

WHICH HOUSE PRICE INDEX?

AN ACADATA BRIEFING NOTE

House price indices report very different average prices. Those for 2003 ranged from £163K to £248K. Hence “why are house prices so different?” is a regular question. To simplify the answer, divide the five indices into two categories; the old and the new. Both old indices report the **‘price of the average house’**. Two new indices report the **‘average of prices paid for houses’**.

The former are conceptual prices; the latter are factual. Therein lie the differences.

Why this divide? Halifax introduced its HPI in 1984 claiming *“the Halifax House Price Index represented a major advance in the measurement of house price changes throughout the country”*. Indeed it did. But that was then, when the launch of Microsoft’s “Windows” was still a year away and property ‘big data’ was unheard of. Factual selling prices in a useable form did not exist. The factual ‘average of prices paid for houses’ could not be prepared. So the academics developing the Halifax HPI conceived of an “average house” (think, say, 2½ bedrooms and 1¼ bathrooms), estimating its price using mortgage offer values. In 1989, the Nationwide HPI followed suit. Factually, these are valuation not price indices. In reality, the “average house” is a concept and does not exist. The “price of the average house” is conceptual. The lender HPIs remain a central focus but were the best that could be done at the time.

Come 2004; come a new “major advance”. Land Registry offered Acadata the average price, monthly by area and property type of every sale; a data volume far in excess of that of any other HPI. This wealth of factual prices enabled the ‘average of prices paid for houses’ to be calculated for our FT House Price Index, now the LSL Acad HPI. The LSL Acad HPI average price is factual after an initial forecast. So is the average calculated by the ONS HPI. This, too, was launched in 2003, but used mortgage completion prices. Land Registry HPI? We explain on page 5 why we see this as conceptual. *Conceptual indices report inflation in conceptual prices*. Factual indices report inflation in factual prices (LSL Acad) or in those using a mortgage, excluding cash (ONS). On page 6 we show some differences.

We quote from the IFS Briefing Note 146 <http://www.ifs.org.uk/bns/bn146.pdf>: a definitive study of house price indices, and thank Daniel Chandler of IFS especially for helping our comments on change in prices. IFS draws attention to the fact that our own LSL Acad HPI “final” result is alone amongst indices in reporting virtually every single housing transaction. But we stress that every index provides information. Users must understand each index in order to pick out what that information is. Page 4 comments that every index suffers from lack of regional data where Halifax/Nationwide report only quarterly. Since the Land Registry HPI uses only 36% of sales data (page 2) we believe that only LSL Acad has enough data for useful average prices for counties and London boroughs. But no index is perfect. No index provides everything. Caveat emptor.

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Which House Price Index? We would welcome any comments or queries sent to info@acadata.co.uk.

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The National Association of Estate Agents reports that in June 2014 properties cost young First Time Buyers an average of £202K. And the factual June *"average price paid for houses"* is now c.£268K. Although the veteran Halifax and Nationwide HPis continue to dominate in the media, at the Bank of England, in the lending industry, and amongst economists has their conceptual *'price of the average house'* now c.£185K lost touch with reality? The Land Registry HPI average price falls lower still and we explain on pages 5/6 why we interpret this is as conceptual although lacking any model property basis. Are conceptual prices now a source of confusion?

The big plus for the lender indices is that they report at the start of the buying cycle. Whether they say that prices are going up or down is news. Add Rightmove and see what you can make of the contradictory price movements in our [House Price Index % Monthly Chart](#). Volatility is inevitable using small data samples so Halifax smooths annual inflation results; LSL Acad smooths all results. Smoothing helps reveal trends but may conceal market change. Remember; *conceptual indices report changes in conceptual prices*. Charted over long periods all measures fall into line. But month by month, do these conceptual price changes have any meaning?

Yes they do. The Nationwide/Halifax HPis are each based on only c.10% of all sales and are often volatile and contradictory. But, if aligned, they can reveal important change. The Bank of England uses an average of their inflation results. The lending industry used them under the FSA, for revaluing loan portfolios. But under FCA and BIPRU* will this continue? The third conceptual index, Land Registry HPI is based on only a c13% initial sample because it discards the 64% of prices which are not repeat sales. Even so, their inflation results are in line.

