FIG WORKING WEEK 2019

22–26 April, Hanoi, Vietnam

"Geospatial Information for a Smarter Life and Environmental Resilience"

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AVM application as a current subject of discussion between the property valuers and scientists - Polish background

Authors:
prof. Małgorzata Renigier-Biłozor
prof. Sabina Źróbek
PhD. Marek Walacik

University of Warmia and Mazury - POLAND
The Faculty of Geodesy, Geospatial and Civil Engineering
Institute of Geospatial Engineering and Real Estate

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Agenda

- Interpretation and origination
- Opinion of the property society
- Key problem in AVMs Issue
- Authors proposition and solutions

Automated Valuation Models (AVM)

Essence and Interpretation

either ***AVM = Valuation*** or ***AVM ≠ Valuation ?***

Valuation > AVM

AVM = (stages) in ***Estimation***

Does **Statistical analysis of the market = *MA*** *if so, does* ***SAM = AVM ?***

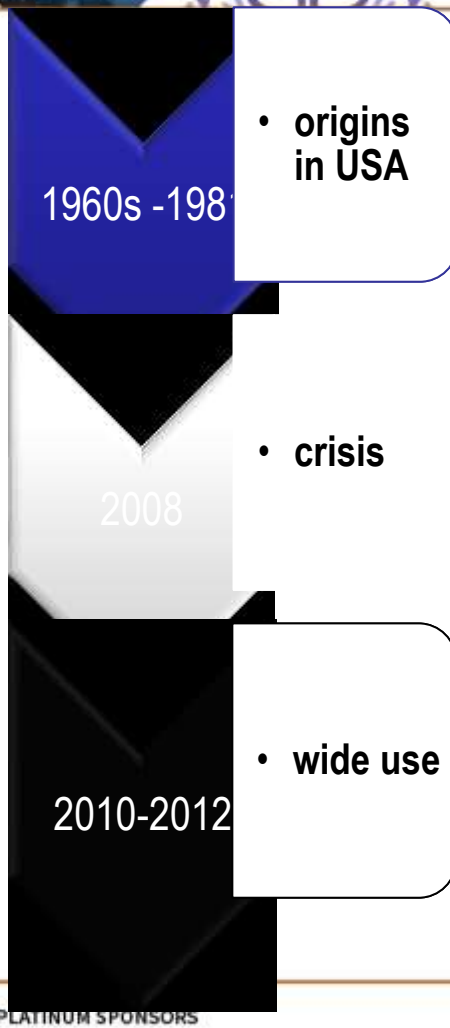
MW ≠ AVM

Automated valuation models AVMs have a wider spectrum of application than just mass appraisal (MA). Automated valuation models can be applied for both large and small databases. They are computer applications that use real estate information to calculate value for a particularly aims of real estates analyses.

AVM ≈ **AUTOMATED MODELS OF MARKET AND REAL ESTATE VALUE ASSESSMENT** (**AMREVA**)

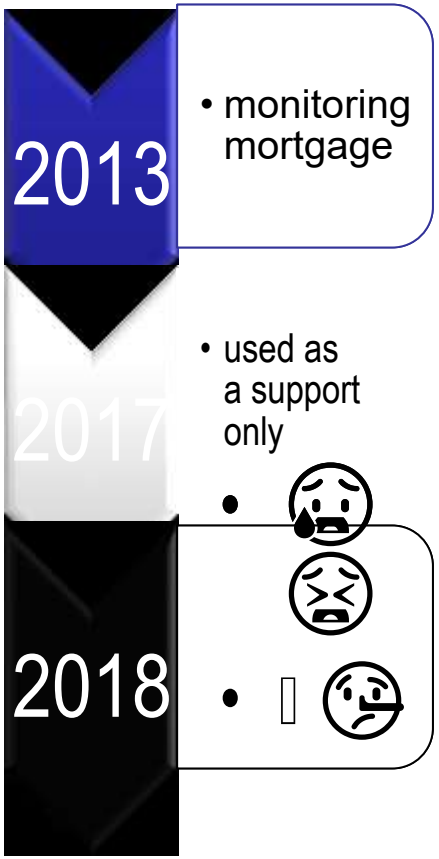
Origins of AVMs…..

