

US Sustainable Home Price Model

Model Summary Document (MSD)

1. Model Purpose and Description

The SHP model addresses several key issues we identified in the existing SHP model, and provides the projections of sustainable home prices for several metropolitan statistical areas (MSA) and divisions across the US. The model also generates the sustainable market value declines (sMVD) at MSA and division levels, which then aggregate into a state and national level (population-weighted) sMVD. The rating team uses sMVDs produced by the model to adjust the property values in its stress/scenario testing process

2. Model Assumptions

The model assumes the sustainable home price reflects the home supply and demand. And the sustainable home price is close to HPI (in optimization, we minimize the error between SHP and HPI).

3. Model Inputs

1. Raw data are retrieved from IHS and 1010data. The data has been transformed in Oracle. This model imports the transformed data from Oracle database (ECON_FACTORS_CALC).
2. Input factors include:
 - a. Real_Income
 - b. Unemployment
 - c. Households_3Yr
 - d. 30Yr_FRM_Rate
 - e. Rent
 - f. Real_income_adjusted_HPI (Real HPI)
 - g. State_level population (Used for State SMVD calculation)
3. Other Data points needed:
 - a. MSA, Province/State, Country
 - b. MSA optimization accuracy and maximum iterations
 - c. Version # for the data retrieval
 - d. Coeff ID to define the set of initial coefficients for each MSA
 - i. Default to the coefficient ID
 - e. Pre-defined lowerbound and upperbound for coefficients

4. Model Development Data

The data covers more than 400 MSA. The input data starts from 1975 Jan 1st and ends in 2020 Mar 1st. The data are quarterly data. The nominal values are converted to real values in the optimization process.

5. Model Limitations

The regression in the optimization process doesn't follow the assumption of linear regression. The use of level based regression is a type of spurious regression that doesn't reflect the true relationship between variables and outcome. The supply side factor is also not enough to reflect the supply side information.

6. Material Changes

The current model version is 1.2.1. Any future material changes will be disclosed in this section.

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