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Amenities and the attraction of Dutch cities

Harry Garretsen^a and Gerard Marlet^{b,c}

ABSTRACT

Amenities and the attraction of Dutch cities. *Regional Studies*. Research on the relevance of amenities for urban wages, jobs or housing prices has mainly focused on the case of US cities. In many (European) countries, the labour and housing markets function, however, rather differently than in the case of the United States. As a result, amenities may affect urban labour or housing markets differently. In addition, in European countries the proximity of cities is such that spatial interdependencies between cities have to be taken into account as well. By using a very rich dataset, this paper analyses the relationship between urban amenities, agglomeration and housing prices for the case of a highly urbanized European country, the Netherlands. It finds that Dutch cities that combine a favourable job location with a variety of urban amenities have significantly higher housing prices. Relatively safe cities, offering a variety of history and cultural events, as well as good restaurants, also have significantly higher housing prices.

KEYWORDS

urban amenities; population growth; housing prices

摘要

荷兰城市的环境舒适性与吸引力。区域研究。环境舒适性之于城市薪资、工作或房价的相关性研究，主要聚焦于美国城市的案例。在诸多（欧洲）城市中，劳动与房屋市场的运作则与美国的案例有所不同。环境舒适性因而可能对城市劳动或房屋市场有着不同的影响。此外，在欧洲城市间的邻近性方面，必须同时考量城市之间的空间互赖。本文运用丰沛的数据集，分析荷兰这个高度城市化的欧洲国家案例中，环境舒适性、聚集与房价之间的关联性。研究结果发现，结合了有利的工作地点和多样的环境舒适性的荷兰城市，有着明显较高的房价。提供多样的历史与文化活动和优良的餐厅，且相对安全的城市，亦拥有显着较高的房价。

关键词

城市环境舒适性; 人口成长; 房价

RÉSUMÉ

L'équipement collectif et l'attractivité des grandes villes hollandaises. *Regional Studies*. La recherche sur l'importance de l'équipement collectif pour ce qui est des salaires urbains, des emplois ou du prix du logement a porté dans une large mesure sur l'étude de cas des grandes villes situées aux É-U. Cependant, dans beaucoup de grandes villes (européennes), les marchés du travail et du logement fonctionnent de façon plutôt différente des États-Unis. Par conséquent, il se peut que l'équipement collectif puisse influencer différemment les marchés urbains du travail et du logement. En outre, dans les pays européens, la proximité des grandes villes est telle qu'il faut tenir compte aussi des interdépendances spatiales intervilles. En employant un ensemble de données très riche, ce présent article analyse le rapport entre l'équipement collectif urbain, l'agglomération et le prix du logement pour ce qui est d'un pays européen fortement urbanisée, à savoir la Hollande. Il s'avère que, dans les grandes villes hollandaises qui réunissent un lieu de travail favorable à toute une gamme d'équipements collectifs urbains, les prix du logement sont sensiblement plus élevés. Des grandes villes relativement sûres qui organisent un éventail d'événements historiques et culturels, et offrent aussi de bons restaurants, font témoin des prix du logement sensiblement plus élevés.

MOTS-CLÉS

équipement collectif urbain; croissance démographique; prix du logement

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ZUSAMMENFASSUNG

Annehmlichkeiten und Attraktivität von niederländischen Städten. *Regional Studies*. Die Studien über die Relevanz von städtischen Annehmlichkeiten für die Löhne, Arbeitsplätze oder Wohnungspreise in Städten konzentrieren sich in erster Linie auf Städte in den USA. In vielen (europäischen) Ländern funktionieren die Arbeits- und Wohnungsmärkte jedoch auf eher andere Weise als in den USA. Daher können sich auch die Annehmlichkeiten anders auf die städtischen Arbeits- oder Wohnungsmärkte auswirken. Darüber hinaus ist in europäischen Ländern die Nähe zwischen Städten so beschaffen, dass räumliche Interdependenzen zwischen Städten ebenfalls berücksichtigt werden müssen. In diesem Beitrag wird unter Verwendung eines stark erweiterten Datensatzes die Beziehung zwischen städtischen Annehmlichkeiten, Ballung und Wohnungspreisen im Fall eines hochgradig urbanisierten europäischen Landes – nämlich der Niederlande – untersucht. Es stellt sich heraus, dass niederländische Städte, in denen sich eine günstige Arbeitsplatzlage mit verschiedenen städtischen Annehmlichkeiten verbindet, signifikant höhere Wohnungspreise aufweisen. Relativ sichere Städte mit historischem Hintergrund und vielfältigem Kulturangebot sowie guten Restaurants weisen ebenfalls signifikant höhere Wohnungspreise auf.

SCHLÜSSELWÖRTER

städtische annehmlichkeiten; bevölkerungswachstum; Wohnungspreise

RESUMEN

Infraestructura y el poder de atracción de las ciudades holandesas. *Regional Studies*. Los estudios sobre la importancia de la infraestructura urbana para salarios, trabajos o precios de la vivienda se han centrado sobre todo en ciudades estadounidenses. Sin embargo, en muchos países (europeos), el mercado laboral e inmobiliario funciona de modo bastante distinto que en los Estados Unidos. En consecuencia, la infraestructura podría afectar de forma diferente a los mercados laborales o inmobiliarios urbanos. Además, en los países europeos la proximidad de las ciudades es tal que también deben tenerse en cuenta las interdependencias espaciales entre las ciudades. En este artículo empleamos un extenso conjunto de datos para analizar la relación entre la infraestructura urbana, la aglomeración y los precios de la vivienda para el caso de los Países Bajos, un país europeo muy urbanizado. Observamos que en las ciudades neerlandesas que combinan una buena ubicación laboral con una amplia variedad de infraestructuras urbanas, los precios de la vivienda son considerablemente más altos. En ciudades relativamente seguras con contexto histórico y una oferta cultural amplia y variada, así como buenos restaurantes, los precios de la vivienda también son mucho más elevados.

