Downloaded from UvA-DARE, the institutional repository of the University of Amsterdam (UvA)
http://dare.uva.nl/document/164806

File ID	164806
Filename	Appendix I: How to make portfolio maps

SOURCE (OR PART OF THE FOLLOWING SOURCE):

Type	Dissertation
Title	Mapping the market : a portfolio approach for informed deliberation of urban development strategies
Author	P.J. Hoetjes
Faculty	Faculty of Social and Behavioural Sciences
Year	2010
Pages	336
ISBN	978-90-815192-1-2

FULL BIBLIOGRAPHIC DETAILS:
http://dare.uva.nl/record/331712

Copyright

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other then for strictly personal, individual use.

UvA-DARE is a service provided by the library of the University of Amsterdam (http://dare.uva.nl)

Appendix I How to make portfolio maps

Introduction

At the beginning of chapter five, the portfolio approach is discussed the way it has been applied in the last three workshops. This is the version to which the approach has evolved during the research project, an evolution which is described chapter six. This appendix describes the way portfolio maps are made in its most recent version: which data are used and how these are processed in order to make the maps. Three types of portfolio maps can be made: a residential portfolio for the whole city, a residential portfolio for only a part of the city and a portfolio for offices.

By following the procedure described below, the portfolio positions of neighbourhoods can be determined, to be represented in the portfolio maps. If the focus is not on the whole city, but a 'partial portfolio' of only a certain part of the city, neighbourhoods positions are calculated and determined in exactly the same manner, yet all in relation to not the city average of property values and value increase, but of the average of the concerning part looked at. Appendix IV shows these partial portfolio maps for Rotterdam Oud-Zuid, as well as the series of residential portfolio maps for Amsterdam, Rotterdam and the portfolio for offices in Amsterdam.

Origins of data

Data on property values, both in Amsterdam and Rotterdam come from the municipal statistics agency, provided by the cadastre. The level of aggregation at which data are available in Amsterdam is the neighbourhood, of which there are 355 in total, whereas in Rotterdam data are aggregated for 87 neighbourhoods. Property values in Amsterdam are available from 1975 and in Rotterdam they are available from 1987. Data on rents for offices come from a real estate monitor of the office market provided by *PropertyNL*.

Measuring the current market value: the position on the x-axis

A neighbourhood's market value is measured the average property value per square meter, based on actual transactions. In order to attain a certain reliability of the property values, data are processed in the following ways:

- Removal of extreme values;
- Interpolation for 'missing years';
- Smoothening of the values.

Removal of extreme values

For reasons of privacy, average transaction values are not available if there a less than 5 observations for a neighbourhood in a year. Yet having less than 5

observations would mean a rather unreliable amount of observations to calculate the average with in the first place. In addition, to prevent distorted average values, the highest and lowest 5 percent of the values for each neighbourhood are removed before calculating the average values. So-called package deals, where a number of houses are transferred from one to another real estate agency, have a distorting effect as well and therefore these have been removed as well.

Interpolation for missing years

If values are missing for one or more years, values are interpolated. The easiest way of doing this is so-called linear interpolation, where the 'gap is bridged' by drawing an imaginary straight line generating a value for the missing year(s). Since property values usually do not follow this linear pattern, interpolation has been done by making use of data on a more aggregate level. In the case of Amsterdam these are the so-called neighbourhood combinations (*buurtcombinaties*) and if these are lacking as well the boroughs (*stadsdelen*) and in Rotterdam only the boroughs (*deelgemeenten*). The rate by which values change are used to calculate a fictional value for the neighbourhood. It is thus assumed that the increase rates at the higher level are representative for the neighbourhood. At least partly this is obviously the case, since values on a higher level are made up of sublevels. The example in the table below illustrates the interpolation method.

	Year 1	Year 2	Year 3	Year 4
Value at the level of the neighbourhood (B)	900	Missing	1600	1800
Value at the level of the neighbourhood combination (C)	1000	1400	1700	1900

The missing neighbourhood value for year 2 (B2) is calculated using the 'surrounding' data:

B2 = (B1+B3) / (C1+C3) * C2, or:
B2 = (900+1600) / (1000+1700) * 1400 = 1296

The same calculation is done when two or more years are missing If in the table above not only year 2, but also year three (1600) were missing, the calculation is:

B2 = (B1+B4) / (C1+C4) * C2, or:
B2 = (900+1800) / (1000+1900) * 1400 = 1303
and:
B3 = (B1+B3) / (C1+C3) * C3, oftewel:
B3 = (900+1800) / (1000+1900) * 1700 = 1583

If instead of values 'in between', values at the beginning or at the end are missing, then these 'loose ends' are calculated in a similar manner, as depicted below.

