

Reappraisal of residential property in May 2009¹

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Introduction

With Act No. 83/2008 on the amendment of legislation applicable to the registration and valuation of property No. 6/2001, which entered into force on January 1, 2009, several changes were made to how property assessment is to be performed.

The Icelandic Property Registry must, according to the legislative amendment, reappraise all properties on May 31 each year based on the going price the previous February. The new valuation will come into effect on December 31 of the same year.

The annual reappraisal will replace annual indexing. With the indexing method, assessment for all properties, or large categories of properties in particular areas, were adjusted by the same percentage irrespective of internal changes in the market value of different types of properties.

The reappraisal is based on information about the characteristics of each property and on the market price of real estate according to registered sales contracts. In general, this provides a better correlation with market value than the use of indexing and leads to greater equality and fairness in taxation. The last comprehensive reappraisal was carried out in 2001 [1] [2]. Prices have doubled since then.

New valuation approaches will be adopted in stages. This time, new approaches in the assessment of residential property were adopted. New valuation approaches for other types of real estate will be adopted in coming years. This paper describes the residential housing valuation.

Valuation approaches

Three approaches to estimating market value have been dominant in the literature of appraisals: sales comparison approach, income approach, and cost approach. These approaches may, as appropriate, be carried out as individual valuations or mass appraisals. Mass appraisals involve systematically assessing a group of properties over a specified period of time using standardized methods and statistical testing. The new mass appraisal of residential property discussed herein is based on the sales comparison approach.

The sales comparison approach is based on the comparison with sales of similar properties. It is assumed that it is possible to determine the value of a property based on the value of recently sold, nearby properties with the same characteristics. Price data is collected together with data on variables that affect the price. These include location, size, age, and other characteristics of the properties in question. Applying the sales comparison approach requires a large number of property sales. This method is therefore particularly suitable for an active residential housing market.

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In the application of the sales comparison approach to mass appraisal, a regression model is developed that describes the relationship between the purchase price and the registered characteristics of the properties.

It was decided to develop multiplicative models of market value:

$$MV_s = Constant \times \prod_{i=1}^n brx_i^{p_i} \times \prod_{j=1}^m q_j^{bry_j}$$

Where MV_s is the present value of the purchase price according to the sales contracts. Brx_i and bry_j are variables from property registries that describe the size, type and location of the property. The constant and p_i and q_j are parameters to be estimated. A linear regression analysis may be applied to these models, as their logarithms are linear.

$$\log(MVs) = \log Constant + \sum_{i=1}^n [p_i \times \log(brx_i)] + \sum_{j=1}^m [bry_j \times \log q_j]$$

Implementation

During the years 2006 and 2008, preliminary studies of the advantages of valuation models of this type were undertaken. Such studies were carried out in East Iceland and in the greater Reykjavik metropolitan area [3] and were promising. In 2007, Robert J. Gloudemans, a well known U.S. consultant in the field of mass appraisals, prepared a pilot model for commercial properties [4]. In 2005, Ásdís Kristjánsdóttir prepared her master's thesis at the Faculty of Economics and Business Administration at the University of Iceland on the interaction between quality factors and property prices [5]. The current reappraisal of residential property was prepared between August 2008 and May 2009, as according to legislation, the work had to end with a valuation at the end of May 2009. Robert J. Gloudemans was a consultant on the project.

The project was divided into the following phases:

1. Preparation. Selection of market period. Selection of possible independent variables and interpret data available in the property registry and purchase registry.
2. Definition of market areas and the further division of each market area into neighborhoods and sub-neighborhoods.
3. Price trends since 2004. Form time adjustment for each market area.
4. Exploring the quality of selected variables.
5. Preparing the valuation models containing time variables.
6. Reviewing time adjustments and valuation models. Examine the quality of valuation models and repeat the process if the quality is insufficient.
7. Forming final valuation models for prices in February 2009 and develop land value models.
8. Adopting the valuation models into our computer systems.
9. Calculating the new valuation for all properties and notify owners.

Preparation

The decision was made to use sales contracts as of 2004. It was always clear that more than one year would have to be used, and it was subsequently considered reasonable not to use only the years 2006–2007 when prices were at their peak.