Why do the lender indices often disagree? Because Nationwide's 1989 model house characteristics are updated annually whilst Halifax's model dates from 1983 and may reflect north not south. Different samples reflect different lending policies. Halifax HPI will tell you by how much the price of their 1983 'average house' has changed in the month or year; Nationwide reports the price change in their 1989 model with less regional bias. These *conceptual price changes cannot be compared to changes in the factual average prices* provided by ONS and LSL Acad; at best they may provide a preview. So now for the factual indices.

- Rightmove's asking prices are naturally volatile but the changes are invaluable to e.g. estate agents
- ONS HPI uses data from the Council of Mortgage Lenders, providing a c.60% sample of mortgaged sales and c.40% of all sales if cash is included. Like the lenders, ONS holds property characteristics (bedroom numbers etc) but prepares a factual *'average of all prices paid'* for properties. Like the lenders, ONS provides e.g. buyer type and property age data. The ONS methodology is the most sophisticated. Disadvantages are: no cash data; volatility in monthly results; lack of county/London borough data; published some 6 weeks after the relevant month end. Use for: mortgage-based prices; buyer and other detail; extensive housing data
- LSL Acad HPI uses Land Registry data to estimate the *'average of all prices paid'*: updated monthly from an initial "forecast" release until (uniquely) every single property transaction is reflected. Initial release uses sufficient data to estimate county/London borough prices. Detailed market commentary. Disadvantages are: initial "forecast" takes 2/3 weeks and "final" release (approximating "ultimate" using every sale) takes c.10 weeks from month end; no property or buyer type detail; may miss turning points. Use "forecast" for first 'average of prices paid for houses', News Release commentary by Peter Williams and county/London borough prices. Await LSL Acad "final" (two months after "forecast") for the full factual prices. We recommend these for use by unitary authorities, for decision making, modelling and risk purposes

*BIPRU is the Financial Conduct Authority (FCA) sourcebook for Prudential Regulation for Banks, building societies and Investment Firms.

ANALYSING SALES PRICE BANDS

The following is an analysis of the frequency distribution by price of the sale of properties in England & Wales from January to December 2013. The data source for this frequency distribution analysis is the Land Registry price paid dataset, which lists every arms length transaction in the domestic property markets of England & Wales but excludes repossessions, properties sold to commercial organisations and properties sold by auction.

