How to Evaluate Valuation Models?

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SUMMARY

Starting 2007 all real estate in the Netherlands will be revaluated yearly for taxation and other government purposes. The 458 municipalities in the Netherlands are responsible for these valuations. To effectively carry out this mass appraisal it is obvious that automated valuation models are used by municipalities.

To improve the quality of valuation models in 2006 the Council for Real Estate Assessment published quality standards for valuation models. These quality standards are based on the "International Valuation Standards". Based on these standards the Council for Real Estate Assessment has set guidelines for municipalities how to evaluate the valuation models, because these valuation models have to guarantee that also the valuations for all properties are correct. By setting these guidelines the Council for Real Estate Assessment tries to contribute to the improvement of the quality of the assessed values as well as the efficiency of the valuation procedures.

Working with valuation models is an activity for specialists. People specialised in the real estate market have to cooperate with specialists in generating automated models. It is however important that the quality of the values generated by the valuation model can easily be demonstrated by other people than these specialist. This helps to convince the taxpayer that the appraisal is performed in a sensible way. Therefore the evaluation of the estimated values and of the valuation model must not only be done by the experts, but also by other employees of municipalities who communicate directly with the taxpayers. The protocol which is developed by the Council for Real Estate Assessment, and is available for municipalities, meets those conditions because the way the quality is evaluated is, in fact, a systematic imitation of the check taxpayers will make.

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1. INTRODUCTION

Starting 2007 all real estate in the Netherlands will be revaluated yearly for taxation and other government purposes. The increase in valuation frequency makes it even more important that the valuation is done correctly and efficiently.

The 458 municipalities in the Netherlands are responsible for these valuations. They use several types of mass appraisal systems and hire in a limited number of specialised valuation firms. For residential properties nearly all assessed values are derived form valuation models set up by these computerised mass appraisal systems. Unlike other countries, in the Netherlands MRA type of models are rarely used for the valuation. Valuation of residential property is based on direct comparison with properties that have been sold recently. The mass appraisal system performs these comparisons by (statistically) grouping properties or by calculating a measure for the similarity of properties. These analyses and calculations by the mass appraisal systems result in valuation models. With these valuation models for each property an assessed value can be calculated.

Before new valuations can be sent to the taxpayer the municipality and the Council for Real Estate Assessment have to evaluate the quality of the new assessed values. The quality of an assessed value includes the following topics:
- is the valuation in accordance with sales prices;
- are the mutual relations between the assessed values of properties consistent;
- is the valuation report for each property convincing?

Based on international standards (for instance International Valuation Standards for mass appraisal) the most important instrument for evaluating the new assessed values were sales ratio studies. These sales ratio studies have lead to valuations that are in general in accordance with market prices. Analysing the sales price ratio for properties that have been sold recently analysing the sales price ratio also guarantees that the valuation is correct. However most property is not sold recently and therefore the Council for Real Estate Assessment has set guidelines for municipalities how to evaluate the valuation models, because these valuation models have to guarantee that also the valuations for the other properties are correct.

According to these guidelines a municipality has to check whether:
- the valuation model explains the difference between the new assessed value and the last valuation;
- the valuation model shows consistent results even when other recent sales are used as "most comparable sale";

- the valuation model explains the difference between the assessed value of a property and the sales price (and/or assessed value) of any recently sold property;
- the valuation model makes clear the difference between the assessed value of a property and the assessed value of any other property;
- the valuation model will result in a logical change in the assessed value in case one of the characteristics of the assessed property is changed.

By setting these guidelines the Council for Real Estate Assessment tries to contribute to the improvement of the quality of the assessed values as well as the efficiency of the valuation procedures.

2. THE VALUATION PROCESS IN THE NETHERLANDS

Until 2007 all real estate in the Netherlands was valued once every four years. Originally these valuations were used by municipalities, polderboards and the national revenue office only for fiscal purposes.

Last years there was an increasing strive for using the assessed value, as it is disclosed to the taxpayer, for other applications, for instance to calculate the maximum rent price for social housing. The existing valuation frequency, once every four years, was not good (actual) enough. Recently, it has been decided to revaluate all real estate every year from 2007 on.

The revaluation will be done by municipalities who may contract external companies. These companies are specialized in the mass appraisal of real estate. The yearly valuation of all real estate in The Netherlands (more than 8 million objects) can only be done in an efficient and conscientious way when municipalities, or the hired company, use valuation models. Even before it was announced that new values should be assessed annually, almost all municipalities already used valuation models. These valuation models are mostly used for the valuation of residential property. In this paper we therefore only refer to the valuation of residential property. The valuation models used in the Netherlands are based on statistical comparison of selling prices of comparable properties.

