Finnish revaluation of land for taxation 2019

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Part I: Current property taxation in Finland

- As to land for housing, Finland is one of those few countries, where separate rates are applied to land and structures.
- Housing land is taxed more heavily than housing structures.
- The nominal rate for housing land varies between 0,6 - 1,35 % and the nominal rate for housing structures varies between 0,39 -0,9 %.
- As for all other land and structures, the nominal rate variation is 0,6 - 1,35 %, the same as for housing land.
Current property taxation in Finland

- The law on property taxation was introduced in 1993. In all property classes land and buildings must be valued separately, land based on market value and structures based on reproduction costs.
- Property tax income is 1.7 billion euros, or 1% GDP.
- Property tax is a local tax, towns and cities are receivers of the tax.
- Income of property tax on buildings is ca 1.2 billion euros, and income on property tax on land is 473 million euros.
- The importance of property tax revenue in local finance is expected to rise in the near future.
The amount and structure of property tax on land, 2014

<table>
<thead>
<tr>
<th>type of property</th>
<th>number</th>
<th>assessment value (mill.€)</th>
<th>property tax on land (mill.€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>residential</td>
<td>69 %</td>
<td>62 %</td>
<td>64 %</td>
</tr>
<tr>
<td>office/retail</td>
<td>1 %</td>
<td>14 %</td>
<td>13 %</td>
</tr>
<tr>
<td>logistics</td>
<td>1 %</td>
<td>1 %</td>
<td>1 %</td>
</tr>
<tr>
<td>recreation</td>
<td>26 %</td>
<td>11 %</td>
<td>13 %</td>
</tr>
<tr>
<td>industrial</td>
<td>2 %</td>
<td>4 %</td>
<td>4 %</td>
</tr>
<tr>
<td>public</td>
<td>1 %</td>
<td>6 %</td>
<td>4 %</td>
</tr>
</tbody>
</table>
Analysis of effective property tax rate

- Effective property tax rates were analyzed in all property classes where sufficient market data is available, namely housing properties and property for commercial and industrial purposes.
- Sales of built and unbuilt properties were analyzed.
- The relevant assessment value for built properties was the sum of assessment value of land and structures.
- As for unbuilt properties, the relevant assessment value was the assessment value of land only, of course.
## System of comparing assessment value and market value

<table>
<thead>
<tr>
<th>Land</th>
<th>Assessment Value</th>
<th>Unit</th>
<th>Market Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Lot</td>
<td>Of land</td>
<td>€/land-m²</td>
<td>Real estate sale</td>
<td>Most recent sale after 1985</td>
</tr>
<tr>
<td>Vacation Housing Lot</td>
<td>Of land</td>
<td>€/land-m²</td>
<td>Real estate sale</td>
<td>Most recent sale after 1985</td>
</tr>
<tr>
<td>Commercial/Industrial Lot</td>
<td>Of land</td>
<td>€/land-m²</td>
<td>Condominium sale</td>
<td>All sales in 1987-2011</td>
</tr>
<tr>
<td>Multifamily Building</td>
<td>Of land and building together</td>
<td>€/floor area-m²</td>
<td>Real estate sale</td>
<td>Most recent sale after 1985</td>
</tr>
<tr>
<td>Single Family Building</td>
<td>Of land and building together</td>
<td>€</td>
<td>Real estate sale</td>
<td>Most recent sale after 1985</td>
</tr>
</tbody>
</table>
Ratio and equity statistics in Finnish property taxation, 2011