- AVMs have their origins in North America (1960), the first commercial application was created in 1981 and began to be developed in the UK in the 1990s.
- After the crisis in 2008 caused by the insolvency of mortgages, Robinson & Dawnie demonstrated the growing importance of AVMs all over the world.
- In 2009, the European Mortgage Federation stressed that: 'AVM is a useful and efficient tool when used appropriately by an experienced operator'.
- The definition of integration between automated valuation and valuation in person was provided by the RICS in 2012 and is as follows: 'Output from an AVM can be utilized as part of evidence in support of a valuation.'
- Moreover, American Bankers Association [2010] indicated that: 'Institutions may employ AVMs for a variety of uses, such as loan underwriting and portfolio monitoring'.



Origins of discussion in Poland

- Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 – article 208 . (…) Institutions may use statistical methods to monitor the value of the property and to identify property that needs revaluation.
- The formal attitude of European Valuers Society [2017] and European Group of Valuers Association [2017] claimed that: "automated valuation models can be used only as a tool to help appraisers estimate the value, for which he is responsible".
- STANDARDS FOR STATISTICAL VALUATION METHODS FOR RESIDENTIAL PROPERTIES IN EUROPES - European AVM Alliance (EAA) – **10.2018**
- However in the last a few years many arguments were raised (e.g. TEGOVA Conference in 2018 "European Valuation Standards with focus on statistical methods of property valuation – are they legal?") against extensive use of the AVM to the valuation of property.



VS

The commonly raised argument deals with uncritical use of results by entities without mathematical and substantive knowledge

Arguments of scientists „in favour of”:

- Improve the quality of models used in the property valuation,
- Support the selection of similar properties,
- Allow to determination of markets similarity,
- Objectivize the subjectivism of the valuation,
- Deliver information from large datasets,
- Simplify solutions in problematic areas of real estate appraisal, eg.: lack of data, precision, significance of data,
- Allow judgment validation,
- Save time,
- Facilitate the interpretation of results and enable credibility verification.

Arguments of scientists „against”:

- Understanding statistics in an intuitive way (recipients),
- High requirements in terms of the amount of necessary information,
- Substantive barriers in the application and interpretation of results,
- It is not possible to take into account professional experience, market knowledge,
- Unsuccessful attempts to "suppress uncertainty",
- Problems with the standard distribution identification.

Arguments of practitioners „in favour of”:

- objective,
- fast,
- increasing work efficiency,
- in accordance with Polish law (in reality only for mass appraisal)

Arguments of practitioners „against”:

- difficult interpretation of results,
- high data requirements,
- high substantive requirements,
- loss of valuation orders.

The key problem in AVMs use

The reliability of data !!!!

The common awareness (and practise??) of data collection

Internal and external inspection – biggest engagement

exteral inspection - semi engagement

Desktop - small engagement

AVM – no engagement

The authors approach

Specialists Supervised AVM

Initial/overall Internal and external inspection

Mathematic analysis

Team engagement

Desktop analyses

Numerical processing

The **key** problem in AVMs use

Definitions

EVS 6 (2017)
AVMs are statistically-based computer programmes which use property information to generate property-related values or suggested values.

Authors propositions:
Specialists Supervised AVM (SSAVM)- are mathematical-based computer algorithms **developed and supervised by the qualified team (specialists)** which use information about properties and property market to generate property-related values.

Research direction - challenges
Application AMREVA where is the big problem with the insuffiency with information and market operation (limited real estate markets).

One of the biggest problem with applying AVMs is the scarcity of data. The lack or unavailability of data poses one of the greatest obstacles impeding the investigation of real estate market specificity. If there is a small set of observations, the use of statistical methods is limited.

That's why many researchers look for **alternative** solutions and methods to increase the efficiency , and accuracy (understood as the difference between the value and sale price) of the results obtained from AVMs.

Utilization of AVM in property decision making

Determining value for insufficient datasets and limited real estate markets

Rating – scoring system of property market classyfication

AUTOMATED MODELS OF MARKET AND REAL ESTATE VALUE

• Grant no N N114 186138, pt: " Development of a decision making system using rough set theory for the real estate market ", 14.04.2010-13.04.2012.