If a taxpayer does not agree with the value assessed by the municipality, he can object to the assessed value. After the last revaluation taxpayers objected to 8% of all valuations. This relatively high percentage of appeals has been caused by the fact that the last revaluation was done four years earlier. During that period (January 1999 to January 2003) the prices of houses have increased 50% on average. The high percentage of appeals and the amount of work caused by it, was one of the reasons to start the yearly revaluation. It is expected that annual revaluation will decrease the number of appeals.

After reviewing the appeals the municipalities made a correction to 40% of the properties for which an appeal was made. A recent study of the Council for Real Estate Assessment in municipalities with a large number of appeals shows that the amount of appeals and the amount of adjustments caused by these appeals were mainly triggered by two reasons:

- imperfection of the valuation model;
- errors in object characteristics like quality of the house, maintenance situation and influences from surrounding properties.

Imperfections in the used valuation models are mentioned as the most important reason for "errors" in the estimated values. The study also shows that the way in which object characteristics like "quality" and "location" are registered and are applied by the valuation model, is an important cause of errors. An example of this is that selling prices of houses on the best locations are used to estimate the value of houses on a less desirable location, without appropriate adjustments. When the object characteristic "location" is not used in a right way in the valuation model, it will result in incorrect estimated values and incorrect mutual relations with the estimated values of other properties.

To achieve the objective that the amount of appeals decreases, it is necessary to recognize and solve the imperfections in the used valuation models and the errors of the object characteristics, before the values are disclosed to the taxpayers. To support the municipalities evaluating the quality of the valuation model and the estimated values, the Council for Real Estate Assessment has extended the protocol for evaluating the quality of the results of the valuation model.

3. COUNCIL FOR REAL ESTATE ASSESMENT

The Council for Real Estate Assessment inspects the valuation process within the municipalities. Besides evaluating the quality of the estimated values and the preparations for the valuation, the Council for Real Estate Assessment also tries to support municipalities by presenting them instruments for improving the valuation. For this reason some years ago the Council for Real Estate Assessment has developed two protocols that can be used by municipal officials to help them evaluate the quality of the estimated values in a simple way. There are protocols for:

- evaluating the quality of the valuation of residential property;
- evaluating the quality of the valuation of non-residential property.

These protocols were until recently primarily based on sales ratio analyses. These protocols are now used by all municipalities. Evaluation of the quality of estimated values by municipalities based on uniform protocols fits the policy of the Council for Real Estate Assessment. These quality analyses can be done more efficiently by municipalities themselves than by the central Council for Real Estate Assessment. The council only checks whether the analyses are done correctly and whether the results meet the criteria. Municipalities have to calculate the ratio between estimated value and sales price for all

residential properties that have been sold in the year before the valuation date and the six month after this date.

These ratios indicate whether the estimated values correspond with actual market prices. Of course only a limited number of all residential properties to be valued are sold in the period around the valuation date. This means that the sales ratio analyses are not effective to evaluate the quality of the valuation for most of the houses. Handling the appeals from taxpayers against the assessed values made clear that most problems concerned houses that were not sold. Handling the appeals also showed that the estimated difference between the assessed value of those non-sold houses and the assessed value of comparable (sold) houses often was incorrect. This bad performance of the valuation models often appeared:

- in neighbourhoods where few houses were sold;
- for types of residential property that are not sold often;
- in market segments with large differences between the houses.

That is why the Council for Real Estate Assessment in 2006 decided to develop a protocol to help municipalities measure the performance of valuation models. Using this protocol should help municipalities to evaluate whether the mutual relation between the estimated values of different (types of) houses are guaranteed by the valuation model.

4. GUIDELINES FOR EVALUATING VALUATION MODELS

To improve the quality of valuation models in 2006 the Council for Real Estate Assessment published quality standards for valuation models. These quality standards are based on the "International Valuation Standards" and can be divided in four categories. These categories are:

1. standards for the use of object characteristics in the valuation models;
2. standards for the use of market prices of residential properties in the valuation models;
3. standards for the functions of the valuation models;
4. standards for the results of the valuation model (for instance requirements for the way a comparison is made between a property that is valued and the sales prices that are used for this valuation. This comparison should convince the taxpayer that the estimated value is correct)

Based on these standards a protocol is made that supports municipalities to evaluate whether the used valuation model performs according to the demands set by the Council for Real Estate Assessment. In this protocol the fourth type of standards (standards for the results of the valuation model and for the comparison made) is the most important. The main reason for the accent on that type of standards is the fact that most appeals of taxpayers were caused by incorrect mutual relations between the property of that taxpayer and comparable properties in his neighbourhood. Another reason for this emphasis on evaluating the mutual relation between objects is the fact that the protocol is an extension for the sales ratio analyses that are already performed.

To evaluate whether a valuation model meets the standards published by the Council for Real Estate Assessment these standards have to be translated into a uniform way of "measuring".