	Year 1	Year 2	Year 3	Year 4
Value at the level of the neighbourhood (B)	1000	1400	1700	1900
Value at the level of the neighbourhood combination (C)	Missing	1300	1600	1800

B1 = (B2 / C2) * C1, or:
B1 = (1300 / 1400) * 1000 = 929

And when both year 1 as year 2 are missing :

B1 = (B3 / C3) * C1, or:
B1 = (1600 / 1700) * 1000 = 941
and:
B2 = (B3 / C3) * C2, or:
B2 = (1600 / 1700) * 1400 = 1318

These calculations could be done for more missing years as well, but obviously the more years are missing, the less accurate the calculations will become. Therefore, the outcome of these calculations have been checked for their credibility by looking at the values of the surrounding neighbourhoods.

In the case of missing values on the level of the neighbourhood as well as at the level of the neighbourhood combination, the above interpolations can be executed by using the data on the level of the borough (which in Rotterdam is the immediate next level). Since the values on the level of the borough are less representative even more, interpolations have only been made in case of missing values that lie 'in between' and not for the 'loose ends'.

'Smoothening' the data

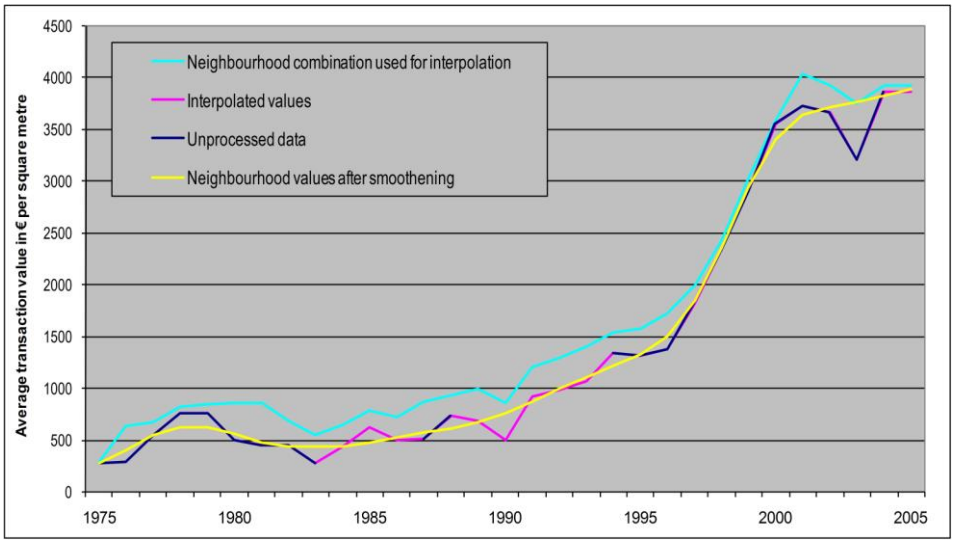
After removal of the extremes and interpolation of missing values, data are still rather 'unsteady'. Particularly when measuring the value increase this is problematic, as increase rates are above city average in one year, below the next year and above again the next year. As this is not how the pace by which neighbourhoods' positions in the city generally change, data are 'smoothened'.

Of the several ways by which smoothening can be done, the so-called 'T4253H smoothing[1]' has been used, since no years are 'lost', in contrast to using

[1] From the SPSS handbook: 'T4253H Smoothing starts with a running median of 4, which is centred by a running median of 2. It then resmoothes these values by applying a running median of 5, a running median of 3, and hanning (running weighted averages). Residuals are computed by subtracting the smoothed series from the original series. This whole process is then repeated on the computed residuals. Finally, the smoothed residuals are computed by subtracting the smoothed values obtained the first time through the process.'

for instance a running average. Figure I.1 demonstrates the result of the smoothening procedure.

Figure I.1 Example of the result of smoothing procedure for an Amsterdam neighbourhood: the yellow line represents the values which are used to identify the neighbourhood position.



