

European Valuer



George Matysiak on assessing the accuracy of individual property values estimated by Automated Valuation Models



Introduction

My second report commissioned by TEGoVA on Automated Valuation Models (AVMs), *Assessing the accuracy of individual property values estimated by automated valuation*

models, considers how AVM providers could improve the quality and transparency of their reports on individual AVM valued properties. By providing a valuer with an indication of the attendant uncertainty surrounding individual AVM valued properties, this will enable valuers to assess the **reliability** of the reported values.

A distinction needs to be made between the reporting requirements for institutional lenders in connection with the valuation of property portfolios on the one hand, and for valuers, lenders and borrowers in connection with the valuation of individual properties on the other. My report to TEGoVA addresses the latter.

Reporting AVM values and attendant uncertainty

Currently, there are no **"industry standard"** formats for assessing the accuracy of AVMs or the reporting of AVM outputs and attendant information. Following a review of relevant available sources, my report recommends clearly specified minimum reporting information from AVM vendors.

My recommendations are summarised in the adjacent table.

Many of the statistical measures are based on AVM **"error"**, which measures the

Table: Recommendations for information to be provided in individual AVM valuation reports →

difference between the AVM Value and the Sale Price:

- $AVM\ Error = AVM\ Value - Sale\ Price$

Various accuracy and uncertainty measures using the AVM **"error"** can be calculated (refer to Table 2 in the report for a description of the statistical definitions of the various measures of AVM accuracy). In Europe, appraiser valuations are typically used in AVM databases in place of sale prices, which is the commonly used benchmark in the United States.

The following brief discussion concentrates on recommendations 1, 2 and 5, being concerned with measures of accuracy.

Recommendation 1

Every AVM generated valuation will have an associated error, which creates uncertainty about the resulting value. The uncertainty surrounding the AVM value can be calculated. Consequently, it is possible to specify a range of values within which the sales price may lie with a given probability. So, the 50% confidence interval and 95% confidence interval are the range of values, in each case, where that eventual sale price is likely to be. The 50% interval tells one there is a 50% chance that the price will be within the given range of values, and the confidence interval is the range of values,

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1: The i) 50% and ii) 95% confidence intervals of the AVM valuation

2: A clear explanation, accompanied by a 'legend', of the 'confidence score' or 'confidence level'

3: Confirmation that comparables have been used in the AVM valuation. If not, what method was used in the AVM valuation?

4: The standard deviation and the skewness of the comparable sales prices, or appraised values, used in the AVM valuation

5: The AVM's overall accuracy, based on the comparable sales sample using:
i) Mean Absolute Error
ii) Median Absolute Error
iii) 'Error Buckets' for the percentage of valuations lying within +/- 5%, +/-10% and +/-20% of the sales price

6: The number and overall geographic distribution of the comparables used in the AVM valuation

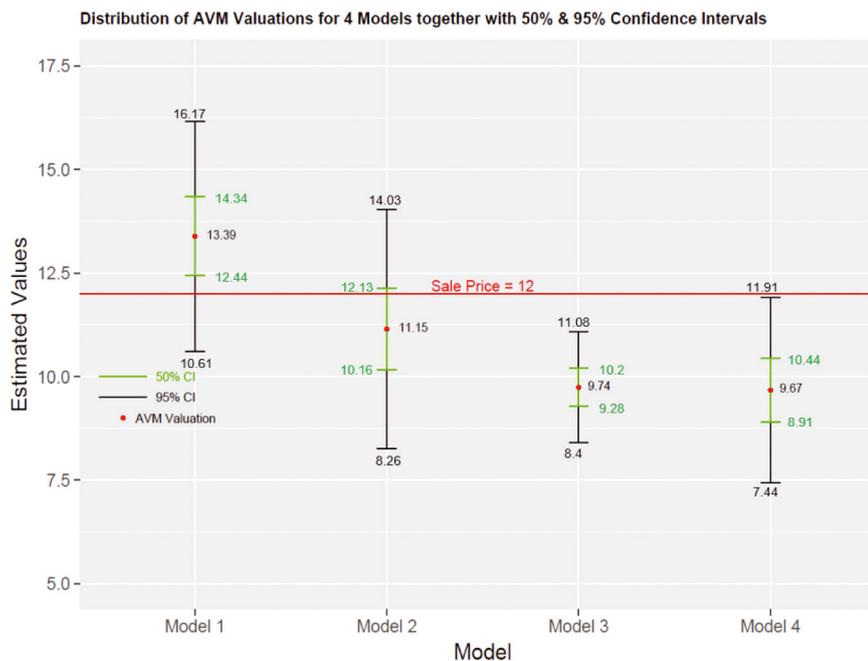
7: The range of comparable sales prices used in the AVM valuation

8: Confirmation of the earliest and the most recent sales dates of the comparables used in the AVM valuation

9: If 'adjusted' comparable sales prices have been used, an explanation of how they were adjusted

10: Confirmation of the Benchmark used in arriving at the figures in 4: and 5: above, sales prices or valuations

Note: 'Comparables' are the properties used in the estimating AVM algorithm.



