

# TESTING INDEXATION

## USING HOUSE PRICE INDICES TO REVALUE RESIDENTIAL PROPERTY PORTFOLIOS

Gone are the days when rising house prices lifted the equity of every borrower and floated the collateral-boats of all mortgage lenders. Stress tests on loan portfolios now require that the collateral supporting mortgage books be accurately revalued. Is an indexation procedure fit for purpose? A pre-requisite for any test is a source of data on a set of properties, with known first-sale prices, that have been resold at known second-sale prices. Not until 2005 did such factual sales prices become available in the form of the Land Registry (LR) "duplicate sale" data. The test which we describe herein comprises, possibly, the only test yet of indexation. We used the factual LR second-sale prices of 405,023 such properties to measure the accuracy obtained in our procedure, when employing our own Acadameetrics Residential Asset Revaluation (ARAC) prices (as used in our stress testing models), alternatively leading house price indices. Comparing the average of the indexed prices with the average of the factual second-sale prices, we found that the difference decreased with the use of more granular data. These differences were as follows:

**"all property" by region: 4.1%-7.6%**  
**by property type by region without CLG: 3.2%-3.9%**  
**by property type by county/London borough using ARAC: 0.3%-0.9%**

Accurate collateral revaluation is needed today, not merely for a whole book, but also for each individual property that supports a loan vulnerable to falling house prices or to rising arrears. This has led to an increasing resumption in the engagement of surveyors or to use of an Automatic Valuation Model (AVM). However, a lender might now choose to employ ARAC for say 3 or 6 monthly revaluations of a whole portfolio whilst engaging a surveyor or an AVM provider for an annual check and for revaluing those properties supporting loans at risk. ARAC is not the right tool for the latter purpose but the ARAC standard deviations for each property can be used to assist lenders in deciding which properties warrant further expenditure.

For lenders using traditional indices, we can undertake ARAC revaluations, provide ARAC house price data for lender use or calibrated results to enable indexed revaluations to be adjusted.

**4th March 2011**

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### 1. OVERVIEW

Past lender practice was to employ indexation to update the collateral value underlying a loan book, using a freely available mortgage-based index. The results were 'good-enough' over long periods of rising house prices and confidence that substantial repossessions were a past phenomenon. Today, a lender is likely to employ a surveyor or an Automatic Valuation Model (AVM) provider for revaluation. Out-sourced surveyor or AVM values come at significant cost but provide the degree of accuracy required in today's market. In this paper, we show that using our [Acadameetrics Residential Asset Calculator \(ARAC\)](#) can provide a proven, high degree of accuracy in measuring the value of collateral at whole portfolio level. ARAC prices are based upon our [Acadameetrics Prices and Transactions \(APAT\)](#) prices which are based, in turn, upon transacted house prices recorded at the Land Registry.

### 2. THE ADVENT OF THE AVM

Competition for remortgage business brought a market for the AVM which enabled a lender to make a speedier offer than was possible if a surveyor was engaged. An AVM was particularly appropriate for a borrower with a low loan to value (LTV) requirement. Whilst use of an AVM for revaluing a whole book is costly, compared with use of an index, a significant additional benefit is that the greater accuracy of the AVM results, compared with what is possible from use of an index, provides more certainty as to the collateral remaining to support each problem borrower, identified as one under, or likely to be subject to, the attention of an arrears management team. Cases for which even the AVM valuation, as indicated by the accuracy bands provided by an AVM, is deemed insufficiently accurate may well be then referred to a surveyor.

### 3. SUPPLEMENTING THE AVM

Use of an AVM for revaluing whole portfolios is likely to become, if it has not already become, the norm. However, a low cost methodology, such as that provided by ARAC, which replaces indexation and can revalue the properties supporting a whole portfolio with tested accuracy at an aggregated level, facilitates the use of more expensive procedures on a less frequent or more selective basis. Such a basis might comprise: annual, rather than say three monthly or six monthly, use of an AVM with use of an indexation at these intervals; engagement of a surveyor or an AVM as frequently as may be optimal given house price changes, arrears history and the circumstances of a borrower. We describe the data and procedures which we employ to provide such indexation, as follows:

**3.1 Land Registry (LR) data** provide the factual prices at which properties are transacted, including prices based upon cash purchases as opposed to the valuations at mortgage offer stage provided by the lender indices. Our APAT data provide the house price data series which underlies our LSL Property Services/Acadameetrics House Price Index. Please see [Acadameetrics Prices and Transactions \(APAT\) Methodology](#) for further detail.

