Housing Price Index (HPI)

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Department of Urban Surveys
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Housing Price Index (HPI)

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1. Definition of Housing Price Index
What is housing price index?

Housing price index is a relative number integrally reflecting the general trend and magnitude of housing price changes in percentage during different periods. HPI is the short form for housing price index.

So far, the statistical survey for HPI is conducted in the municipal districts of 70 large and medium-sized cities, excluding the counties. Village housing is not covered in the “Statistical Survey Program on Sales Prices of Residential Buildings”. Village land is included in the coverage of the statistical survey only after the completion of transfer of ownership upon requisition by our nation for urban development.
Our nation and local governments at all levels perform timely analysis and decision-making and carry out macro-economic regulation and control of housing price, so as to secure and promote healthy and orderly development of property market.

Inform the general public of the rise and fall of housing prices in a timely manner. Provide data on residential housing transactions for reference by real estate enterprises and intermediaries of second-hand housing.

HPI is used in national accounts for deflating relevant indicators of services sector in GDP accounting.

The changes in HPI can clearly reflect the trail of market development. It is an important reference for studying the economic cycle and also the foundation for analysis of economic prosperity and forecast.

Fundamental applications of HPI for the economy and society
2. Collection, Compilation and Dissemination of Basic Data
2. Collection, Compilation and Dissemination of Basic Data

Information on sale price, area, amount, etc. of the newly built residential housing in 70 large and medium-sized cities is taken directly from the data of online advance sale contracts in local real estate management departments. The data of online advance sale contracts of the newly built residential housing transactions mainly include: project name, project address, building number, total number of storeys, which floor/storey of the building, residential structure, building area, transaction price, time of contract-signing, etc.

Not a comprehensive enquiry. A hybrid method of focused enquiry and statistical enquiry is adopted. The data is based on the report of real estate brokerage firms, and also the information reported by real estate management departments to the enumerators during the on-site visits. To guarantee representativeness, the total turnover of the selected real estate brokerage firms should generally account for over 75% of the total turnover of the local second hand residential housing transactions. The data contents are slightly different from those collected from newly built residential housing.
What is online advance sale contract?

It is the short form for online advance sale contract of residential housing put on sale. The original intention of the real estate management departments for establishing such network management system was to make real estate transactions more transparent, and to prevent developers from concealing project information and repeating sales of the same housing. The system is now the only channel for contract-signing between buyers and sellers of real estate transactions.

Online advance sale contract is the only legitimate contract of residential housing transaction. The formality of contract recording, commercial loan, housing provident fund loan, etc. cannot be proceeded without completing the online advance sale contract. Data of online advance sale contracts are genuine transaction data of residential housing.
2. Collection, Compilation and Dissemination of Basic Data

- Enquiry form of newly built residential housing and second hand residential housing

Data items:
- Housing address
- Floor level
- Housing structure
- Transaction price
- Gross floor area
- Time of contract-signing

Data items:
- Housing location
- Housing type
- Area sold
- Price sold
- Unit price of the housing sample
Data Collection, Compilation and Dissemination

1. 1600 hrs from 1st to 8th of each month

Statistical teams of 70 large and medium-sized cities are responsible for basic processing of the data of online advance sale contracts and preparation of processing documents. They would conduct on-site research of the housing project with large trading volume in the month and prepare subsequent report.

2. From 9th to 17th of each month

The Department of Urban Surveys is responsible for comparing, assessing, computing and summarizing the housing price data of 70 large and medium-sized cities, with specific details on each housing project of each city.

3. 9:30 on 18th of each month

The Statistical Information Network of China publicizes the previous month’s data concerning the changes in residential housing prices of 70 large and medium-sized cities throughout the country and performs real-time public opinion monitoring. Occasional articles on data interpretation would also be publicized simultaneously.

