

# Nationwide HOUSE PRICE INDEX



## Methodology

### Introduction

There are several methods that could be used to calculate the trend in house prices, ranging from a simple average of purchase price to a statistical method of averaging. Then there is the matter of making sure that the different mixture of properties sold in each month does not give a false impression of the actual change in house prices. The next few sections explain the way we do this as well as providing some background to the Nationwide house price series and the current methodology that we employ to calculate average house prices.

### Background to Nationwide House Price Information

Nationwide Building Society has a long history of recording and analysing house price data and has published average house price information since 1952. The following provides a short chronology of publish series and developments in Nationwide's methodology of calculating average house prices:

- 1952 – Annual publication of house price data
- 1974 – Quarterly data is published for the first time
- 1989 – Development of new house price methodology. A statistical 'regression' technique was introduced under guidance of 'Fleming and Nellis' (Loughborough University and Cranfield Institute of Technology)
- 1993 – The house price system was further improved following publication of the Census 1991 data. Frequency for UK series increased to monthly.

The monthly figure measures the mix adjusted average house price for all houses in the UK. Every quarter the Nationwide also publishes a more detailed breakdown of house prices. These include both UK and 13 regional estimates for:

- 4 types of property (Detached houses, semi-detached houses, terraced houses and flats/apartments)
- 2 types of buyer (First time buyer and Former owner occupiers)
- 3 property ages (New, modern and old)

This makes a total of 140 separate series, all of which are published quarterly on our internet site <http://www.nationwide.co.uk/hpi/>

### Data - source, cleaning and sample size

#### Source

All house price information is derived using Nationwide mortgage data. This data is extracted monthly for mortgages that are at the approvals stage and after the corresponding valuation report has been completed. Approvals data is used as opposed to mortgage completions since it should give an earlier indication of current trends in prices in the housing market.

#### Cleaning

Nationwide house price series utilise only owner occupied property information. In addition, properties that are not typical and may distort the series are also removed from the data set. Therefore, the following criteria are used to select which properties to include:

- House purchases - remortgages and further advances are excluded
- Owner occupied properties – buy to let properties are excluded
- Properties sold at true market prices - right to buy sales at discounted price are excluded
- Floor size has to be within specified limits for a give type of property - e.g. a detached house has to have at least 400 sq ft floor area

## Sample Size

The number of cases that are used to calculate the average price for a given month will depend on the volume of monthly mortgage activity and out of these the cases that meet the criteria in the cleaning process. The monthly sample size will therefore vary from month to month.

Nationwide has sufficient sample size to produce a representative house price series. N.B. Net lending figures quoted at our half yearly and annual results are not a guide to our sample size. Sample size is based on the number of new loans we write i.e. the amount of gross lending for house purchase (remortgage cases are excluded).

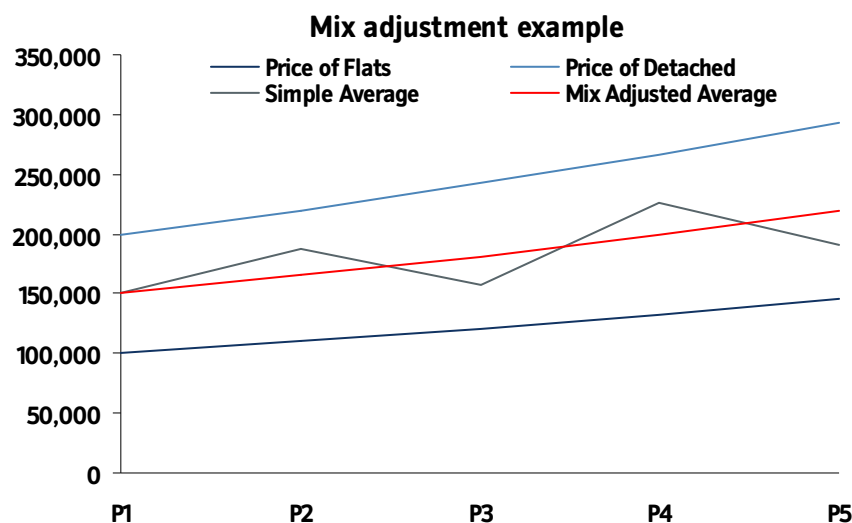
The Nationwide Building Society is currently the 3rd largest mortgage lender in the UK. Our share of the gross house purchase market has averaged c10% over the last 3 years. This allows us to be confident that the series based on Nationwide mortgage data is representative of the whole house market. The quarterly UK series for all houses uses 3 months of data and hence a much larger sample than at the month. The samples sizes for the other quarterly series will depend on what it is they are measuring, for example the series for first time buyers only considers properties being brought by first time buyers and hence this will have a smaller sample size than that used for the whole of the UK. It is for this reason that detailed breakdown of house prices are produced quarterly.