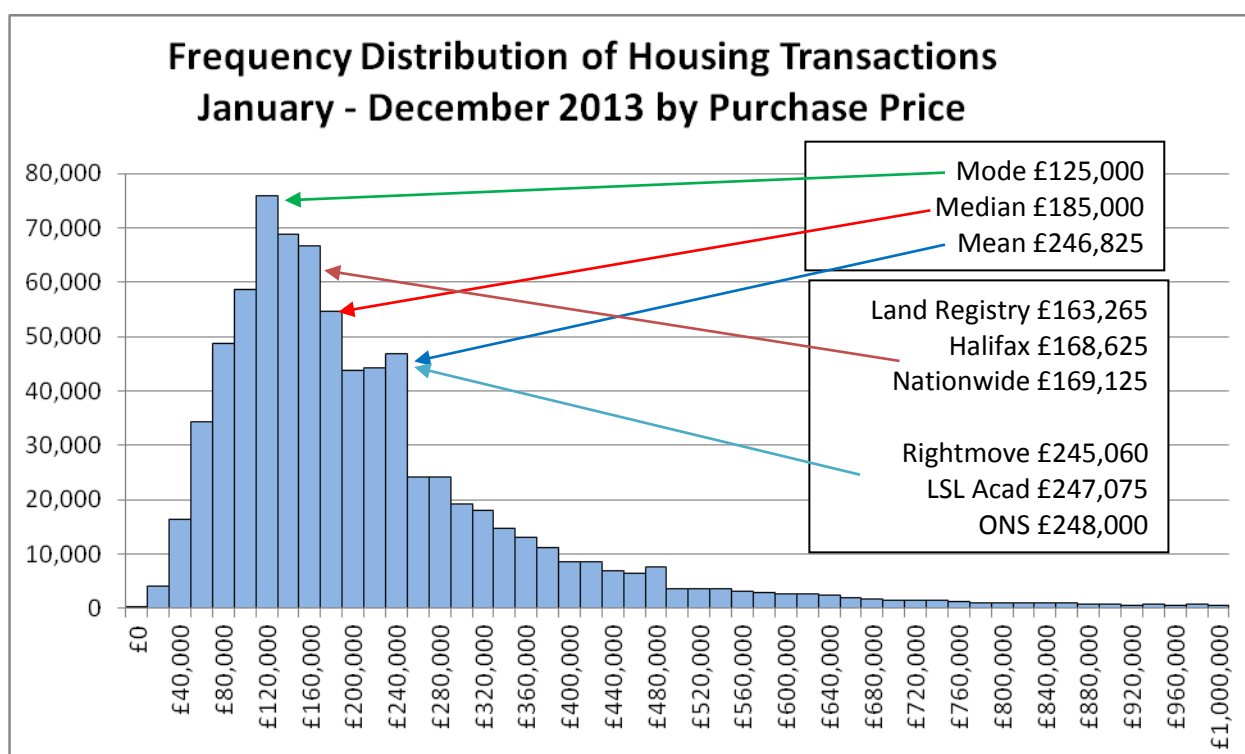


Figure 1 The frequency distribution of housing transactions from January to December 2013, analysed by purchase price

Unsurprisingly, the distribution as shown in Figure 1 is left skewed, with a long tail of the most expensive properties to the right. The total number of properties sold during the 12 month period was 780,760. In the interests of space we have truncated the scale along the bottom (x) axis to £1 million (the highest valued property sold during 2013 was £29.3 million).

The main measures used by statisticians to describe such a distribution are the mode (the most frequent price), the median (the half-way price) and the mean (the arithmetic average price). In the above distribution the mode is £125,000, the median is £185,000 and the arithmetic mean is £246,825. It is interesting to note that the Council of Mortgage Lenders paper 10/14 reporting prices for the period March 2013 to April 2014 said 'the overall average property value for first-time buyers over this period was £188,600'. This suggests that FTBs were paying close to the median prices, somewhat higher than those estimated by the conceptual indices.

It is worth pointing out that the mode price at £125,000 corresponds to the level at which stamp duty becomes payable on the sale of a property. It would thus appear that the most frequent price at which a property is sold matches the highest price at which stamp duty remains at a zero rate. Stamp duty thresholds have an influence on the distribution of property prices right up the price scale. There is an observable cliff edge in the distribution at £250,000, where SDLT rates change from 1% to 3% and a similar, although smaller, cliff edge at £500,000 where SDLT rates change from 3% to 4%. This is almost inevitable given the current slab system for stamp duty which means buyers will negotiate hard at those price points so that they pay a lot less stamp duty.

So how do the various house price indices compare with the frequency distribution for 2013? Table 1 uses a simple average of the house prices reported by the different Index providers over the year:

Which house price index?

Table 1. The average house price reported by the Indices providers for the period Jan – Dec 2013

Source	Average Jan – Dec 2013 prices
Land Registry	£ 163,265
Halifax	£ 168,625
Nationwide	£ 169,125
Rightmove	£ 245,060
LSL Acad	£ 247,075
ONS	£ 248,000

As can be seen, the prices reported by Land Registry HPI (LRHPI), Nationwide and Halifax fall somewhere between the Mode and Median price of the frequency distribution produced by an analysis of all housing transactions in England & Wales over the year. The Nationwide and Halifax indices are both based on the concept of a "standardised average price" for a home, which takes account of the costs of purchasing a defined 'average home', as opposed to calculating the average price paid for an actual home. Land Registry describes the prices it produces as being "Average prices". The LRHPI figure is based on the geometric mean of homes purchased in April 2000, adjusted by its repeat sales methodology for all subsequent dates. We have calculated that the geometric mean of all homes sold in 2013 was £192,330, not £163,265. Hence, we question the use of the word "Average" in this context. LRHPI house prices no longer reflect the current geometric average. Nor are they an average of the prices seen in the current market. Nor are they the price of the 'average house'. The remaining three indices are calculated using an arithmetic average of house prices weighted by various factors.

