



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 Collateral Valuation Calculator (ACVC LGA) 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 ACVC LGA: 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 ACVC LGA 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. ACVC LGA is not the right tool for the latter purpose but the ACVC LGA 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 ACVC LGA revaluations, provide ACVC LGA house price data for lender use or calibrated results to enable indexed revaluations to be adjusted.

19th December 2012

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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 [Acadametrics Collateral Valuation Calculator \(ACVC LGA\)](#) can provide a proven, high degree of accuracy in measuring the value of collateral at whole portfolio level. ACVC LGA prices are based upon our [Acadametrics Prices and Transactions \(APAT LGA\)](#) 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 ACVC LGA, 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 LGA data provide the house price data series which underlies our LSL Property Services/Acadametrics House Price Index. Please see [Acadametrics Prices and Transactions \(APAT LGA\) Methodology](#) for further detail.

3.2 Acadametrics Collateral Valuation Calculator (ACVC LGA) LR, and hence APAT LGA, 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 LGA data would show a blank in the appropriate cell. As described in our [Acadametrics Residential Asset Calculator \(ACVC LGA\) Methodology](#), ACVC LGA provides an average price, for e.g. a particular county and property type, calculated using the APAT LGA region and/or all property price movements for the month concerned. ACVC LGA also provides our means of entering initial property values and the calculations and, within the revaluation output, standard deviations at individual property level. ACVC LGA 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 Collateral Valuation Calculator (ACVC LGA).

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 ACVC LGA.

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%
ACVC LGA	-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%
ACVC LGA	-32.5%	-17.9%	0.8%	21.8%	48.2%

County/London borough, by property type, data were available only using ACVC LGA.

ACCURACY AND SPREAD OF INDEXED REVALUATIONS					
COUNTY/LONDON BOROUGH BY PROPERTY TYPE PROVIDED BY ACVC LGA 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

ACVC LGA 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

ACVC LGA 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 ACVC LGA. Surprisingly, inclusion of property type made little difference in the case of the Nationwide index.

Also somewhat surprisingly, employing ACVC LGA county, rather than ACVC LGA 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 and research consultancy focussed upon house prices and property portfolio risk and with a 23 year co-operation with Dr Stephen Satchell, Economics Fellow, Trinity College, University of Cambridge. We are expert in the measurement of house prices. Our FTHPI, launched in 2003 by the Financial Times, pioneered use of Land Registry data in a mainstream house price index. Following a 2010 sponsorship agreement with LSL Property Services PLC, FTHPI is now published as LSL Acad E&W HPI but retains full independence with a monthly commentary by Dr Peter Williams. Our LSL Acad Scotland HPI was launched in 2011. We work with LSL to employ their substantial valuation and rental information to support participants in the housing sector. As FTHPI, the index was chosen by the Chicago Mercantile Exchange for a possible future residential house price derivative, put on hold as a result of the financial crisis.

What about our risk solutions, including stress testing, model validation, loss benchmarking, analysis of pre-payment risk, pricing of mortgage books, forecasting performance of credit score models (mortgages, credit cards and unsecured loans under changing macroeconomic scenarios)? By combining these from 2009 with the web skills and analytics software of New York based MIAC Analytics in our jointly owned MIAC Acadametrics Ltd, together we have created what is recognised as a top-flight consultancy. Partnering Clayton ERM when due diligence is required, [MIAC | Acadametrics](#) (M | A) has powerful tools to provide the independent risk analytics and cross-lender outcomes now increasingly seen as important to regulators. M | A's work for mainstream lenders and top acquirers is largely under non-disclosure agreements but e.g. Yorkshire Building Society credited M | A's stress testing contribution to their purchase of the Egg mortgage book.

ACADAMETRICS LTD provides Acadametrics Prices and Transactions (APAT LGA) data showing property type prices for Local Government Areas from 1995, using Land Registry data* for England & Wales counties, unitary authorities and London boroughs and data from 2003 for local authorities in Scotland*. APAT LGA includes an interactive chart facility. APAT POSTCODE provides average prices plus transactions for postcode districts and optional data for postcode sectors, towns, streets or defined areas of interest to a client. We prepare indices for third parties. We also forecast house prices.

MIAC ACADAMETRICS LTD combines MIAC's DataRaptor data management platform and WinOAS cash flow tools with the Acadametrics data and solutions for on-balance sheet lenders, securitisations and for buyers or sellers of loan portfolios. These tools and MIAC's Asset Valuation Model are available for client in-house use. Principal Acadametrics tools and solutions offered are:

- **loan by loan Stress and Scenario Testing (SST)** based upon Dr Satchell's work during the 1989-1991 housing crisis and employing our own independent downturn default database. Uses ACVC and UKRMR below.
- **Acadametrics Collateral Valuation Calculator (ACVC LGA)** based upon APAT LGA data. ACVC LGA provides a complete revaluation solution for lenders and residential property portfolio owners, in-house or as an out-sourced service. ACVC LGA's loan level confidence measures enable e.g. surveyor or AVM costs to be minimised
- **UK Regional Possessions Forecasting (UKRPF**)** uses our Satchell/Qi Zhang model to forecast regional possessions for the notional UK mortgage book, accounting for forbearance; lenders use for benchmarking
- **UK Regional Macro Risk (UKRMR**)** uses our Satchell/Qi Zhang model to provide a mortgage risk weight for any specified macroeconomic scenario and flex the SST possession probabilities for e.g. the FSA "anchor case"

Our work has an academic foundation in econometrics, statistics and decision theory; our solutions are developed using our own resources under our "research first" policy. Further detail is provided on our website www.acadametrics.co.uk.

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** under development for early 2013 release