

**WHITE PAPER**



# **AVM Valuation and Forecasting Technologies: Capital Markets**

**The Use of AVM Technology in Residential  
Real Estate Investment Platforms**

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The deflation of the U.S. residential housing market and its ongoing inability to establish a broad stasis has resulted in a market-wide introspection on the effectiveness of existing analytics and, consequently, the logistics of making future investments. In retrospect, the widespread losses experienced in whole-loan and securitized portfolios points to a common flaw of poor data compounded by unsubstantiated assumptions, resulting in erroneous projections. Given these errors, it is not surprising that many investors remain on the sidelines questioning their capacity to analyze risks associated with future investments, much less the efficacy of those investments.

This is the first of three white papers focusing on automated valuation modeling (AVM) technology and its various applications to this market sector.

This particular paper will focus on how AVM technology can provide critical information necessary to improve portfolio and risk management analytics, as well as optimize capital investment allocations. It will focus on AVM technology in residential real estate platforms and is divided into two sections:

#### **Background**

Review of what the market standard was in terms of data availability and analysis prior to the crisis, and the directives to address analytics and risk management post-crisis.

#### **AVM Technology**

An introduction to what AVM modeling can provide and the elements required to construct reliable valuations and forecasts.

The second paper will focus on applications of AVM technology for whole-loan and REO investors. The final paper will introduce AVM technology as a tool for portfolio optimization and risk management for the non-agency residential mortgage backed securities (RMBS) investors.

### **Background**

The swift recession of the U.S. housing market, which precipitated the effective collapse of the RMBS market, has had several significant consequences for U.S. residential mortgage issuance. Concurrent with effectively forcing the U.S. government, through its government-sponsored entity (GSE) proxies, to underwrite approximately 95 percent of mortgages currently issued, the events over the past three years triggered wide-ranging reviews over risk management and portfolio management analytical practices. Particular attention has been paid to data transparency and granularity, or more precisely the lack thereof, as investors are coming to realize that broad market indices do not provide sufficient information to make decisions regarding capital deployment or monitor portfolios for risk management purposes.

These informational and analytical shortcomings have been highlighted in the past, but are clearly the focus of regulators today. The Basel Committee on Banking Supervision's decisions regarding the measurement of credit risk-based capital highlighted the need for a thorough understanding of the underlying risks associated with mortgage assets, whether they are securitized or held as whole-loans. Likewise, the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) underscores the importance of heightened transparency and improved performance reporting from issuers, servicers and trustees, as well as more sophisticated evaluation and risk management analytics from investors. (Dodd-Frank Sec. 404, 941).<sup>1</sup>

In response to the above, many market participants have attempted to implement more rigorous analytics by either developing in-house platforms or outsourcing analysis to independent advisory firms. Whether the platforms are in-house or outsourced, regardless of whether they use proprietary or third-party analytics, all efforts seek to identify, quantify and incorporate variables such as unemployment, interest rates, housing inventories, etc. Correlations are stressed to capture "tail" risks, although unlikely to occur, which would exceed credit enhancements either structured into securities (i.e., subordinated tranches) or inherent overcollateralization in the mortgages themselves (e.g., loan to values (LTV) s of 80 percent or less). By stressing these risks and running simulations on the portfolios, risk managers seek to estimate probability of default (PD), loss given default (LGD) and exposure at default (ED). These are the building blocks of the value at risk (VAR) model<sup>2</sup>

It is surprising that investors still lack fundamental information regarding the core risk-drivers within the real estate portfolios being analyzed, given the turbulent market of the past three years; the plethora of regulatory directives relating to transparency and analysis; and the substantial time and resources dedicated by those investors to improving their portfolio and risk management applications.

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<sup>1</sup>The focus of this discussion is risk and portfolio management for capital markets investors. Issuers required to retain an economic interest in the securitized mortgages, per new regulations, clearly have similar needs, both for prudent risk management and regulatory capital considerations. (Dodd-Frank Sec. 941; FAS Amendment to FIN 46R).

<sup>2</sup> Although all of the foregoing pertains to non-agency RMBS, the risk-drivers cited hold true for RMBS "derivatives," including ABS CDOs and synthetic RMBS ("CDS RMBS"). Indeed, the importance of this information is underscored by reporting vagaries associated with synthetic RMBS (Reg AB, IIIA2b), and the lack of loan-level information associated with CDO reporting. Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Pillar I- "Basel II").

Specifically, basic credit questions often remain unanswered, including:

- What are the values of the subject properties backing the mortgages, both at issuance and on an ongoing basis?
- What is the LTV of the property, at issuance and on an ongoing basis?
- What is the CLTV of the property, at issuance and on an ongoing basis?
- If distressed (REO), what is the market value of the property and what is the median discount relative to the local market?
- What is the projected value of the property over the next 6, 12, 18 and 24 months?
- Current performance notwithstanding, are there any other aspects of the subject property that would give rise to its default; i.e., are there hidden “at-risk” properties in the pool?
- What is the credit profile of the borrower, both at issue and on an ongoing basis?

AVMs provide the critical information mentioned above and are the building-blocks to constructing thorough portfolio management tools. Through AVMs, investors gain essential property-specific information such as current property valuations, which can then be incorporated into broader metrics including current leverage measurements (LTV/CLTV), projected collateral values, and home-price index trends.