PALABRAS CLAVES

infraestructura urbana; crecimiento de población; Precios de la vivienda

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INTRODUCTION

In order to explain why some cities are more successful or attractive than others, research in both urban economics and economic geography has traditionally focused on agglomeration economies that originate from the production side of the economy. In doing so, agglomeration economies at the city level as well as between cities are invoked to explain why cities differ. Internal and external economies of scale in the production process are both seen as the key determinants of city size and a city's economic structure. In urban economics, following, for instance, the seminal urban model by Henderson (1974), there is by now a huge empirical literature that tries to establish which type of economies of scale and production structure boosts a city's population and economic growth (for instance, see Rosenthal and Strange, 2004, for an extensive survey of the empirics of urban agglomeration economies).

In recent years there has been a real surge of research in modern urban economics that turns this standard perspective on its head by focusing on the role of people to understand the differences in the plight of cities. Initiated by the early theoretical and empirical contributions of, notably,

Roback (1982) and Graves (1983) respectively, and spear-headed by the work of Glaeser (2011) and co-authors, the idea is that cities are to be (partly) looked upon as consumer cities, and cities that are more attractive to consumers to live and work will be the more successful cities (Glaeser, Kolko, Saiz, 2001; Clark, 2003). The attractiveness of cities depends not only on what could be seen as the standard agglomeration benefits and costs such as higher (nominal) wages and housing rents respectively, but also, and crucially, upon urban amenities (Glaeser et al., 2001).

There is an extensive empirical literature that argues that both natural and constructed urban (dis)amenities are important to understand why people prefer some cities over others and, hence, why these cities are more successful. From the perspective of the amenity literature, people do not so much follow jobs but it is rather the other way around (Boarnet, 1994). Cities that offer superior natural amenities (like a mild climate or a benign physical environment) and/or high-quality constructed or man-made amenities (a wide range of consumer goods and local public services) are seen as attractive, that is, as amenity-rich cities (Partridge, 2010; Glaeser & Gottlieb, 2009). The main conclusion that follows from this empirical literature is

that amenities indeed matter for urban growth. This conclusion has, however, not gone undisputed.

First, there is a debate about the relative importance of urban amenities when set against more standard (production) agglomeration effects (cf. Kemeny & Storper, 2012, with Partridge, 2010). Recently, a number of authors have empirically tested the relative importance of both theoretical perspectives (jobs versus amenities) on the attractiveness and growth of cities (e.g., Storper & Scott, 2009; Kemeny & Storper, 2012; Biagi Faggian, & McCann, 2011). This debate has not been settled yet, and one issue is the lack of amenity data at the urban level, specifically when it comes to man-made (as opposed to natural) amenities. Amenity data are not readily available and the emphasis is (therefore) often on a limited set of (physical) amenities like the weather or general climate (Rappaport, 2006; Cheshire & Magrini, 2006). It is here that the paper makes a first contribution to the literature through its use of an extensive set of amenity data on the neighbourhood level for Dutch cities, and it also takes quality and proximity of amenities into consideration.

Second, there is an ongoing debate on the role of spatial inter-city interdependencies (cf. again Kemeny & Storper, 2010, with Partridge, 2010): people can work in one city, live in another and make use of the amenities in a third. This might be less relevant for the case of the United States, but it is certainly an issue in smaller, highly urbanized countries like the Netherlands. From an empirical perspective, these spatial interdependencies are difficult to take into account as one preferably needs data on actual travel behaviour for work and amenities to measure these interdependencies. In the present paper data on actual travel behaviour will therefore be used.

Third, and finally, there is an issue about how relevant amenities are across countries and in different institutional settings as to the workings of the labour or housing market. Much of the urban amenity literature focuses on the case of the United States and it is only fairly recently that studies about the relevance of amenities for urban growth in other countries have begun to appear (see the second section). The amenity literature has much to gain from a comparative perspective.

In this paper the focus is on the case of Dutch cities. In many (European) countries, the labour and housing markets function rather differently than in the case of the United States. As a result, amenities may affect urban labour or housing markets differently. This is certainly true for the Dutch case. The Netherlands is a highly urbanized, small country where commuting is very important. Jobs (and amenities) in a city are within acceptable travel times of many people living in other cities (e.g., Figure 3). In the United States, people do not easily move from New York City to Los Angeles without changing their job. In the Netherlands, people can easily move from one city to another while keeping their job location constant. More than 50% of the labour force living in a certain municipality in the Netherlands works in another municipality. Following the argument given by Kemeny and Storper (2010, p. 14), it could be argued that the Dutch case is better

suited to the kind of *locational sorting* by consumers that underlies the urban amenity literature.

The Dutch case also differs from the United States for a number of institutional reasons. In the US amenity studies, the dependent variable is typically a city's population growth (Glaeser et al., 2001).¹ In the Netherlands, and not unlike other continental European countries, the combination of restrictive Dutch planning policies towards urban growth, very low housing supply elasticity and relatively limited interregional wage differences imply that in the authors' view amenity differences will primarily show up in housing prices, with housing price being higher in locations or cities with better amenities and job possibilities. This also means that the standard spatial equilibrium condition (with wages, population growth and housing rents as the three endogenous variables; e.g., Glaeser & Gottlieb, 2009) that typically underlies the empirical urban amenity literature cannot automatically be applied to the case of the Netherlands, but is nevertheless still relevant, as will be argued in the next section.