One important aspect in the revaluation was to adopt a new classification system for residential property. The classification is based on the Icelandic standard IST120:2007 with augmentations:

IST120:2007 *Augmentation*

- 1100 Ground-oriented residential buildings (single family houses) - This category includes all types of houses (detached, semi-detached, houses built in a row, etc.) each dwelling of which has its own entrance directly from the ground surface
 - 1111 Detached house
 - 1115 Detached house on farms or non-residential lots
 - 1121 Row houses, three or more houses built in a row
 - 1125 Semi-detached house, two houses connected together in a row
 - 1126 Duplex housing, two apartments in the same building (upstairs/downstairs), each with their own property id – two real estates
- 1200 Multifamily structures; apartment blocks including at least three condominiums
- 1300 Other specialized residential structures
 - 1314 Retirement housing services - serviced apartments

Information on floor area was, at the same time, reinterpreted. In Iceland, detailed registration of residential floor area has been practiced for a number of years. These records are now categorized for the purposes of obtaining different value assessments. Floor area used for habitation (i.e. living floor area) should be more valuable than other areas. Thus we now have living floor area measurements for each apartment as well as the total floor area of the property.

Residential floor area was categorized in the following manner:

1. Enclosed living area on main floors
2. Enclosed living area in a basement
3. Enclosed living area in a loft
4. Enclosed garage area
5. Other enclosed parking space facilities
6. Balcony area
7. Enclosed storage area outside apartment (in the basement or the loft), sheds and other raw/cheap spaces not falling under 1–3.

In addition to information on sales contracts, the following data was collected from the property registry:

- Location of property (municipality, urban area, co-ordinates)
- Classification of property based on the IST120 standard
- Lot area and share of ownership of the lot
- Property area, itemized according to the new categorization of floor areas, living area, garage area, etc.

- Number of rooms (lounges, kitchen, storage, utilities room)
- Circumference of detached houses
- Number of floors in the building, as well as the number of floors belonging to the property and which floor is considered the main floor; example: apartment on the 4th floor (main floor) and the 5th floor in a 10-story apartment building
- Year of construction
- Construction material used in exterior walls
- Information on the number of parking spaces in parking garages belonging to the property
- Information on the number of hygiene facilities (bathtubs, showers, toilets)
- Information on whether there is an elevator in the building
- Information on the number of apartments in the building

Market area

It was clear from the very beginning that separate models would have to be developed for single family houses and condominiums. It suffice to mention that market price proved to be independent of the size of the lot for condominiums but not so in single family houses. One valuation model is prepared for each market area. The size of a market area is defined by two factors: (a) the number of sales contracts, which have to be numerous, and (b) the property markets, which must be uniform within the area, i.e. it is assumed that price trends are the same within an area. Distinctions are made between individual neighborhoods within the same market area by means of simple area coefficients. There were 6 market areas for single family houses and 5 market areas for condominiums.

Single family houses

- Reykjavik metropolitan area (Höfb). Number of neighborhoods = 54, and 18 sub-neighborhoods
- Sudurnes and Kjós (Snes). Number of neighborhoods = 8
- West and South Iceland, excluding the municipalities of Skaftárhreppur, Mýrdalshreppur, and Vestmannaeyjar (SuVest). Number of neighborhoods = 26
- Westfjords and northwest Iceland (VfNoV). Number of neighborhoods = 16
- Northeast Iceland (NoAu). Number of neighborhoods = 14
- East Iceland and the municipalities of Skaftárhreppur, Mýrdalshreppur, and Vestmannaeyjar (Aust). Number of neighborhoods = 25

Condominiums

- Reykjavik metropolitan area (Höfb). Number of neighborhoods = 54, and 23 sub-neighborhoods
- Sudurnes and Kjós (Snes). Number of neighborhoods = 8
- West and South Iceland (SuVest). Number of neighborhoods = 25
- Westfjords, north and east Iceland (VfNoAu). Number of neighborhoods = 26
- Akureyri. Number of neighborhoods = 1

Neighborhoods and sub-neighborhoods

Outside the greater Reykjavik metropolitan area, neighborhoods were created by combining municipalities and urban areas that had similar characteristics and had had

similar coefficients in older appraisals. In the Reykjavik area, neighborhoods were formed with the assistance of a database of coordinates that the Icelandic Property Registry has created. Neighborhoods were drawn up in a geographical information system. They were then tested and improvements made. There were 54 when the final models were prepared. In addition to neighborhoods in the Reykjavik area, sub-neighborhoods were also drawn up. Such areas were drawn up where localized location effects occurred, sometimes even across neighborhoods. Examples of such location effects are lots adjacent to the sea or to roads with excessive traffic noise.