A systematic protocol to evaluate the valuation model that is derived from the market data can help municipalities to determine whether this valuation model is adequate for assessing values for all residential properties and for the taxation based on these values. Furthermore this systematic protocol can help to determine the quality of the comparison that is made with properties that have been sold recently and of the mutual relation to the estimated values of comparable and non-comparable houses. Of course the content of this protocol is also close connected to other existing protocols of the Council for Real Estate Assessment.

All the published quality standards of the Council for Real Estate Assessment arise from the desire to control and guarantee the mutual relation between the values of comparable properties as well as less comparable houses. Therefore the protocol to evaluate the quality of the valuation model is complementary to the existing protocol for sales ratio analyses to evaluate whether the estimated values are in accordance with market prices. To evaluate whether the valuation model guarantees correct mutual relations between houses the Council for Real Estate Assessment has analysed the following three possibilities:

1. to evaluate whether the valuation model fulfils each single quality standard published by the Council for Real Estate Assessment. For instance, a municipality can (randomly) examine if each estimated value of a house can be related to at least 25 sales prices of (comparable and non-comparable) houses. The purpose of this requirement is to make sure that the valuation of a house is not only related to a few sales prices of comparable houses within the same neighbourhood. In that case it is possible that the estimated values are incorrect when compared to other types of residential properties or with properties within other neighbourhoods. When each estimated value is also related to more sales prices of less comparable houses (for instance houses of an other type or houses in an other neighbourhood).

2. to evaluate whether the estimated differences between pairs of comparable houses and of pairs of less comparable houses are correct. This can be done by randomly selecting pairs of houses. For each selected pair the municipality has to examine whether the mutual relation between the estimated values is correct and can be explained tot the taxpayer. The protocol then has to give a systematic procedure for selecting pairs of properties that will be evaluated. For instance pairs of houses of the same type within the same neighbourhood have to be selected, but also pairs of properties from different types within one neighbourhood and pairs of properties of the same type in different neighbourhoods.

3. to evaluate whether the valuation model translates the object characteristics of a property into a correct estimated value and into correct estimated value differences. This can be done by randomly changing for a sample of properties the object characteristics which are used by the valuation model and examine the influence of this

change on the estimated value. It can, for instance, be interesting to examine what happens when the size of a house or the size of a garden is changed. When for instance small changes of the object characteristics result in large changes of the estimated values or result in unexpected changes (a larger house gets a lower estimated value or a house with a better maintenance situation gets a lower value), it can be concluded that the valuation model doesn't work correctly.

The Council for Real Estate Assessment has discussed these three possibilities with valuers and valuation model experts of municipalities and the specialised valuation firms. This has resulted in the following conclusions:

1. The experts of the municipalities and the valuation firms doubt that the evaluation whether the valuation model fulfils each single quality standard published by the Council for Real Estate Assessment is achievable. They suspect this evaluation will not be possible because most of the standards are very technical. For most of the employees of municipalities it will be very difficult to examine whether the valuation model and the used computer tools fulfil some technical specifications.

2. The representatives were enthusiastic about the protocol based on selecting pairs of houses to examine how the valuation model has coped with differences in object characteristics. They expect this method can be easily understood by all employees of municipalities, can help them evaluating the valuation model. This method also corresponds to the way the taxpayer will check the assessed value and the valuation report he receives.

3. The representatives do not expect that the third method will work and they expect a high risk of errors caused by the evaluation. The evaluation has to be done in a test version of the valuation model, because otherwise it is possible that by accident a value estimated using fictitious object characteristics will be officially assessed and used for the taxation. The experts fear that most of the municipalities have insufficient knowledge to guarantee that the evaluation will not result into this kind of errors.

Based on the discussion with experts from municipalities and specialised valuation firms the Council for Real Estate Assessment has developed the protocol for evaluating valuation models based on the second method

5. A PROTOCOL FOR EVALUATING VALUATION MODELS

The remarks from the experts of the municipalities and the specialised valuation firms have resulted in the Council for Real Estate Assessments decision to develop the second method. This means that municipalities in addition to the sales ratio analyses will evaluate the quality of the valuation models by examining the mutual relations between selected pairs of properties valued. The protocol implies that not only the assessed values of "pairs of houses" and the difference in value will be examined and judged, but also the valuation reports of the two properties. In a way this method imitates how taxpayers will judge the assessed value and

their valuation report. Taxpayers often compare their assessed value with the assessment sent for instance to their neighbours or colleagues and will use the same comparison to decide whether they will object to the assessed value.

An important element of the additional protocol is the selection of pairs of properties. It is not to be done to compare all possible pairs of properties. The municipality has to use a set of guidelines to select a workable number of pairs to be compares. For this selection the following two different types of selection principles must be used:

1. Guidelines that focus on the selection of pairs of houses where it is likely that the owners of the houses (the taxpayers) will also make the same comparison. They will use this comparison to decide whether they will officially protest against the assessed value. As a result of this method for instance different types of houses in the same neighbourhood, or in the same street, will be selected.

