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Conference Paper

The Relevance of Amenities and Agglomeration for Dutch Housing Prices

51st Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World", 30 August - 3 September 2011, Barcelona, Spain

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Garretsen, Harry; Marlet, Gerard (2011) : The Relevance of Amenities and Agglomeration for Dutch Housing Prices, 51st Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World", 30 August - 3 September 2011, Barcelona, Spain, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:
https://hdl.handle.net/10419/120218

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The Relevance of Amenities and Agglomeration for Dutch Housing Prices

Harry Garretsen & Gerard Marlet[1]

First draft, March 2011

1. Introduction

In order to explain why some cities are more successful than others, researchers in both urban economics and economic geography have traditionally focused on agglomeration economies that originate 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 (specialization/diversity) boosts a city's population and economic growth, see for instance Rosenthal and Strange, 2004 for an extensive survey of the empirics of urban agglomeration economies, De Groot et al, 2007, for the corresponding meta analysis of this literature or Glaeser et al, 1992, for what is still a seminal empirical paper on urban agglomeration economies.

In economic geography at large, so including the new economic geography (Krugman, 1991), the main difference with urban economics is that through the introduction of trade or transport costs between locations, spatial interdependencies play a much more prominent role (Combes et al, 2005, Brakman et al 2009). Despite this analytical difference, urban economics and (new) economic geography are much alike in the sense that agglomeration economies that originate on the production side of the economy play also a key role in the empirical research in (new) economic geography on cities (Partridge, 2010, Brakman et al, 2009, ch.7). The inhabitants of cities are rather passive

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This paper builds on Chapters 4 and 5 of Marlet's PhD thesis (Marlet, 2009). We thank Clemens van Woerkens for his role in compiling the data set

and not instrumental in explaining inter-city differences since either people basically follow jobs. Both in their capacity as consumers and workers, people are less important than firms.

Against this background, there has, however, been a real surge of research in modern urban economics in recent years that puts 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 spearheaded by the recent work of Edward Glaeser and his 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 2001). The attractiveness of cities does not only depend on what could be seen as the standard urban agglomeration benefits and costs of larger cities such as higher (nominal) wages and housing rents respectively, but also and crucially upon urban amenities (Glaeser et al, 2001) and/or – as Florida puts is – diversity and a tolerant atmosphere (Florida, 2002). By now, 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 nice climate or physical environment) and/or high quality constructed amenities (a wide range of consumer goods and local public services) are seen as attractive that is to say as amenity-rich cities, see Partridge (2010) and Glaeser and Gottlieb (2009) for an overview of recent urban amenity studies. The main conclusion that follows from this empirical literature is that amenities matter for urban growth.

This last conclusion has, however, not gone undisputed. For one thing, there is a debate about the relevant importance of urban amenities when set against more standard (production) agglomeration effects and spatial inter-city interdependencies (compare Kimeney and Storper, 2010 vs Partridge, 2010). There is also an issue when it comes to

the measurement of 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 (Rappoport, 2006, Cheshire and Magrini, 2006). At the same time, with constructed or man-made amenities there is the issue of causality in the sense that fast growing cities may simply attract these amenities as a by-product. In this paper, we take another limitation of the current urban amenity literature as our starting point. With only a very few exceptions (e.g Cheshire and Magrini, 2006), the literature focuses on the case of US cities only. We will focus on the case of Dutch cities.

The first aim of the paper is thus to see how relevant physical and constructed amenities are for Dutch cities. A second aim of the paper is to use a broad and more extensive amenity data set than has been used in previous studies. This extension does not only concern the range of amenity variables but also the geographical scale. We will not only use amenity data at the city level but also for non-urban areas. In addition, we will break down the amenity data to the neighborhood level for the whole of the Netherlands. The Netherlands is a highly urbanized, small country where commuting is very important. This means that spatial interdependencies cannot be ignored. These interdependencies first of all concern the possibility to live in one city and work in another city, but they also include the spatial reach of amenities as well. It takes for instance only 20 minutes by train for instance to go from Utrecht (the 3rd largest city) to Amsterdam (the largest city), so a decision to live in Utrecht might also be influenced by the possibility to "consume" the urban amenities from Amsterdam.

More generally, and following the argument in Kimeney and Storper (2010, p. 14), given the relatively small size of the Netherlands, which is comparable to that of a single large metropolitan area (MSA) in the USA, 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. In the US, people doe not easily move from NY to LA for better view, without changing their job. In The Netherlands, people can easily move from one city to another keeping their job location constant.

Finally, as will argue in more detail below, the Dutch case also differs from the US for a number of more structural reasons. In the US amenity studies, the dependent variable is typically a city's population growth (see Glaeser etc 2001). In the Netherlands, the combination of restrictive Dutch planning policies towards urban growth, a very low housing supply elasticity, and relatively limited interregional wage differences imply that amenity and other differences between cities differences will show up in housing prices, with housing price being higher in locations or cities with better amenities and job possibilities. After controlling for various other explanations and after carrying out a range of robustness checks, our main conclusion will be that for the case of The Netherlands, amenities are an important determinant of Dutch housing prices.

2. Background: the spatial equilibrium condition and 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 people (not firms) as central actors. In choosing their optimal location, individual agents 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 to say a spatial equilibrium 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 next question is what urban variables best capture the individual's preference for any given city. Glaeser et al (2001, p.30) stipulate that 3 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 for the US cities at least. 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 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. To assess the relevance of urban amenities for city population, one can measure amenities directly or indirectly by taking the difference between a city's wages (not income, as Glaeser 2001 does) and housing rents. This modeling as 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 does not only yield equilibrium city size but also predictions about the welfare implications of the overall city size distribution (Desmet and Rossi-Hansberg, 2010).

It is beyond purpose of the present paper to give an overview of the recent empirical literature on the relative importance of urban amenities for city size or growth. As we stated in our introduction, the bulk of the research focuses on the case of US cities and most studies 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.[2] 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). Our principal interest here is in the application of the spatial equilibrium condition for The Netherlands. In the remainder of this section we will argue how the standard spatial equilibrium analysis cannot be applied to assess the relevance of urban amenities for Dutch cities.

[2] See also Kimeney and Storper (2010), Albony (2009), Glaeser (2008) or Glaeser and Gottlieb for additional and more mixed evidence for US regions and cities as to the relevance of amenityled growth.

The first issue that sets the Dutch case apart from the US case deals with urban population growth. Our main sample consists of the 50 largest Dutch cities. Figure 1 gives the population growth for each Dutch municipality during the period 1994-2004, the solid lines demarcate the 50 largest cities. As is clear from Figure 1, growth was rather limited or even outright negative and it was very unevenly distributed. This is also true for the 50 cities. Substantial growth (10% or more) was merely confined to a few municipalities close to the major cities of Amsterdam, Utrecht, The Hague and Rotterdam. This is no coincidence. The Netherlands has a long tradition of urban planning whereby the central government regulates building plans for each city and municipality.

INSERT FIGURE 1 HERE

More specifically for the period under consideration, the government stipulated that 600.000 new homes would be built between 1995 and 2005 and it also laid out where these new homes would be built. This led to the so called VINEX building program whereby the vast majority of these 600.000 new homes were allocated to municipalities or new towns that are close to close to the major cities (VROM, 1990). In basic economic terms, Dutch housing supply is (and always has been) very restrictive and selective as well to the effect that a city's overall population growth is largely policy driven. To substantiate this last claim, Figure 2 shows for each of the 50 largest municipalities in The Netherlands the correlation between city population growth and the number of new homes allotted by the VINEX planning policy to each city during the period 1995-2004. One testable hypothesis that arises from Figures 1 and 2 is that we do *not* expect urban amenities to have a significant impact on Dutch urban population growth. We will test this hypothesis in section 5.

INSERT FIGURE 2 HERE

The fact that restrictive housing building policies undermine the relevance of urban amenities for urban population growth is not relevant for The Netherlands. 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 and Shapiro, 2003; Glaeser, Gyourko and Saks, 2005). With the above brief discussion of the spatial equilibrium condition in mind, this raises the question where 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 regional wage differences are rather limited. Again, as with the population growth, this points to a structural difference with other countries like the USA. Wage setting in the Dutch case is highly centralized and the result of bargaining between employers' and labor unions at the national level. This means that urban wages in for instance cities in the center, like Amsterdam, are only marginally higher than in peripheral cities and municipalities in the North or South.