<table>
<thead>
<tr>
<th>Property Type</th>
<th>Median</th>
<th>Standard Deviation (log)</th>
<th>Effective Property Tax Rate (0.01 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>all country</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>within a jurisdiction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Median</td>
</tr>
<tr>
<td>housing, several apartments</td>
<td>25</td>
<td>0.49</td>
<td>0.32</td>
</tr>
<tr>
<td>single family house</td>
<td>32</td>
<td>0.70</td>
<td>0.67</td>
</tr>
<tr>
<td>lot for housing</td>
<td>34</td>
<td>0.94</td>
<td>1.00</td>
</tr>
<tr>
<td>second home, recreation</td>
<td>29</td>
<td>0.72</td>
<td>0.69</td>
</tr>
<tr>
<td>lot for second home, recreation</td>
<td>32</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>commercial-industrial, built</td>
<td>42</td>
<td>1.14</td>
<td>1.07</td>
</tr>
<tr>
<td>commercial-industrial lot</td>
<td>47</td>
<td>1.17</td>
<td>1.12</td>
</tr>
</tbody>
</table>
Part II: Introducing a new set of methods for valuation

- Skills in valuation, statistics, econometrics, geomatics, and computing are needed and have been used to develop state-of-the-art mass valuation models.
- The databases on which they depend where taken mostly from public databases, and in some cases non-public databases kept by taxation authorities.
- The key methods are intensive use of market information, simple hedonic models and spatial analysis.
- The main innovation is a mix of standard hedonic regression and spatial analysis, mainly indentifying nearest property sales and calculating spatial moving average.
Mass valuation process

(Robert Gloudemans, Richard Almy Fundamentals of Mass Appraisal, p. 6)
The role of CAMA in mass appraisal  (Richard Borst)
Data sources:

- condominium sales 1987 - 2016, which are collected for transfer and sales profit taxation purposes (source: Taxation authorities).
- land and other real property sales 1986 - 2016 (Official real property sales price register, kept by National Land Survey)
- cadastre
- zip code area subdivision
- grid data 250x250 m2 (major cities only)
Critical conditions and tasks

- The adequacy of market information
- Subdivisions of land
- Overview of the price landscape
- Modelling land prices
- The toolbox for practical use: a set of 3 valuation methods to choose from
The adequacy of market information

- The next slide illustrates, that in most zip code areas there is enough land sales to determine the average residential land value.
- In some areas there are enough land sales to determine the residential land value variation within the area.
- In some areas the land sales are scarce, and those are the areas where land is most expensive. However, there is plenty of home sales in those expensive areas.
Number of lot sales and condominium sales in 30 years by zip code area
Price of housing lot and condominium in 2014 by zip code area
Overview of the price landscape

- Slides 17-19 illustrate three levels of accuracy in presenting the price landscape
  - 17) zip code area (3000 in the country)
  - 18) grid area (2000000 grids if 6.25 ha in the country)
  - 19) Property level (again, 2000000 properties in the country)
- Slides 20-22 illustrate the price landscape in Helsinki Metropolitan area.
Price of single family home by zip code area, Southern Finland
Constant quality price of condominium by grid, Helsinki MPA
Constant quality price of condominium by property, Southern inner Helsinki
Helsinki MPA

The amount of housing lot sales

| N | 1,000000 - 2,000000 |
|   | 2,000001 - 4,000000 |
|   | 4,000001 - 8,000000 |
|   | 8,000001 - 15,000000 |
|   | 15,000001 - 69,000000 |
The amount of single family house and housing lot sales
Constant quality housing lot sales price (€/m2)
Constant quality housing lot sales price (€/m²)
Constant quality single family house sales price (€/floor-m2)
Constant quality sales price: house and housing lot
Constant quality housing condominium sales price (€/floor-m2)
Constant quality sales price: condominium, house and housing lot
The toolbox for practical use: a set of 3 valuation methods to choose from

- In search of a scalable, cost-effective way to calculate more than 2 million land values, a multiple method approach is proposed.
- There are three methods that are very different from each other in terms of accuracy, effort, costs and ease of use. The methods are, from less accurate to most accurate:
  1. Zip code area median price. This method is less accurate, very easy to use, very cheap.
  2. Nearest lot sales. This is the main method, quite accurate, quite costly.
  3. Nearest condo sales. This is most difficult to use, quite accurate even when land price data is scarce.
The toolbox for practical use: a set of 3 valuation methods to choose from