4. After 18th of each month

Timely feedback would be given to the relevant central teams and statistical teams about issues identified in data evaluation for rectification within required period. Regular sampling of housing projects and intermediaries for on-site validation are conducted.
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3. Compilation of Housing Price Index
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- Newly built commercial residential housing
  - Newly built commercial residential housing
  - Indemnificatory housing
- Second hand residential housing
  - 90 m² and under
  - 90—144 m²
  - Over 144 m²

Main indicators of housing price index of each city
The basic classifications of newly built commercial residential housing and second hand residential housing are the same.
3. Compilation of Housing Price Index

1. Steps and formulae for computing the chain month-on-month price index of the basic classification of individual cities (weighted average basis)

   **Step 1:** Compute current-month and previous-month average prices for the basic classifications for individual items.

   **Step 2:** Compute month-on-month chain price index for the basic classifications for individual items (including indemnificatory housing).

   **Step 3:** Compute month-on-month chain price index for the basic classification of the whole city (including indemnificatory housing).

   - **Formula:**
     \[ R_{t,t-1}^j = \frac{\sum_{i=1}^{n} H_{t,i} w_{t,i}^j}{\sum_{i=1}^{n} w_{t,i}^j} \]
     
     Among which, \( H_{t,i}^j \) is the chain price index of basic classification \( j \) of project item \( i \); \( w_{t,i}^j \) is the area sold (dollar amount) for period \( t \) (current month) of the basic classification \( j \) of item \( i \); \( n \) is the number of items contained in the basic classification. Then take the simple average of the two indexes derived from the weighted area sold and weighted dollar amount.

   - **Formula:**
     \[ H_{t,i} = \frac{p_{t,i}^{j,i}}{p_{t-1,i}^{j,i}} \]
     
     Among which, \( p_{t-1,i}^{j,i} \) is the average price (assessed average price for new project) for period \( t-1 \) (previous month) of basic classification \( j \) of item \( i \); \( p_{t,i}^{j,i} \) is the average price for period \( t \) (current month).

   - **Formula:**
     \[ p_{t,i}^{j,i} = \frac{Y_{t,i}^{j,i}}{Q_{t,i}^{j,i}} \quad \text{and} \quad p_{t-1,i}^{j,i} = \frac{Y_{t-1,i}^{j,i}}{Q_{t-1,i}^{j,i}} \]
     
     Among which, \( Y_{t,i}^{j,i} \), \( Y_{t-1,i}^{j,i} \) are the dollar amounts sold for periods \( t \) (current month) and \( t-1 \) (previous month) respectively of basic classification \( j \) of item \( i \); \( Q_{t,i}^{j,i} \), \( Q_{t-1,i}^{j,i} \) are the areas sold for periods \( t \) (current month) and \( t-1 \) (previous month) respectively of basic classification \( j \) of item \( i \).
3. Compilation of Housing Price Index

2. Steps and formulae for computing the chain price indexes for the above categories under the basic classification of individual cities (over the same period of last year; month to month; fixed base price)

**Step 1**
- Formula for fixed base price index (note: with the year 2010 as base year, i.e. with the average price in 2010 as the base period price and the area sold in 2010 as the base period area sold)

\[ L_t = L_{t-1} \times \frac{\sum P_i Q_{2010}}{\sum P_i Q_{2010}} \]

Among which \( P_i \) means the average price for various classifications of the month; \( Q_{2010} \) means the area sold of various classifications in 2010; \( L_t, L_{t-1} \) are fixed base price indexes of current month and previous month respectively; and \( \frac{\sum P_i Q_{2010}}{\sum P_i Q_{2010}} \) is the index over last month.

**Step 2**
- Compute month-on-month chain price index

\[ \text{Current-month Price Index over previous month} = \frac{L_t}{L_{t-1}} = \frac{\text{Fixed Base Price Index of current month}}{\text{Fixed Base Price Index of previous month}} \times 100 \]

**Step 3**
- Compute the price index for the month over the same period last year

\[ \text{Current-month Price Index over the same month of last year} = \frac{L_t}{L_{t-12}} = \frac{\text{Fixed Base Price Index of current month}}{\text{Fixed Base Price Index of the same month of last year}} \times 100 \]
3. Compilation of Housing Price Index