To be specific, 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 euro 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 to the rest of the UK. Moreover, these inter-regional Dutch wage differences dwarf against the regional differences in (owner occupied) housing prices. To give one example (but see also section 3), the average housing price *per* m^2 in Amsterdam was 3000 euro in 2006(?) against 1250 euro in the city of Heerlen in the peripheral South. Even though inter-regional wage differences are small, we will include wages as a robustness check in of our model extensions in section 5.

With not only urban population growth but also urban wages arguably being less relevant for the case of Dutch cities, we are left with housing rents or, in our data set, owner-occupied housing prices, as variable alongside urban amenities in the spatial equilibrium setting.[3] The restrictive housing building policy implies that housing supply elasticity for

[3] The main reason to focus on owner-occupied housing prices instead of on the housing rents on the rental market is that on the rental housing market, not only the quantity of housing available is restricted and

the owner-occupied housing is very low at best. There are studies that put this housing supply elasticity squarely at zero (Koning, 2006). What matters for our present purposes is that there is widespread consensus that 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 our view. In line with hedonic pricing method, this provides the opportunity to use housing prices to assess the relevance of what are essentially unpriced "goods", urban amenities. Our central hypothesis will therefore be if (urban) housing prices are indeed higher in amenity-rich places. In doing so, we will not only control for housing characteristics but we will also include various other controls and robustness checks. Most importantly, and here our empirical investigation differs from the recent urban amenity research, we will have to take spatial interdependencies seriously. Given its small size and high population density, the attractiveness of a certain location does also depend 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.

3 Data set

Our basic data set for (i) Dutch cities consists of (ii) housing prices, (iii) a job potential variable as agglomeration measure, (iv) amenity data, and a host of control variables. In this section we will focus on the introduction (i)-(iv) and we will introduce and define the remaining variables as we go along.

(i) Dutch cities

Given that the purpose of this paper is to establish the relevance of amenities for Dutch cities, the benchmark sample of Dutch locations that will be used in our estimations in

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almost completely policy driven but the same holds fro 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.

sections 4 and 5 contains our selection of the 50 largest Dutch municipalities, the so called *G50* sample (Marlet, 2009, chapter 2). We checked our G50 sample against other definitions and size classifications of Dutch cities and this resulted only in minor changes in the list of cities that are immaterial to our conclusions. In addition, we also ran our main regression models for a subsample of the 50 largest cities, the so called K31 group of Dutch cities. The selection of these 31 cities is not based on their sheer population size but on other criteria such as a city's building density (Van Oort, 2002). Appendix A lists the G50 and K31 cities. Figure 3 indicates which of the 50 cities make up the subsample of 31 cities. To check whether our results also hold for a larger set of locations, we will also look at a broader and detailed spatial scale by including all 483 Dutch municipalities and by breaking The Netherlands down into 4015 zip code areas. A main thing to notice about the map depicted by Figure 3 is how close most Dutch cities are. To take Amsterdam as an example, the 3 other big cities Rotterdam, Utrecht and The Hague are at a mere 75, 40 and 55 km from Amsterdam (geodesic distances). The Netherlands as a whole is 41.528 km^2 and the population density is nearly 400/km^2. Figure 3 serves as reminder that spatial interdependencies cannot be ignored.

INSERT FIGURE 3 HERE

(ii) Housing prices

For the period 1997-2006, we have detailed information on owner-occupied housing prices. At the zip code level this gives us 4007 locations for the whole of The Netherlands for each of which we have 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. We want 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 we prefer housing prices per square meter to control for inter-city differences in the size of the houses. Figure 4 shows the housing prices per square meter for 2006 at the zip code level for the Netherlands. For the G50 cities, housing prices per square meter in

2006 were the highest in Amsterdam (3000 euro) and the lowest in Heerlen (1250 euro) in the South. Moreover, in our estimations we will also control for housing *type,* by including, as a share of total housing transactions, the share of single detached houses, terraced houses and apartments in our sample period. Figure 4 shows that housing prices per km^2 are typically higher in the western and middle part of the country.

INSERT FIGURE 4 HERE

(iii) Agglomeration: job potential

As we argued above, spatial interdependencies or, in other words, economic geography, cannot be ignored in the Dutch case. This may not only be relevant for individual agents in their capacity as consumers when we consider the role of urban amenities but also where the job perspectives are concerned. The attractiveness of city *j* from the perspective of individual workers may not only depend on the job availability in that city, but also on how many jobs in other locations *i* (cities and non-cities alike) can be reached from city *j*, corrected for the distance between *j* and *i.* A city's attractiveness as a place to live (and buy a house) depends on the other words inter alia on its job potential. The job potential of city *j,* JP_j is defined as $JP_j=\sum_i (w(t_{ji}+t_{ij})B_i)$ where B_i is total number of jobs in city *i,* t_{ji} is average effective travel time from *j* to *i* at the start of the working day, t_{ij} is the average effective travel time from *i* to *j* at the end of the working day, and, based on commuting surveys, *w* is the share of the Dutch population that is willing to undertake the daily commute between *j* and *i*. As to the effective travel time, the effective travel time takes actual road distance by car and corrects travel time for congestion effects. Inner city jobs are included with the assumption that the average travel distance is the distance from the city border tot the city centre at an average speed of 30 km per hour (for more details see Marlet, 2009 and Van Woerkens and Marlet, 2005). Figure 5 gives for each of the (in 2007) 458 Dutch municipalities (including the 50 largest cities) the job potential (x1000 jobs).

INSERT FIGURE 5 HERE

It is clear from Figure 5, and despite congestion being a serious problem in the western part of the country, that the economic center of The Netherlands (the *Randstad* area), offers a job potential that is much higher for cities and municipalities located in the *Randstad* area.

(iv) 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 ethnic restaurants in the 1980s and 1990s (Clark, 2003). We tried to be more precise in constructing our amenity data set. First, we based our amenities on sociological theories on preferences of households (e.g. Häußermann 1996). And second, we constructed our amenity indicators at different levels, the neighbourhood(zip code)-, city- and regional level, as well as spatial averages and spatial lags. An example of a spatial average amenity indicator is shown in figure 6. The proximity to live performances shown in the map is based on real travel times to performing acts, and the willingness-to-travel for recreation. In a similar way, we constructed a set of more than 25 urban amenity indicators, most of them measured at different spatial levels. We made a distinction between dwelling specific amenities (direct living environment), urban (constructed) amenities and natural amenities. Appendix B provides a full list of the amenity indicators.

INSERT FIGURE 6 HERE

4. Basic estimation results

After the introduction of the main ingredients of our data set, we now turn to the basic estimation results. Throughout our specifications in this section and the next section, (owner-occupied) housing prices per square meter will be the dependent variable and the job potential, our agglomeration measure, and a set of amenity variables will be the main explanatory variables. Our benchmark set of locations will be the G50 list of Dutch cities but we will use alternative samples as well. Table 1 presents the cross-section estimation results for 2006 for the G50 cities, the K31 cities (a subsample of the G50 cities) and all

458 municipalities (that includes the G50 cities). Apart from the job potential variable, the specification includes the set of 7 amenities that consistently had a significant (and correctly signed) impact on housing prices. Our general model had over 25 amenities (see appendix B). As control variables, not reported, we include the housing type (share of detached house, share of terraced houses, and share of apartments, see section 3), and the size of the location (population size) which invariably turned out to be insignificant.

INSERT TABLE 1 HERE

Our main interest is with the amenity variables, but note first that the job potential variable has a strong positive impact on the level of housing prices. When we exclude the amenity variables, the job potential already picks up about 50% variation in housing prices for the 3 samples of Dutch locations in Table 1. In the introduction of our paper we referred to a discussion about the relative importance of economic geography (here, the job potential variable) and the urban amenity variables (compare Partridge, 2010 with Kimeney and Storper, 2010). For the Dutch case both type of variables seem to matter. Even though the job potential variable is positive and significantly associated with Dutch housing prices, the selected amenity variables are also statistically significant. Two of these amenity variables (proximity to nature and share of historic buildings) are physical amenities and can be considered as exogenous. The other amenity variables belong to the category of constructed or man-made living-amenities and here causality is much harder to ascertain, since one could argue 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.