**3.2 Acadameetrics Residential Asset Calculator (ARAC)** LR, and hence APAT, does not provide an average price for months when fewer than three sales of a particular property type take place within a particular county, unitary district or London borough. For such months, APAT data would show a blank in the appropriate cell. As described in our [Acadameetrics Residential Asset Calculator \(ARAC\) Methodology](#), ARAC provides an average price, for e.g. a particular county and property type, calculated using the APAT region and/or all property price movements for the month concerned. ARAC also provides our means of entering initial property values and the calculations and, within the revaluation output, standard deviations at individual property level. ARAC house prices, as a monthly data series, but without the calculations are available for clients to use in-house.

### 4. TESTING AN INDEXED REVALUATION

Testing accuracy of a house price index requires the availability of two prices fetched by the same property at different times, recorded in an electronic database.

**4.1 The Land Registry (LR) "price paid dataset"**, announced in 2004 and published in 2005, revealed the two or more prices for every property sold more than once since 2000; data from 1995 has since been added. By July 2007, the "price paid dataset" provided the prices of 405,023 such properties sold in 2006-2007 which we used to

test the Halifax, Nationwide and CLG house price indexes together with our then Acadametrics Residential Asset Calculator (ARAC).

**4.2 Our test** compared each latest-sale price recorded in the “price paid dataset” with the price for the same property at the latest-sale date calculated by applying the growth in each index to the first-sale price recorded in the LR dataset. The result was expressed, for each loan, as the ratio of the “latest-sale price paid” to the indexed revaluation. The log of each ratio was then used as the datum in obtaining a distribution that was roughly normalised. The figures given below are the exponent (antilogged) equivalents of points in this distribution.

Our first test used regional data, as provided by all the indices under consideration. Our second test used regional data by property type; this excluded the CLG index for which this level of granularity was unavailable. Our third test used county/London borough data by property type - a level of granularity provided only by ARAC.

## 5. RESULTS

**Regional data** Using regional data, discrepancies at portfolio level varied from 7.6% to 2.6%.

ACCURACY AND SPREAD OF INDEXED REVALUATIONS					
REGION					
total observations 405023	Ratio less 2 standard deviations %	Ratio less 1 standard deviation %	One minus the average value of the ratio as a %	Ratio plus 1 standard deviation %	Ratio plus 2 standard deviations %
CLG	-33.4%	-18.4%	7.2%	22.5%	50.1%
Nationwide	-33.4%	-18.4%	4.1%	22.5%	50.1%
Halifax	-34.3%	-18.9%	7.6%	23.3%	52.1%
ARAC	-33.4%	-18.4%	2.6%	22.5%	50.1%

**Regional data by property type** The addition of property type considerably improved overall accuracy.

ACCURACY AND SPREAD OF INDEXED REVALUATIONS					
REGION BY PROPERTY TYPE					
total observations 405023	Ratio less 2 standard deviations %	Ratio less 1 standard deviation %	One minus the average value of the ratio as a %	Ratio plus 1 standard deviation %	Ratio plus 2 standard deviations %
Halifax	-32.8%	-18.1%	3.2%	22.0%	48.9%
Nationwide	-32.7%	-18.0%	3.9%	21.9%	48.7%
ARAC	-32.5%	-17.9%	0.8%	21.8%	48.2%

**County/London borough, by property type, data** were available only using ARAC.

ACCURACY AND SPREAD OF INDEXED REVALUATIONS					
COUNTY/LONDON BOROUGH BY PROPERTY TYPE PROVIDED BY ARAC ONLY					
total observations 405023	Ratio less 2 standard deviations %	Ratio less 1 standard deviation %	One minus the average value of the ratio as a %	Ratio plus 1 standard deviation %	Ratio plus 2 standard deviations %
counties	-32.6%	-17.8%	0.9%	20.8%	45.8%
County of Gtr.Lon.	-29.4%	-15.8%	0.4%	19.0%	41.6%
London boroughs	-29.6%	-16.1%	0.3%	19.2%	42.1%

## **6. STANDARD DEVIATIONS**

ARAC data and software provide a one minus the average value of the ratio % calculation for each revalued property and the standard deviations of that calculation. By contrast with an error band provided with an AVM, these deviations are transparent statistical measures, using the range of values for the property type and area under estimation, shown within the 405,023 sample.