Price trends since 2004

The price development of each neighborhood was described in stages. Within each stage, a fixed relative monthly growth is assumed. Figure 1 shows the price development of single family houses. The Reykjavik area stands out with a peak at the close of 2007. Figure 2 shows the price development of condos. As is the case for single family houses, the price decreases over the last few months of the period is first and foremost measurable in the Reykjavik area. The price decreases in the condominium market area that reaches from the Westfjords to east Iceland, excluding Akureyri, is particularly interesting, with the exception of Akureyri. However, it must be kept in mind that the goal is not to measure price developments, but rather to describe the property market as it was in February 2009. Price developments are used to bring all contracts to the price level of February 2009.

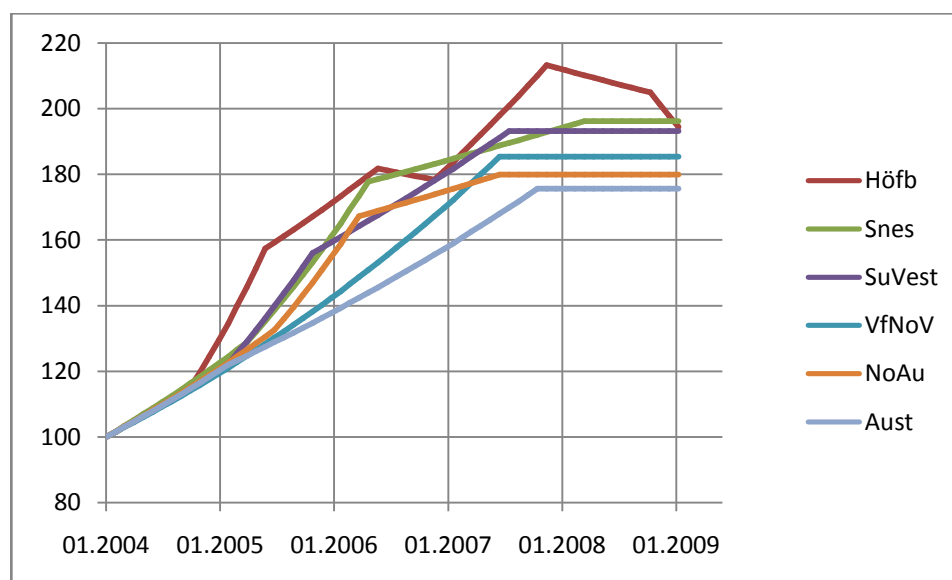


Figure 1. Single family houses

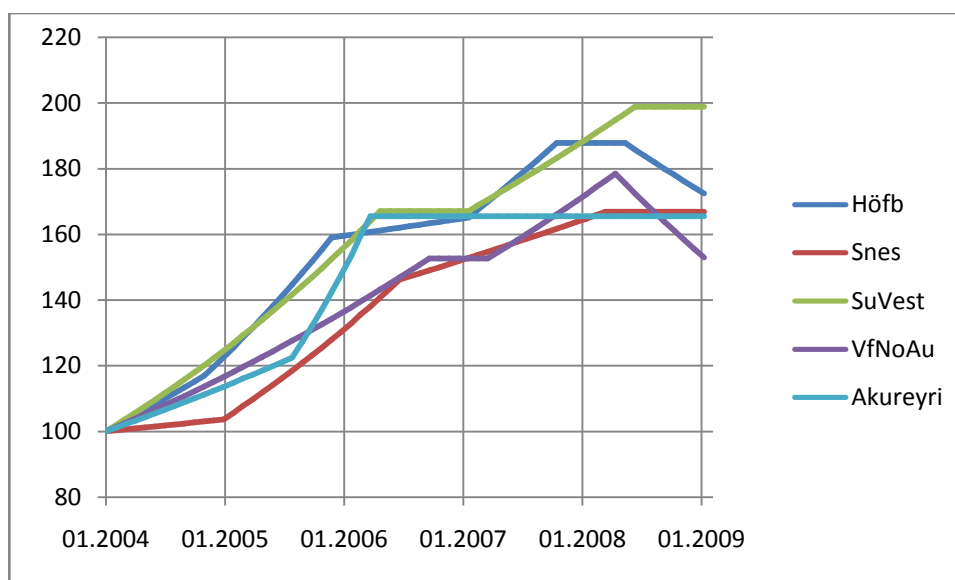


Figure 2. Condominiums

Variables from property registries

The following variables proved to be significant in estimating market value, see Tables 1 and 2.