Apart from the causality issue, another drawback of the specification underlying Table 1 is that it does not provide information over possibility that the importance of amenities and/or the proximity of jobs has changed over time. According to for instance Glaeser (2001) but see also Florida (2002), successful cities are increasingly consumer cities and this would mean that over time amenities have become more important. To test for this, we replaced the (2006) level of housing prices by the change of housing prices for the

period 1997-2006. Since data or housing prices per square meter are only available for 2006 onwards, we used the change in a particular type of houses, terraced houses, as our dependent variable. Since we are particularly interested in the relevance of amenities for cities, Table 2 shows the estimation results for the change of housing prices for the G50 cities. We use 2001 as a year to split the sample because the Dutch economy went into recession in 2001 and this led us to believe that the results might be different before and after 2001

INSERT TABLE 2 HERE

Table 2 indicates that there is a negative relationship between initial housing prices and the subsequent change of housing prices which could imply that people have becoming less willing to live in cities with high housing prices. At the same time, the urban amenities included Table 2 (as well as the job potential variable) continue to exert a significant impact on the change of housing prices as well. Given the possible endogeneity of some of the amenity variables, one should again be careful with causal inference. Notwithstanding the significant results for the job potential variable and our set of amenities, another reason why we think
Tables 1 and 2 cannot be the final answer on the question as to the relevance of amenities and (job) agglomeration for Dutch housing prices is that we have a relatively small sample of cities. This is arguably also an issue for other urban amenity studies, but we are in a position to address the critique of a small sample bias by extending our amenity data set to the neighborhood level. For a range of our amenity variables, as introduced in section 3, we can thus look at the much finer spatial scale of the zip code level that divides The Netherlands into 4015 areas. For these 4015 areas we have a full set of amenity data for in total 2328 zip code areas. This substantially enlarged sample implies that we can not only measure housing prices per square meter, but also amenities at this level of spatial disaggregation. Moreover, because of the enlarged sample we are able to add a number of amenity variables as explanatory variables. As can be seen from Table 3, the set of the amenity variables has now been substantially enlarged and most of the amenity variables are actually measured at the neighborhood level. Some of the

independent variables are measured at the regional level (like job potential or proximity to the sea) or the city level (where the city level can also imply a municipality that does not belong to our list of G50 cities).

INSERT TABLE 3 HERE

In our view, Table 3 not only confirms and strengthens the initial findings as reported in Tables 1 and 2 as to the significant relationship between Dutch (dis)amenities and housing prices, Table 3 also offers additional evidence that the relevance of amenities holds at the neighborhood level and shows that this is true for a much wider set of amenity variables than in the empirical specification underlying Tables 1 and 2. Until now, job potential has been based on the proximity of jobs where in our calculation of the effective distance matrix car travel was the mode of transport. Table 3 also includes the a separate measure where proximity to the nearest railway station help to define the effective commuting distance between places of living and work.

Finally, and here we again refer to the discussion on the interpretation of the spatial equilibrium condition for the Dutch case, we have argued that inter-city or inter-regional wage differences are relatively limited in The Netherlands. Instead of neglecting wages altogether, we included wages (euro per hour) among the set of independent variables in table 3. Even though inter-regional wage differences are relatively limited, they do exist and once we include wages among our set of regressors, wages have a positive effect meaning that housing prices are higher in places with higher wages which is in line with the basic spatial equilibrium condition. However, job opportunities are far more important, and all our amenity indicators remain significant.

5 Extensions

In this section we will discuss a number of extensions that are meant to solidify our main finding that natural and constructed amenities (and job agglomeration) matter for Dutch housing prices. To begin with, and recall our discussion in section 2 on the alleged unsuitability of population growth as dependent variable, we have estimated our basic model from section 4 for the 50 and 31 city samples, with urban population growth as the

dependent variable. Apart from the job potential variable and the amenity variables that are also included in Table 1, we have also added the share of pre-WWII houses and, crucially, 3 policy variables that capture for each city the importance of so called new VINEX housing, the policy indicator that we used in section 2 to approximate the restrictiveness of Dutch housing policy. Table 4 gives the estimation results for the population growth between 1995 and 2004.

INSERT TABLE 4 HERE

As is clear from Table 4, the job potential and amenity variables basically lose their significance once we replace housing prices as dependent variable by population growth. The policy variables are, however, on the whole significant and the positive coefficients of the VINEX variables indicate that population growth was significantly higher in those cities where new housing was allowed according to the VINEX policy in the period 1995-2004. All in all, the estimation results confirm that as opposed to notably the case of US cities, urban population growth is not a very useful indicator to study the relevance of amenities in the Dutch case.

A second extension deals with the issue as to what kind of people prefer to live in cities with high quality amenities (and a large job potential) and are willing (and able) to pay the price for this preference in the form of a higher housing price. Following Glaeser et al (2003), Clark (2003) and Florida (2002) one could hypothesize that high skilled workers are in particularly drawn to amenity-rich cities To see whether the relationship between housing prices and amenities (and job potential) may in particular reflect locational sorting by a specific group of people, the high-skilled, we estimated our basic model for the 50 and 31 cities and replaced housing prices by (the change in) the share of high-skilled in each city. Table 5 shows the corresponding estimation results. Although the evidence is somewhat mixed (we only report the significant amenity coefficients), it seems to be the case that there is a significant positive relationship between the share of high-skilled workers in a city and city amenities. The empirical evidence is less clear-cut when we consider the change in high-skilled share between 1996 and 2006.

INSERT TABLE 5 HERE

In the urban economics literature there is a long tradition that goes back to Von Thünen (1826) which puts land prices or land rents at the heart of the analysis. De Groot et al (2010) presents estimation results for our basic set of amenity variables where housing prices are replaced by land prices (euros per square meter, averages over period 1985-2007). This model illustrates that there is a positive relationship between land prices and a wide range of our amenity variables .

Finally by way of extension, we come full circle and we go back to Figure 3 (see also Appendix A) which shows the positioning of the 50 largest cities on the map for The Netherlands. In our view the estimation results, as summarized by Tables 1-5, show convincingly that better amenities (and a larger job potential) go along with higher housing prices. People are willing to pay a price in the form of a higher housing price in order to live in a place with high-quality amenities and a good proximity to jobs. In that sense, we find that amenities as well as economic geography matter. 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. Based on our estimations the question is how the Dutch cities compare in terms of amenities and job proximity. Table 6 therefore ranks the 50 cities according to their combined amenity and job proximity scores. To arrive at these scores, we took the estimation results from Tables 1 and 2. The amenity and job potential variables enter this "city attractiveness" index by weighing them with their respective coefficients, where the models underlying Tables 1 and 2 each get a 50% overall weight.

INSERT FIGURES 7 AND 8 HERE

Table 7 lists the 50 cities with Amsterdam topping the list as the most attractive city. The numbering of the cities can be traced to Figure 3 to give an idea of the positing of each city in The Netherlands. The first column of Table 7 gives the attractiveness index where

both the estimation results for amenities and the job potential have been included. Amsterdam thus tops the list and cities from the economic heartland, the *Randstad* area in the West, dominate the top half of the list. With one exception, Spijkenisse (47), cities 45-50 are cities on the peripheral edges of the country. The second column of Table 6 shows the attractiveness index when only the amenity variables and not the job potential are allowed to enter the index. Amsterdam again heads the lit but there are some noticeable shifts. Cities like Groningen or Maastricht that score low on job potential because of their isolated position in resp. the North and South now crop up within the top-10 because these 2 cities offer high quality living amenities. Similarly, some cities in the economic heartland do now much worse because their amenity scores are below par (see for instance cities 32, 33 and 41 in the second column and compare with their positioning in the first column).