## Mix Adjustment Process

### Why Mix Adjust?

The purpose of mix adjustment is to simply isolate pure prices changes. The simple example below illustrates how the changes in the mixture of properties sold each month could give a misleading picture of what is actually happening to house prices. The set of properties sold from month to month will vary by location and design etc. and some adjustment is necessary to make sure all of these do not give a false impression of the actual changes to house prices. A mix-adjusted or 'standardised' index is not affected by such changes because the relative weight given to each characteristic of a property in the 'mix' (or 'basket', to use an analogy with retail prices) is fixed from one period to the next.

### Simple example - Benefits of mix adjustment



Suppose that the price of both detached houses and flats increased at the same rate for five periods, with flats being cheaper.

Further suppose that the proportion of flats and detached sold in each period varied considerably, as the table below shows.

Time period	P1	P2	P3	P4	P5
% Flats	50	30	70	30	70
% Detached	50	70	30	70	30

The simple average of both kinds of properties will be influenced by the proportion of each property sold. In periods 3 and 4 the simple average shows a decrease, whereas the actual prices of both increased!

The mix adjusted average uses a consistent measure of the proportion of each type of property and is able to better reflect the true change in prices.

The mix-adjusted price represents the price for an average or 'typical' house. This should not be confused with the average price of all houses. The latter is usually higher because even though there are fewer more expensive houses sold, their price is such that they bias the simple average to be greater than the price of the typical house.

## Calculating the price of a typical house

### Calculation

The price of a property will depend on the characteristics of the property. These characteristics could include physical properties of the house, like its design, but other aspects such as the type of neighbourhood the house is located in will also contribute to the price someone is willing to pay. Using mortgage data, the Nationwide house price system can relate all the observed combinations of these factors and relate them to the price of which the house was sold for. From this, the model can estimate how much on average a house would cost given a set values for these characteristics, in particular a set of characteristics that describes the 'typical' house. This typical house does not physically exist, it is an 'average' house across all the characteristics that the model uses. This method is repeated on data sets at different points in time and changes in the price of this typical house reflect only the price changes over the same time periods, and not the mixture of properties sold in the current or previous periods.

### Factors that affect the price of a house

The following are the items that are used to describe the characteristics of a property. There is no set order that these contribute most to the price of the house, although UK location, the type of neighbourhood and house size are consistently the three most important followed by the design of the house.

- UK Location, i.e. part of country.
- Type of neighbourhood. The Nationwide index uses an established demographic system that classifies areas in the UK into 54 categories based on the type of people that live there; two examples include retirement and council areas.
- Floor size
- Property design (detached house, semi-detached house, terraced house, bungalow, flat, etc.)
- Tenure (freehold/leasehold/feudal) except for flats, which are nearly all leasehold
- Number of bathrooms (1 or more than 1)
- Type of garage (single garage, double garage or none)
- Number of bedrooms (1, 2, 3, 4 or more than 4)
- Whether property is new or not

## Seasonal Adjustment

House prices are slightly seasonal - that is, prices are higher at certain times of year irrespective of the overall trend. This tends to be in spring and summer, when more buyers are in the market and hence sellers do not need to discount prices so heavily, in order to achieve a sale. The effect on prices over the year is of the order of +/- 2.0%; however this is much smaller than the change in volume of property transactions. The seasonal effect is estimated each month using established statistical methods.

For the monthly house price index where changes can be as little as 0.1%, seasonal factors are important. The Nationwide therefore produce a seasonally adjusted series for UK house prices which seeks to remove this effect so that the overall trend in prices is more readily apparent.

Seasonal adjustment shows that July is generally the strongest month for house prices (raw prices are 1.5% above their SA level) and February is the weakest (raw prices are 2.0% below their SA level).