Continuity

The average transaction values of some neighbourhoods are close to the city average. Sometimes neighbourhoods then cross the average in one year and go back in the next year, yet without an actual significant change of their position. In the maps, however, neighbourhoods would change colour. To prevent such a distorted image, i.e. we want neighbourhoods to change colour only if something actually changes, the condition is set that a changing position is only shown on the map if it lasts for at least three consecutive years. So a neighbourhood crossing the city average for two years and going is not made visible in the maps.

This does not work for the first and last two years in the period. Therefore, for the first and last year, the condition above does not apply and for the second and second to last year, a changing position has to last two consecutive years instead of three.

Absolute transaction values

Looking at the relationship between size of the houses and property values per m², shows a pattern of prices per m² dropping when the average size of the houses increase. Not every added m² thus is valued proportionally. Even so, despite of relatively low property values per m², neighbourhoods with large houses generally do have above average property values in absolute terms; obviously for every added m² still has to be paid. It would be unrealistic to treat neighbourhoods with above

average property values in absolute terms as dogs or question marks, just because of a decreasing added value when houses are larger, when in reality these are often neighbourhoods with a strong position in the housing market. Therefore, another condition for neighbourhood property values to be designated as above average is that, in addition to the transaction values per m², transaction values in absolute terms have to be above average as well. If a neighbourhood thus shows below average values per m² but above average values in absolute terms, it is designated not a dog or question mark, but a star of a cash cow.

The absolute transaction values used here show a comparable amount of gaps, which are interpolated in similar way as the transaction values per m². The same goes for the smoothing procedure, which is done here as well.

Measuring the value increase: the position on the y-axis

The increase in property values is an indicator of the potential of a neighbourhood. Here, we look at the increase in absolute terms over the previous four years. A period of four years in considered a proper balance; looking only at the increase of the last one or two years results in too many unsteady changes, whereas longer periods demonstrate too little of the dynamics taking place. The value increase for instance for the year 2000 is thus measured as the average transaction value per m² of 2000 minus the average transaction value per m² of 1996.

The assumption that is made here is that value increase of the recent past indicates some further increase. Obviously, this needs not be the case, since a neighbourhood may have reached its peak already. Hence, the condition is set that in order to have a value increase characterised as above average, not only the increase of the last four years, but also the single last year has to be above average. Still, whether or not a neighbourhood has reached its peak is something to be discussed in a workshop rather than predicted on base of the measured value increase.

Value increase is looked at in absolute terms, rather than in percentages. The reason for this is the idea that in the portfolio approach we want to see whether and how neighbourhoods' positions change in the city by moving to or away from the city average. Looking at the increase in percentages, however, does not indicate whether or not this is the case. If a neighbourhood at the bottom of the property market shows an above average value increase in terms of percentages, this does not mean that the gap with the city average is getting smaller; it may even widen. If the same neighbourhood shows above average value increases in absolute terms, on the other hand, this indicates an actual move towards the city average. Hence, the value increase for 1999 is simply measured as the average property value per m² for 1999 minus the average property value per m² for 1994.

Continuity

Value increases, like the property values, are sometimes close the city average. Likewise, neighbourhoods can change colour without much actually changing. Here too therefore, a changing position is shown only when an above or below average increase lasts for at least three consecutive years. And here too, for the first and last

year, the condition above does not apply, while for the second and second to last year, a changing position has to last two consecutive years instead of three.

Above zero
In addition to the above condition, value increase also has to be above zero. If property values are above the city average, but decreasing, a neighbourhood may be improving its position in relative terms. It might therefore be designated as a star or a question mark. Still, in such a situation one can hardly speak of interesting opportunities for investment. Hence, although there is something to say for the alternative, value increase has to be above zero.

Measuring the portfolio positions for office areas

The portfolio positions for offices in Amsterdam, although not used to much lesser extent than the residential portfolio maps, are measured in roughly the same manner. There are some important differences.

First, instead of looking at transaction values, the average rents per m² are used, as these provide a more realistic and timely image of the market position of a neighbourhood. With every new lease contract, the rent is valued according to its current position in the market, whereas a transaction of the real estate object occurs much less often.

Second, there is no interpolation of missing neighbourhood data with help from data on a more aggregate level. This is because office sites, more than residential neighbourhoods, are individual sites. Rents at the level of the neighbourhood are correlated to lesser extent to the rest of the area. Hence, missing values are interpolated in linear manner. After this, values are smoothened like the residential property values.