The LSL Acad HPI, having been recalibrated in January 2014, is within £250 of the arithmetic mean for the period. The Rightmove price is calculated from sellers' expectations of the prices they would receive which, in 2013, were close to those actually achieved. The ONS price index is calculated using mortgage-financed transactions collected via the Regulated Mortgage Survey which covers the majority of mortgage lenders in the UK. The ONS figures do not include cash sales which are likely to have lowered the average house price, due to the discounts obtained by purchasers in being able to offer cash payments.

A Caveat Concerning Sample Size for Regions and County/London Boroughs

Supposing sales fell again to 60,000 monthly. Current month volumes used by each index would start as follows:

- Rightmove 54,000
- ONS 24,000
- LSL Acad 21,000 ultimately 60,000
- LRHPI 7,600 finally 21,600
- Halifax 10,200
- Nationwide 9,000

(please see page 2 for caveats concerning the above estimates. For LRHPI, we have estimated 36% repeat sales)

For each of 141 counties/London boroughs samples are 1/141th the above. This is why:

- Halifax and Nationwide report regional results only quarter by quarter without monthly lower level results
- LSL Acad maintains a policy of smoothing all prices over three month rolling periods
- LRHPI smooths region/county/London borough prices over four month rolling periods, although this breaks their timing link with the LRHPI national prices

Of those indices providing final prices, ONS HPI does not include monthly county/London borough results. LRHPI does so but we refer readers to the cautions on page 6. The LSL Acad "forecast" release includes county/London borough results using 3 months data but our forecasts employ rolling averages and indicate trends. Only LSL Acad HPI "final" uses all the data for the full story.

Which house price index?

UNDERSTANDING THE LAND REGISTRY HOUSE PRICE INDEX

The Institute for Fiscal Studies (IFS) noted in its May 2014 *“House prices: what do the statistics really mean”* that *“All the indices show a broadly similar pattern. But they disagree on the extent of growth over the decade: the LSL Acad index shows an increase of over 55%, while the Land Registry index suggests an increase of around 35%. This is a large discrepancy.”*

LRHPI Inflation results. IFS explains that *“The Land Registry take a different approach. The Land Registry (LR) index is based on another method, known as repeat sales. The LR measures the increase in the price of each property sold in a given month compared to the price of that same property the last time it was sold. The average increase in prices is essentially the average of these individual increases in price. This approach ensures the index only measures genuine increases in price, without requiring the level of detail [required by the other major indices] (assuming the quality of the property has not changed substantially between sales, in which case an increase in ‘price’ might just reflect an increase in quality). However, it is still affected by changes in the mix of sales: for example, a shift in sale volumes towards properties whose price is increasing rapidly will show up as an increase in the overall rate of price growth, even if in fact each property is growing at the same rate as before. More generally, properties which sell more frequently will be over-represented in this index.”*

The monthly Notes attached to LRHPI state that *“using repeat transactions”* ensures an *“apples for apples”* comparison. However, as IFS points out, LRHPI averages the *“apples for apples”* price changes for the whole sample of monthly properties for which two prices are available, irrespective of property type. This is in contrast to the American repeat sales index, the S&P Case Shiller HPI, which reports only on one property type (the standard American *“single family home”*). Hence the IFS comment: the LRHPI *“is still affected by changes in the mix of sales”* and *“properties which sell more frequently will be over-represented in this index”*. We interpret this as meaning that LRHPI % Monthly and % Annual change results are not on a *“constant quality”* basis.