6 Conclusions

In this paper we have combined concepts from the field of urban economics with views from the area of geographic economics (the New Economic Geography). This approach enabled us to depict both the significance of the characteristics of the city itself and that of its location. Cities which 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. These are relatively safe cities, offering a variety of history and culture events, as well as good restaurants. In addition, successful cities are places where people can optimize their career prospects, not necessarily – as often assumed – as a result of business districts in these cities, but access to jobs from these cities. In other words, attractive cities are cities which offer a broad range of amenities in the city, nature situated close-by, and work at a convenient distance. Not (only) the location of work, but (especially) the quality of the living environment is crucial in the choice for Dutch people where they want to live.

References (to be completed)

Boarnet, M., 1994: The monocentric model and employment location, in: Journal of urban economics, 36, p. 79-97

P.C. Cheshire, S.Magrini, 2006: Population Growth in European Cities: Weather Matters - But only Nationally, in: Regional Studies, 40, 1, pp. 23-37

T. N. Clark, 2003: Urban amenities: lakes, opera, and juice bars do they drive development?, in: The city as an entertainment Machine, Research in Urban Policy, 9, pp. 103-140.

R. Florida, 2002: The rise of the creative class, and how it's transforming work, leisure, community and everyday life (Basic Books, New York).

E.L. Glaeser, J. Kolko, A. Saiz, 2001: Consumer City, in: Journal of Economic Geography, pp.27-50

Glaeser, E.L. Saiz, A., 2003: The rise of the skilled city, NBER working paper series, 10191

E. L. Glaeser, J. D. Gottlieb, 2009: The Wealth of Cities: Agglomeration Economies and Spatial Equilibrium in the United States, Journal of Economic Literature, 47, 4, 983-1028.

Graves, P.E., 1983: "Migration with a composite amenity: the role of rents", Journal of regional science,, 23, p. 541-546.

H.L.F. de Groot, J. Poot, M.J. Smit, 2007: Agglomeration, Innovation and Regional Development (Tinbergen Institute Discussion Paper 079/3).

H. de Groot, G. Marlet, C. Teulings, W. Vermeulen, 2010: Stad en land (Cpb, Den Haag)

H. Häußermann, W. Siebel, 1996: Soziologie des Wohnens (Weinheim, Juventa).

M. Koning, R. Saitua Nistal, J. Ebregt, 2006: Woningmarkteffecten van aanpassing fiscale behandeling eigen woning, CPB Document, No 128.

G.A. Marlet, 2009: De aantrekkelijke stad (VOC Uitgevers Nijmegen)

Ministerie van VROM, 1990: Vierde Nota over de Ruimtelijke Ordening Extra (SDU Uitgevers, Den Haag)

J. Rappaport, 2006: Moving to Nice Weather (Working Paper, Research devision, Federal Reserve Bank of Kansas City)

Roback, J., 1982: Wages, rents, and the quality of life, in: Journal of political economy, 90, p.1257-1278.

J.H. von Thünen, 1826: Der Isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie (Perthes, Hamburg).

E. L. Ullman, 1954: Amenities as a factor in regional growth, in: Geographical Review, 44, pp. 119-132.

Van Oort, F.G., 2002: Agglomeration, economic growth and innovation. Spatial analysis of growth- and R&D externalities in the Netherlands (Tinbergen Institute research series ; no. 260, Amsterdam, Thela Thesis)

C.M.C.M. van Woerkens, G.A. Marlet, 2005: De bereikbaarheid van gemeenten, in: Atlas voor gemeenten 2005 (Stichting Atlas voor gemeenten, Utrecht)

Appendix A

List of Dutch cities; 50 largest municipalities (G50) and 31 core cities (K31)

	Cities	G50	K31
1	Alkmaar	X	X
2	Almelo	X	X
3	Almere	X	
4	Alphen aan den Rijn	X	
5	Amersfoort	X	X
6	Amstelveen	X	
7	Amsterdam	X	X
8	Apeldoorn	X	X
9	Arnhem	X	X
10	Bergen op Zoom	X	
11	Breda	X	X
12	Delft	X	X
13	Den Haag	X	X
14	Deventer	X	X
15	Dordrecht	X	X
16	Ede	X	
17	Eindhoven	X	X
18	Emmen	X	
19	Enschede	X	X
20	Gouda	X	
21	Groningen	X	X
22	Haarlem	X	X
23	Haarlemmermeer	X	
24	Heerlen	X	X
25	Helmond	X	X
26	Hengelo (O.)	X	X
27	Hilversum	X	X
28	Hoorn	X	
29	Leeuwarden	X	X
30	Leiden	X	X
31	Leidschendam-Voorburg	X	
32	Lelystad	X	
33	Maastricht	X	X
34	Nijmegen	X	X
35	Oss	X	
36	Purmerend	X	
37	Roosendaal	X	
38	Rotterdam	X	X
39	Schiedam	X	
40	‘s-Hertogenbosch	X	X
41	Sittard-Geleen	X	X
42	Spijkenisse	X	
43	Tilburg	X	X
44	Utrecht	X	X
45	Velsen	X	X
46	Venlo	X	X
47	Vlaardingen	X	
48	Zaanstad	X	
49	Zoetermeer	X	
50	Zwolle	X	X

See figure 3 for the location on the map

Appendix B Amenity Indicators

Dwelling Specific Amenities	*source*
Average housing size	NVM/Funda
Owner occupied houses	VROM/Syswov
Single detached houses	VROM/Syswov
Pre-war houses	VROM/Syswov
Share social housing	VROM/Syswov
Nuisances	Atlas
Crime rate	CBS/KLPD
Quality of schools	NIWI
Kindergarten	NUK
Urban amenities	
Shops for fun shopping	Locatus
Sunday shopping	Atlas
Shops for daily shopping	Locatus
Professional soccet team (performance index)	Atlas
Musical venues	Atlas
Cultural Festivals	Respons
Museums	NMV
Live performances	Atlas
Quality Restaurants	Atlas
Diversity in restaurants	Atlas
Cafes	Bedrijfschap Horeca en Catering
Historic Buildings	Rijksdienst voor Archeologie, Cultuurlandschap en Monumenten
Canals	BZK
University	
Natural amenities	
Parks	CBS
Public water	CBS
Nature	Atlas
Proximity to the sea	Atlas
Common recreational grounds	CBS
Sport facilities	CBS