THE RELATIONSHIP BETWEEN HOUSING PRICES AND AMENITIES FOR DUTCH CITIES

At the heart of the recent urban amenity literature is the so-called spatial equilibrium condition (Roback, 1982; Glaeser, 2008). This condition looks at households (and not only firms) as central actors. In determining their location, households maximize their indirect utility function and firms minimize a unit cost function. Given the purpose of this paper the focus is on the households. In choosing their optimal location, individual households maximize their utility and if the utility of location j is higher than that to be gained at their present location i , these individuals migrate from i to j . Migration stops, that is, a spatial equilibrium from the perspective of individual households is reached, when individuals have become indifferent between locations in terms of the utility offered by each location.

To give the spatial equilibrium notion empirical content, the question is then which urban variables best capture the individual's preference for any given city. Glaeser *et al.* (2001, p. 30) stipulate that three elements enter the equation: the urban productivity premium, the urban rent premium and the urban amenity premium. The first premium is a positive premium and captures the idea that productivity increases with city size. This is the standard economies-of-scale argument where the nature of the scale economies can refer to both urbanization or localization economies. A positive productivity premium means that (nominal) wages increase with city size, and this is indeed a stylized fact, at least for US cities (Kemeny & Storper, 2010). The diseconomies of scale are given by the negative urban rent premium meaning that housing rents are higher in larger (or denser) cities. The urban rent premium simply refers to the fact that housing rents are higher in cities, that is, in more densely populated areas.

The urban amenity premium can be negative or positive since amenities can be negative (e.g., high urban crime rate

and bad climate) or positive (e.g., a low crime rate and nice weather). In the empirical research based on the spatial equilibrium condition, the location or migration decisions of all individuals are such that in equilibrium for each individual the balance between a city's wages, rents and amenities is the same across locations. The spatial equilibrium allows for cities to differ in population size and the process towards such an equilibrium means that cities differ in population growth, which is why population growth is typically the dependent variable in studies that try to assess the empirical relevance of urban amenities. To do so, one can measure amenities directly or indirectly by taking the difference between a city's wages and housing rents. This modelling of the location choice as the tension across cities between productivity (or efficiency), diseconomies of scale (congestion effects) and urban amenities is quite general and can be given a general equilibrium interpretation that yields not only equilibrium city size but also predictions about the welfare implications of the overall city size distribution (Desmet & Rossi-Hansberg, 2014).²

In the full-blown spatial equilibrium model that focuses on the inter-city spatial equilibrium (see Glaeser & Gottlieb, 2009, for a good introduction), with households (as well as firms) making their location choices, there are three endogenous variables on the city level (wages, population size and the price of non-traded goods (e.g., housing rents)). Urban amenities are among the set of exogenous variables (see Glaeser & Gottlieb, 2009, equations 1–3). As was stated above in the introduction, most studies that focus on the case of US cities confirm that amenities matter and some studies (e.g., Partridge, 2010) even claim that, at least for US cities, amenity-led population growth clearly outperforms the standard production externalities explanations mentioned in the introduction.³ For a sample of European cities, Cheshire and Magrini (2006) find, however, less convincing evidence, but their measurement of amenities is confined to physical amenities (weather).⁴ The principal interest here is in the empirical relevance of urban amenities for Dutch housing prices and this puts the analysis within the realm of the model underlying the spatial equilibrium condition as referred to above, albeit for the case where housing rents or, in the present case, housing prices have to have all of the adjustment to account for between- (and also within-) city amenity differences so as to keep households' utility constant across space. The remainder of this section will argue why the standard, full-blown spatial equilibrium empirical application, as summarized above via Glaeser and Gottlieb (2009) with the three standard endogenous variables (wages, population growth and housing rents), cannot be readily be copied to assess the relevance of urban amenities for Dutch cities. The spatial equilibrium is also relevant for the Dutch case, but in order to see this the peculiarities of the Dutch labour and housing market first need to be taken into account.

The first issue that sets the Dutch case apart concerns urban population growth. As is clear from the figures in Appendix A in the supplemental data online, growth was rather limited or even negative in most of the largest cities in the Netherlands. Substantial growth was merely confined

to a very few number of new towns close to the city of Amsterdam, like Almere and Haarlemmermeer. For the period under consideration, the government stipulated the building of 600,000 new homes between 1995 and 2005. This led to the so called VINEX building programme whereby the vast majority of these 600,000 new homes were allocated to municipalities or new towns close to the major cities (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer (VROM), 1990). Dutch housing supply was very restrictive in this period. That is why urban population growth and, hence, the resulting urban population size, one of the three key endogenous variables in the spatial equilibrium model, can be looked upon as effectively exogenous in the Dutch case.⁵ In contrast with amenity studies for the case of US cities, it is not expected that urban amenities have a significant impact on Dutch urban population growth (Marlet, 2009, figs 5.1, 5.2, tab. 5.1).

With the brief discussion of the spatial equilibrium condition from the beginning of this section kept in mind, this raises the question whether and how the effect of urban amenities shows up for Dutch cities. In theory, the difference between urban wages and urban housing rents thus captures the urban amenity premium. In the Dutch case, this is not a very useful indicator because inter-regional *wage* differences are rather limited compared with inter-regional housing rent differences. Figure 1 gives the wage differences at municipality level; Figure 2 provides housing price differences for each location (at six-digit postal code level) in the Netherlands. The solid lines in the maps demarcate the 50 largest municipalities. Appendix A in the supplemental data online provides the municipality names, their position on the map and rankings for the 50 largest Dutch municipalities.

