

Technical White Paper

*i*MVI™

Intelligent Market Volatility Index

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IntelliReal™
REAL INTELLIGENCE

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Introduction

The Intelligent Market Volatility Index (iMVI) is an IntelliReal proprietary micro-resolution median house price index that offers significant advantages over the current industry standard, Office of Federal Housing Enterprise Oversight (OFHEO) Home Price Index (HPI), and is better suited for a number of applications that monitor a given loan's volatility including tracking loan-to-value (LTV) ratios of individual mortgages.

Uses and benefits over traditional solutions

Industry standard OFHEO HPI provides a broad measurement of market movement

Prior to the iMVI, the market relied upon the OFHEO HPI as a broad measure of the movement of single-family house values within the US; as a whole, within regions of the country, in individual states and at the Metropolitan Statistical Area (MSA) level. The HPI was developed in 1992 to provide a risk-based capital stress test to account for changes in the LTV ratios of mortgages held or guaranteed by Fannie Mae or Freddie Mac to measure the capital adequacy.

The HPI index includes only transactions involving conforming, conventional mortgages purchased or securitized by Fannie Mae or Freddie Mac. Conforming refers to a mortgage that both meets the underwriting guidelines of Fannie Mae or Freddie Mac and that does not exceed the conforming loan limit, a figure linked to an index published by the Federal Housing Finance Board. The conforming mortgage loan limit for single-family homes in 2007 is \$417,000. Conventional means that the mortgages are neither insured nor guaranteed by the FHA, VA, or other federal government entities. Mortgages on properties financed by government-insured loans, such as FHA or VA mortgages, are excluded from the OFHEO HPI, as are properties with mortgages whose principal amount exceeds the conforming loan limit. Mortgage transactions on condominiums, cooperatives, multi-unit properties, and planned unit developments are excluded and refinancing mortgages are included using a subset of residential sales as the basis for the HPI.

The iMVI uses “arms length” and “non-conforming” sales from public and market data to more accurately reflect values and risk at the loan level

The iMVI uses the entire population of “arms length” sales including condo sales, separated by type, to establish unique indexes by property type. And, unlike the HPI, the iMVI includes “non-conforming” and conventional sales capturing slower market adjustments not reflected in the OFHEO index and excludes refinancing mortgages. Since the iMVI is partly based upon an ever increasing number of closed live data feeds (where authorized), indications of short term trends and volatility can be observed in near real time. The HPI reports on longer term trends masking short term fluctuations.

The iMVI is comprised of more than 15,000 individual indices segmented on dimensions of property type and geography with near national coverage for areas as small as a neighborhood, but never larger than a county. Whereas the HPI, as of their February 26, 2008, release, provides trending information for 352 Metropolitan Statistical Areas and 29 Metropolitan Statistical Area Divisions. These areas cover 1,094 of 3,294 county or county equivalent entities, do not track individual property types and are for areas no smaller than a single county, but typically many counties.

The iMVI is based upon all arms length transactions by property type with refinance transactions excluded. The HPI is based upon only repeat, conforming, conventional mortgages on single-family dwellings purchased or securitized by Fannie Mae or Freddie Mac including refinance transactions and excluding homes that have been mortgaged only once.

Technology

iSegment™ Methodology

The iMVI uses a proprietary segmentation technique creating Intelligent Segments (iSegments). Each iSegment is composed of demographically, economically, and socially similar micro-geographies exhibiting similar housing characteristics, located nearby one another and within the same county.

The iSegmentation process for each property type:

- The segmentation process begins by defining the micro-geographies that cover the entire county.
- Each micro-geography is characterized by 400 scaled and weighted demographic, social, economic, location, and housing characteristic dimensions.
- The distance between all unique pairs of geographies is calculated as a measure of similarity.
- All of the properties within all of the geographies are then assigned to an iSegment.