TABLES AND FIGURES

Figure 1 Population growth in The Netherlands, 1994-2004

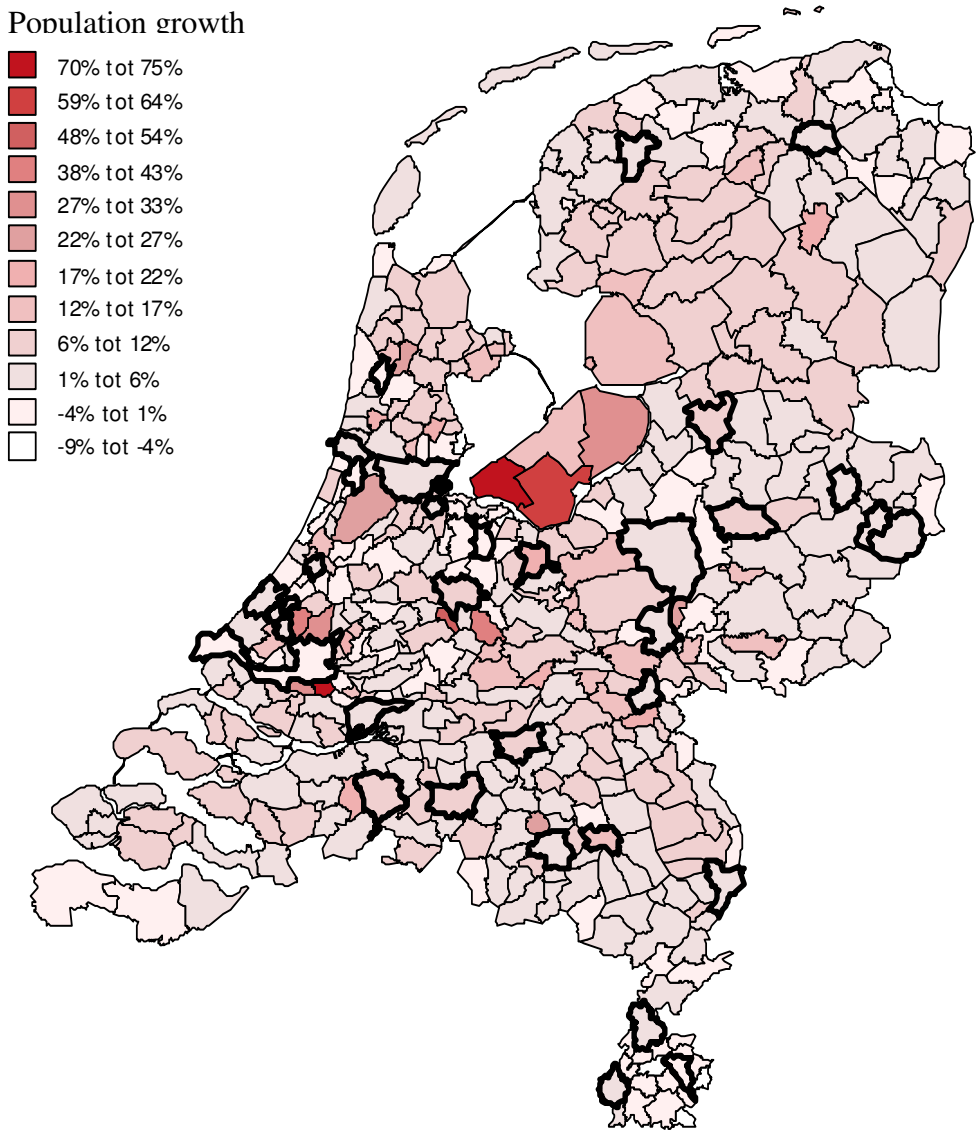


Figure 2 VINEX and population growth (G50)

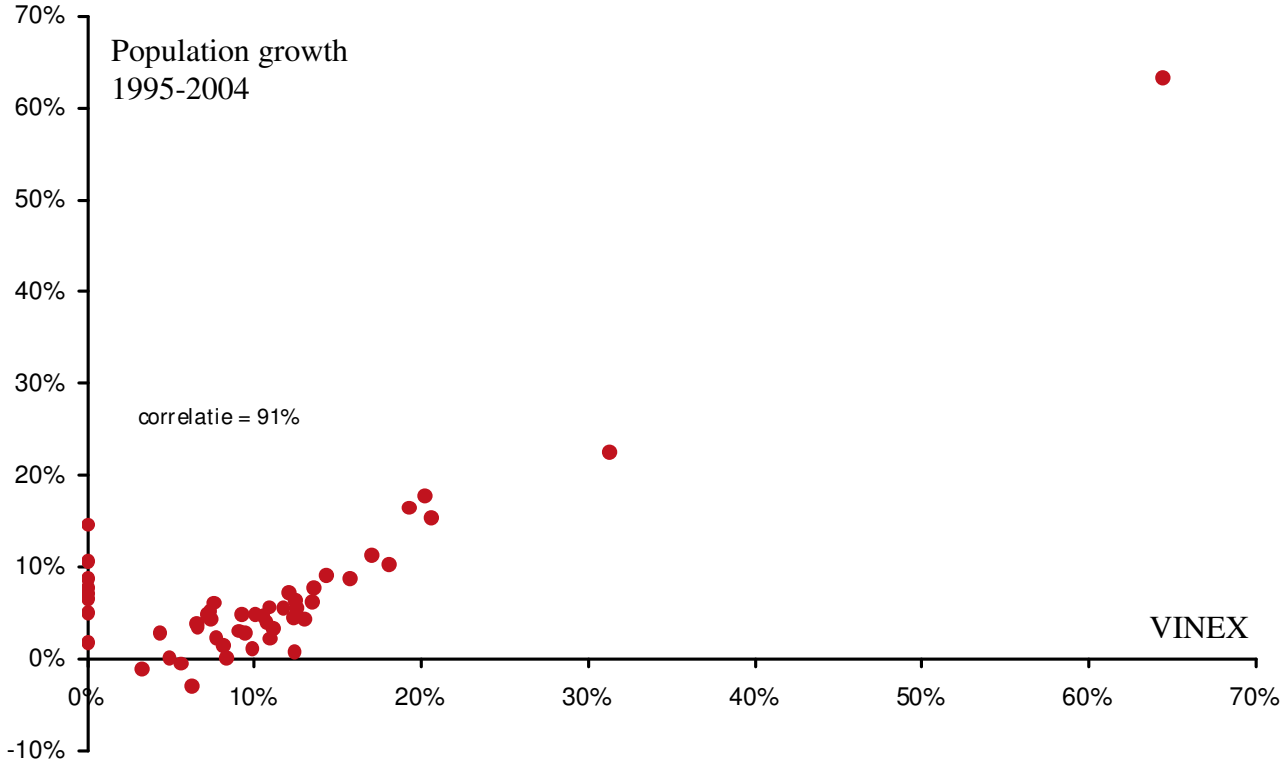
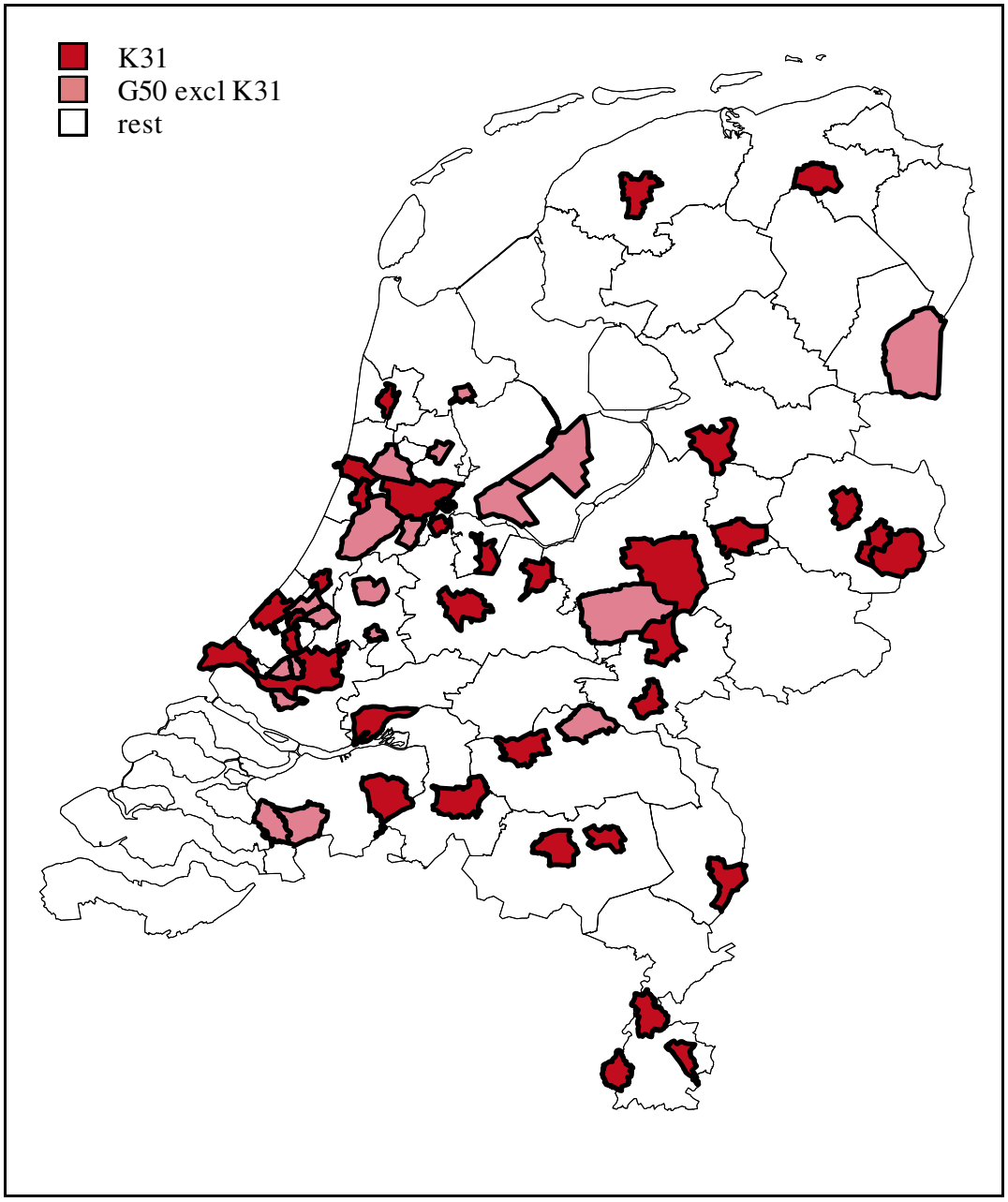