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in each case, where that eventual sale price is likely to be. The 50% interval tells one there is a 50% chance that the price will be within the given range of values, and the 95% interval that there is a 95% chance that the sale price will be within that range. Clearly, the 50% range of values will be narrower than the 95% range.

“Following a review of relevant available sources, my report recommends clearly specified minimum reporting information from AVM vendors.”

As an example, the illustration above shows the distribution of the 50% and 95% confidence intervals for four models. The actual sale price was €12 million. **Model 2 was the most accurate**, where the sale price fell within the 50% values range. For Model 1 it fell within the 95% range and for Models 3 and 4 it fell outside the 95% range, indicating that these models were very inaccurate.

Recommendation 2

A clear explanation, accompanied by a legend, of the “confidence score” or “confidence level”. “Confidence score” and “confidence level” represent the AVM vendor’s assessment of how accurate, in their view, the AVM valuation is. It provides useful information on how much confidence the AVM vendor has in the resulting valuation figure. Each vendor will have their

own definition, for example, it could be on a scale of 1-9 or some other scale. The basis of the calculations will differ for different AVM vendors. Consequently, Recommendation 2 asks for a clear explanation, together with a legend showing the range of values.

Some vendors will base their definition on **Forecast Standard Deviation (FSD)**. The FSD is a statistical measure which provides the probability that the sale price will fall within a range of the estimated AVM value. That is, the uncertainty surrounding an AVM valuation figure. The lower the FSD, the smaller the range within which the sale price may lie. For example, if the FSD is 10%, there is a 68% (2/3rds) probability that the sale price will fall within +/-10% of the AVM estimate. If the AVM returns an estimate of €100,000, there is a 68% chance that the sale price will lie in the range €90,000 and €110,000.

Recommendation 5

i) Mean Absolute Error

The **Absolute Error** measures the difference between the AVM valuation and the sale price, the AVM Error, of each comparable used, ignoring whether it’s a positive or a negative amount. The Mean Absolute Error takes the average of the individual absolute errors.

ii) Median Absolute Error

This is the middle value which splits the Absolute Errors, such that 50% are less than the middle value and 50% are greater than the middle value. Hence, the Absolute Errors are split into two groups containing an equal number of errors.

iii) The “Error Buckets”

This is a term employed to describe the range in which the AVM valuations fall. For example, the *Zillow* ranges shown in Figure 3 in the report, show the percentage of AVM valuations falling within +/- 5%, +/- 10% and +/- 20% of the sales price. These ranges are commonly referred to as “Error Buckets”.

Conclusion

My recommendations are not about judging the accuracy of AVM models *per se*. They are directed towards making an assessment of the accuracy reported for a specific situation, namely the AVM valued property in question. For different properties, different conclusions about accuracy based on the same model could result. If AVM vendors were to adopt the recommendations, the quality of individual AVM reports would improve. This would not only provide insights into the precision surrounding AVM valuations but would also increase the degree of confidence in AVM valuations.

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I have sought to identify, and recommend, minimum required information which could be provided by AVM vendors and at the same time would be undemanding. That is, the figures fall out of the AVM valuation process and could therefore be routinely reported. Consequently, by identifying the uncertainty surrounding AVM valuations, this will assist the valuer in judging the accuracy of an AVM generated estimate of value.

The current buzzword in data mining/machine learning investment circles is “quantamental”, which captures the essence of *combining* the output from an algorithm and fundamental analysis. Consequently, it may be that the partnership of AVM output and valuer analysis will result in synergies. ●

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The progress of the valuation profession in Bulgaria is charted by Svetla Dermendzhieva



First of all, I would like to thank all valuers who will be reading my article. On behalf of the Management Board of the Chamber of Independent Appraisers in Bulgaria (CIAB) and

personally, I would like to express thanks to the Chairman of the TEGoVA Board of Directors, Mr. Krzysztof Grzesik, for the support that he and his colleagues have offered to our organisation.

