

Will Mass Appraisal and Automated Valuation Models take away my job?

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Will robots take my job?

WILL ROBOTS TAKE MY JOB?

90%

Appraisers and Assessors of
Real Estate

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SOC CODE: 13-2021

<https://willrobotstakemyjob.com/13-2021-appraisers-and-assessors-of-real-estate>

Derived from Carl Benedikt Frey and Michael A. Osborne *[The Future of Employment: How susceptible are jobs to computerisation?](#)* (2013).

Appraise real property and estimate its fair value. May assess taxes in accordance with prescribed schedules.

World Bank Real Estate Management Project 2015

- €36.2 million for 5-year project, of which €6.6 million for Component A Valuation and Property Taxation:
 - (a) improving the system for annual property taxation through
 - (i) developing a **sales price registry** for real estate;
 - (ii) developing software to process data from the sales price registry;
 - (iii) developing and assessing a **Mass Appraisal** pilot program on property tax rolls and collection procedures in local governments units; and
 - (iv) establishing a building registry;
 - (b) improving the real estate valuation framework through, improving the quality of education for valuers, and adopting internationally recognized standards for valuation.
- Project involves developing **mass appraisal** but **not AVMs**

Definition of terms

- **Mass appraisal** = mass valuation = Computer Assisted Mass Appraisal (CAMA) = hedonic real estate price models: The International Valuation Standards Committee (2005) “the practice of appraising **multiple properties** as of **a given date** by a **systematic and uniform application** of appraisal methods and techniques that allow for **statistical review and analysis** of results”
- **Automated Valuation Models (AVM)**: “A model that uses one or more **mathematical techniques** to provide an **estimate of value of a specified property** at a **specified date**, accompanied by a measure of confidence in the accuracy of the result, without human intervention post-initiation” (RICS ,2013).

Similarities between AVMs and mass appraisal

- Both use statistical methods to estimate the value of properties and determine the accuracy of the models
- Replace, at least in part, human valuers by machines – attempt to replicate the market
- Both depend on teams to collect and analyse data rather than the judgement of an individual
- Multi-disciplinary approach used including statistics, econometrics, geo-informatics rather than just valuation
- Neither involve inspections of the properties but rely on databases of characteristics, remote sensing, or satellite imagery
- Can harness the potential of “big data”
- Both depend upon a data set of prices

Differences between mass appraisal and AVMs

Mass appraisal

- Carried out as at a **single date**
– not up to date
- Used to estimate the values of a **large number** of properties
- Principally used by **public sector**
- Typically **part of a land administration** system
- Characteristic use: **property taxation**
- **Public system**

AVMs

- Continuously **updated in real time**
- Used to estimate the value of a **single property**
- Principally used by **private sector**
- **Stand alone**
- Characteristic uses: **mortgage valuations, setting asking prices**
- **Proprietary systems**

Mass appraisal

- To assess recurrent (annual) property taxes
- To check sporadic property taxes eg property transfer, inheritance, capital gains tax
- To check other taxes and fees eg land registration fees
- Drainage, sewerage, flood protection charges
- Social security entitlement
- Checking bank capital adequacy
- Fraud prevention
- Setting rents for social housing
- Cost-benefit analysis of projects

AVMs

- Advise on asking prices
- Marketing device for mortgage banks and estate agents (realtors)
- Advice to valuers – ability to check valuations against larger reference group
- Mortgage valuations and further advances
- Revaluations of property portfolios eg company accounts, collective investment vehicles, pension funds
- Tax planning

Common methodological base for AVMs and mass appraisal

- Use of **statistical methods** to estimate values
- Use data from **sample** of properties for which there have been transactions and apply models to estimate values of properties for which there have been no transactions
- **Hedonic modelling** approach:
 - price = function (characteristics of properties)
 - eg size, location, age, number of rooms, access to transport, access to schools, number of bathrooms, garage
- Assumes **efficient market** in which prices reflect what buyers value – **semi-strong** market that fully reflects publicly available information eg property characteristics
- Some property price indexes also use hedonic modelling approaches

Variety of statistical methods

- **Multiple regression** – most common approach. Problem of **multicollinearity** (independent variables that are correlated) – recent developments in **location** modelling – location, location and location! – can stand proxy for group of characteristics buildings of a common age share
- **Multivariate** – looks for factors in the data to resolve multicollinearity
- **Clustering** – multivariate methods that look to group similar properties
- **Neural networks** – artificial intelligence or machine learning from past valuations undertaken by valuers – potentially subject to implicit biases of past valuers
- **Expert systems** – potentially of value in thinly traded markets

Why use mass appraisal?

- Ensures a consistent systematic rule-based approach
- High start-up costs but low cost per property valued – economies of scale – Netherlands €17 per property
- Allows for frequent and regular revaluations – speedy valuations possible over a short timescale
- Overcomes shortage of human valuation capacity by replacing skilled valuers by machines and multi-disciplinary teams

BUT

- Significant numbers of valuers need to be employed to:
 - Assess quality of transaction data, including inspecting properties
 - Advise on models
 - Value properties that cannot be modelled
 - Handle appeals

Questions mass appraisal and AVMs cannot answer

- Why is my property tax assessment so high and my neighbour's so low?
- Why have I been refused the mortgage I have applied for?
- Why is the compensation I received when my property was expropriated so low?
- What is the worth of this property to me?
- How did you manage to lose so much of the money I invested with you?
- Can you prove to the court that the machine-generated valuation of this specific property is accurate to within $\pm 10\%$ of the market price?

The “computer says” is the wrong answer!

Limitations of mass appraisal and AVMs

- Values generated through **averaging** process.
“On **AVERAGE**, a property with these characteristics should sell for \$x between willing buyer and willing seller.”
- Ignore the **rich data** that comes **from inspecting** a property and its location – data that is not public
- **Dependent on good quality transaction price data** – proxies like valuations and asking prices are used where this is not available. Timing important – title registration or mortgage application?
- Models **explain only part of variability** in price – may be only 50-60%
- AVM models are **opaque** – proprietary reasons and intellectual property rights

Conclusions

- No future for the €50 “drive by” valuation – machines are cheaper and have access to similar data
- Some mortgage valuations will be machine-generated – all revaluations required by the Bank of International settlements & most additional advances. Initial advances likely to require a valuer to sign off the security.
- Tax valuations likely to be mainly by mass valuation except properties that cannot be modelled – perhaps 1/3rd commercial properties? Plus unusual residential ones. Once there are reliable recurrent valuations, all valuations for public purpose likely to use them as a check.
- Public likely to adopt tax valuations for private purposes once confidence in them is established – help to improve market efficiency.
- Valuers need to ensure that they add value to AVMs – valuation as a tool rather than occupation

Will you lose your job?

- No, but your job will change
- Fee income from residential mortgage valuations will become less important
- Greater emphasis on commercial property and business-to-business activities and on advice that includes valuations rather than just valuations
- The reform in licensing valuers and in valuation standards was essential preparation for the changes
- Beware of “snake oil” salesmen trying to sell proprietary AVMs!