Again, as with the population growth, this points to a structural difference with other countries like the United States or the UK. Wage setting in the Dutch case is highly centralized and the result of bargaining between employers' and labour unions at the national level. This means that urban wages for the same job or function in, for instance, cities in the west, like Amsterdam, are only marginally higher than in peripheral cities and municipalities in the north or south. Wages in the so-called Randstad area, the area in the west including the agglomerations of Rotterdam, The Hague, Utrecht and Amsterdam, were only 2.9%, or €400, on an annual basis higher in 2005 than in the rest of the country. To put this in perspective, wages in US cities are on average 30% higher and wages in London are on average 45% higher compared with the rest of the UK. These inter-regional Dutch wage differences are dwarfed against the regional differences in (owner-occupied) housing prices.

With not only urban population growth but also urban wage differences not being particularly relevant for the case of Dutch cities, one is left with housing rents or, in the dataset, owner-occupied housing prices, as the variable alongside urban amenities that can vary across cities.⁶ In terms of the spatial equilibrium model (see again, for instance, Glaeser & Gottlieb, 2009), this means that essentially one endogenous variable is left: urban housing rents (the price of non-traded goods).

Figure 1. Wages (% of average), 2005

Figure 2. Housing prices per m² (% of average), 2006

Figure 2 shows Dutch housing prices per square metre (m²). To give one example: the average housing price in Amsterdam was over €3000/m² in 2006 against €1250/m² in the city of Heerlen in the peripheral south. The upshot of the centralized wage-setting system and the resulting very limited inter-city wage differences is that, just like with city population size, city wages are best thought of as being exogenous as opposed to the city wage endogeneity in the spatial equilibrium model.

The restrictive housing-building policy implies that housing supply elasticity for the owner-occupied housing is very low at best. There are studies that put this housing

supply elasticity squarely at zero (Koning, Saitua Nistal, & Ebregt, 2006). What matters for present purposes is that there is a widespread consensus that the Dutch housing supply is very inelastic. The direct implication of an inelastic or even vertical housing supply curve is that inter-city or inter-regional differences in the attractiveness of cities should show up in housing prices in the case of the Netherlands in the authors' view. In line with the hedonic pricing method (Roback, 1982), this provides the opportunity to use housing prices to assess the relevance of what are essentially unpriced 'goods': urban amenities.

The central hypothesis will therefore be that (urban) housing prices are indeed higher in amenity-rich places. In doing so, job availability and housing characteristics will be controlled for, but also various other controls and robustness checks are included. In addition – and here the empirical investigation also differs from the recent urban amenity research – spatial interdependencies are taken seriously. Given its small size and high population density, the attractiveness of a certain location also depends on the work and amenity opportunities of nearby cities. Large-scale commuting and short travel distances between many cities imply that people can work in city *j* and reap its productivity premium in the form of better job opportunities (Boarnet, 1994) but still prefer to live in city *i* because of the high-quality amenities, or vice versa.

All in all, for the reasons outlined above (centrally planned urban population growth, centralized wage setting and the relevance of economic geography), the standard application of the spatial equilibrium condition that underlies much of the empirical urban amenity research is less suitable for the case of the Netherlands. But even though the housing supply is very inelastic and wage setting is subject to significant institutional constraints, the model underlying spatial equilibrium is still relevant given that housing prices are freely set and people are free to relocate to amenity-rich (and job-rich) locations between and within cities. Even with a perfectly fixed housing supply and perfectly fixed wages, people will bid up housing prices in these cities to the point where the marginal migrant is indifferent across locations.

DATASET

The basic dataset for Dutch cities consists of (1) housing prices, (2) two job potential variables as inter-city agglomeration measures for the labour market, and (3) twenty-three amenity indicators, and a host of control variables. A detailed spatial scale is used by breaking the Netherlands down into 2336 six-digit postal code areas. Some of the independent variables are measured at the regional level (like job potential or proximity to cultural events) or the municipality level (like the presence of a university). In this section the focus is on the complete set of variables and the remaining control variables will be introduced as the paper progresses.

Housing prices

For 2006, there is detailed information on owner-occupied housing prices (Nederlandse Vereniging van Makelaars –

NVM). At the postal code level this gives 4007 locations across the Netherlands for which there is information for each year on the average price at which houses in that area were actually sold. As such, average house prices are, however, not very useful. The idea is to find out if location (or city) characteristics like urban amenities or the availability of jobs have an impact on housing prices in that location/city. But average housing prices are not only a function of these location or urban specific variables, they are also a function of housing characteristics. That is why housing prices per m² are the preferred measure to control for inter-city differences in the size of the houses. Figure 2 thus has already shown that housing prices per m² are typically higher in the western and middle parts of the country.

Job potential

As has been argued above, spatial interdependencies or, in other words, economic geography or inter-city agglomeration effects cannot be ignored in the Dutch case. This may be relevant not only for individual agents in their capacity as consumers when one considers the role of urban amenities but also where job perspectives are concerned. The attractiveness of city j from the perspective of individual workers may depend on the job availability in that city and also on how many jobs in other locations i (cities and non-cities alike) can be reached from city j , corrected for the travel times between j and i , and the willingness to travel for work (Marlet 2009, fig. 3.11). A city's attractiveness as a place to live (and buy a house) depends inter alia on its job potential. The job potential of city j is defined as the total number of jobs in other cities i , that can be reached from city j , and calculated using:

$$\tilde{J}_i = \sum_j w(0.5 \times t_{ij}^{\text{morning}} + 0.5 \times t_{ji}^{\text{evening}}) \times J_j$$

where t_{ij} is the travel time from location i to j ; $w(t)$ is the share of workers who will accept t as the time needed to get to work (based on commuting surveys); and J_j is the number of jobs in location j . The effective travel time takes actual road distance by car and corrects travel time for congestion effects. Congestion will increase travel times and reduce the potential labour force that is willing to travel to the firms location (for more details, see Marlet, 2009; and Van Woerkens & Marlet, 2005). This indicator for job opportunities is based on travel times by car only, not public transport. That is why a second indicator for job opportunities is introduced: the proximity of a train station. This indicator is based on the distance from a certain location to the nearest train station.