• Grant no 528-03-03-0881. „ Development of the structure of the decision support subsystem on the real estate market"; 2012-06-01 - 2012-12-31.

• Grant no UMO-2014/13/B/HS4/00171, pt: " Developing the methodology of real estate market ratings ", 20.02.2015-19.02.2017.

Research direction - challenges

Application AMREVA where is the big problem with the insuffiency with information and market operation (limited real estate markets).

A decision making algorithm for real estate valuation based on RST and VTR. The model was tested on a data set of commercial real estate properties in the city of Bari, Italy, and a data set of residential real estate properties in the city of Olsztyn, Poland.

No. of real estate to be appraised	Value	Price	Vale /Price	Median	MPE	COD
1	5 514	5 319	1.0367	1.0410	7.43	0.0494
2	5 710	5 485	1.0410			
3	5 062	5 267	0.9611			
4	6 815	5 636	1.2092			
5	5 062	4 841	1.0456			

Source: Author's calculation

Table 11b. COD and MPE result of RST in Automated Valuation Model - Italian residential real estates

No. of real estate to be Appraised	Value	Price	Vale /Price	Median	MPE	COD
1	157 000	159 000	0.9874	0.9565	4.27	0.0289
2	115 000	122 000	0.9426			
3	136 000	132 000	1.0303			
4	110 000	115 000	0.9565			
5	102 000	107 000	0.9533			

Source: own calculations

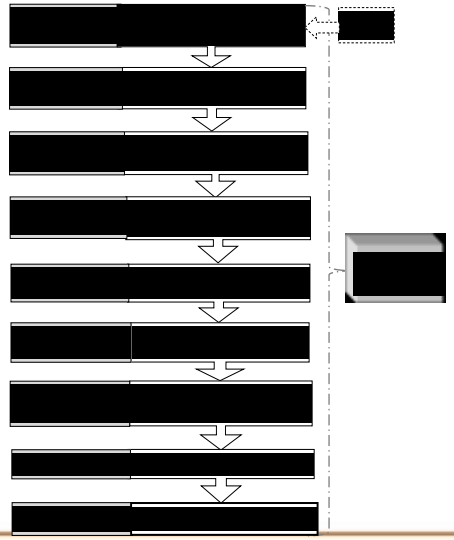


Figure 1. Decision-making algorithm in the form of AVM with the use of RST and VTR for real estate valuation.
Source. Own [illegible]

*The term "**forced sale**" is often used in circumstances where a seller is under compulsion to sell and that, as a consequence, a proper marketing period is not possible and buyers may not be able to undertake adequate due diligence. The price that could be obtained in these circumstances will depend upon the nature of the pressure on the seller and the reasons why proper marketing cannot be undertaken…*" (IVS, 2017; *General Standards IVS*, 2016).

The differences (D) between market value (V_{MV}) and forced sale value (V_{FV}) **will be developed with the application of the rough set method**, extended by value tolerance relations (fuzzy theory). The proposed method is perfect for both big and small databases, as well as data that is ambiguous, imprecise and varied.

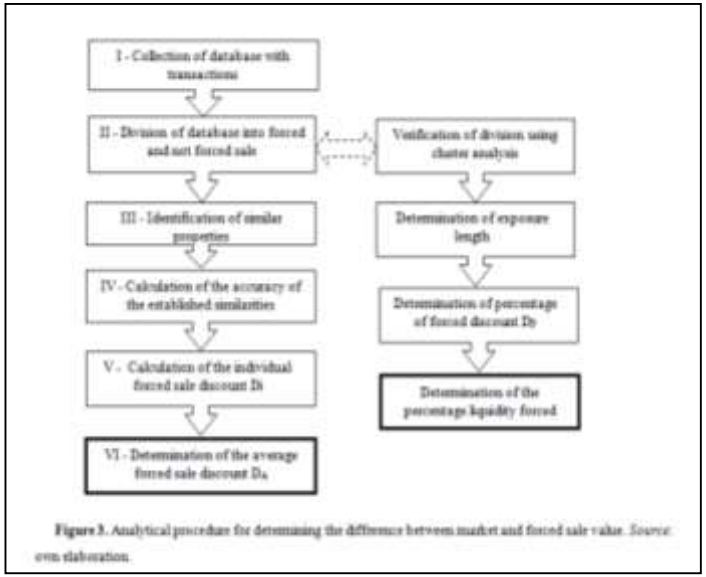


Figure 3. Analytical procedure for determining the difference between market and forced sale value. Source: own elaboration.