## **7. CONCLUSION**

ARAC produces average ratio values that are closer to one, than do the indices tested.

Use of the Land Registry property type category improved the accuracy (i.e. brought the ratio closer to one) for both the Halifax index and ARAC. Surprisingly, inclusion of property type made little difference in the case of the Nationwide index.

Also somewhat surprisingly, employing ARAC county, rather than ARAC regional, data, made little difference. For the county of Greater London, the average ratio error was 0.4%. Adding granularity by employing London borough data, reduced this only to 0.3% (as shown above).

We plan to update this test, using current Land Registry data as soon as possible, this year.

## ABOUT ACADAMETRICS

Acadametrics is an analytics consultancy focussed upon house prices and property portfolio risk. We conduct research, led by Dr Stephen Satchell, Economics Fellow, Trinity College, University of Cambridge, develop solutions to assist lenders and are expert in the measurement of house prices, preparing our own house price index launched in 2003 by the Financial Times as FTHPI. In a step to expand coverage, LSL Property Services PLC agreed to support the index, known from June 2010 and widely published as the LSL Property Services/Acadametrics House Price Index (LSL Acad HPI). Whilst backed by LSL, the index retains its authority as independently prepared and providing an independent News Release commentary. As FTHPI, the index was chosen by the Chicago Mercantile Exchange for a possible future residential house price derivative.

Our past work has included the analysis of pre-payment risk, the pricing of mortgage books and the assessment of the performance of credit score models for mortgages, credit cards and unsecured loans under changing macroeconomic scenarios. Much of our early work involved forecasting the mortgage and MIG losses arising from the 1989-1991 housing crisis. As a result, we hold what we believe to be the largest available downturn default database, which enables our stress and scenario testing methodologies, developed by Dr Satchell.

Since early in 2009, we have worked closely with MIAC Analytics from New York. Our joint company, [MIAC | Acadametrics](#) Limited, provides our data and models on the MIAC DataRaptor data management platform with the WinOAS cash flow tool. These can now be downloaded from our secure UK server, for use in-house. Our models assist on-balance sheet lenders, together with participants in securitisations and in the sale and purchase of loan portfolios. We offer:

- **House Price Data Series** entitled Acadametrics Prices and Transactions (APAT) providing monthly house price trends from 1995 at national, county, unitary district and London borough level, based upon Land Registry data, with interactive charts for every participant in the housing sector; we offer expertise and data for all those investing in or advising on house prices and extensive analytical capability
- **Collateral Valuation** using our Acadametrics Residential Asset Calculator (ARAC) based upon APAT, incorporating data entry and calculation software to provide loan level confidence measures used in our Residential Property Portfolio Revaluation service and SST (below). The house price data are also available as a series for use by lenders and owners of residential property portfolios for their in-house revaluation use
- **Loan Level Stress and Scenario Testing** comprising our:
  - **Arrears and Possessions Forecasting (UKAPF)** using our Satchell Wongwachara model to forecast at UK level, accounting for forbearance; for benchmarking purposes and economists; our related Macro-Risk Model assesses national risk levels
  - **Stress and Scenario Testing (SST)** with ARAC revaluation as standard, or AVM revaluation, to provide forecasts of loan by loan possessions and losses, employing Macro-Risk Model output to reflect alternative scenarios
- **Custom Data and Model Development** which includes the provision of loss data from our downturn default database for client LGD benchmarking, model validation and model development, by Dr Satchell, bespoke to customers' needs. We have considerable expertise in index construction, available for clients

Our website includes numerous descriptive papers. Acadametrics services have an academic foundation in econometrics, statistics and decision theory and are developed from our own resources under our "research first" policy. Further detail is provided on our website [www.acadametrics.co.uk](http://www.acadametrics.co.uk).

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