<table>
<thead>
<tr>
<th></th>
<th>expensive location</th>
<th>average location</th>
<th>inexpensive location</th>
</tr>
</thead>
<tbody>
<tr>
<td>high rise housing lots</td>
<td>nearest condo sales</td>
<td>nearest lot sales</td>
<td>nearest lot sales</td>
</tr>
<tr>
<td>single family housing lots</td>
<td>nearest lot sales</td>
<td>nearest lot sales</td>
<td>zip code area median price</td>
</tr>
<tr>
<td>recreational housing lots</td>
<td>nearest lot sales</td>
<td>nearest lot sales</td>
<td>zip code area median price</td>
</tr>
<tr>
<td>office and commercial lot</td>
<td>nearest lot sales</td>
<td>zip code area median price</td>
<td>zip code area median price</td>
</tr>
<tr>
<td>industrial lots</td>
<td>zip code area median price</td>
<td>zip code area median price</td>
<td>zip code area median price</td>
</tr>
<tr>
<td>tax base share (%)</td>
<td>40</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>land area share (%)</td>
<td>3</td>
<td>27</td>
<td>70</td>
</tr>
</tbody>
</table>
Zone price based on a spatial moving average of nearest comparable land sales.

- Identifying an area of homogenic land values involves five steps:
  1. Based on high price level, high variation on prices, or a vision of price landscape produced by grid data, a method of nearest land sales is chosen
  2. Constant quality, deflated unit land prices are calculated by hedonic regression. Only spatial factors are left out of regression.
  3. Nearest land sales are automatically identified and a suitable number, between three and nine of them, is chosen
  4. Spatial moving average of land prices is calculated automatically
  5. Price zones are finished by manual interpretation
Price of housing lot and condominium in 2014 by zip code area
Housing lot price model specification

- **LBRPRICE** = $\alpha + \beta_t \times \text{TIme} + \beta_a \times \text{LLOTAREA} + \beta_r \times \text{ADJACENTTOSEE} + \epsilon$, where

- **LBRPRICE** = ln (price of building right €/floor-m2)
- **TIME** = time of sale = year - 2000 + month /12
- **LLOTAREA** = ln (LOTAREA)
- **LOTAREA** = lot area m2, max 1000 m2 in cities and towns, max 3000 m2 elsewhere
- **ADJACENTTOSEE** = 1, when the sale is adjacent to see, otherwise = 0
- **A** = constant
- **$\beta_t$, $\beta_a$, $\beta_r$** = parameter values
- **$\epsilon$** = error term
- **ln** = natural log
Housing land price (€/m²) as function of house price. 77 commuting areas in the country

\[ y = 3.4158x + 0.4206 \]
Property tax base in a medium sized city (Kouvola). Lilac indicates housing lot sales.
Based on three nearest neighbors a spatial moving average of land values is generated automatically.
House prices as indicators of land prices

- Slides 29-40 illustrate, how land price can be derived from home prices: condominium prices in high rise buildings in urban areas, and single family house prices in suburban areas.
Multi-family housing lot price by grid, constant quality, Helsinki MPA
Land share of housing price by grid, Helsinki MPA
Conclusions (1)

- The aim was to derive the land part of the property value for all the property tax base.
- In most cases comparable prices of land sales are enough.
- In most valuable locations land sales are scarce, but home sales are abundant. It’s possible to derive the land share of house prices.
- The relevant technique:
  1. Extensive use of standard regression analysis
  2. Calculating constant quality home prices
  3. Identifying nearest comparable sales and calculating spatial moving average
Conclusions (2)

Based on the availability of data and how valuable the location is, a toolbox of three valuation methods is introduced:

1) for most invaluable land zip-code medians are recommended,

2) for more expensive land a spatial moving average of nearest comparable land sales is recommended, and

3) for most expensive land a spatial moving average of nearest comparable apartment sales is recommended as a second method.
More information

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