Review of House Price Index: case of RESIDEX for Bhopal in India

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Abstract

The housing industry of India is one of the fastest growing sectors. A large population base, rising income level and rapid urbanization leads to growth in this sector. In spite of Best & Sincerest efforts by Government, there still exists a huge gap between the number of houses required and the number of houses available. The increasing demand supply gap of residential housing is responsible for continuous price rise. Even as global housing prices recorded growth of a mere 0.9 per cent in 2011-12, India saw 12 per cent growth in the same period, according to a Knight Frank report, India. The present paper entitled "Review of Housing Price Index – Case of Residex for Bhopal in India" is an attempt to reveal the issues concerned with housing price index results in Bhopal, India. This paper focuses the method and significance of different housing price index and discusses its results of Residex for Bhopal. The paper has been divided into three sections. Section one deals with the method of house price indexes. Section two explains the Residex house price of India and the constraint to the house price results. The paper finally presents the key finding for Residex results – The house price index for India.

Key Words *- Index, Housing Price, Residex.*

1. Introduction

The prices of residential properties have an important role in the economy of every country. Construction, real estate and finance industries, the government and all other services associated with housing closely monitor the movement of house prices, as do the authorities in charge of collecting taxes that are derived, directly or indirectly, from property transactions and ownership. The purpose of a house price index (HPI) is to enable such monitoring by summarizing the changes of the house prices over time and space. A typical house price index is associated with a geographical area (a country) and its housing stock.

A house price index is defined as a table, one dimension of which is time, and the others, if any, may be geographical areas (regions or districts), property types (detached, semidetached, apartment, and the like) and circumstances of the transaction (first-time buyer, purchase of a newly built property, freehold, and the like) (Longford, 2008). An index aims to compare the sale prices of a typical property, or a collection of properties, if they were sold in short run or in long run over time. It might be also useful to compare two similar properties in different location.

Construction of a housing price index for a developing country like India is complex, as there are various concepts for housing price indices, many ways for compiling price data and different sources of data, both private and public. The study makes a review of the concepts and methodology for construction of real estate price indices and discusses the operational housing price index for India 'RESIDEX'. It finally discusses the results of Residex for Bhopal.

2. Methods for HPI

There are many house price indexes which are being used to estimate the housing price change by government, semi government and private agencies of different countries. These indexes are mostly based on Laspeyres weighted average method, Hedonic Method and Repeat sale methods. All these have some strengths and weaknesses.

2.1 Laspeyres weighted average method:

The Laspeyres method is used to aggregate sub-city indices into the city HPI. The weights attached to each sub-city level index is percent of transaction in that strata to total transactions in the city, assuming percent of transactions of each zone to total city transactions remains constant. Laspeyres price index calculates weighted average change in prices over a period for a fixed basket of products drawn from a base period,

comparing total cost of purchasing specific quantities or mix of properties in base period with total cost of purchasing the same quantities/mix in other periods. An index of these costs is then constructed. The method is suitable for constructing broad measures of prices, such as national indices of house prices or national accounts estimates of imputed rent for owner-occupied house (Chandrasekar, 2010).

2.2 Hedonic Method:

The concept of this method of construction takes its roots from the Lancaster's theory of consumer demand. Hence the hedonic method relates the price of a house to the characteristics or attributes it possesses. So when a house is purchased, the buyer's willingness to pay a certain price is dictated by the size of the house, the number of rooms it has, the neighborhood and other environmental characters. Halifax HPI nationwide (UK) use this methodology for the construction of their respective house price indices. (Wood, 2003) critically examines the methodology, database and weighting diagram of these indices.

2.3 Repeat Sales Method:

In the 1980s, Karl Case and Robert Shiller developed the repeat sales index technique. This methodology is recognized as the most reliable means to measure housing price movements and is used by other home price index publishers, including the Office of Federal Housing Enterprise Oversight (OFHEO), USA. The repeat sales method uses data on properties that have sold at least twice, in order to capture the true appreciated value of constant-quality homes.

To calculate the indices, data are collected on transactions of all residential properties during the months in question. The main variable used for index calculation is the price change between two arms-length sales of the same home. Each sale price is considered a data point. When a specific home is resold, months or years later, the new sale price is matched to the first price creating a sale pair. The difference in the value of this sale pair is measured and recorded.

Though repeated sales index provides only the price index and not the value of the attributes, it deals in quality changes by ensuring that quality of the unit under observation has not changed during the observable period.

The Case Shiller index (USA) uses the repeat sales method effectively. Residex, the HPI constructed by NHB, uses Laspeyres weighted average method for the construction of its index. It is useful to discuss the result of a region with the change in price of its sub-region.