This process is continued until the entire subject county is assigned to iSegments for a particular property type. The process is then repeated for the same county with the next property type until the entire county geography is assigned to an iSegment for its particular property type. This process is repeated for every county. When all iSegments are constructed, a quarterly median house price index, iMVI, is calculated for each iSegment.

iMVI Features

- National coverage.
- Based upon actual prices of completed arms length transactions and non-conforming sales by property type.
- Immunity to over-aggregation with each index based upon small closely spaced homogeneous geographic areas.
- Available in an ad hoc or batch process and reported in a graphical or numeric format.
- Flexibility to modify index start date and time.
- Property price tiers with each segment containing a limited range of property price tiers.
- Quarterly and annual resolution.

- Seasonal price variations and other short term features remain with the data allowing the user to filter or smooth according to the requirements of the project supporting the idea that “one person’s noise is another person’s signal”.

Data types, sources and aggregation

- Based upon all and only arms length transactions.
- Includes non-conforming mortgages.
- Uses all property types individually.
- Uses closed normalized and non-duplicated tax transactions.

Background

There is a compelling need to accurately track changes in mortgage (LTV) by means of an index that tracks changes in house prices. The current industry standard index of house prices is published quarterly by the Office of Federal Housing Enterprise Oversight (OFHEO) House Price Index (HPI) is limited to Core Based Statistical Areas (CBSA) or Metropolitan Divisions (MD) as defined from time to time by the Office of Management of Budget. The methodology used for generating the HPI is based on a modified version of the weighted-repeat sales (WRS) methodology proposed by Case and Shiller (1989).

Disadvantages of tracking LTV on any particular mortgage with HPI.

- Insufficient geographic resolution: CBSAs or MSADs used by OFHEO to generate the HPI are never smaller than an entire county and frequently much larger with the largest including 28 counties in the Atlanta-Sandy Springs-Marietta, GA, CBSA. In fact, two-thirds of all the geographies used are comprised of two or more entire counties and the average of component counties is just less than three (2.87). Such large geographical areas are composed of many component or sub-areas that typically exhibit varying price change patterns that can be very different from the HPI. This means that the HPI for the geographical area may be inappropriate for the micro market area in which a particular mortgaged property is located.
- Insufficient coverage of important property types: The HPI tracks only single-family, single-unit, detached properties, excluding condominiums, cooperatives, and planned unit developments (PUDs). There is a large percentage of mortgage activity on residential properties that are not tracked. This means that the HPI might be inappropriate to the type of property that is mortgaged.
- Both resale and refinancing transaction types are included in the HPI: Refinance is usually not valued consistently with resale transactions because there is no arms length or free market exchange of the subject property. This tends to distort the overall index, especially when refinancing rates are high. This means that the HPI might at times be inappropriate to any mortgage.

- Only transactions on conforming conventional mortgages are included in the index: The conforming conventional mortgage restriction places a cap (\$417,000 in 2007) on the transactions that can be included in the index — excluding an entire class of transactions or properties that can be included. Unfortunately this cap changes from time to time. For example the cap increased in 2006 by 16% from the \$357,650 limit that had been in force in 2005, which was 8% higher than the cap in 2004. Such changes tend to distort the index because the indexed population changes over time. This means that the HPI might be inappropriate for tracking properties across a time period within a particular price tier.
- The method of building the index: Case-Shiller indexing is a weighted-repeat sales methodology that only considers repeat transactions. In a repeat transaction the same property has been sold or refinanced more than once and both mortgages were subsequently purchased by either Freddie Mac or Fannie Mae. All transactions not meeting these stringent criteria are excluded. To generate the index the price change over time is calculated and the price changes of a number of these transactions is aggregated over time; weighting transactions that are closer together in time more heavily than those with more elapsed time between sales. The purpose of this is to guard against index distortion due to changes in property attributes. The assumption is that transactions on the same property close together in time more accurately reflect the overall market trend because there is less of a chance that property attributes have changed. This assumption may actually select and heavily weight transaction sequences comprised of property purchases at lower than market prices and refurbishment followed by immediate resale at sometimes a much higher price. These transactions tend to support higher rates of appreciation and mask market downturns.

To overcome the disadvantages of the HPI, the ideal index would include essentially all and only free market transactions, capture the differing rates of change within large market areas and track property types individually. IntelliReal iMVI accomplishes exactly that.



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