Figure 3 gives for each postal code area and the 50 largest municipalities their job potential for 2006. It is clear that, despite congestion being a serious problem in the western part of the country, the municipalities in the economic centre of the Netherlands (the Randstad area) offer a job potential that is much higher than for cities and municipalities located in the border area. Travel time between two of the four largest cities in the Netherlands, Utrecht and Amsterdam, is less than half an hour, which means that for the city of Utrecht not only do jobs within the same

city and region contribute to the job potential but also do approximately half the jobs in Amsterdam. Many of the new towns north of Amsterdam (like Almere) face serious congestion problems. That is why they benefit less from the proximity of Amsterdam, and therefore have a lower job potential than many other municipalities in the Randstad area.

Amenities

Amenities used in other research have varied from mainly climate and environmental beauty from the 1950s on (Ullman, 1954) to opera houses, sport events, book shops, pubs and all sorts of restaurants in the 1980s and 1990s (Clark, 2003). The authors tried to be more precise in constructing the amenity dataset. First, the amenities on theories and surveys are based on preferences of households (Marlet, 2009). Second, the amenity indicators are constructed at different levels (neighbourhood, city and regional level), and in addition spatial averages and spatial lags are used. In that way, the analysis is based on a set of 23 amenity indicators where a distinction was made between natural amenities, urban (constructed) amenities and dwelling specific dis-amenities (crime and nuisances).

Natural amenities

Natural amenities are indicated by the proximity to nature and the sea. Proximity to nature (hectares of nature within an acceptable travel time) is measured as a weighted sum of the natural areas (see Centraal Bureau voor de Statistiek (CBS) Bodemstatistiek, 2000, in Appendix B in the supplemental data online) surrounding the location, the weight depending on the travel time from the location to that area, being a monotonically decreasing function. Proximity to the sea is measured by the minimum travel time from a location to the nearest North Sea coast. Figure 4 shows a map of the proximity to nature for all locations and a ranking of (the 50 largest) Dutch cities that provide the most nearby nature. Most of the cities ranked in the top are located in the middle (Almere, Lelystad, Amersfoort, Hilversum) and eastern (Ede, Apeldoorn) parts of the country, with relatively large natural sites like the national parks of the Veluwe and the Utrechtse Heuvelrug.

Constructed amenities

Although the data sources (see CBS Bodemstatistiek, 2000) and the way of calculating the indicators are similar to that of the proximity to natural areas, the indicator for the proximity to recreational grounds is categorized under the constructed amenities, because recreational grounds are clearly and recently man made. That is also the case for the total area (acres) of parks and sport facilities in town, and the total amount (acres) of public water in the neighbourhood.

The proximity to cultural events and venues – live performances (see Atlas voor gemeenten (Atlas), Vereniging voor Schouwburg- en Concertgebouwdirecteuren (VSCD) and Nederlands Uitburo (NUB), 2006)⁷ and museums (see Nederlandse Museumvereniging, 2010) – is also based on real travel times from a location to the

Figure 3. Job potential (amount of jobs $\times$ 1000, within an acceptable travel time), 2006

events and venues, and the average willingness-to-travel for attending these cultural events and venues. $W(t)$ in the job potential function described above is here defined as the share of potential visitors who will accept t as the time needed to get to the cultural event or venue. Other – in a similar way – spatially constructed amenities used in the specification are proximity to shops for fun shopping and distance to shops for daily shopping (see Vastgoedmonitor (VGM), 2006). The proximity to live performances – the

yearly number of live performances within an acceptable travel time – is shown in Figure 5. It is clear that the inhabitants of the major cities in the Netherlands (Amsterdam, Rotterdam, The Hague and Utrecht) have the largest number of live performances nearby. The same is true (but not shown on the map) for the amount of shops for ‘fun shopping’.

Beside the spatially constructed amenities, amenity indicators at the municipality level are used, such as the presence and performances of a professional football (soccer) team in town,⁸ the number of quality restaurants (see *Michelin Guide* and *Lekker Guide*, 2006), the diversity of restaurants in town (see *Dinnersite*, 2006), the availability of a university in town, and the number of kindergartens per 1000 inhabitants (see Netwerkbureau Uitbreiding Kinderopvang (NUK), 2004). To proxy for all possible omitted urban amenities, the distance to the city centre is also used as an amenity indicator.

In addition, the share of monumental buildings (see Rijksdienst voor het Cultureel Erfgoed, 2006) and the share of historical canals (total length per building; see Ministerie van BZK, 2006) are taken on board as indicators for the aesthetic quality of the inner city. The indicator for the share of monumental buildings (see Appendix A in the supplemental data online) shows that the oldest Dutch cities such as Maastricht, Leiden, Dordrecht, Haarlem and Delft have the largest monumental city centres.

On top of the spatially and locally measured amenity indicators, the number of pubs is used as an amenity indicator at the neighbourhood level. This amenity is measured as the number of pubs per 1000 inhabitants. The number of pubs in 2006 was obtained from the Bedrijfschap Horeca en Catering (the trade organization for hotel and catering industry). The number of cafés in the neighbourhood per 100 inhabitants is shown in Appendix A. Beside pub-

Figure 4. Proximity to nature (hectares of nature within an acceptable travel time)

Figure 5. Proximity to live performances (yearly amount of live performances within an acceptable travel time), 2006

rich cities like Maastricht and Amsterdam, also inhabitants of the new town of Almere and smaller towns like Bergen op Zoom and Arnhem find on average a relatively large amount of pubs in their neighbourhood.