Table 1: Brx _i variables	Description
bilskurflm	Garage floor area, price category 4.
bilskurflm40m2	Garage floor area up to 40 m ² . Garages that are larger than 40 m ² are valuated as 40 m ² garages, price category 4.
ibflm	Living floor area, price categories 1, 2, and 3.
lodflmal	Area of lot in accordance with ownership share in lot.
lodflmal1000m2	Area of lot up to 1,000 m ² . Lots larger than 1,000 m ² are calculated as 1,000 m ² lots.
risflm	Floor area of loft where the ceiling height is under 180 cm and the building's performance table exists, otherwise 0.
serm2	Floor area of storage and other less valuable spaces, price category 7.
svalirflm	Area of balcony, price category 5.
ummalshlf	Ratio between the circumference of a detached house and the circumference of an equally large square. Calculated as the circumference divided by four times the square root of the average area of the floors. This forms a quality co-efficient, as complicated detached houses with large circumferences receive a higher co-efficient than square houses. If the house in question is not detached housing, this variable is = 1.

Table 2: Bry _j variables	Description Most of these variables are binary variables.
2_5ibudirihusi	Are there 2, 3, 4, or 5 apartments in the building? If so, the variable will be 1, otherwise 0.
2ibudirihusi	Are there 2 apartments in the building?
3haedir&yfir	Is the property on two or more floors?
aldurundir25	The age of the property up to a particular maximum. E.g. in the event of a sales contract from 2004 and a construction year of 1960, then the value of the variable will be 25. The value of this variable is 0–25.
aldurundir30	The age of the property up to a particular maximum. The value of this variable is 0–30.
aldurundir40	The age of the property up to a particular maximum. The value of this variable is 0–40.
aldurundir60	The age of the property up to a particular maximum. The value of this variable is 0–60.
aldurundir80	The age of the property up to a particular maximum. The value of this variable is 0–80.
efstahaed	Is the apartment located on the top floor of the building?
efstuhaedir	Is the apartment on the fourth floor or higher? Defined so that floors 4 and 5 receive the value 1, floor 6 receives the value 1.5, and floor 7 or higher receives the value 2. This is a corrective co-efficient for higher buildings.
einbyliajord	Property classification 1115.
fjbilastaeda	Number of parking spaces in parking garage.
fjhreinltaekja100	Number of bathtubs + number of showers + number of toilets multiplied by 100 and divided by the area of the apartment. This is an assessment of the number of hygiene appliances per 100 m ² of apartment area.
gotustudlar, i.e. sub neighborhood	Sub-neighborhoods are 0–1 variables that apply where localized location effects can be measured on the purchase price, for instance due to luxuriousness, good views, or due to heavy traffic. The valuation increases with higher sub-neighborhood coefficients, see valuation formulas.
haedyfir3	Is the floor higher than the 3 rd floor? The 4 th floor receives the value 1, the 5 th floor receives the value 2, etc.
hverfistudlar, i.e. neighborhood	All properties belong to a neighborhood, whether they are in the greater Reykjavik area or outside it. Neighborhoods differ in size but have in common the fact of encompassing areas where sales can be compared and where it is possible to measure location effects. These are 0–1 variables. For each property, only one is = 1, others are =0. The valuations increases with higher neighborhood coefficients, see valuation formulas.
kjallari	Is the property located in a basement?
kjallarihlfi	Proportion of apartment area in basement.
litidland	This is 550 minus the lot area in square meters divided by 100. This is a correction for lots that are smaller than 550 m ² .
margarhaedir	Is the property on two or more floors?

margaribudir	Are there many apartments in the building?
odyrsteinn	Is cheaper concrete used in the building?
odyrsteinnedatimbur	Are cheaper materials used in the building?
ofan2haedar&anlyftu	Is the apartment located above the 2 nd floor and there is no elevator in the building?
ofan3haedar	Is the apartment on the 4 th floor or higher?
ofan3haedar&anlyftu	Is the apartment located above the 3 rd floor and there is no elevator in the building?
parhus	Semi-detached house, property classification 1125.
radhus	More than two houses connected together, row house, property classification 1121.
rishlf	Proportion of apartment area in the loft where there is no performance table.
thjonustuibud	Is the apartment a service apartment for the elderly? Often apartments with in-house services, property classification 1314.
timburhus	Is timber or steel used in external walls?
tveggjahaeda	Is the property on two floors?
tvibylshus	Duplex housing, two apartments in the same building (upstairs/downstairs), each with their own property identification number, property classification 1126.
undir6ibeftir1980	Are there fewer than 6 apartments in the building which was built after 1980?
undir6ibfyrir1980	Are there fewer than 6 apartments in the building which was built before 1980?
fjhreinltaekja100	Number of bathtubs + number of showers + number of toilets multiplied by 100 and divided by the area of the apartment. This is an assessment of the number of hygiene appliances per 100 m ² of apartment area.

Quality of mass appraisal

The quality of a valuation can be assessed based on the ratio between the valuation and the purchase price. Three types of statistics are most used for this purpose.