1. Steps and formulae for computing the chain month-to-month price index of the basic classification of individual cities (second hand)

   **Step 1:** Compute the chain index for the selected second-hand housing of each basic classification

   \[ R_{t,t-1}^j = \frac{\sum_{i=1}^{n} H_{i,j} w_{t,i}^j}{\sum_{i=1}^{n} w_{t,i}^j} \]

   Among which \( H_{i,j} \) is the chain price index of sample residential housing \( i \) of basic classification \( j \); \( w_{t,i}^j \) is the area sold (dollar amount) for period \( t \) (current month) of the residential housing type represented by the sample residential housing \( i \) of basic classification \( j \); and \( n \) is the number of sample residential housing contained in the basic classification.

   \[ H_{i,j} = \frac{p_{t,i}^j}{p_{t-1,i}^j} \]

   Among which \( p_{t,i}^j \) is the price for period \( t \) (current month) of sample residential housing \( i \) of basic classification \( j \); \( p_{t-1,i}^j \) is the price for period \( t-1 \) (previous month).

2. Computation of second-hand housing price index of individual cities is the same as that for newly-built housing price index.
3. Compilation of Housing Price Index

❖ Pros and cons regarding the compilation of residential housing price index

A. Requirement for homogeneity of sample in the compilation of index. The ideal price index of real estate should be “pure price index”, i.e., one which only reflects price changes arising from changes in supply and demand in the market and price changes from the purchasing power of currency, and excludes price changes arising from changes in factors of real estate quality (including location, surroundings, quality, structure, etc.). It is required that real estate of base period and that of report period for comparison have the same quality, i.e., maintaining the “homogeneity” of real estate.

B. Requirement for innovation in compilation of indices. Due to “heterogeneity” of real estate projects, there are always differences between two pieces of property in terms of location, quality and structure. Even for the same piece of property sold at two different times, there also appear differences relating to changes in surrounding locations, depreciation and internal renovation.

C. Due to immovability, low transaction frequency, difficulty in observing and sampling transaction prices, etc., involved in real estate, the compilation framework of housing price index is more complicated as compared with the price index framework of other ordinary commodities.

D. Super tabulation is adopted for the data of online advance sales contracts of newly built residential housing. Chain equation is used to establish fixed base index series with 2010 as base period. Manual cross-checking, assessment, computation and tabulation are required for data involving nearly 300,000 transactions each month on average. The volume of data processing is huge.
4. Interpretation and Use of Housing Price Index
Interpretation and Use of Housing Price Index

Correctly understand the implication of housing price index

Integrally reflect the general trend and magnitude of change in housing price level. For example, a city comprises only Districts A and B. Suppose there is a greater increase in housing price in District A and a greater decrease in housing price in District B. The residential housing price index of the city only reflects the general changes in housing price of Districts A and B together. It cannot be said that as District A has a greater increase in housing price, there will be a higher housing price index in that city; and that as District B has a greater decrease in housing price, there will be a lower housing price index in that city.

Correctly distinguish the scope of application of different indexes

If you want to know the trend of residential housing price, you need to look at the price index of newly built residential housing put on sale in that city; if you want to know the trend of small-sized residential housing price, you need to further study the price indexes of residential housing classification for units with area that is “90 m² and below”.

Correctly distinguish changes of mixed average price

Homogeneous comparability is the basic principle of compiling residential housing price index. For this, it is necessary to rule out the effects of non-price factors like structure, quality, direction of building, number of levels, degree of renovation, etc. in order to reflect the trend and magnitude of change in “pure price”. Hybrid average price is simply the division of total dollar amount by total area sold, without taking out the non-price factors. For example the sale of luxury residential housing decreases and that of ordinary one increases; and the sale of residential housing in central district decreases and that of residential housing in remote areas increases. All these could correspondingly pull down the level of hybrid average price.

Prevent biased judgment caused by subjective or fragmented opinions

Need to find correct matches when using different residential housing price indexes.

Hybrid average prices cannot reflect accurately the changes in “pure price”.

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