Dis-amenities

As indicators for the dis-amenities of certain urban neighbourhoods, nuisances and crime rates for each postal code area are used. Nuisances are measures of the percentage of inhabitants of a neighbourhood who face severe problems (see Veiligheidsmonitor, 2006). Crime rates are the average amount of yearly reported crimes (see Korps Landelijke Politiediensten (KLPD), 2003–05) per 1000 inhabitants. Nuisances are shown in Appendix A in the supplemental data online. It makes clear that most of the (larger) cities that offer most of the cultural amenities (cf. Figure 5) also face most of the urban problems.

ESTIMATION RESULTS

After the introduction of the dataset, this section presents the estimation results. Throughout the specifications, (*owner-occupied*) *housing prices* (per m²) will be the dependent variable, *job potential* and the *set of amenity variables* will be the main explanatory variables. As control variables, housing characteristics – the share of social houses and pre-war houses (both VGM) and the share of detached houses, semi-detached houses, terraced houses and apartments (all NVM) – and the size of the location are used (total population; see CBS, 2006), the latter invariably turned out to be insignificant. Table 1 presents the cross-section estimation results.

First, an ordinary least squares (OLS) specification of the general model (column (1)) was estimated. But, Moran's *I* test indicates that there is spatial autocorrelation in the residuals. Therefore, the general model was re-run using a spatial error specification, with contiguity between postal code areas as the distance weights (column (2)). This does not change the main results compared with the OLS estimation. In the general model (column 2 in Table 1), only seven out of the set of 23 (dis-)amenities (proximity to musical venues, proximity to recreational grounds, distance to shops for daily shopping, the presence and performance of a professional football team, diversity in restaurants, share of canals and parks) turned out to be insignificant or had the unexpected negative sign. However, due to multicollinearity, this general-to-specific approach could be problematic. But, only five out of 23 amenity variables turned out to correlate substantially (> 0.6) with one or more other amenity indicators in the specification. When these five indicators were excluded, the coefficient and statistical significance of the other amenity variables remain largely the same (see column (3)). The job potential variable invariably has a positive and highly significant impact on the level of housing prices. The introduction above referred to a discussion about the relative importance of economic geography (here, the job potential variable) and the urban amenity variables (cf. Partridge, 2010, with Kemeny & Storper, 2010). For the Dutch

case, both types of variables thus seem to matter. The conclusion is that job opportunities and amenities are approximately of similar importance for the attractiveness of locations and the spatial distribution of local rents.

Two of the amenity variables (proximity to nature and the sea) are natural amenities and can clearly be considered as exogenous. Also the two dis-amenities (nuisances and crime rate) are significant with the expected (negative) sign. With the man-made or constructed urban amenities and also the two dis-amenities, there is the issue of causality in the sense that fast-growing cities may simply attract these amenities as a byproduct. Although it was found that the most attractive cities in the Netherlands are not the fastest-growing cities, it could be argued that, for instance, the quality of restaurants (a consumer good amenity) merely reflects that sought-after 'living' cities or municipalities, as exemplified by high housing prices, attract high-quality restaurants. In other words, some amenity indicators might suffer endogeneity. This is certainly not the case for the share of monumental (mainly 17th-century) buildings and possibly not for the presence of a university, since most Dutch universities were founded decades or even centuries ago. For the other constructed amenities like theatres, museums and restaurants, endogeneity remains a problem.⁹ As a possible solution one could have used historical instrumental variables (as suggested by Glaeser & Resseger, 2010), such as the presence of art museums 100 years ago, or the local level of education 50 years ago. Unfortunately, these historical data are not available. That is why column (4) has been added in Table 1. This column introduces a model that leaves out indicators that clearly suffer endogeneity, such as quality restaurants and proximity to cultural events. That model contains only amenity indicators that are more likely to be genuinely exogenous: the share of monumental buildings, the distance to the city centre, and the presence of a university. Leaving out the amenities that suffer endogeneity does not affect the main conclusion.

Higher housing prices need not be caused by higher amenity values, but (both of them) could be driven by sorting effects (for the Dutch case, see also Bakens, Mulder, & Nijkamp, 2013, on this issue). That is why education levels were excluded in the specification in column (1) in Table 2. The share of higher educated people at the six-digit postal code level could be measured by using several years of a large survey in the Netherlands called *Integrale Veiligheidsmonitor Rijk (IVR)* (2006). The share of inhabitants with higher incomes at the six-digit postal code level, based on a CBS database (2003), was also used. The results in column (1) of Table 2 show that only the share of people with a higher income correlate positively with housing prices. It seems that the presence of local amenities drive sorting between educated and less educated across locations, and not so much the presence of those higher educated themselves. This clearly warrants further research because to investigate properly the relevance of sorting effects, micro-economic data are needed.