2. Guidelines that focus on the selection of pairs of houses where the mutual relation between the values has changed recently. For instance if the value of the detached houses in a certain street has risen five percent, but the value of the other houses (that are attached) has risen ten percent, this means that the relation between the values of these two types of houses is changed. The municipalities should select some pairs of detached versus attached houses to examine whether the valuation model has assessed the right values (right value differences).

6. CONCLUDING REMARKS

To effectively carry out a mass appraisal of a large number of real estate properties it is obvious that automated valuation models are used. In the Netherlands models are used that make a direct comparison between properties to be valued and not the MRA types of models. This choice is made because the valuation model also has to present a valuation report that is understandable and convincing for the taxpayer. When using these models it is a necessity to evaluate whether the quality of the models meets the (accepted) standards, before sending the assessed values to the taxpayer.
Working with valuation models is an activity for specialists. People specialised in the real estate market have to cooperate with specialists in generating automated models. It is however important that the quality of the values generated by the valuation model can easily be demonstrated by other people than these specialist. This helps to convince the taxpayer that the appraisal is performed in a sensible way. Therefore the evaluation of the estimated values and of the valuation model must not only be done by the experts, but also by other employees of municipalities who communicate directly with the taxpayers. The protocol which is developed by the Council for Real Estate Assessment, and is available for municipalities, meets those conditions because the way the quality is evaluated is, in fact, a systematic imitation of the check taxpayers will make.

APPENDIX

Standards for valuation models published by the Council for Real Estate Assessment

The assessed values of houses are primary based on the results of a valuation model. The term "valuation model" doesn't focus on the software tools that are used to value the houses. A "valuation model" is defined as the objective model of the relation between all properties to be valued in a municipality and the estimated values that are based on this relation. To guarantee the quality of the assessed values a valuation model has to meet the following quality standards:

- a minimum set of object characteristics (location, type of property, building year, size of the building, size of land) has to be used in a valuation model;
  The location can for instance be used in the model by using the postal code or by using in predefined neighbourhoods with a comparable market level.
- supplementary object characteristics must be included in the valuation model if the market analysis indicates the importance of these characteristics;
  The use of supplementary object characteristics can be restricted to a subset of the houses in a municipality (for instance only for houses that have been build before 1930 the characteristic that there is central heating is used in the model).
- selling prices for at least a period of five years must be used in the valuation model. The software tools must make clear the market development in the period between the date of sale and the valuation date.
- the valuation model guarantees correct mutual relations between the estimated values of several (groups of) houses; This means that each estimated value of a house can be related to at least 25 sales prices of (comparable and less comparable) houses.
  The estimated value of a single group of houses may not only be based on sales prices within that group of comparable houses. This means that the valuation model must also make an automated or interactive comparison with sales prices of houses in an other neighbourhood or with sales prices of other types of houses. When just a small amount of sales prices is available a comparison with less than 25 selling prices may be unavoidable.
- the valuation model is dynamic; This means that it is possible to work with a variable valuation date and the model can easily be used for the valuation for the next valuation date.
- the valuation model not only generates estimated values but also supports municipalities to analyse new market information and to deal with appeals from taxpayers against the assessed value;
  For instance the valuation model can calculate the influence on the value of incorrect object characteristics or of an incorrect comparison with a sold property. The valuation also supports the analysis of sales prices that (seem to) diverge from the market value.
- the valuation model helps to explain the difference between the (new) estimated value of a house and the (existing) assessed value of a house (of course both valuations have a different valuation date);
  If taxpayers receive a new assessed value yearly this is an important requirement, especially when the increase of the assessed value of a house differs from the increase of the average market level for residential property.

- the valuation model provides a selection of sales prices of comparable houses (those sales prices are printed on a valuation report) to convince taxpayers that the assessed value is in accordance with market prices;
  It must always be possible to change the selection of sales prices that are printed on the valuation report. When other selling prices are selected for the valuation report the estimated value stays unchanged.
- the valuation model explains the difference between the estimated value and the sales prices of comparable houses that are selected by the valuation model for printing on the valuation report;
- the valuation model explains the difference between the estimated value and the sales prices of houses that are selected by the taxpayer;
- the estimated values are round down on a level that fits to the accuracy of the valuation; At least all assessed values are round down to units of € 1000.
- the valuation model is robust. This means that if two houses differ only on one object characteristic, the value difference between those houses is as can be expected.
  The concept of robustness means that a valuation model controls the correct mutual relations between the estimated values of all residential property. It also means that the consequences of changes in a property can are logic.

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