Table 1. Comparative Analysis

Model	Strengths	Weaknesses
Laspeyere's Weighted Average Model	*Low data required *Easily implementable	*Only provides a house price index *Ignores attributes and change in quality of the house *Index is only a proxy *not very usable for further analysis
Hedonic	*Credible data Provides detailed data *Can be used for versatile research purposes	*Requires data on attributes of a house *Relative complex to implement *Ignores changes in quality of a house.
Repeat Sale	*Credible data *Provides data more detailed relative to Laspeyres	*Data required extensive in terms of time period and difficult to attain *Very difficult to implement in the short run *Does not provide information on the attributes *It faces a problem of small samples from the population

3. An operational Housing Price Index for India

A paper prepared by the RBI (Joshi, et al., 2005) reviews the methodology, sampling techniques, collection of price data, for construction of real estate price indices in Canada and UK (Halifax index). It also suggests a methodology for India to use of Hedonic price model. But, such an index suffers from the drawback that the index is based on multiple regression equations, which can be applied only with large sample size at the all India level and may not be applicable at regional and sub-regional levels for lack of sufficient number of observations. Even if data are available, it may be difficult to have a good fit and to specify a representative housing unit. It will also be difficult to combine regional indices unless we know the weights. It discusses conceptual issues relating to prices only, but does not deal with practical problems relating to determination of weights and sources of reliable basic data on prices, stock and transactions of houses.

The measurement of house prices poses significant conceptual and practical problems. The most important

point is to note that no one method of constructing a housing price index is ideal and it is better to construct a set of alternative indices on the basis of available data, least cost and the purpose of the indices.

3.1 Properties of a Good HPI

Like any other index, a good housing price index must satisfy a number of criteria as suggested by (Joshi, et al., 2005)**:**

- Reliable data should be available easily and with least cost
- Index must be relevant for the purpose of the users
- Index must be easy to calculate
- Index should be easily interpreted
- Index should be easily updated at regular intervals
- Index should reflect the reality
- Index should be decomposable by regions and categories
- Index should be subject to usual statistical test

3.2 Residex for the Case of Delhi

A survey had been conducted in Delhi for 30 colonies in different tax zones on the basis of transactions for the collection of basic data. These colonies are spread over all parts of Delhi such as South, North, West and East Delhi. 2001 was taken as the base year for the construction of HPI and update the index on half yearly basis. Basic data were being collected for each year since 2000. For each selected colony and for each year, information was collected for at least 20 transactions, which actually took place during the year. Transactions price excluding taxes and duties and agent's commissions were collected. For each selected colony, average prices per Square Feet of plinth area were estimated by taking arithmetic mean, weighted mean, median and mode. The weight for each zone in the city was made to estimate both the volume index (weighted by number of units) and the value index (weighted by total value). For each tax zone, average price of housing per square feet (AP) was estimated by the weighted average of average housing prices for different categories i.e.

$$AP_{2001} = (W_{<500} \times AP_{<500}) + (W_{500-1000} \times AP_{500-1000}) + (W_{>1000} \times AP_{>1000})$$

Where AP – Average Price and W – Weight (Chandrasekar, 2010)

Then zone-wise price indices were calculated for all the zones for all the years. Other alternative house price indices like representative property method, hedonic regression model and repeat sale method from the hedonic price model were used to get better results. All these models have advantage as well as drawbacks as tabulated below.

Table 2. Alternative House Price Indices for Delhi: A comparison by (Das, 2009)

Type	Advantage	Drawback
Average Price – Mean, Median, Mode	Easy to collect and calculate	No correction for quality differences
Representative Property method	Avoid most quality change problem	Focuses only on one set of properties and ignores developments of other properties
Hedonic regression models	Controls for quality changes Takes into account all possible houses	Requires huge data, Potential bias for incorrect model specifications
Repeat sales method from the hedonic price model	Less data requirements, less dependent on model	Requires at least two sales, Quality of the same property may change during intervening period

3.3 Case Study Findings

After the study of all type house price indices, it was observed that covered area was the most significant factor influencing the price of a house followed by the location of the property in terms of tax zones. Other variables found significant include the legal status of the property with houses in unauthorized colony commanding lower price. Quality of construction, type of house (LIG, MIG etc), accessibility as measured by nearness to the main road (has positive impact on price), increase in distance from the metro (has a negative impact on price) were other variables influencing the house prices in Delhi. Access to schools, market etc, and amenities like water facilities, power load shedding etc. were dropped from the regression as they were statistically insignificant. The variables water and electricity could have been insignificant because there was a widespread problem of recall by the real estate agents. Age has,

surprisingly, a positive sign implying that people are willing to pay more for older properties. However when a regression was run dividing the age in two different groups i.e. less than 17 years and more than 17 years, the co-efficient for age were positive in the former case but negative for the latter case. The estimates show that zero bedroom houses are preferred over one bedroom flats. The trend in house prices show that the prices in Delhi, taking the base year as 2001, were in depression prior to 2001, but showed an increasing trend thereafter. The prices were 49% higher in 2005. The prices started increasing at a faster rate especially from 2003.

