although internationally comparable data on the parcel size of dwellings are not available, the average parcel size in the Netherlands is probably considerably smaller than that in neighbouring countries.4 This implies that open space has been saved. Koomen et al. (2008) show that almost all urbanization in the Randstad area between 1995 and 2004, has taken place in relatively large unbroken areas that are attached to existing urban areas. This is a result that is clearly in line with the compact-city philosophy and clustered deconcentration. Also the probability of changing open space into urban land use was significantly lower in the Green Heart than in the remaining part of the Randstad during this period.

However, even though restrictions on the extent of residential areas do preserve open space, it also leads to higher housing prices, and it can lead to dissatisfaction of

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3 | The following new towns were designated: Hoorn, Purmerend, Alkmaar, Almere, Lelystad, Huizen (for Amsterdam); Spijkenisse, Hellevoetsluis, Capelle aan de Jüssel (for Rotterdam); Zoetermeer (for The Hague); Houten, Nieuwegein (for Utrecht).

4 | For example the share of detached dwellings is only 14 per cent, compared with 27 per cent in other European countries (SCP, 2000).
consumers with the respect to the size of the parcels and the resulting quality of the dwellings. Several studies show that restrictive policies, or zoning, keep land prices for residential construction high (Aalbers et al., 1999; Buurman and Rietveld, 2000). Furthermore, studies in the Netherlands show that compared with other countries, the supply elasticity of the Netherlands is low (Boelhouwer et al. 2001; Swank et al. 2002; Vermeulen and Rouwendal, 2007; Ewijk et al., 2006; Koning et al., 2006). Another problem on the housing market is the bigger gap between the insiders, i.e. households who own a house, and the outsiders, i.e. households who want to own their first house (Oosterwijk, 2006). Because the insiders on the housing market have often gained a large increase in value on their house, they can use this profit to buy a new house, so that they can offer a higher price than the outsiders, households that are potential first-time buyers on the housing market. The result is increased pressure on the housing market (VROM-raad, 2007).

Therefore, we can conclude that spatial planning has produced large positive and negative welfare effects. Although in the Netherlands there is a general belief that spatial planning policy is necessary to balance the numerous and often contradictory goals, it is surprising to see that applications of cost-benefit analysis to spatial planning are scarce. A tool to evaluate spatial planning is the Social Cost-Benefits Analysis (SCBA). The SCBA is simply the statement that a project should only be carried out when the benefits of the project exceed its costs. The main advantage of the SCBA methodology is that it tends to direct the discussion towards the determination and comparison of all relevant effects. However, a major problem in SCBA is that the costs of a policy are often defined in monetary terms, whereas the benefits are usually not defined in monetary terms. Fortunately economic theory provides methods, such as the hedonic price method, that attempt to assess the monetary value of these benefits objectively. The values of some non-market goods have been studied intensively over the past decades, and several studies provide useful surveys of this literature (McConnel and Walls, 2005, on the valuation of open space; Nelson, 2004, on aircraft noise). However, comparison of the benefits with their associated costs has scarcely been done for (some) effects of government intervention. Despite the large welfare implications, the question whether the size of the intervention is optimal has hardly been investigated. (For a fuller discussion, see Rouwendal and van der Straaten, 2007; Rouwendal et al., 2007.)

1.4 Research questions

Part I of this thesis aims to provide insight into the relationship between the households’ characteristics and their residential choice. Special attention is given to the power couples, couples of which both members are higher-educated. This part looks into household characteristics, work location, and the location choice. It consists of three chapters. Chapters
and 3 are closely-related to each other and analyse the location choice of households. In Chapter 4 the effects of search imperfections on the labour and housing markets, on the journey-to-work behaviour is analysed.

Part II of this thesis looks more deeply at the costs and benefits of two urban (dis)amenities: namely, parks and public gardens, and aircraft noise, and analyses whether the supply of these amenities is optimal. This part consists of Chapters 5 and 6 and looks at the costs and benefits of open space in cities and the benefits of an aircraft noise reduction. The conclusions with respect to the analyses in the previous chapters are summarized in the last chapter (Chapter 7). In that chapter the implications for policy are also discussed.

Hence, the main research questions may be summarized as follows:

a. Do double-income households, and especially power couples, differ in their location choice compared with other household types?

b. What are the effects of search imperfection on the average commute?

c. What are the costs and benefits of the provisions of parks and public gardens in cities?

d. What would be the benefits of an aircraft noise reduction in the Netherlands?

Figure 1.1 gives a general overview of the structure and contents of the thesis.

