# **Automated Valuation Model**



An innovative tool for Market Intelligence and Risk Management

### June 2015



RICS Regulated by RICS

### **EPS** - Introduction

Established presence in SEE: Greece (since 2000)
 & Romania, Bulgaria and Serbia (since 2005)

✓ Average Turnover: €11Million per annum in the region,

✓ Highly-qualified personnel: experienced and certified from international professional bodies such as ANEVAR, RICS and TEGoVa and also ISO
 9001 & EN ISO 14001 certified,

✓ More than 200 employees and 500 collaborators in the region,

#### Research & Development:

- Since 2010 Residential Indices and Forecast presented on a quarterly basis,
- Starting with 2014, **Residential AVM and Commercial Indices** have been added to the tools used,
- By utilizing a broad range of resources (valuations, market reports, indices, forecasts, questionnaires, in-house expertise), a fully functional Risk Management System for Real Estate Assets has been developed.





# **EPS'** Services Chart

**Real Estate Advisory** 



**Property Services** 

# The Romanian Real Estate Market I

- One of the most important and fast-developing markets in the SEE.
- Clear signs of stability, both economical and political, compared with all the surrounding countries: Russia, Ukraine, Turkey, Hungary, Greece, etc.
- High investments volume in 2014, similar to more mature markets like the Czech Republic and Poland.
- Favourable geopolitical context which encourages further investments and the entrance of new investment funds on the market.
- Higher yields compared to more saturated markets in the region.



## The Romanian Real Estate Market II

- In a similar manner with behavior of more mature markets, following the initial bubble period of 5 years, a stabilization can be noticed for the last 4-5 years.
- Using Indexation, Forecasting and due to the positive macroeconomic fundamentals (disposable income, unemployment, inflation, interest rates, etc.), the Romanian market exhibits evidences of a solid and healthy property market.



**Property Services** 

Eurobank

## What is an AVM

"A computer model to assist in the science of valuation which takes proper and balanced account of increased availability of data and the use of mathematical models to estimate the value of a property or for a mass appraisal of millions of properties. "(Automated Valuation Models, RICS information paper, 2014).





## The EPS AVM

EPS AVM provides a property's current Market Price Estimate using comparable data and sophisticated statistical modeling (Hedonic Regressions) based on: **Comparable properties** – some of the variables taken into account are: type of property, number of bedrooms, parking, land size etc.

**Geography** - analysis from the local neighborhood right through to National level.

**Recorded sales** - comprehensive database of records dating from 2005.

**Confidence indicator** - cross-checking with the current market conditions.



## Legislative aspects of an AVM

### Romania

- ✓ EPS AVM fully meets ANEVAR's requirements, covering every representative point of the relevant Guideline October 2010
- Internationally (UK):
  - The Financial Service Authority provides general guidance in its Prudential sourcebook for Banks, Building Societies and Investment Firms (known as BIPRU). Rule 3.4.66 sets out the method for monitoring property values, noting that it allows 'statistical methods to be used to monitor the value of the property and to identify property that needs revaluation'.
- AVM is bound to limitations in usage in line with international practice
- Explicit terms and conditions are provided on the EPS website



# **Development of EPS AVM**

The overall construction and assessment of the Romanian EPS AVM has been established according to ANEVAR's guidelines. EPS followed the hereinafter stages:

- ✓ Stage 1: Sampling Procedures
- ✓ Stage 2: Sample Size
- Stage 3: Data Management and Data Quality Analysis
- ✓ Stage 4: Stratification
- Stage 5: Determining Model Specifications
- ✓ Stage 6: Model Calibration
- Stage 7: Model Testing for Quality
- ✓ Stage 8: Model Validation
- ✓ Stage 9: Model Application
- Stage 10: Periodic Check of Model Accuracy



# Structure of EPS AVM

- Hedonic Regression Model:
  - Is in the heart of AVM and Index developments
  - ✓ Ln(V<sub>6li</sub>/V<sub>8li</sub>) = Σb<sub>1lj</sub>V<sub>ji</sub> + Σb<sub>2j</sub>L<sub>ji</sub> + Σb<sub>3j</sub>a<sub>ji</sub> + e<sub>li</sub>
  - Provides the optimum coefficients for each property characteristics, useful in developing a successful AVM mathematical process
- Market forecasting (the present, from indices describing the past)
  - EPS has developed residential forecasting for every region and major city.
- Market Reports
  - Covering Bucharest and all counties.
  - Presenting the current sale price and rent ranges for each geographical area.
- Specialized Questionnaires from Market Experts



# **AVM Inspection Procedures**

EPS' market data derive from an extensive list of sources (e.g. Market Reports, Questionnaires, Bancpost etc.). The quality of the data is checked on a daily basis on a four-phase procedure.





### Phase 2: Uniformity and Reliability of Data

According to the **Standards** on Automated Valuation Models (AVMs), approved by the **International Association of Assessing Officers**, the Ratio Study checks the performance and uniformity of data. The Romanian homogeneity results are outstanding:

Ratio Study Performance Standard	ls
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Area Characteristics	Measure of Tendency	COD	PRD
Newer, more homogeneous areas	0.9-1.10	10.0 or less	0.98-1.03
Older, hetergeneous areas	0.9-1.10	15.0 or less	0.98-1.03
Rural residential and seasonal	0.9-1.10	20.0 or less	0.98-1.03

Ratio Study Results on Bucharest				
Measure of Tendency	1.01			
Coefficient of Dispersion (COD)	10.77			
Price Related Differential (PRD)	1.01			



✓ Data Assessment is a continuous process, carried out by high quality in-house personnel during and after each phase in order to ensure the reliability of the end results.