Thus the price of house depends upon many factors which defines its quality and vary person to person as per their priorities.

4. Discussion on the Residex result of Bhopal

Cities have been recognized as engines of growth. As healthy mind needs a healthy body so do citizens need healthy environment to live and work. There are many factors which create a healthy liveable space for the citizen and there is a complex correlation between them, and this correlation is a derivative of time.

Cities are growing at a pace faster than ever before, one hand cities other prospects to the citizens to grow, develop, on other hand they are becoming dynamic day by day. More and more people tend to migrate to urban areas. Under such situation cities are under immerse pressure to provide more and better habitat to existing and new migrating population.

Bhopal is the capital city of Madhya Pradesh. It has evolved in last few decades as one of the most happening cities in Indian Real Estate. The socio-economic central, strategic location, connectivity of other parts of the country, political will, policy level reforms, situation of law and order, good governance initiatives, financial reforms etc. has made Bhopal a preferred destination for residential activities in last decade and the trend is increasing. Housing in Bhopal has evolved from individual houses in 50's - 70's to small colonies, layouts and apartments buildings in 80's - 90's to closed campus with all amenities in 2000-10. The future lies in to fully development integrated township, SEZ's and special projects. Bhopal has been selected as ideal city for monitoring residential price index by National Housing Bank.

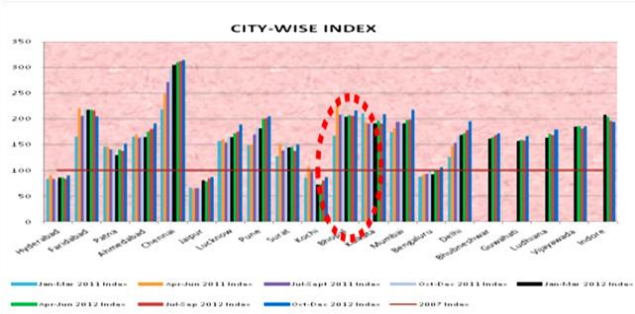

Figure 1. City-wise Index (NHB Residex)

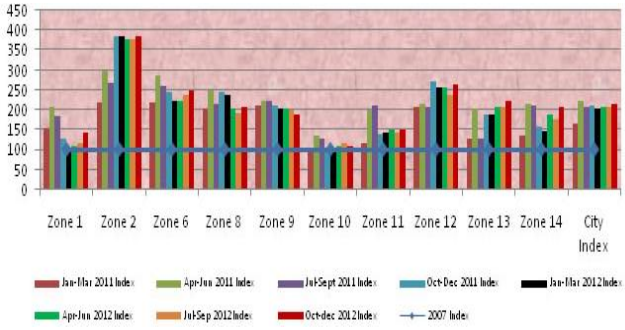

Figure 2. Zone-wise Index of Bhopal (NHB Residex)

Table 3. Residex quarterly results for 2011-2012

Zones	Localities	2007 Index	Jan-Mar 2011 Index	Apr-Jun 2011 Index	Jul-Sept 2011 Index	Oct-Dec 2011 Index	Jan-Mar 2012 Index	Apr-Jun 2012 Index	Jul-Sep 2012 Index	Oct-Dec 2012 Index
Zone 1	Airport Road, Bairagarh City	100	154	208	187	130	108	111	119	144
Zone 2	Koh – e- Fiza, Shyamala Hills	100	219	298	267	386	386	377	377	385
Zone 6	Nehru Nagar, Bhadbhada Nagar	100	218	286	263	246	223	224	239	250
Zone 8	Punjabi Bagh, Ashoka Garden	100	203	250	217	246	239	203	192	208
Zone 9	Shivaji Nagar, Arera Colony, Chunna Bhatti	100	213	224	225	213	205	203	199	187
Zone 10	Bagh Mugaliya, Katara Hills	100	99	138	130	102	100	109	118	111
Zone 11	Khajuri Kalan, Raisen Road, J K Road	100	116	200	211	138	143	150	144	150
Zone 12	Karod, Ayodhya Nagar, Berasia Road	100	209	215	207	273	256	257	240	266
Zone 13	Krishna Nagar, Saamra Kalan	100	129	205	129	190	190	208	208	225
Zone 14	Gulmohar, Trilanga, Shahpura, Hoshangabad Road	100	136	215	211	160	148	191	178	206
City Index		100	167	224	208	211	204	207	206	216

Source: (NHB Residex)

According to the result of Residex, house price in Bhopal show very little rise during 2011-2012 while Chennai and Delhi had a tremendous price rise. The ground situation states that builders and developers are making money due to accelerated residential property price. The result doesn't follow the theory of Bid Rent as the price of Zone 8 and 9 is decreasing which is situated close to the central business district. Price change in housing has its social economic significance. The attributes identified as the indicators of Residex

has limitation. India has a socialistic economy. It is insufficient to estimated housing demand and price without taking social attributes into the account.