I represent the CIAB in accordance with the **Independent Valuers Act (IVA)**. The valuation of sites/assets by independent valuers in Bulgaria dates back to the beginning of the 1990s, therefore valuers in Bulgaria have an established qualification, as well as methodological and professional experience. Indeed, Bulgaria is one of the few EU Member States that has such a law regulating valuation.

CIAB was established in accordance with IVA and is a professional organisation with the following scope of activity:

- regulating the activity of independent valuers in the public interest
- recognition of the professional qualification (through examinations organised by CIAB) of independent valuers (CIAB is the only organisation in Bulgaria that is legally authorised to issue certificates and stamps for those who have acquired a valuation qualification)
- keeping a public register of all independent appraisers and companies of independent appraisers in Bulgaria
- validation of valuation standards in the country
- conducting qualification training
- observing the terms and procedure for exercising the valuation profession and the relationships with clients and users of valuations of sites/assets, in accordance with IVA, including the liability of independent valuers in the case of non-performance of their professional duties and non-compliance with the norms of the Code of Professional Ethics. This carries the right to impose disciplinary sanctions, including withdrawal of the issued certificates, as well as representation of the valuer profession before public authorities and international organisations.

As provided for by the legislation, CIAB has a Management Board, a Supervisory Board and a Professional Ethics Committee. At present, **3775 independent valuers are entered** in the public registry kept by CIAB. Most of them have more than one qualification certificate.

With the adoption of IVA, the legislator responded to the evolving socio-economic conditions and the business and market needs, defining the following valuer competencies in IVA Article 6 – real estate; real cultural values; machinery and equipment; intellectual and industrial property rights and other factual relationships such as concessions, etc; companies and receivables; financial assets and financial institutions; other assets, including works of art, other than movable cultural assets; agricultural land and permanent crops; land plots in forest areas.

“Prior to the formation of the value statement, the valuer must be sufficiently sure of the results of the approaches and methods used, that need to be reliable and substantiated.”

The preparation of valuations of sites/assets by independent valuers in Bulgaria is required for the activities of state and municipal administrations; the judicial system; the National Revenue Agency; stock and commodity markets; banking and financial institutions; insurance institutions; bailiffs; lawyers and notaries; implementing the provisions of the Accountancy Act; when forecasting and carrying out investment processes; other factors and economic areas.

With regard to the need to further harmonise the work of the independent appraisers in Bulgaria on the basis of the current legal framework and the key EU legislation concerning valuation, as well as in the spirit of TEGoVA's policy, the General Meeting of the CIAB adopted the Bulgarian Valuation Standards (BVS) in March 2018 in Shumen, with effect from June 1st 2018, when the standards become binding on all valuation professionals.

BVS, as an instrument, further develops the ability to regulate the work of the independent valuer and reflects the real

needs arising from the different valuation qualifications. In view of the attempts made to introduce unlawful automated object/asset valuation, and taking into account TEGoVA's policy on AVMs and on valuations carried out by independent valuers, the establishment and validation of BVS reflects the **essential role** of the independent valuer and his/her public accountability.

BVS are in harmony with the European Valuation Standards and the International Valuation Standards, at the same time providing for the specifics of the Bulgarian legislation relevant to valuation. BVS also provide considerable attention to the requirements of the content of the valuation report, in which the value statement should be formed after the application of well-founded approaches and methods in the assessment process and is the result of the overall valuation process. Prior to the formation of the value statement, the valuer must be sufficiently sure of the results of the approaches and methods used, that need to be reliable and substantiated. The reported value must be clearly and unequivocally stated, together with a confirmation that a sufficiently in-depth study has been carried out. In May 2018, an agreement was signed between CIAB and TEGoVA by which CIAB was authorised to award the REV valuer status to independent valuers, which is of **utmost importance** to foreign investors and commercial banks.

The CIAB Management Board has demonstrated good practice and experience in organising and conducting qualification events, national conferences, courses, seminars and discussions, aiming at extending the attendance to valuers from other countries, from TEGoVA member organisations. The CIAB Management Board has established a Methodology and Qualification Council, having signed framework contracts with leading universities in the country, for cooperation in the field of qualification activities and preparation of professional materials for conducting them. The Board will be happy to cooperate with other TEGoVA member organisations as appropriate. ●

Svetla Dermendzhieva is Chairman of the Management Board of the Chamber of Independent Appraisers of Bulgaria (CIAB).

Krzysztof Grzesik outlines the role of the qualified valuer in the new European context



Most readers of *European Valuer* know that TEGoVA is the European valuation standards and qualifications setter, but not everyone is conscious that its

work takes place in the context of the Europeanisation of real estate and the valuation profession. As a result, even though the work of our members remains eminently local, the regulatory and professional constraints that we operate under have become essentially European. TEGoVA's role is to be a reference and a guide for EU legislators and authorities, setting standards and qualifications that meet the needs of the Union's markets and regulators to the benefit of EU citizens and valuation professionals.