1. Measures of appraisal level. Three such measures are the median ratio; the mean ratio (also known as the average, arithmetic mean); and the weighted mean (also known as the aggregate mean or ratio of the aggregates). Laws and regulations on property assessments in Iceland assume that property valuations are equal to market prices, and as a result, these ratios should be as close to one as possible. Let's symbolize the purchase price of property i with s_i and the valuation with m_i . The mean ratio is $\bar{m}/\bar{s} = \frac{1}{n} \sum \frac{m_i}{s_i}$, and the weighted mean is

$$\frac{M}{S} = \frac{\sum m_i}{\sum s_i}$$

2. Measures of appraisal uniformity. The coefficient of dispersion (COD) is the most used measure of appraisal uniformity. It is based on the average deviation, which measures the average absolute difference of the ratios from

the median. COD is defined as
$$\text{COD} = \frac{\frac{1}{n} \left(\sum \left| \frac{m_i}{s_i} - \widetilde{m/s} \right| \right)}{\widetilde{m/s}}$$
 where $\widetilde{m/s}$ represents the median of dispersion.

In general, it is believed that 5% is the lowest COD that a valuation model can achieve. A COD of 5% is in fact the variability of the market and is not dependent on the characteristics of properties. In areas where the property market is very active and the houses homogenous or newly constructed, the COD should ideally be between 5–10%. In older or more varied neighborhoods, it is sufficient that the COD be between 5–15%. In more rural areas and in areas where the market is not as active, the COD may be in the range of 5–20% [6].

3. The price-related differential (PRD) measures uniformity in the appraisal of low- and high-value properties. Appraisals are considered regressive if high-value properties are under-appraised relative to low-value properties and progressive if high-value properties are relatively over-appraised. If full equality is achieved, the differential is 1.00. The differential should preferably be in the range of 0.98 to 1.03 [6]. If the PRD is lower than 0.98, then the high-value properties are over-appraised. If the PRD is higher than 1.03, then the high-value properties are under-appraised. The price-related differential (PRD) is defined as the ratio between the mean ratio and the aggregate ratio, i.e.

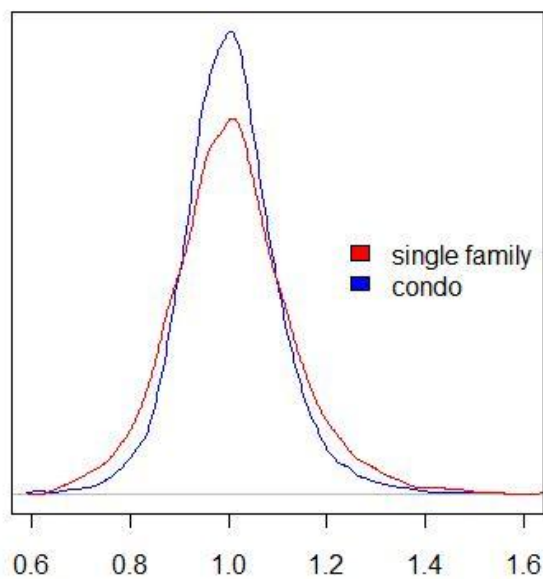
$$\text{PRD} = \frac{\overline{m/s}}{M/s}$$

Tables 3 and 4 show the statistics on the quality of the valuation. The greater Reykjavik area is particularly positive, with COD being 9.5% in single family houses and 7.7% for condos. Figure 3 shows the range of the dispersal in the Reykjavik area. Other neighborhoods also show good results. However, the results for single family houses in the Westfjords and northwest Iceland, as well as on the east coast, provide scope for improvement over the coming years.

Table 3	Number of sales	Median level	PRD	COD
Single family houses				
Greater Reykjavik area	6,590	0.998	1.015	9.5%
Sudurnes and Kjós	2,030	0.991	1.026	12.3%
West and South Iceland	2,441	0.987	1.026	13.0%
Westfjords and northwest Iceland	858	0.982	1.055	19.6%
Northeast Iceland	1,822	0.994	1.031	14.4%
East Iceland	1,329	0.978	1.061	20.7%

Table 4 Condominiums	Number of sales	Median level	PRD	COD
Greater Reykjavik area	23,652	0.999	1.011	7.7%
Sudurnes and Kjós	1,286	1.002	1.013	8.6%
West and South Iceland	1,237	0.995	1.019	10.7%
Westfjords, north and east Iceland	858	0.999	1.040	16.4%
Akureyri	1,287	1.003	1.016	9.3%