LRHPI average house prices The LRHPI Notes continue *“The standard average house price presented by Land Registry is calculated by taking the average (geometric mean) price in April 2000 and then recalculating it in accordance with the index change both back to 1995 and forward to the present day.”* On pages 1 and 4, we question the use of the word *“average”* in this context and note that the Land Registry prices do not equate to the arithmetic mean, geometric mean, median or mode of the housing market of today. IFS concludes: *“The Land Registry is best interpreted as a measure of price growth rather than price levels”*.

The terms *“geometric mean”* and *“recalculating it in accordance with the index change”* require discussion. For readers not familiar with the *“geometric mean”*, we explain the arithmetic and geometric mean as follows. An arithmetic mean is obtained by adding together the data in a series and then dividing by the number of data in the series. Thus the arithmetic mean of 1, 2, 3, 4, 5 is calculated using the formula $(1 + 2 + 3 + 4 + 5)/5 = 3$. A geometric mean is obtained by multiplying together the data in a series and then taking the n th root of the result, where n is the number of data in the series. Thus the geometric mean of 1, 2, 3, 4, 5 is calculated using the formula $\sqrt[5]{(1 \times 2 \times 3 \times 4 \times 5)} = 2.605$ (to 3 decimal places).

In general, the geometric mean has a smaller value than the arithmetic mean. For example, in April 2000 (the Land Registry base month), we calculate that the arithmetic mean of all houses sold in the month was £106,820. The Land Registry calculated that the geometric mean was £82,251. LRHPI has taken this base figure of £82,251 and multiplied it by the index change (based on RSR) to provide a *“standardised average price”* of £166,771 for December 2013.

“Recalculating (the geometric mean price) in accordance with the index”. The LRHPI was 132.18 in April 2000 and was 268.01 in December 2013. A quick check shows that $£82,251 \times 268.01/132.18 = £166,773$, thus confirming the December 2013 figure quoted above. However, as mentioned on page 4, *“the geometric mean of all homes sold in 2013 was £192,330, so the Land Registry quoted figures are no longer reflecting the geometric average”*.

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In correspondence, IFS added to the conclusion that *“The Land Registry is best interpreted as a measure of price growth”* saying: *“the LR index does provide another (albeit imperfect) way of thinking about average growth in prices”*. Yes; perhaps e.g. comparison of change in the raw (not mix adjusted) Land Registry prices compared with LRHPI change in the prices of properties sold more than once since 2000 would differentiate a market segment of interest to those improving and selling houses.

About the above IFS conclusion *“The Land Registry is best interpreted as a measure of price growth”*, Land Registry commented *“An Index is to measure change”*. This appears to discount the importance of the LRHPI prices. However, Land Registry publishes not merely change measures but a number of prices; not least the 2013 LRHPI national prices which average £163,265 and which result in the queries which this paper addresses. LRHPI prices are reported, too, at region and county/London borough levels. These show similar differences to the equivalent LSL Acad average prices. For Kingston, the LRHPI average price in February 2014 was £368,113 (cf. LSL Acad £453,991). Mathematically, the LRHPI price was the April 2000 Kingston geometric mean price, multiplied by the index which is seeking to measure price growth over a 14 year period and averaged with the November, December and January prices. We hope this is understood.

Land Registry also publishes LRHPI house prices on its website “Search the HPI”. Those choosing “View HPI data for a single region” can find prices over a specified period for a specified county. These assume that the % change in price for a detached house has been the same as for a flat since 1995. Land Registry explains that *“The household type breakdown on London Borough/County/Regional level is provided to enable reference to absolute levels rather than to explore differential movements”*. But it seems to us that inviting website users to enter a specific property type suggests that the differential average price for that particular property type is what will be provided. As already noted, whilst Land Registry describes its prices as “standardised”, the prices are not standardised in the sense of representing a conceptual property as do the Halifax and Nationwide indices.

