

## **HBOS - Economic View - House Price Index - Index Methodology**

### **The Halifax House Price Index**

The Halifax House Price Index is the UK's longest running monthly house price series with data covering the whole country going back to January 1983. The Index is based on the largest monthly sample of mortgage data, typically covering around 15,000 house purchases per month, and covers the whole calendar month. From this data, a "standardised" house price is calculated and property price movements on a like-for-like basis (including seasonal adjustments) are analysed over time. Properties over £1 million are included (since December 2002) and the index is seasonally adjusted with the seasonal factors updated monthly.

The indices are based on the detailed records of the prices, physical characteristics and the regional location of all the houses on which the organisation has made a mortgage offer in each time period.

The methodology is applied separately to produce monthly and quarterly standardised indices for different categories of house (all houses, new houses and existing houses) and buyer (first-time buyers and former owner-occupiers). The U.K. national all houses, all buyers monthly index is also available as a seasonally adjusted series.

Regional index numbers are also created (quarterly) for all, new and existing houses and for houses bought by first-time buyers and former owner-occupiers. The regional all houses, all buyers quarterly indices can also be provided as a seasonally adjusted series.

### **Available Data**

The database used to construct the current indices offers a large number of house-purchase transactions that have been financed by the Halifax. As a consequence, the analytical procedures used in developing the Index are both reliable and robust.

Not all house purchases financed by the Halifax are included in the database. There are some properties that are excluded from the subsequent analyses. For example, the vast majority of council house sales which may have been sold at below market price. After editing, the database covers around 13,500 house purchase transactions per month.

It should be noted that the data refer to mortgage transactions at the time they were approved rather than completed. This has the disadvantage of covering some cases that never proceed to completion. However, it has the advantage that the price information is more up-to-date as an indicator of price movements and is on a more consistent time-base than completions data given the variable time lags between approval and completion.

### **Methodology**

The methodology is based on the 'hedonic' approach to price measurement characterised by valuing goods for the attributes they possess. In the case of housing, prices will reflect the valuation placed by a purchaser on the particular set of physical and locational attributes possessed by the property they wish to buy.

Prices are disaggregated into their constituent parts using multivariate regression analysis. This permits the estimation of the change in average price from one period to another on a standardised basis. An obvious analogy can be drawn with the standard basket of goods used for calculating the retail price index.

So, observing a set of house prices,  $P_i$ , ( $i=1,2,\dots,n$ ), in time period ( $t$ ) in which each house ( $i$ ) is sold. Price differences in these properties will be due to differences in qualitative characteristics (type of property, region, etc.) and to differences in quantitative characteristics (age of property, number of habitable rooms, garages, bathrooms, etc.). For each house,  $i$ , we can represent the price,  $P_i$ , as a function of these characteristics  $X_{ij}$ , along with a group of unmeasured (and randomly distributed) factors,  $e_i$ . Mathematically, this relationship can be expressed as

$$P_i = b_0 + b_1X_{1i} + b_2X_{2i} + \dots + b_jX_{ji} + e_i$$

where  $b_1, b_2, \dots, b_j$  are the regression coefficients associated with the qualitative and quantitative variables  $X_{ij}$ .

The regression coefficients are estimated using the technique of ordinary least squares. These coefficients indicate the relative importance of the variables in explaining the variation of house prices in any one time period  $t$ .

The average price for any set of houses in any period will depend on the number of observations on each characteristic in that period. Standardisation allows for the varying mix of characteristics between different time periods and is achieved by applying a representative set of weights corresponding to the numbers of each characteristic observed in a base period. For the Halifax House Price Index this has been chosen as 1983. The index numbers represent the movement in average prices for houses possessing the same characteristics as those bought in 1983 and are calculated by comparing the weighted (i.e. mix-adjusted) prices in each current period with the weighted average price in the base period.

The steps involved in establishing the Index are

Calculate the weights,  $Q_j$ 1983 : the proportions of the qualitative variables and the means of the quantitative variables present in the base period (1983).

With price recorded in natural log form, use the technique of least squares to estimate the regression coefficients  $b_j$  for the  $j$  explanatory variables (in both the base period ( $b_j$ 1983) and for every subsequent time period  $t$  ( $b_{jt}$ )).

Calculate the base-weighted index for the current period ( $I_t$ )

$$I_t = \text{antilog} \dots \dots \dots$$

Summation is carried out over all variables included in each regression.

This procedure is used to calculate five monthly series of base-weighted index numbers covering

- all houses (seasonally adjusted)
- all houses
- new houses

- existing houses
- houses bought by first-time buyers
- houses bought by former owner-occupiers

Index numbers for each of the twelve standard statistical regions are calculated quarterly for

- all houses (seasonally adjusted)
- all houses
- new houses
- existing houses