Figure 3 Map with Dutch cities; 50 largest municipalities (G50) and 31 core cities (K31)



See Appendix A for corresponding city names

Figure 4 Housing prices per square meter , 2006, Zip code level

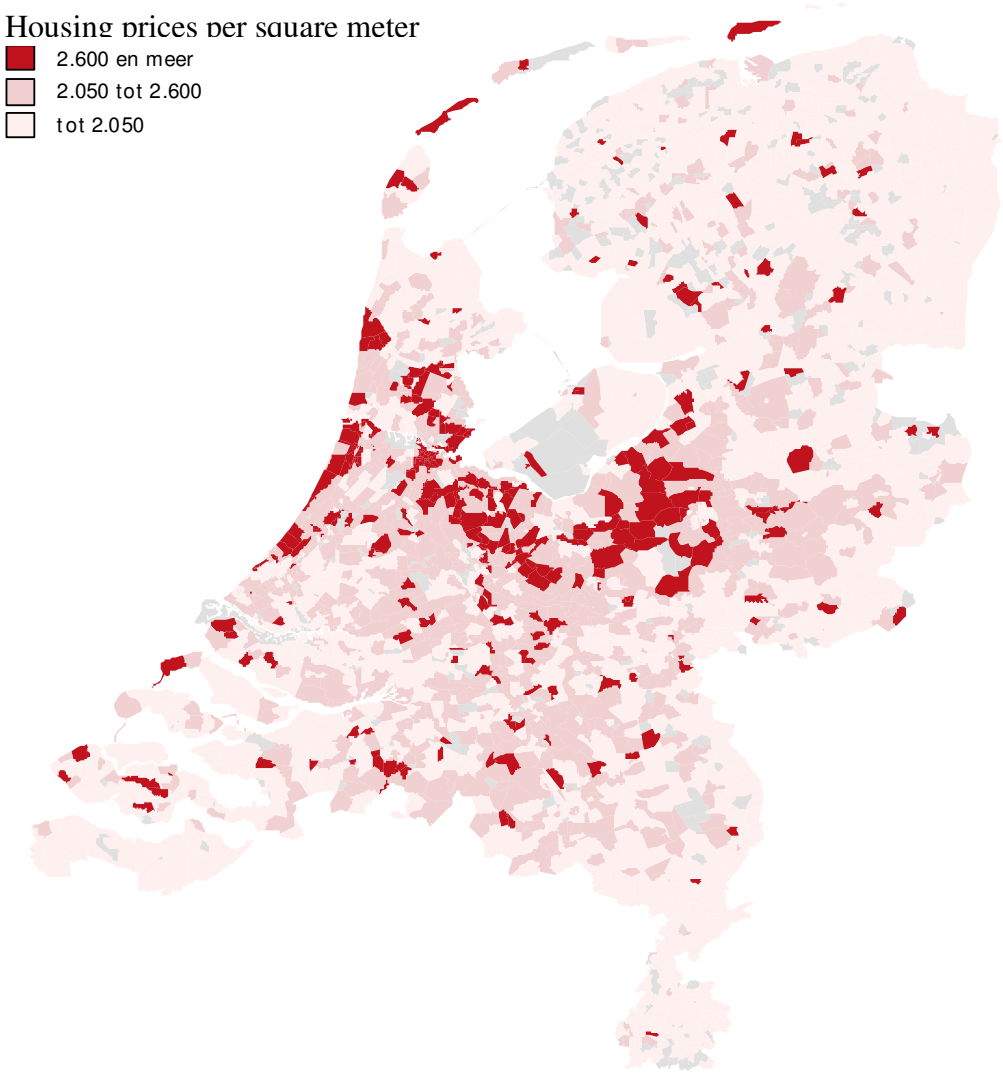


Figure 5 Job potential, 2006

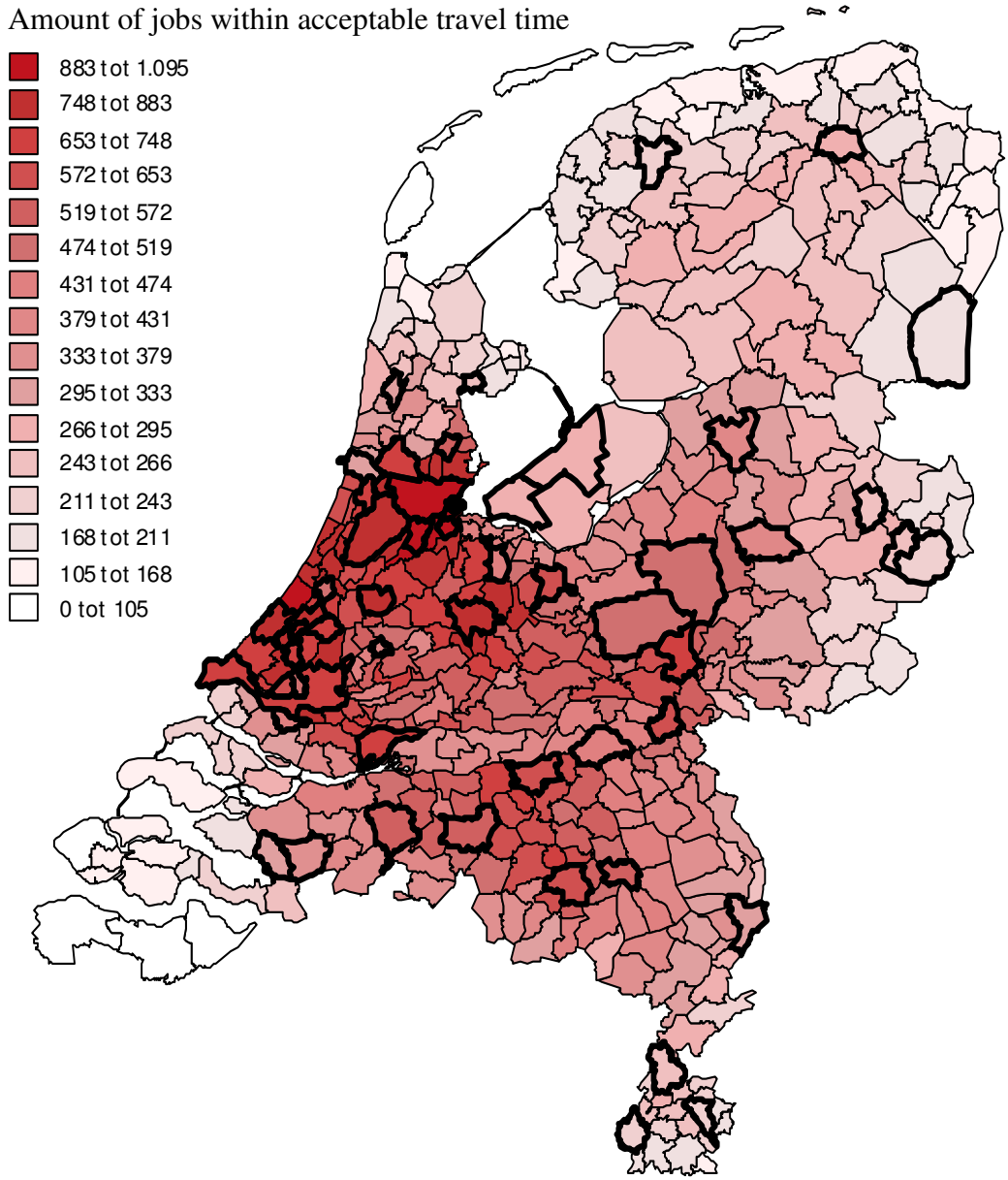
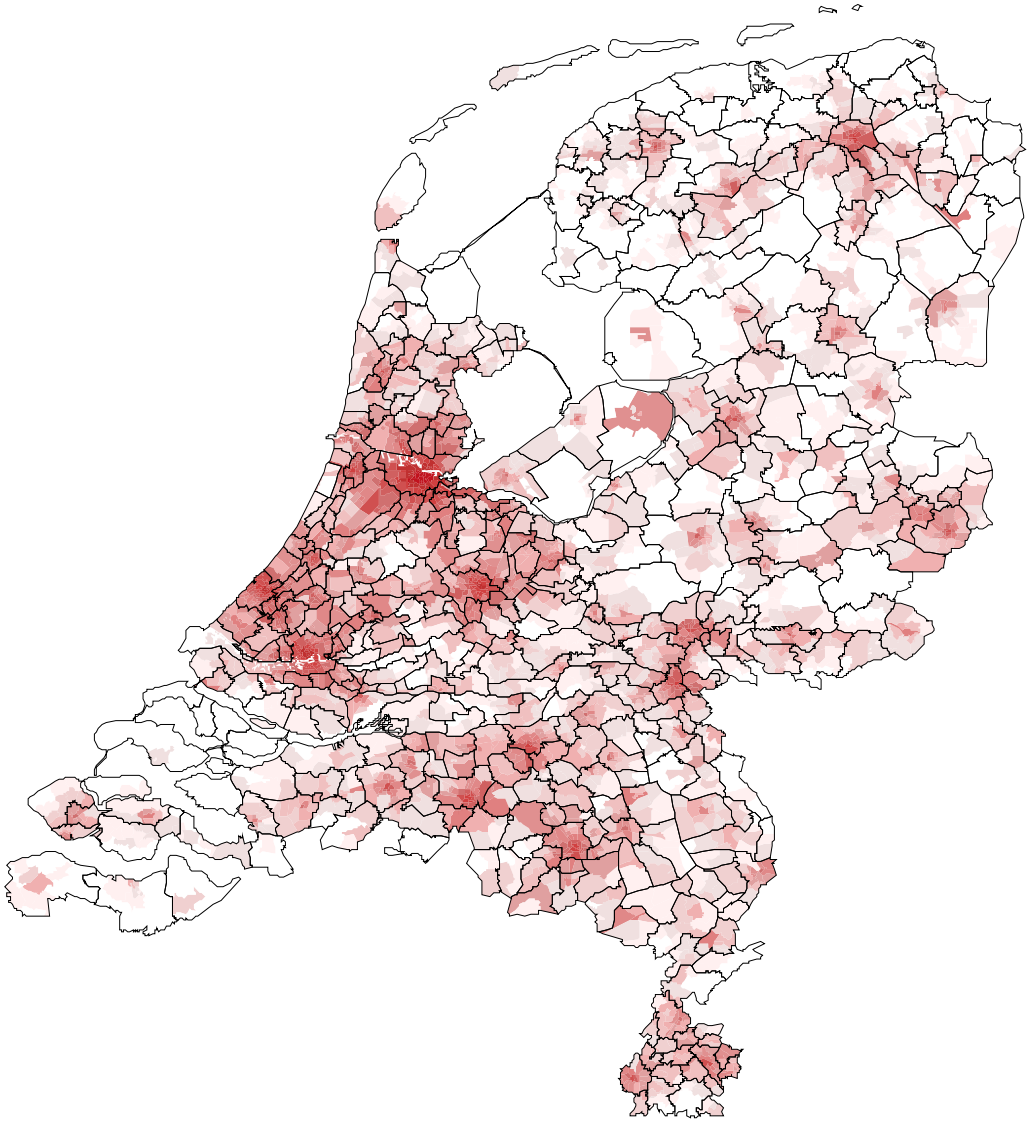