It was argued above in the second section that inter-regional or inter-city wage differences are very limited for

Table 1. Basic estimation results: housing prices (€/m²), 2006 (zip-code level)

	(1)	(2)	(3)	(4)
<i>Job opportunities</i>				
Job potential	0.563***	0.459***	0.539***	0.507***
Proximity of train station	0.072***	0.037***	0.025	0.032**
<i>Natural amenities</i>				
Proximity to nature	0.254***	0.162***	0.125***	0.104***
Proximity to the sea	0.183***	0.170***	0.174***	0.177***
<i>Constructed amenities</i>				
Distance to city centre	−0.094***	−0.095***	−0.089***	−0.112***
Proximity to live performances	0.082***	0.114***	0.187***	
Proximity to musical venues	−0.062***	−0.037**	−0.037**	
Proximity to art museums	0.030**	0.021**	0.015	
Proximity to history museums	0.043**	0.042***	0.044**	
Proximity to recreational grounds	−0.474***	−0.313***		
Proximity to shops for fun shopping	0.447***	0.306***		
Professional soccer team	0.031	0.003	−0.007	
Quality restaurants	0.059***	0.067***	0.066***	
Diversity in restaurants	−0.019	0.033		
University in town	0.136***	0.046*		0.045***
Share monumental buildings	0.086***	0.080***	0.086***	0.096***
Share canals (length per building)	−0.022	−0.025*	−0.022	−0.012
Share kindergarten in town	0.126***	0.082***	0.071***	
Amount of cafés in the neighbourhood	0.039**	0.033**	0.027**	
Parks in town	−0.026	−0.037*	−0.051***	
Public water in the neighbourhood	0.073***	0.061***	0.069***	
Sport facilities in town	0.065**	0.090***	0.071***	
Distance to shops for daily shopping	−0.015	0.004	0.003	
<i>Dis-amenities</i>				
Nuisances	−0.180***	−0.156***	−0.155***	−0.143***
Crime rate	−0.184***	−0.115***	−0.068**	−0.052**
<i>Housing characteristics</i>				
Share social housing	−0.118***	−0.104***	−0.095***	−0.118***
Share pre war houses	0.026***	0.037***	0.048***	0.095***
Share single detached houses	0.216***	0.271***	0.269***	0.261***
Semi detached houses	0.035	0.088***	0.085***	0.082***
Share terraced houses	−0.117***	−0.114***	−0.116***	−0.112***
Share apartments	−0.098**	−0.057*	−0.066*	−0.010
Method	Ordinary least squares (OLS)		ML	ML
Lambda (spatial error coefficient)		2.95***	3.33***	2.68***
N	2328	2328	2328	2328
Adjusted R ²	0.64			
Loglikelihood		−16036.53	−16057.68	−16151.25

Note: Standardized coefficients; *** > 99%; ** > 95–99% * > 90%; the weight matrix is based on inverse distances, row standardized.

the case of the Netherlands. As an extra robustness test, the average hourly wages were added to the set of regressors. The average euros per hour earned in the municipality,

based on an estimation derived from income levels (Marlet, 2009), was used. The results in column (2) show that average wage levels correlate positively with housing prices.

Table 2. Robustness tests: housing prices (€/m²), 2006 (zip-code level)

	(1)	(2)	(3)	(4)
<i>Job opportunities</i>				
Job potential	0.384***	0.468***	0.587***	0.510***
Proximity of train station	0.031**	0.036**	0.023	0.038**
<i>Natural amenities</i>				
Proximity to nature	0.091***	0.125***	0.130***	0.116***
Proximity to the sea	0.158***	0.177***	0.176***	0.179***
<i>Constructed amenities</i>				
Distance to city centre	−0.067***	−0.099***	−0.096***	−0.098***
Proximity to live performances	0.124***	0.178***	0.197***	0.151***
Proximity to art museums	0.023*	0.016	0.015*	0.023
Proximity to history museums	0.027**	0.041***	0.041***	0.043***
Quality restaurants	0.051***	0.061***	0.059***	0.066***
University in town	0.053***	0.082***	0.074***	0.040***
Share monumental buildings	0.072***	0.086***	0.078***	0.080***
Share kindergarten in town	0.034*	0.083***	0.083***	0.076***
Amount of cafés in the neighbourhood	0.049***	0.035**	0.030**	0.035**
Public water in the neighbourhood	0.051***	0.066***	0.068***	0.063***
<i>Dis-amenities</i>				
Nuisances	−0.098***	−0.161***	−0.158***	−0.157***
Crime rate	−0.079***	−0.105***	−0.102***	−0.101***
<i>Housing characteristics</i>				
Share social housing	0.064***	−0.101***	−0.106***	−0.109***
Share single detached houses	0.328***	0.284***	0.278***	0.280***
Share half houses	0.095***	0.090***	0.084***	0.087***
Share terraced houses	−0.057*	−0.113***	−0.109***	−0.108***
Share apartments	0.017	−0.071*	−0.066*	−0.045
<i>Other controls</i>				
Share high educated	0.016			
Share high income	0.324***			
Average wage (municipality level)		0.122***		
Planned new houses built (1995–2005)			−0.054***	
Total job growth (2000–05)				0.022
Total company growth (2000–05)				−0.008
Acres new business plots (2000–05)				0.021
Method	Maximum likelihood (ML)	ML	ML	ML
Lambda (spatial error coefficient)	2.93	3.59	3.58	2.94
N	2328	2328	2328	2328
Loglikelihood	−15 882.75	−16 062.80	−16 064.17	−16 069.13

Note: Standardized coefficients; *** > 99%; ** > 95–99% * > 90%; the weight matrix is based on inverse distances, row standardized.

It was also argued above that the spatial distribution of population growth in the Netherlands during this period was mainly driven by massive government-decided spatial allocation of housing construction. To find out if this policy

affected the spatial distribution of housing prices, an indicator for the amount of new constructed houses per municipality in the preceding period (1995–2005) was included. The results are shown in column (3). The number of

government-decided new constructed houses in a municipality has indeed a significant negative effect on housing prices.