Some readers might ask "Why all this 'Europe' for an activity which is so clearly local?" Four reasons:

- the Europeanisation of real estate investment and rental markets
- EU power over major policy areas targeting or impacting real estate
- the shift of control over financial and real estate markets from the national to the European level in the wake of the banking crisis
- the use of Automated Valuation Models (AVMs) for "valuer-free" valuation reports for individual properties combined with banks' pressure for ever-shorter, "tick-box" valuation reports, constitute a challenge which European regulators and valuers need to face together.

Each of these events was a challenge and an opportunity for valuers, and in each case TEGoVA became a catalyst for translating EU policy into valuation practice on the ground, adapting its standards and creating qualifications for the new European markets.

1. The Europeanisation of real estate investment and rental markets

Not long ago, Europe was a collection of purely national property markets – the scale of cross-border investment was near zero. The right to invest in real estate without obstacle is founded on free movement of capital and although that was one of the Four Freedoms (along with free movement of goods, services and people) enshrined in the Treaty of Rome, it did not become

operational until secondary legislation was passed in 1988. Even then, no-one in the property industry took advantage of it until the mid-nineties, but from then on, cross-border property investment grew exponentially, from €0.02 billion in 1995 to €23.10 billion in 2016 – a total, cumulative stock of €273 billion in the second quarter of 2017.

In the early days, cross-border investment flows were largely office and retail with a dab of logistic and hotel, but today they mirror the new taste of institutional investors for residential, student housing and medicalised, age-friendly property.

TEGoVA has met this challenge with both its standards and its qualifications:

- in our European Valuation Standards (EVS) a specific European Valuation Guidance Note (EVGN 6) on Cross-border Valuation lays down the qualifications, professional experience and market knowledge, terms of engagement, compliance with local rules and insurance that valuers need to take into account when operating cross-border
- but far more potent for most valuers is the prospect of European clients on the home ground. The ambitions and the reach of property investors may now be pan-European, but their knowledge and skill-sets remain local. Nowhere is proper valuation advice more necessary than on a new market in a different culture. TEGoVA has acted to provide pan-European property investors with a recognisable pan-European valuation elite so that wherever they are, investors know who to turn to. This was the rationale for TEGoVA's Recognised European Valuer (REV) designation, now awarded to 2871 valuers and later its TEGoVA Residential Valuer (TRV) designation, currently awarded to 634 valuers. Now this type of client is no longer the special preserve of the international anglosaxon property advisory firms. REV and TRV have turned local firms into players and are increasingly making them the valuers of choice of the major pan-European banks with trickle-down to national banks.

2. EU power over major policy areas targeting or impacting real estate

Not long ago, the European Economic Community lived down to its name - it was

about facilitating commerce and little else. Since then, in successive Treaties, Europeans have given their collective self the power to regulate global phenomena that require collective solutions, the most glaring being pollution and global warming. That's why power to regulate environmental and energy policy has shifted to the EU, leading to legislation that impacts and even targets real estate and valuation.

TEGoVA has adapted EVS to this new reality:

- EVGN 8 on Property Valuation and Energy Efficiency helps valuers to integrate the requirements of the Energy Performance of Buildings Directive into their practice. Most significantly, it alerts the valuer to the need to recognise what degree of renovation of a building is "major" enough to trigger the Directive's energy efficiency renovation requirements. If a building cannot be put on the market without a major renovation, the costs of energy efficiency renovation need to be computed into value. EVS Guidance also helps the valuer to check whether an energy performance certificate is required, its degree of accuracy and corresponding capacity to increase or depress value
- it is important for qualified valuers, and especially REV and TRV, to have a basic understanding of the fact that EU legislation impacts property valuation so that they know the national real estate rules that are grounded in EU law and therefore cannot be changed by local and national legislators. For this purpose, EVS contains an entire Part 3 on European Union Legislation and Property Valuation that describes the valuation impacts of EU banking, accounting, state aid, VAT, health and safety, energy, environment and Common Agricultural Policy rules.