Figure 3: Models in the greater Reykjavik metropolitan area
[single family/condos]



Density function – price/valuation

Valuation models

A total of 11 valuation models were developed to calculate the property assessments for 2010, 6 for single family houses and 5 for condos. In light of circumstances in the market, including the large number of property exchange contracts and low salability, the decision was made to anticipate a 5% lower price than model calculations on their own indicated

Single family houses:

Greater Reykjavik metropolitan area:

$$\begin{aligned} \text{value} = & 38.100 \times \left(\frac{\text{ibflm}}{140}\right)^{0,6980} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,3791} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,4865} \times \left(1 + \frac{\text{risflm}}{\text{ibflm}}\right)^{0,1495} \\ & \times \left(\frac{\text{lodflmal}}{400}\right)^{0,0580} \times \text{ummalshlf}^{0,1510} \times 0,9039^{\text{kjallarihl}} \times 0,9495^{\text{radhus}} \times 0,9584^{\text{parhus}} \times 0,8629^{\text{tvibylisus}} \\ & \times 0,9808^{\text{tveggjahaeda}} \times 0,9474^{3\text{haedir\&yfir}} \times 0,9920^{\text{aldurundir25}} \times 0,9317^{\text{odyrsteinn}} \times 0,9472^{\text{timburhus}} \\ & \times 1,0125^{\text{fjhreinltaekja100}} \times 1,0543^{\text{fjbilastaedi}} \times \text{hverfisstudlar} \times \text{gotustudlar} \end{aligned}$$

Sudurnes:

$$\begin{aligned} \text{value} = & 23.473 \times \left(\frac{\text{ibflm}}{120}\right)^{0,685} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,485} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,348} \times \left(1 + \frac{\text{risflm}}{\text{ibflm}}\right)^{0,339} \\ & \times \text{ummalshlf}^{0,076} \times 0,906^{\text{kjallarihl}} \times 1,062^{\text{rishlf}} \times 0,954^{\text{radhus}} \times 0,836^{\text{tvibylisus}} \\ & \times 0,872^{\text{margaribudir}} \times 0,946^{\text{tveggjahaeda}} \times 0,915^{3\text{haedir\&yfir}} \times 0,995^{\text{aldurundir80}} \\ & \times 0,959^{\text{odyrsteinn}} \times 0,959^{\text{timburhus}} \times 0,991^{\text{litidland}} \times 1,030^{\text{fjbilastaedi}} \times \text{hverfisstudlar} \end{aligned}$$

West and South Iceland

$$\begin{aligned} \text{value} = & 20.482 \times \left(\frac{\text{ibflm}}{120}\right)^{0,6373} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,5265} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,2607} \times \left(\frac{\text{lodflmal}}{650}\right)^{0,0559} \\ & \times (1 + 0,05 \times \text{fjbilastaeda}) \times 0,916^{\text{kjallarihl}} \times 0,920^{\text{tvibylisus}} \times 0,897^{\text{margaribudir}} \\ & \times 0,995^{\text{aldurundir80}} \times 0,980^{\text{odyrsteinn}} \times \text{hverfisstudlar} \end{aligned}$$

Westfjords and northwest Iceland

$$\begin{aligned} \text{value} = & 20.482 \times \left(\frac{\text{ibflm}}{120}\right)^{0,6373} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,5265} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,2607} \times \left(\frac{\text{lodflmal}}{650}\right)^{0,0559} \\ & \times (1 + 0,05 \times \text{fjbilastaeda}) \times 0,916^{\text{kjallarihl}} \times 0,920^{\text{tvibylisus}} \times 0,897^{\text{margaribudir}} \\ & \times 0,995^{\text{aldurundir80}} \times 0,980^{\text{odyrsteinn}} \times \text{hverfisstudlar} \end{aligned}$$

Northeast Iceland

$$\begin{aligned} \text{value} = & 26.198 \times \left(\frac{\text{ibflm}}{120}\right)^{0,72734} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,622} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,231} \times \left(\frac{\text{lodflmal}}{500}\right)^{0,025} \\ & \times (1 + 0,05 \times \text{fjbilastaeda}) \times \text{ummalshlf}^{0,190} \times 0,9412^{\text{kjallarihl}} \times 0,9268^{\text{radhus}} \\ & \times 0,8977^{\text{tvibylisus}} \times 0,9552^{\text{tveggjahaeda}} \times 0,9279^{3\text{haedir\&yfir}} \times 0,9936^{\text{aldurundir60}} \\ & \times 0,9764^{\text{timburhus}} \times \text{hverfisstudlar} \end{aligned}$$