### **AVM Technology**

Although AVMs have been used by mortgage originators and servicers for years their use by the capital markets has typically been indirect (e.g. estimating the value of a portfolio off of a broad index, such as S&P/Case-Shiller HPI). However, AVMs are an ideal application for evaluating both whole-loan and REO portfolios, both by optimizing capital investments, as well as materially improving risk management platforms.

As the name suggests, AVMs provide an estimated property value based on the combination of mathematical models and data. However the impact of AVM methodologies, in terms of potential portfolio profitability and capital preservation, the sophistication of the AVM provider should be thoroughly evaluated. This evaluation should focus on three general areas:

1. Data Integrity
2. Analytics Methodologies
3. Property Valuation

## 1. Data Integrity

What is the veracity of the property-level data used and evaluated by the AVM? A critical element of any property valuation effort is accuracy and timeliness. Relying on recent sales statistics alone fails to capture nuances that could materially impact the value of a property. For example, recent value-enhancing renovations, such as kitchen or bathroom renovations, will be recorded in the County Assessor's and County Recorder's Offices. Capturing and incorporating this information into AVM models will clearly impact the value of the property between the buy/sell cycles.

## 2. Analytic Methodologies:

The investor must also determine whether the AVM provider's analytics are sufficiently sophisticated to provide an accurate valuation with a given market. Property-level valuations are directly dependent on the sophistication of the AVM provider's models. Hence, the provider should have a variety of methodologies to account for the many variables in property valuation. Examples include:

- Neural Network
- Linear and Non-Linear Regression
- Econometric & Statistical Non-Regression-Based Time Trend Analyses
- Data Mining
- Statistical Discrete and Statistical Fuzzy Clustering
- Probabilistic
- Bayesian Theory

Not surprisingly, these models typically generate a range of values; the degree of dispersion of these results around a median reflects the degree of accuracy – and level of confidence – the AVM provider should place on the result.

### **REO Valuations**

Foreclosed properties require additional techniques beyond what is normally applied for performing real estate. Supplementary analytics must incorporate variables including the condition of the property, time since foreclosure, inventory of foreclosed properties in the immediate area, etc. Valuations are dependent on these unknowns (i.e. indicating a valuation depending upon varied levels of property condition.). Likewise, the severity of an REO discount, reflected in the median discount to market, should be indicated.

### **Collateral and Market Risk Analysis**

A major benefit derived from sophisticated analytics is the ability to identify those properties that pose *likely* risks – despite the fact that their specific mortgages may be current and nothing about the property itself may be noteworthy. For example, a previously foreclosed property, or a property located within a neighborhood with high foreclosure rates, has a statistically higher risk of delinquency and default than properties lacking these characteristics. The above information would indicate higher early payment default (EPD) or “strategic default” risks. Likewise higher LTVs and CLTVs may suggest mortgage fraud and overvaluation risks. However, false positives can generate losses due to actions taken where no risks exist, so the provider’s accuracy is essential in this exercise.

### **3. Valuation and Forecasting**

With new regulations, investors (including originators who plan on securitizing their portfolios) will need to accurately quantify the degree of economic interest retained in the mortgage investments.<sup>3</sup> To the extent that projected property valuations provide an indication of ultimate recovery on defaulted mortgages, the data and analytics used in property valuation should also enable the AVM firm to provide projected valuations.

A distinction is made between forecasts provided by broad indices: At best, these average away the nuances surrounding individual properties and local regions. At worst, they provide misleading and inaccurate estimates for calculations based on both zip-code level and more granular property-level valuations. Further, investors require precision and consistency when making investment or risk management decisions. A forecast of “up” or “down” is insufficient for relative value or VAR calculations. Rather, precise estimates of price movement over an actionable time period of six to 24 months provides the data needed for capital deployment and positioning.

*The value of a zip-code level forecast is best-illustrated in an analysis of the CBSA-level forecast for the NY Metropolitan Area, featured in the Appendix.*

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<sup>3</sup> Dodd-Frank Sec. 941.

## Conclusion

As illustrated, AVM technology can be an integral tool for optimizing portfolio investments and mitigating risks associated with residential properties. Specifically, AVMs can provide critical information on:

- Current address-level values of both performing and REO properties.
- Projected property-level values of up to 24 months.
- Zip-code level forecasts for both hedging and portfolio optimization purposes.
- Current Loan-to-Value and Combined Loan-to-Value data for evaluating collateralization and, ultimately, recovery (and loss) given default.
- Properties that are at a higher risk of delinquency/default due to subject-specific and/or market-specific issues.
- Historical zip-code level price trends.

With this information, investors can better deploy and protect capital while constructing and managing their residential property portfolios.

*This is the first white paper in a series of three that discusses the use of AVM technologies in the capital markets. The second paper will focus on applications of AVM technology for whole-loan and REO investors. The final paper will introduce AVM technology as a risk mitigation tool for RMBS investors.*

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However, upon more granular analysis, there is a 13 percent spread between price movements at the county level within the N.Y. Metropolitan CBSA. An upper-price tier condominium in midtown Manhattan appreciated five percent over the 12-month period, whereas a middle-tier condominium in Ocean County, N.J. depreciated eight percent over the period. Finally, an upper-price tier SFR in Morris County, N.J. remained essentially flat over the period, appreciating approximately one percent.

As illustrated, managers seeking to identify and manage the market volatility within a real-estate backed portfolio inadvertently conceal alpha through the averaging-effects of CBSA forecasts.