

# Nationwide HOUSE PRICE INDEX



## Methodology

### Introduction

There are several methods that could be used to calculate the trend in house prices. The simplest would involve calculating the average of the prices paid for properties in a period. However, more complex statistical methods are generally preferred in order to control for variations in mix of properties being sold in each period. As we explain below, these methods are important to ensure that the underlying trend in property values is captured, rather than changes in the characteristics of the houses being transacted.

The next few sections provide some background to the Nationwide house price series and the current methodology that we employ to calculate house prices.

### Market coverage

The Nationwide house price index is an indicator of trends in UK house prices. The index is calculated based on owner occupier house purchase transactions involving a mortgage. Buy to let and cash purchases are **not included**.

### Background to Nationwide House Price Information

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

- 1952 – Annual publication of house price data
- 1974 – Quarterly data 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 house price for houses across the UK. Every quarter the Nationwide also publishes a more detailed breakdown of house prices. These include both UK and 13 regional estimates by buyer type (first time buyers and former owner occupiers).

Additionally, we produce UK figures for 4 types of property (detached houses, semi-detached houses, terraced houses and flats/apartments) and property age (new and not new).

This makes a total of 48 separate series, all of which are published quarterly on our internet site: <https://www.nationwidehousepriceindex.co.uk/resources>

### Calculating the price of a typical house

#### Calculation

The purchase price of a house will depend on its characteristics, including its physical properties, such as its size and number of bedrooms, as well as the type of neighbourhood in which the house is located. Using data from approved mortgages, we use a statistical process called hedonic regression to relate observed combinations of these characteristics to the house purchase price. Using this information we can estimate how much a house with a given set of characteristics would be expected to cost. In particular, we use a set of characteristics that describes the 'typical' UK house in order to track the value of a typical UK property over time. This typical house does not physically exist, it is an 'average' house across all the characteristics that are included in the model. 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

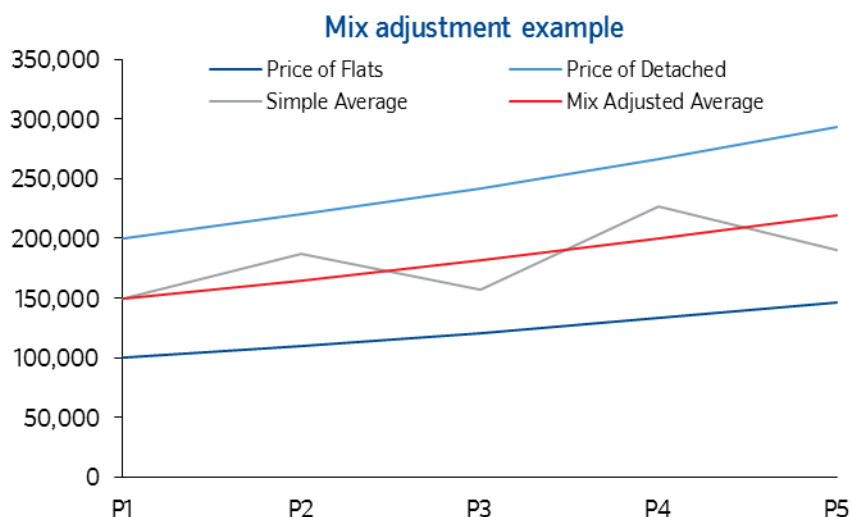
The following are the items that are used to describe the characteristics of a property. There is no set order in which these contribute most to the price of the house, although UK location, the type of neighbourhood and house size are consistently the three most important, followed by the design of 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 59 categories based on the type of people that live there; two examples include retirement and council areas.
- Property design (detached house, semi-detached house, terraced house, bungalow, flat, etc.)
- Number of bedrooms (1, 2, 3, 4 or more than 4)
- Whether property is new or not

## Why Mix Adjust?

The purpose of mix adjustment is to simply isolate pure price changes. The simple example below illustrates how 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, design etc.) and some adjustment is necessary to make sure that such shifts do not give a false impression of the actual change 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
% Detached	50	70	30	70	30
% Flats	50	30	70	30	70

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 (or weighted) 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 a '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.

## Data - source, cleaning and sample size

### Source

All house price information is derived using Nationwide mortgage data. This data is extracted monthly from mortgage applications at the approvals stage and after the corresponding valuation 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. We use a number of criteria to select which properties to include, for example:

- 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

### Sample Size

The number of cases that are used 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. 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 second largest mortgage lender in the UK. Our share of the gross house purchase market has averaged c.12% over the last three 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 three months of data and hence a much larger sample than at the month. The sample sizes for the other quarterly series will depend on what 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.

## 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 +/- 1.0%; 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. Nationwide therefore produces 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 around 1% above their SA level) and February is the weakest (raw prices around 1% below their SA level).

The seasonal adjustment process is run each month which may result in revisions to seasonally adjusted series.

## Updates to typical house

The weights used to calculate our 'typical' house are updated from time to time to ensure the index maintains a relevant typical house. We currently update our weights every two years using four years' worth of data. Regional weights are calculated using external data from the Land Registry, HMRC and UK Finance to remove any regional bias in the Nationwide data. As part of the weights updates, we ensure that continuous price series and indices are maintained. This may involve using joining factors to remove any breaks in the series.

## Data revisions

Occasionally, it may be necessary to restate, revise or remove data from the index. In this event, a note will be published in our monthly / quarterly press release to inform users.

## Changes to methodology

We reserve the right to vary our methodology and to edit or discontinue the whole or any part of the Index at any time, for regulatory or other reasons.

The methodology is subject to annual review by Nationwide's internal oversight function. This document will be updated to reflect any changes in our methodology. Changes to methodology will also be scrutinised by Nationwide's internal oversight function.

## Legal information

The Nationwide House Price Indices are prepared from information that we believe is collated with care, but no representation is made as to their accuracy or completeness. We reserve the right to vary our methodology and to edit or discontinue the indices at any time, for regulatory or other reasons.

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