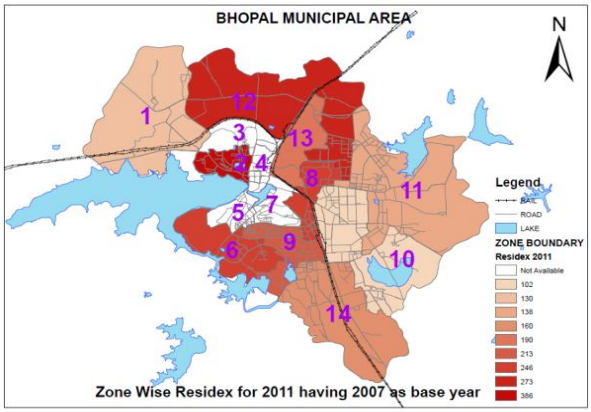

Figure 3. Zone-wise Residex for 2011

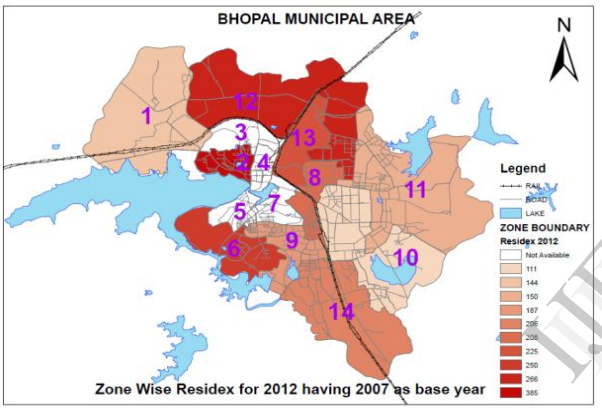

Figure 4. Zone-wise Residex for 2012

Zone wise study of Bhopal for Residex seems insignificant because these zones are not tax based classification as with the case of Delhi. It was also difficult to find identical sample property to compare the price change in different zone as the quality of house varies as well as quality definition differ person to person.

The key findings of Residex for Bhopal are

- Tremendous price rise (about 280% rise) in last two year has been seen in Zone 2 Koh - e - Fiza, Shyamala Hill.
- Price decreased in zone 8, Zone 9, Zone 12 during 2011 – 2012
- Gulmohar, Trilanga, Shahpura and Hosangabad got about 25% price increment only in a single year (2011-2012)
- The maximum price rise is about 280% while some zone has rise fall during 2011 – 2012.
- The city price increase by 116% taking 2007 as base year.
- Quarterly HPI figure presents rise and fall in housing price regularly in city.
- Location preference seems one of the cause for price rise
- Quality and quantity both of the building is compared by consumer
- Hedonic model have some limitation because the weight of different quality varies place to place.
- Sampling of basket might be prepared different for different city
- Weight to qualitative and quantitative attributes might be given by stratified sampling

5. Conclusion

Housing is an important asset in the India. The high level of volatility in the housing market requires that the price movement is adequately tracked for smooth functioning of the economy. The study discusses the results of employing the techniques for developing House Price Index for India and its accuracy.

For a House Price Index to be meaningful, it must compare prices of equivalent houses from one period to the next. This is difficult as no two houses are identical. Therefore, a system of measurement is required which allows for differences in the sample houses traded i.e. data should be quality adjusted. In order to solve this problem adoption of the hedonic method is a step in the right direction as this method estimates the trends of prices for typical houses sold and purchased during the year.

More detailed knowledge of the housing market can be translated into a better house price index by adjusting the matching procedure. For example, matching may be constrained within (sets of) geographical areas.

Hedonic model tries to measure qualitative changes of properties and its correlate with change in market demand. In spite of having the potential of hedonic to measure the demand change with respect to qualitative changes of the housing attributes has many limitations.

Indian real estate is very dynamic. The test and interest for housing as per its quality is different from person to person. It looks insufficient to make any decision based on HPI in India. Attempt to draw Housing Price by tax zones have been focused on secondary information. It cannot explain pace in value change with change the qualitative of housing.

The housing market itself is extremely varied in terms of type of property. A city like Mumbai is home to slums and high rise luxurious apartments with vast price differentials, making the task of creating a housing price index even more challenging.

In brief, it is difficult to establish that two properties, as assets, are alike, even if they are adjacent, were constructed at the same time and have (or originally had) the same design. Such an index would be a very poor indicator of what is actually happening in the housing market. The qualitative attributes of a house need to translate into quantity which might help to compare two different properties. It is suggested to develop first a housing quality indicator which can help to monitor housing price index.

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