East Iceland

$$\begin{aligned} \text{value} = & 21.156 \times \left(\frac{\text{ibflm}}{120}\right)^{0,74008} \times \left(1 + \frac{\text{bilskurflm40m2}}{\text{ibflm}}\right)^{0,731} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,256} \times \left(\frac{\text{lodflmal}}{600}\right)^{0,017} \\ & \times (1 + 0,05 \times \text{fjbilastaeda}) \times 0,7633^{\text{kjallari hl}} \times 0,8826^{\text{einb yliajord}} \times 0,9373^{\text{rad hus}} \\ & \times 0,9407^{3\text{haedir \&yfir}} \times 0,8583^{\text{tvibylis hus}} \times 0,9912^{\text{aldurundir 60}} \times 0,9367^{\text{timbur hus}} \\ & \times \text{hverfisstudlar} \end{aligned}$$

Condominiums:

Greater Reykjavik area

$$\begin{aligned} \text{value} = & 18.641 \times \left(\frac{\text{ibflm}}{85}\right)^{0,8034} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,4505} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,5016} \\ & \times \left(1 + \frac{\text{risflm}}{\text{ibflm}}\right)^{0,1641} \times \left(1 + \frac{\text{svalirflm}}{\text{ibflm}}\right)^{0,1869} \\ & \times 0,971^{\text{kjallarihlfr}} \times 1,023^{\text{rishlfr}} \times 0,986^{\text{margarhaedir}} \times 0,992^{\text{aldurundir30}} \times 0,959^{\text{odysteinn}} \times 0,984^{\text{timburhus}} \\ & \times 1,026^{\text{fjhreintakja100}} \times 1,036^{\text{fjbilastaeda}} \times 0,965^{\text{ofan3haedar\&anlyftu}} \times 1,054^{\text{undir6ibfyrir1980}} \\ & \times 1,041^{\text{undir6ibeftir1980}} \times 0,938^{\text{kjallari}} \times 1,009^{\text{efstahaed}} \times 1,008^{\text{haedyfir3}} \times 1,093^{\text{thjonustuibud}} \times \text{hverfisstudlar} \\ & \times \text{gotustudlar} \end{aligned}$$

Sudurnes

$$\begin{aligned} \text{value} = & 15.013 \times \left(\frac{\text{ibflm}}{85}\right)^{0,9266} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,7175} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,5252} \times \left(1 + \frac{\text{risflm}}{\text{ibflm}}\right)^{0,3467} \\ & \times (1 + 0,075 \times \text{fjbilastaeda}) \times (1,0934)^{\text{rishlfr}} \times (0,9918)^{\text{aldurundir40}} \\ & \times (1,0407)^{\text{fjhreintakja100}} \times (0,9585)^{\text{ofan2haedar\&anlyftu}} \times (1,0186)^{2 \times \text{5ibudirihusi}} \\ & \times (0,9572)^{\text{kjallari}} \times (1,1063)^{\text{efstahaed}} \times \text{hverfisstudlar} \end{aligned}$$

West and South Iceland

$$\begin{aligned} \text{value} = & 15.438 \times \left(\frac{\text{ibflm}}{85}\right)^{0,739} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,377} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,515} \times \left(1 + \frac{\text{risflm}}{\text{ibflm}}\right)^{0,445} \\ & \times \left(1 + \frac{\text{svalirflm}}{\text{ibflm}}\right)^{0,185} \times (1 + 0,07 \times \text{fjbilastaeda}) \times 0,822^{\text{kjallarihlfr}} \times 0,991^{\text{aldurundir40}} \\ & \times 0,948^{\text{ofan3haedar\&anlyftu}} \times \text{hverfisstudlar} \end{aligned}$$

Westfjords, north and east Iceland

$$\begin{aligned} \text{value} = & 9.500 \times \left(\frac{\text{ibflm}}{85}\right)^{0,9425} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,394} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,288} \times 0,906^{\text{kjallarihlfr}} \\ & \times 1,070^{\text{fjbilastaeda}} \times 0,989^{\text{aldurundir30}} \\ & \times 1,014^{\text{fjhreintakja100}} \times 0,941^{\text{ofan2haedar\&anlyftu}} \times 1,102^{\text{ofan3haedar}} \times \text{hverfisstudlar} \end{aligned}$$