External Valuations are also reviewed internally to eliminate appraisal bias and improve quality when necessary.



## Phase 3: Real-Time AVM Filter

### **AVM Deviation Chart**

✓ Deviations over the confidence ranges (outliers) are reappraised and justified case-by-case .

✓ Outliers are trimmed after filters have been applied and justification has been given.

✓ Approximately 64% of appraisals with deviation in the range [-10%,10%]

✓ Approximately 91% of appraisals with deviation in the range [-20%,20%]



## Phase 4: 2<sup>nd</sup> Review & Justification

#### Phase 4: Outliers Justification Example

ALERT System for Residential New Loans / Outliers Justification							
Case Number	Property type	County	Approval Date	Final Market Value (FMV)	Deviation % (AVM Value vs F.M.V.)	Deviation Justification	Additional Senior Reviewer Assigned
638675	Apartment	Ialomita (IL)	5/6/2015	26,200	-20.61%	The property is located in the center area of the city, on a main road, in a building from 1989 with a very good condition. The apartments located in this area are sold at average prices ranging 520-550 euros / sqm, so the reported value is correct.	XXX



# Verification Study Results

- The verification study of the AVM demonstrated (2015 results):
  - ✓ Average deviation around 1.8%
  - ✓ 8.4% MAD for the urban areas
  - ✓ An overall MAD of 10% at national level
  - ✓ About 91% of appraisals with deviation
    less than 20%



**AVM Cumulative Deviation Chart** 



**Property Services** 

# Product Highlights

•Romanian Know-How: developed in Romania and custom-built specifically for local property market conditions.

• Follows the guidelines of ANEVAR and RICS

•Wealth of data: EPS draws upon data from a wide variety of sources, including: certified appraisals, sales, market reports and questionnaires

•Quality Controls: processes certified by ISO 9001:2008, daily data inspection, verification study carried out on a quarterly basis by independent valuers

• Market beating accuracy: MAD between 7% and 10% for the urban areas. An overall MAD of 10% at national level

• Instant turnaround: speed up loan evaluation process by user-friendly online service

• Cost effective: cheaper alternative for low- to medium-risk assessments



# **AVM Applications**





# **AVM Applications cont.**

- By lenders and their associates for the loan origination process or subsequent revaluation for credit decision and capital adequacy purposes
- In auditing of valuations
- For local taxation purposes both for mass appraisal and for estimations at individual level
- For the identification of fraudulent activity
- For the provision of valuation estimates for large scale asset valuations.
- For cost/benefit analyses for potential public expenditure or estimating compensation payments to owners, for example, for flood relief schemes, road schemes or airport expansion etc.
- For lending (capital adequacy purposes)



## The AVM Platform

### **Retail user**: A robust and easy to use internet based platform.

- Bilingual, tablet compatible, self explanatory
- Can choose between simple form and full valuation report
- No need to open an account (but possible)

#### Professional user - intermediate use

- Same as retail platform
- Appropriate for repeated use of small number of valuations

#### **Professional/Institutional use**

- Bulk processing of valuations (up to millions in one go)
- Aid for pre-valuation checking, filtering and correction of data

Residential Automated Va	luation System	Eurobank
		Property difference
Creation Date : 04/12/2014		
Subject Valuation		
Istimated Value : €51,723		
20% confidence of independent certified valuation falling within range of : €€51,723 to € €51,723	Cales Autel Visicu 😨 Cales Aurel VI	
Price/sq.m.: 6394	51	rada Avidon
	Creatie Strategy	and the second second
	HS-S-C	Map stata 62.01.4 Goog a
Comparables	Evaluated property characteristic	51
A 2 bedrooms Apartment, built in 1988 at a distance of 0.015 k.m.	Coordinate East	21.28453
was estimated at 36,400 Euro, as	Coordinate North	46.20117
of today.	Administrative sector	Arad
	Population	Medium size city,Residents 100-200k
A 2 bedrooms Apartment, built in	Type of residence	Apartment
1973 at a distance of 0.015 k.m. was estimated at 38,600 Euro, as	Usable residence area sq.m	87
of today.	Land area s.q.m.(nouses only)	0
	Year of construction	1998
A 3 bedrooms Apartment, built in	Number of floors of the building	10
1987 at a distance of 0.004 k.m.	Ploor of the property	0
was estimated at 56,600 Euro, as of today.	Tedeser parking available	10
	Time of heating	NO Induced heating
	Type or nearing	Independent nearing
A 2 bedrooms Apartment, built in 1973 at a distance of 0.037 k.m.	Rumber of hadrowns	
was estimated at 37,000 Euro, as	Provinity to touristic hotspot	1 VEC
of today.	Finance to counse. notapet	NO
	Outstanding views	VEC
	Discissmer Privace Eurobanis Property Services does not collect pr determination or purpose of the contenuination with the profession, etc.; These personal data are provided for Legalation. New New New New New New York of Sme, to role to request and receive, without delay and processing advance with the negleter. Terms and Candit	enonal information unless it is essential for the e-user (e.g. name, surtaine, address, e-mail, phote, the Company with the content of the period concentration concentration of the period of the period of the period of the concentration of the period of the period of the tim a comprehension and clear way, the purpose of the tim a 2014 (EP

Beta version for AVM website

Eurobank