Figure 6 Amenity example: proximity to live performances (zip code level)



Amount of yearly live performances within acceptable travel time

Figure 7 Attraction index (amenities and job potential)

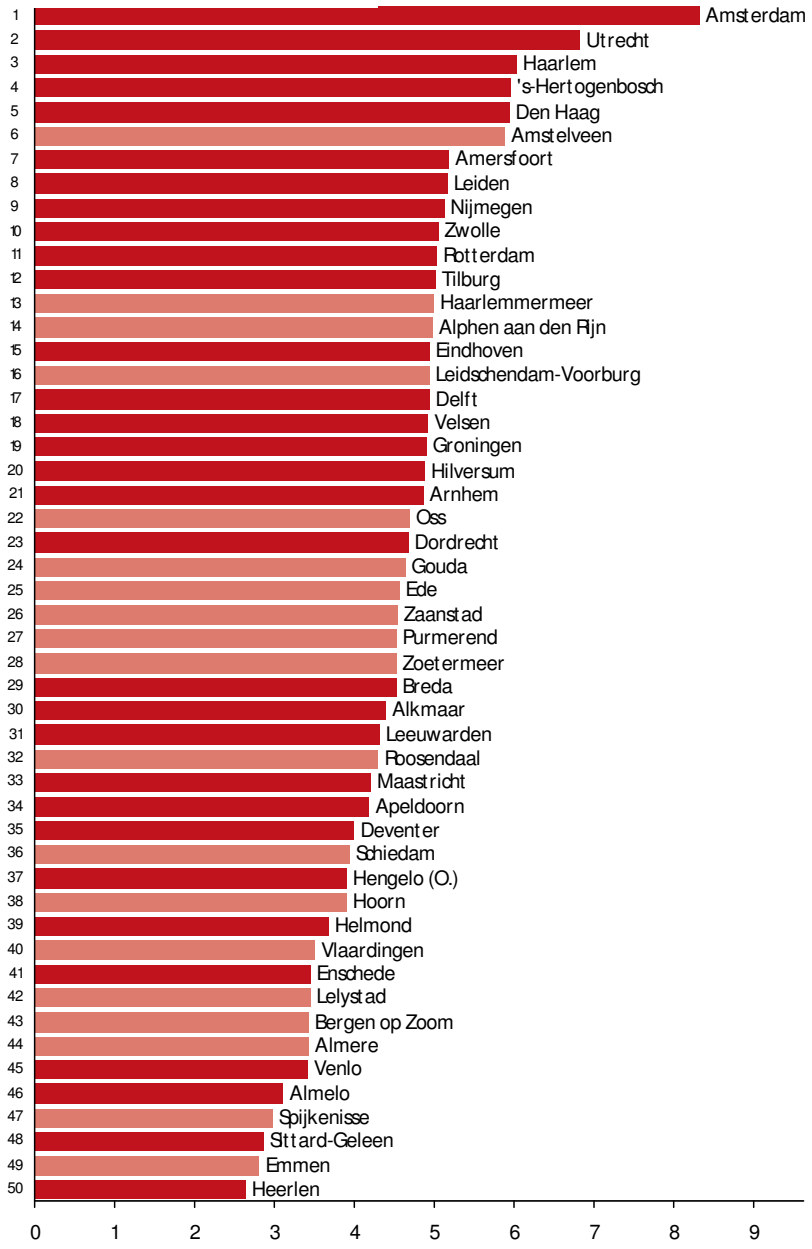


Figure 8 Amenity index (without job potential)