Akureyri

$$\begin{aligned} \text{value} = & 17.104 \times \left(\frac{\text{ibflm}}{85}\right)^{0,7524} \times \left(1 + \frac{\text{bilskurflm}}{\text{ibflm}}\right)^{0,330} \times \left(1 + \frac{\text{serm2}}{\text{ibflm}}\right)^{0,392} \times 0,945^{\text{kjallarihlfr}} \\ & \times 1,052^{\text{rishlfr}} \times 1,070^{\text{fjbilastaeda}} \times 0,961^{\text{margarhaedir}} \times 0,989^{\text{aldurundir25}} \times 0,863^{\text{timburhus}} \\ & \times 0,863^{\text{odysteinn}} \times 1,021^{\text{fjhreintakja100}} \times 0,939^{\text{ofan2haedar\&anlyftu}} \times 1,040^{2 \times \text{ibudirihusi}} \\ & \times 0,938^{\text{kjallari}} \times 1,040^{\text{haedyfir3}} \end{aligned}$$

Land value models

The valuation models can be interpreted as the valuation of a reference property x dispersion from the reference property. If we take a look at, e.g. single family houses in northeast Iceland, we can see from the formula that the valuation of a reference property is ISK 26,198M. The reference property has 120 m² of living floor space,

excluding garages and parking space, excluding storage space outside the house, excluding basement, and excluding lofts. It is a newly constructed concrete detached residence on one floor located on a 500 m² lot and with a circumference ratio = 1. The property is located in an area with a neighborhood coefficient = 1, i.e. in Akureyri.

On determining the land valuation, the decision was made to determine the land valuation ratio (i.e. the land value divided by the property value) of the reference properties, i.e. a base ratio. This was done by finding properties in the property registry which were the most similar to the reference property, calculating their land valuation ratio according to an earlier valuation and determining the base ratio close to those ratios. The land valuation ratio changes between neighborhoods; a more valuable area means a higher land valuation ratio. These effects are revealed in the land coefficient. At the same time, it is ensured that effects relating to the age of buildings influence first and foremost the building valuation and that the effects of lot size influence the land valuation. Finally, an effort was made to have location-specific increases in land valuations similar to increases in the property assessment.

For condos:

$$\text{land valuation ratio} = \frac{\text{base_ratio} \times \text{land_coefficient}}{\text{age_factor}}$$

For single family houses:

$$\text{land valuation ratio} = \frac{\text{base_ratio} \times \text{land_coefficient}}{\text{age_factor} \times \text{land_size_factor}} + 1 - \frac{1}{\text{land_size_factor}}$$

If we take as an example a single family house in northeast Iceland, then the age factor is 0.995^{alduundur80} and the land size factor is (lodfmal/500)^{0.025}.

Completion

In June 2009, property owners were sent notification of the amount of the property assessment for 2010. A period of grace was given to July 24, 2009 to make an objection to the valuation. It was assumed that the objections could be processed before the valuation came into effect and tax collection began on its basis. The number of objections proved to be only approximately 300. A detailed report "Property assessment 2010" on the reappraisal was issued [7]. The website of the Icelandic Property Registry provides free access to information about the property assessment of each property, and searches can be conducted by the name of the property or its property identification number. Access is also granted to the valuation criteria used for each property [8].

Residential housing on farms was not valued according to the new valuation approach, nor was the land belonging to farms. If account is taken of buildings that are weather-tight or more finished, then there are currently approximately 98% of residential properties, excl. farms, which are valued according to the new approach. The new property valuation is a total of approximately 65% of all property assessment in Iceland.

The following totals in Table 5 apply to fully complete residential housing, valuated according to the new approach in June.

Table 5

Fully completed residential housing May 31, 2009		Number of properties	Total floor area m ²	Living floor area m ²	Property assessment ISK thousands
Greater Reykjavik	Single family	26,488	5,001,701	4,201,387	1,039,152,221
	Condos	48,553	4,688,812	4,299,675	1,003,035,510
Sudurnes and Kjós	Single family	5,066	813,246	813,246	113,812,334
	Condos	2,716	349,071	335,045	51,601,680
West and South Iceland	Single family	7,914	1,255,270	1,012,064	162,959,598
	Condos	2,691	255,214	235,427	39,577,090
Westfjords and NV	Single family	3,777	599,060	493,720	42,514,795
Westfj., and ...	Condos	2,431	226,159	208,133	20,240,911
Northeast Iceland	Single family	6,993	1,098,177	924,889	123,268,509
Akureyri	Condos	3,100	266,921	256,642	43,552,290
East Iceland	Single family	4,814	771,674	638,290	68,482,432
Total in Iceland	Single family	55,052	9,539,129	7,919,191	1,550,189,889
	Condos	59,491	5,786,177	5,334,921	1,158,007,481
	Total	114,543	15,325,306	13,254,112	2,708,197,370

Sources:

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