A FINAL COMMENT ON HOUSE PRICE GROWTH

Given that the different HPI indices measure different elements of the housing market, it should not be too surprising to discover that the growth rates associated with each index also differ. The following table shows the change in prices over the last ten years from March 2004 – March 2014:

Table 2. The % change in House Prices over the 10 year period March 2004 – March 2014

Index	March 2004	March 2014	% change
Halifax	£ 151,491	£ 178,249	17.7
Land Registry	£ 141,612	£ 169,124	19.4
Nationwide	£ 142,584	£ 180,264	26.4
Median	£ 140,000	£ 182,500	30.4
ONS ⁽¹⁾	134.3 ⁽¹⁾	189.7 ⁽¹⁾	41.3
Rightmove	£ 179,570	£ 255,962	42.5
LSL Acad	£ 182,735	£ 261,913	43.3

(1) ONS: we have used the ONS Index rather than the ONS prices as the latter are not intended for annual comparison purposes

As can be seen the Indices are similarly divided into two groups, with the ‘conceptual’ indices (Halifax, Nationwide and LR) showing the lowest growth in prices over the ten year period, whereas the indices based on the arithmetic average price (ONS, Rightmove and LSL Acad) have the highest growth. We note that there has been a shift in property sales away from the north of England & Wales towards the south over this period, which will have increased the average value of house sales, without affecting the value of the ‘average house’. In Table 2 we have included the ‘median’ price for both March 2004 and March 2014, with the % change in the median price falling between the two groups. The median values are less affected by the sale of high priced properties than an arithmetic average. We are now producing median data. Is to study both mean and median prices perhaps the way forward?

Which house price index?

ABOUT ACADATA LTD

Acadata replaces the name Acadametrics, following our 2013 agreement with MIAC Analytics (our partners in MIAC Acadametrics) that MIAC Acadametrics would take responsibility for all risk work whilst Acadata would focus on house price indices and data.

Acadata is an analytics and research consultancy, expert in the measurement and analysis of house prices, with a 23 year co-operation with Dr Stephen Satchell, Economics Fellow, Trinity College, University of Cambridge. We are an independent source of support for those working in the housing sector e.g. providing:

- LSL Acad E&W HPI for LSL Property Services plc
- LSL Acad Scotland HPI for LSL Property Services plc

In addition to indices, we provide HPI weights enabling property funds to relate investments to the movement of an HPI e.g. to Hearthstone plc. We provide house price data and monthly updates using Land Registry* and Registers of Scotland* data in the form:

- Acadata Prices and Transactions (APAT LGA) comprising prices and transactions data from 1995 for England & Wales (2003 for Scotland) for Local Government Areas (E&W counties and London boroughs and Scottish local authorities)
- Acadata Prices and Transactions (APAT PCA) comprising prices and transactions data from 1995 for England & Wales (2003 for Scotland) for Post Code Areas

Our postcode data enable us to provide average prices plus transactions for postcode districts and optionally for postcode sectors, towns, streets or defined areas of interest, used e.g. by estate agents, developers and house builders. As variants of APAT PCA, we now provide for each Post Code Area town e.g. TW Twickenham or PO Portsmouth:

- APAT PCA E&W MASU GB (Mix Adjusted Seasonally Unadjusted) from 1995 (Scotland from 2003)
- APAT PCA E&W MASA GB (Mix Adjusted Seasonally Adjusted) from 1995 (Scotland from 2003)

At a lower level still, we use Land Registry Price Paid Dataset and Registers of Scotland data

- APAT PCA Medians GB (Median house prices also transactions) from 1995 (Scotland from 2003)
- APAT E&W Regional Medians

As an example of customised work, we provide e.g. APAT PCA E&W MASU for lenders, trusts and funds holding residential property with the postcode areas matching those in the property portfolio. The price movements then provide an early, simple and inexpensive guide to how the collateral is performing. For loan by loan revaluation purposes, we supply our house price data series through MIAC Acadametrics which offers a full revaluation service, aligned to the lender risk profile and regulatory requirements. Our work has a strong academic foundation and our solutions are developed using our own resources under our “research first” policy. Our data are used by HM Treasury. Further detail is provided on our website www.acadata.co.uk.

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