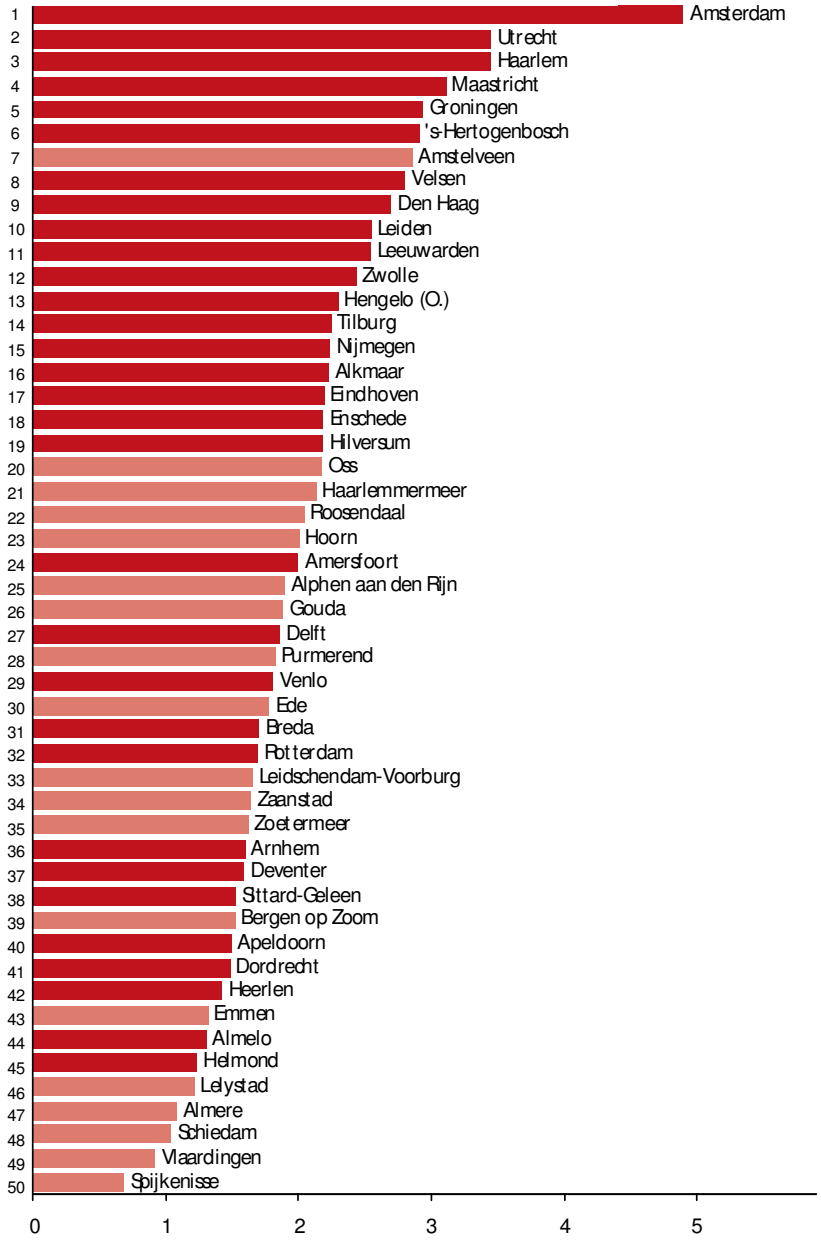


Table 1 Basic estimation results (cross-section, 2006), level of housing prices

Housing prices (€ per square meter), 2006	31 Core Cities (K31)	50 largest cities (G50)	All municipalities
Job opportunities:			
Job potential	1,36 (6,2)***	1,36 (11,9)***	1,54 (18,7)***
Amenities:			
Crime rate	-60,62 (-3,0)***	-61,52 (-6,3)***	-36,07 (-3,9)***
Professional soccer team (performing index)	1,29 (2,3)**	0,69 (1,9)*	
Live performances (local)	51,24 (5,3)***	50,83 (6,7) ***	20,61 (2,6)**
Live performances (spatial lag)			31,11 (2,9)**
Quality restaurants	43,15 (3,0)***	38,12 (3,1) ***	12,68 (2,3)**
Share historic buildings	14,04 (2,7)**	10,31 (2,6)**	6,17 (2,6)**
Proximity to nature	1,39 (3,8)***	1,17 (7,6)***	1,66 (10,3)***
	OLS	OLS	OLS
N	31	50	458
R^2 Adj.	0,90	0,90	0,63

*** > 99%, ** > 95%, * > 90%

Table 2 Amenities and Change in housing prices

Change in housing prices 1997-2006	1997-2006	1997-2001	2001-2006
Job opportunities:			
Job potential	0,001 (4,77)***	0,0005 (4,22)***	0,0003 (3,22)***
Amenities:			
Average housing size		0,002 (2,54)**	
Crime rate	-0,023 (-2,85)**	-0,013 (-1,88)*	-0,020 (-3,03)***
Professional soccer team (performing index)			0,0008 (2,22)**
Live performances	0,024 (2,41)**	0,026 (4,27)***	
Quality restaurants	0,038 (2,02)**		
Share historic buildings	0,006 (1,66)*	0,003 (1,66)*	0,006 (3,83)***
Proximity tot the sea	0,317 (3,20)***	0,129 (1,70)*	0,139 (2,20)**
Proximity to nature	0,040 (3,75)***	0,027 (4,23)***	0,011 (1,46)
Control variables			
Initial housing prices (1997, 2001)	-0,012 (-6,02)***	-0,005 (-4,85)***	-0,003 (-5,48)***
	OLS	OLS	OLS
N	50	50	50
R^2 Adj.	0,45	0,39	0,39

*** > 99%, ** > 95%, * > 90%

Table 3 Housing Prices and Amenities at the Neighborhood Level (zip-codes)

Housing prices (€ per square meter), 2006	
Job opportunities:	
Wages (city level)	223.3 (4.0)***
Job potential (city and regional level)	1,1 (11,0)***
Proximity of train station (neighborhood level)	469.4 (3.6)***
Amenities:	
Share social housing (neighborhood level)	-322,6 (-6,7)***
Nuisances (neighborhood level)	-7,7 (-9,3)***
Crime rate (city level)	-22,2 (-7,8)***
Public water in the neighborhood (neighborhood level)	858,1 (3,9)***
Distance to shops for daily shopping (neighborhood level)	-4,9 (-1,5)
Proximity to Live performances (spatial average, regional level)	0.2 (7,6)***
Quality restaurants (city-level)	10,0 (2,6)**
Cafés (neighborhood level)	26,9 (3,1)***
University (city level)	95,8 (4,4)***
Share historic buildings (city level)	5,0 (4,7)**
Proximity tot the sea (regional level)	551,5 (7,0)***
Proximity to nature (regional level)	0,8 (7,6)***
	OLS
N	2328
R^2 Adj.	0,61

*** > 99%, ** > 95%, * > 90%

Table 4 Population growth and amenities

	I	II
Job opportunities		
Job potential	-0,009 (-0,36)	0,045 (2,1)**
Amenities		
Proximity to nature	0,0002 (3,40)***	-0,0002 (-0,17)
Crime rate	0,002 (1,00)	-0,001 (-0,06)
Live performances	0,0003 (0,12)	-0,0003 (-0,84)
Quality restaurants	-0,005 (-1,34)	-0,004 (-0,99)
Pubs	0,008 (0,48)	-0,001 (-0,06)
Share Historic buildings	0,0016 (2,04)**	0,0013 (1,82)*
Pre-war houses	-0,23 (-5,01)***	-0,0178 (-0,32)
Policy		
Nationally planned (Vinex) new construction inside the city, 1995-2004	0,316 (2,03)**	0,869 (4,54)***
Nationally planned new construction outside the city on Vinex-location, 1995-2004	0,929 (13,1)***	1,202 (8,18)***
Nationally planned new construction outside the city on non-Vinex-location, 1995-2004	0,158 (0,42)	1,22 (3,00)***
	OLS	OLS
sample	50	31
Adj. R^2	0,89	0,80

*** > 99%, ** > 95%, * > 90%

Table 5 High skilled people and amenities

	Share 2006	Share 2006	Growth 1996-2006	Growth 1996-2006
	K31	G50	K31	G50
Job opporinities				
Job potential	0,00022 (3,7)***	0,00023 (4,4)***	0,041 (2,4)**	0,060 (3,3)***
Amenities				
Share owner occupied houses	0,257 (2,5)**	0,164 (2,0)*		
Share pre-war houses	0,100 (1,8)*	0,128 (2,0)*		
Live performances	0,012 (6,5)***	0,012 (4,1)***	0,0029 (3,2)***	0,0035 (3,3)***
Quality restaurants	0,006 (1,7)*	0,0079 (2,2)**		
Share historic buildings			0,001 (3,4)***	0,0008 (2,6)**
Proximity to nature	0,0069 (1,3)	0,0092 (2,6)**	0,0051 (3,3)***	0,005 (3,7)***
Control variables				
Amount of students	1,968 (7,8)***	1,976 (8,1)***		
	OLS	OLS	OLS	OLS
sample	31	50	31	50
R^2 Adj.	0,80	0,77	0,65	0,45