Even with city size being largely policy driven and exogenous, it could be argued, following Duranton and Puga (2005), that if firms compete for local land in cities to find suitable locations (notably headquarters) this may affect land prices and, thus, indirectly, urban housing prices because of the scarcity of land. This mechanism is expected not to be very relevant for the case of the Netherlands because the market for housing for households and the property (real estate) market for firms are in fact two segmented markets. Government regulation typically stipulates that firms locate in industrial zones in the city that are not meant for private housing purposes. To test for the possible role of firms as competitors for land, the total amount of acres of newly developed business plots in the municipality during the preceding five years (2000–05), and job and company growth at the six-digit postal code level (also 2001–06) were included. Neither significantly correlates with rents (see column (4) in Table 2). This implies that the migration of firms to certain locations/cities is not relevant for private housing prices.

Adding education and income levels, wages, newly constructed houses and business plots to the main specification did not affect the main results of the amenity indicators. Some coefficients are affected, but except for the proximity of a train station in column (3), proximity to art museums in columns (2) and (4), and share of social housing in column (2) they all remain significant and with the expected sign. Therefore, the main message from Table 1 remains that more and better amenities (and a larger job potential) go along with higher housing prices.

One has to be careful about causal inference, but at least it can be argued that amenities and job proximity go along with higher housing prices. People are willing to pay more to live in a place with high-quality amenities and a good proximity to jobs. In that sense, it is found that amenities as well as economic geography matter.

CONCLUSIONS

Research on the relevance of urban amenities has mainly focused on the case of US cities. In many (European) countries, the labour and housing markets function rather differently than in the case of the United States. As a result, amenities may affect urban labour or housing markets differently and the empirical application of the spatial equilibrium condition that underlies the bulk of the (US) amenity research cannot be merely copied to the case of these other countries. In addition, in European countries the proximity of cities is such that spatial interdependencies between cities have to be taken into account as well. By using a very rich dataset, this paper analyses the relationship between urban amenities, agglomeration and housing prices in the case of a highly urbanized European country: the Netherlands. Dutch cities that combine a favourable location in terms of distance to work with a variety of urban amenities appear to be the most attractive locations for people to live in, as

signalled by housing prices. These cities are also relatively safe, offering a variety of historical and cultural events, as well as good restaurants. In addition, they are places where people can optimize their job prospects, not necessarily (only) as a result of jobs within these cities, but with access to jobs in other job locations. In other words, attractive cities are those that offer a broad range of amenities in the city and work at a convenient distance.

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

SUPPLEMENTAL DATA

Supplemental data for this article can be accessed at <http://dx.doi.org/10.1080/00343404.2015.1135239>

NOTES

1. But see also Adamson, Clark, and Partridge (2004), who, and with the exception of the eight largest US cities, show that more skilled workers monotonically prefer large cities for urban amenities but instead of housing prices they use net migration and wages to identify these patterns.
2. One can refer here to the literature in urban economics that, following Roback (1982) and Blomquist, Berger, and Hoehn (1988), analyses the conditions for a spatial or locational equilibrium across cities. In this set up (exogenous) inter-city amenity differences are fully reflected in the inter-city differentials dr/dA and dw/dA , where r , w and A are housing rents, nominal wages and amenities respectively. There is, however, also a well-established literature in urban economics that focuses on intra-city spatial equilibrium where utility for households is equalized within a single (monocentric) city, and where intra-city amenity differences are reflected in differences in housing rents across the city (wages are uniform per city). In this respect, a spatial or locational equilibrium can be given an inter-city as well as an intra-city foundation. Given, as will be argued below, that wages do not vary across cities in the Dutch case, the authors agree with the observation of one referee that for the analysis both versions of the spatial equilibrium analysis boil down to the conclusion that housing rents or housing prices need to adjust to compensate for (inter-

and intra-)city differences in amenities so as to keep households' utility constant across space.

3. See also Kemeny and Storper (2010), Albouy (2009), Glaeser (2008) or Glaeser and Gottlieb (2009) for additional and more mixed evidence for US regions and cities as to the relevance of amenity led growth.

4. The study of Cheshire and Magrini (2006) is for European cities; recent country studies that assess the relevance of (urban) amenities include Italy (Maddison & Bigano, 2003; Colombo, Michelangeli, & Stanca, 2010), Germany (Rehdanz & Maddison, 2009; Buettner & Ebertz, 2009), England and Wales (Srinivasan & Stewart, 2004; Stewart & Lee, 2009), Canada (Giannias, 1998), and Russia (Berger, Blomquist, & Sabirianova, 2008).

5. The fact that restrictive housing building policies undermine the relevance of urban amenities for urban population growth is not only relevant for the Netherlands. Even in some of the US states, notably California, building policies have become quite restrictive over time to the effect that the relationship between urban amenities and urban population growth has weakened (Glaeser & Shapiro, 2003; Glaeser, Gyourko & Saks, 2006).

6. The main reason to focus on owner-occupied housing prices instead of on the housing rents of the rental market is that for the rental housing market not only is the quantity of housing available restricted and almost completely policy driven, but also the same holds for housing rents. All-encompassing, uniform rent control policies that cover the whole country imply that amenity (or agglomeration) effects will simply not show up in rental prices because prices (and quantities) are precluded from reacting to demand effects that would result from people preferring certain rental locations over others.

7. Live performances include both classical concerts, opera, dance and theatre performances, popular music and musicals. The number of performances is determined using data from ticket services and calendars used to advertise the programmed performances.

8. See www.vi.nl, 2006/.

9. To deal with this, and only for those amenity variables where data availability would allow one to do so, the general model was also estimated with lagged ($t - 1$) values for the amenity variables; this does not change the basic results.

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