European Valuation Standards 1 (EVS 2012 point 5.4.4) describe hope value as follow: "*Hope value is used to describe the price (…) which the market is willing to pay in the hope of a higher value use or development opportunity being achievable than is currently permitted under development control (…).".*

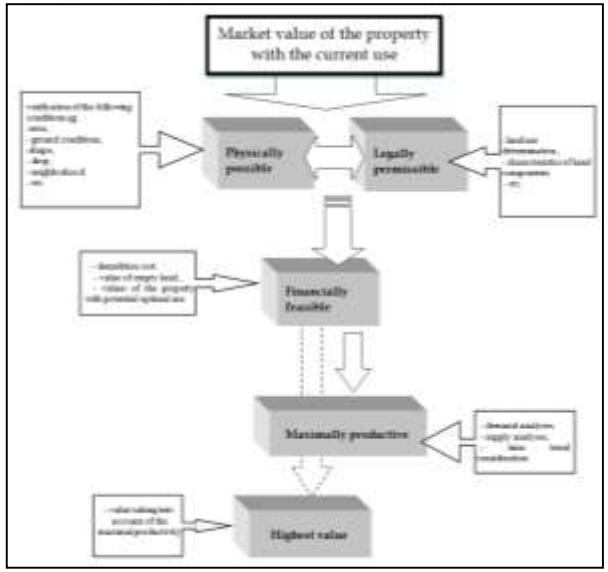
An Application of Author's model for determining hope value. The model proposed for the valuation of hope value of a apartments using the Titman's model.

Hope value is the difference between the existing use value and the price that the market might pay for future transformation.

Determining Hope Value and Hope Value Ratio using author's model

Obs.	V_1 (in zl)	V_0 (in zl)	V_H (in zl)	V_H/V_1	V_H/P_0
1	350 224.58	314 148.00	36 076.58	10%	10%
2	293 665.28	267 669.00	25 996.28	9%	8%
3	170 366.26	151 098.00	19 268.26	11%	9%
4	345 311.60	283 857.00	61 454.60	18%	13%
5	228 878.52	205 403.00	23 475.52	10%	9%
6	195 227.21	166 000.00	29 227.21	15%	14%
7	451 814.87	398 298.00	53 516,87	12%	11%
8	- 15 274.00	- 48 200.00	-	0	0
9	302 783.14	274 074.00	28 709.14	9%	9%
10	204 513.43	183 920.00	20 593.43	10%	9%
11	281 699.20	251 875.00	29 824.20	11%	10%
12	197 325.95	171 423.00	25 902.95	13%	9%
13	527 928.98	469 192.00	58 736.98	11%	11%

Source: own elaboration



The EVS 2017 defined the concept of highest and best use, under condition of assessment the property in the date of valuation, such as:
it is the most reasonably probable use;

- legal;
- physically possible;
- supported by evidence;
- financially feasible;
- that offers the highest value for the property.

The proposed HUB analyses assumed a few main stages leading to the selection/choice of a reliable optimal use of the property. The projected use might meet fourfold of these tests (conditions): physically possible, legally permissible, financially feasible, maximally productive.

Table 1

Test recommendations to estimate the highest and best use.

	Physically possible	Legally permissible	Financially feasible	Maximally productive	Highest value
RICS	✓	X	✓	✓	X
IVS	✓	✓	✓	✓	✓
EVS	✓	✓	✓	✓	✓
Act on real estate management – Polish example	?	?	?	?	?

Source: Own study

CONCLUSIONS

AUTOMATED MODELS OF MARKET AND REAL ESTATE VALUE ASSESSMENT (AMREVA)

can be an effective tool supporting the work of real estate appraisers.