3. The shift of control over financial and real estate markets from the national to the European level in the wake of the financial crisis

Europe is built on crisis. In the decades before Lehman went down, the EU legislated to facilitate pan-European banking business by freeing up capital movement and harmonising or mutually recognising national banking legislation. It did little to control the solidity of banks because that

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was a prerogative national governments were not prepared to relinquish. As of 2008, that changed with remarkable speed as European leaders scrambled to save the euro. The European authorities came to realise that valuation of immovable property is a systemic activity which can either shore up financial and real estate markets if it is properly and independently done, or be an accelerator of market failure if it isn't. The EU began to regulate valuation directly:

- the Mortgage Credit Directive required that member states ensure that reliable valuation standards be used within their territory and that valuers be professionally competent and independent from the credit underwriting process, providing valuations that are impartial, objective and properly documented
- in its Asset Quality Review Manual for banks, the European Central Bank drafted a complete chapter on collateral and real estate valuation, fifteen pages of instructions on how valuations of banks' collateral are to be carried out
- the European Commission has just tabled a Proposal for a Directive on Covered Bonds, laying down that they must be collateralised by high quality assets whose market value or mortgage lending value can be determined and that for this purpose member states must have proper rules on valuation of assets.

The European authorities have put TEGoVA and EVS at the heart of their regulation of valuation:

- the Mortgage Credit Directive names TEGoVA and EVS as internationally recognised valuation standards that member states should take into account when ensuring that reliable valuation standards are in place
- the European Central Bank in its Asset Quality Review Manual for the updating of banks' real estate collateral values gives EVS primacy over all other standards.

4. The use of AVMs for "valuer-free" valuation reports for individual properties combined with banks' pressure for ever-shorter, "tick-box" valuation reports, constitute a challenge which European regulators and valuers need to face together

In certain countries, political and consumer ignorance have enabled the use of "valuer-free" AVMs for valuation of individual properties. It is a threat, not just to the valuation profession, but first and foremost to consumers and to the stability

of financial markets. However, both the Mortgage Credit Directive and the Capital Requirements Regulation clearly ring-fence the valuation or even the revaluation of individual properties from "valuer-free" AVM valuations.

TEGoVA is working with the European Commission to ensure that it enforces EU law by investigating and prosecuting infringements by member states:

- TEGoVA's lawyers have analysed the relationship between EU law and AVM use and highlighted the infringements to the Law in a memorandum for the Commission
- leading academic, Professor George Matysiak, produced a report for TEGoVA on the accuracy of AVMs, revealing
 - the opacity of European AVM manufacturers who refuse to reveal any information on the nature and quality of their inputs
 - the avowed inaccuracy of U.S. AVMs concerning individual properties, falling over 20% off of sales price as much as 63% of the time in certain areas
- getting our own house in order with a new European Valuation Standard 6 on AVMs and a European Valuation Guidance Note 11 on The Valuer's Use of Statistical Tools. Thanks to EVS 6, the European Union finally has a Standard laying down that: *"AVMs cannot be used to produce a valuation report that complies with EVS independently of a valuation process founded, inter alia, on inspection of the property by the valuer and the application of valuation judgment by the valuer. Where used, an AVM is never more than a tool contributing to the valuer's estimation of value, for which he remains responsible."*
- Professor Matysiak has since produced guidelines on "Assessing the Accuracy of Individual Property Values Estimated by Automated Valuation Models" providing guidelines to practicing valuers on what they need to know in order to assess the usefulness of any given AVM as a contributor to their overall judgment on value. The report is summarized in this issue of *European Valuer*.

Pressure from banks for ever shorter, ever dumber "tick-box" valuation reports acts as a vice in combination with valuer-free use of AVMs. Indeed, the production of simplistic valuation reports by machines may be part of bank strategy to eliminate all obstacles to instantaneous electronic mortgage credit request and authorisation.

That's why TEGoVA's European Valuation Standards Board is close to completion of a template of an EVS-compliant valuation report containing:

- methodology and assumptions
- **the selection criteria for relevant comparables**, including:
 - justification of the criteria chosen for selection of comparables (market area, size, type) with clear links to the property's defined market and competitive area
 - judgement on the choice of criteria (criteria's respective and relevant importance and impact on value of property).
- **the analysis of the chosen comparables and the valuation:**
 - list of comparables chosen
 - justification and judgment of each selection
 - description of each comparable
 - adjustment to the property including appropriate comment reflecting the logic and reasoning for the adjustments provided
 - calculation and adequately supported opinion of market value.

It is fair to state that all TEGoVA activity and resources serve a single goal:

- making sure that EU regulators recognise the role of the qualified valuer and enforce that recognition on the member states
 - ensuring that the valuation profession and in the first instance the European valuation élite of REV's and TRV's conduct their practice in a manner that:
 - protects consumers and property markets
 - and ensures the continued relevance of the profession
- ... thanks to the exercise of analytical judgment founded on professional experience and qualifications. ●

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