Figure 1.1 The structure of the thesis
1.5 Introduction to the essays

Chapter 2 analyses the trends in the concentration of power couples and other household types in the urbanized Western part of the Netherlands during the period 1981-1998. Possible explanations for these trends that are investigated are that power couples experience a more complex work-home relationship than other couples, or that they have developed an increased preference for urban amenities. Further analysis focuses on the urban wage premiums, commuting behaviour, and housing market behaviour of power couples. Chapter 3 elaborates on the co-location problem of power couples and analyses whether power couples use their relatively large purchasing power to outbid other households from locations that are especially attractive to them. Instead of analysing separate features of the residential location, in this analysis the choice of a residential location is regarded as the result of a trade-off between many aspects involved, including the accessibility to the labour market and transport system, regional wage differences, (urban) amenities and the cost of living. A residential sorting model is used to analyse the willingness-to-pay for several location characteristics, and even allows for heterogeneity between households in their preferences for the characteristics of their residential location. Special attention is paid to the accessibility to local labour markets and to the transportation system and whether power couples differ with respect to these preferences.

The effect of search imperfections on journey-to-work (commuting) behaviour, is analysed in Chapter 4. In that chapter, the assumption is tested that workers optimally choose their residence or workplace location so that the costs related to commuting are minimized. Search imperfections are defined as the presence of job and residential moving costs and lack of perfect information about job opportunities. Imperfect information implies that employed (and unemployed) workers decide to accept jobs and residences which do not minimize their commuting costs, because they do not have full information about all jobs and residences and have to search for vacant jobs and residences. A large number of studies use aggregate data on commuting flows to test the minimizing of commuting costs assumptions. The disadvantages of using aggregate data are that they rely on two strong assumptions: (1) that workers are homogeneous with respect to jobs and residences; and (2) that the workplace is the only travel destination. In this chapter an entirely different microeconomic approach is applied to the job-search theory. We make a distinction between the commute of the self-employed, which is assumed to be the result of a search process for vacant workplaces, and the commute of the employee who searches for vacant jobs. Because the availability of workplaces is much more widespread than that of jobs, the self-employed essentially may be able to minimize the commute, whereas employees may have to accept jobs with a longer commute. In the empirical analysis, the extent of the ‘excess commuting’ is identified by estimating the difference between the commute of employees and that of self-employed individuals.
Part II of the thesis focusses on the determination of the optimal level of urban amenities from the economic point of view.

Chapter 5 focusses on the optimal level of the provision of open space in the form of parks and public gardens in cities. Parks and public gardens are generally considered to be important amenities, but most studies stop after having established that statistically significant benefits are present. However, in this chapter we make an attempt to introduce the cost side into the analysis, and take the price of land as the appropriate indicator for its costs. The costs and benefits of the provision of open space are analysed using the hedonic pricing method and applied to the three large cities of the Netherlands. Because households living in apartments and households living in single-family houses may differ in their willingness-to-pay to live close to parks and public gardens, we make a distinction between those households and estimate two separate prices. Another novel element of our analyses is that we use the estimated willingness-to-pay in order to analyse the demand functions for parks and public gardens, lot size (for single-family houses), and floor area (for apartment). Because of data limitation and estimation problems in previous studies, this step has been left out most of the time. However, having estimated the demand function, we can then investigate how demand reacts to changes in income, age, number of children, the presence of higher-educated adults and (non-marginal) changes in the supply of open space. The chapter ends with a simulation of an optimal neighbourhood plan and investigates how the optimal allocation of open space and residential land reacts if income, age, lot size, or floor area change in the neighbourhood.

Next chapter, Chapter 6, focusses on aircraft noise around Amsterdam airport on the urban fringe of the Amsterdam Schiphol region. Using the same hedonic pricing method as in Chapter 5, we examine the effect of aircraft noise on house prices in order to determine the marginal benefits of aircraft noise reduction. Although the chapter focusses on aircraft noise, we also include information about background noise. We do this by taking multiple sources of traffic noise (i.e. road, railway and aircraft noise) into account simultaneously, and by setting threshold values for all three sources of noise. After analysing the benefits of a reduction of aircraft noise for one house, we calculate the total benefits of reduction in aircraft noise in the whole Amsterdam Schiphol region. The analysis of the benefits of aircraft noise reduction was part of a larger study in which the costs of aircraft noise reduction were also analysed (Lijesen et al., 2010). Using both results, we were able to determine whether the present level of emission norms relating to aircraft noise, which are based on historical levels and political considerations, are optimal or whether welfare improvements are possible.

Finally, the thesis closes with Chapter 7, which contains a summary and a general conclusion concerning the lessons that can be drawn from the various analyses undertaken as part of this research.

Changing preferences for residential location have important consequences for the distribution of households over space, both at the national and at the regional scale. This thesis aims at deepening our insights into the dynamic mutual relation between household
characteristics and location choice. Furthermore, our analysis shows that it is possible to establish welfare-based levels of the provision of urban amenities, which tends to direct the discussion of the optimal size of government intervention towards the determination and comparison of all relevant effects.