

B

MODELLING

INTRODUCTION

B.1 The Inquiry has developed a number of detailed models to illustrate reform of the local government finance system. Results from the Inquiry's council tax revaluation and reform options are presented in Annex A. This technical Annex describes the processes behind the models.

COUNCIL TAX REVALUATION AND REFORM MODELLING

Data Sources

B.2 The Inquiry's revaluation model uses information supplied by the Valuation Office Agency (VOA) from three data sources:

1. residential sales information over a two-year period July 2003 to July 2005;
2. data from the Automated Valuation Model (AVM) employed in preparation for the revaluation; and
3. data from the Test Modelling Exercise conducted during the development of the AVM.

B.3 In general the key information required for each property is:

- sales price/property value;
- date of sale or valuation;
- current council tax Band; and
- local council tax Billing Authority.

Final Data Set B.4 The combination of the three data sources gave a sample data set for the Inquiry's models comprising 2.2 million valuations or 10 per cent of the total number of dwellings in England (22 million).

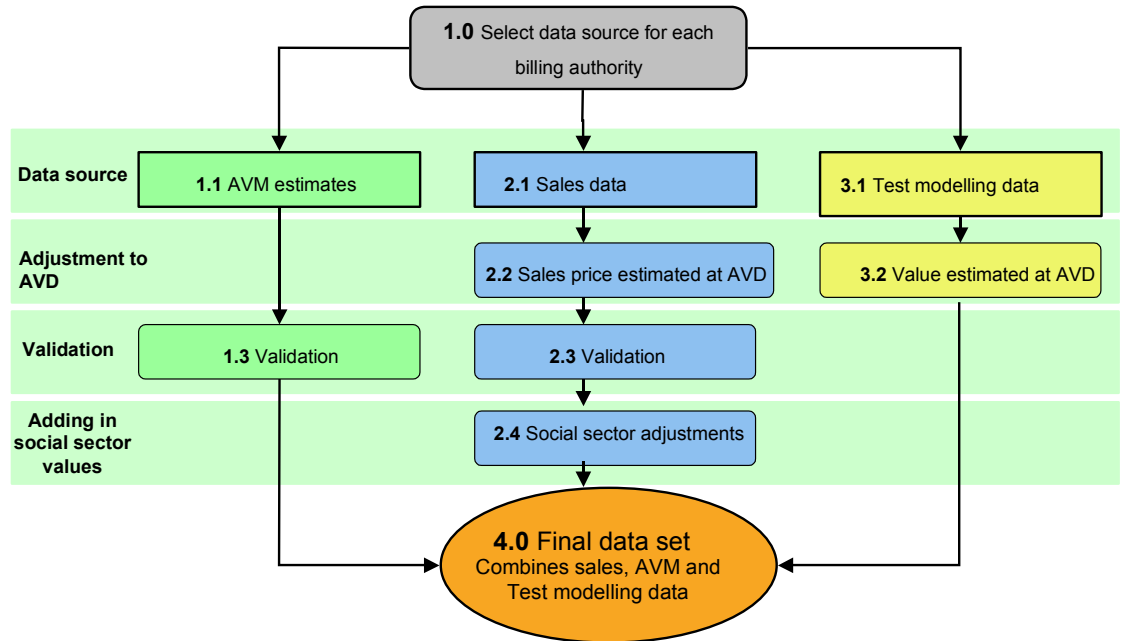
B.5 The sampling fraction varies regionally, from 6.8 per cent in the North East to 12.4 per cent in the West Midlands.

B.6 A later and more robust data set received from the VOA will be used to update the existing illustrations shown in Annex A and to model any further reform options for council tax revaluation.

B.7 It is recognised that other bodies provide advice and commentary on the property market and there are other data sets available for revaluation analyses. However, it should be noted that the final sample data set used for the Inquiry's revaluation modelling combines information on all reported residential sales with valuations from the AVM, which has the benefit of countrywide representation.

Description of the model

Chart BI: Creating the final data set



Selecting the data source for each authority

B.8 Firstly the revaluation model selects the most appropriate data source for each Billing Authority (step 1.0). The data options are the test modelling data, the AVM estimates or the residential property sales data.

Data adjustments and validation procedures

B.9 The AVM data provide estimated property values at the AVD.¹ Each AVM estimate has an associated confidence value, the lower this value the better the estimate. The revaluation model only retains AVM estimates with a confidence value below a predefined cut-off point (step 1.3) such that less reliable estimates are excluded from the final revaluation data set. The AVM estimates contain information on private and social sector properties.

B.10 The revaluation model adjusts the two-years of sales data to a single point of sale at the AVD (step 2.2). The sales data are then validated to exclude non-open market transactions, for example right to buy sales or sales between members of the same family. Other property transactions are also excluded from the sales data if it is felt that the recorded sales price does not reflect the likely value of the property for council tax purposes (step 2.3). Finally the revaluation model uses data from the English Household Conditions Survey (EHCS) to generate estimated social sector property values by council tax band and region at the AVD. These estimates are imputed onto the sales data set such that the ratio of private sector to social sector dwellings reflects the true ratio for the region as a whole (step 2.4).

B.11 The test modelling exercise data reflect property values at various points during 2004 so all of the property values are re-calculated on the final AVD (step 3.2). The data

¹ The Antecedent Valuation Date (AVD) for the 2007 revaluation exercise was set at 1 April 2005, two years prior to the date the new valuation lists would have come into effect.

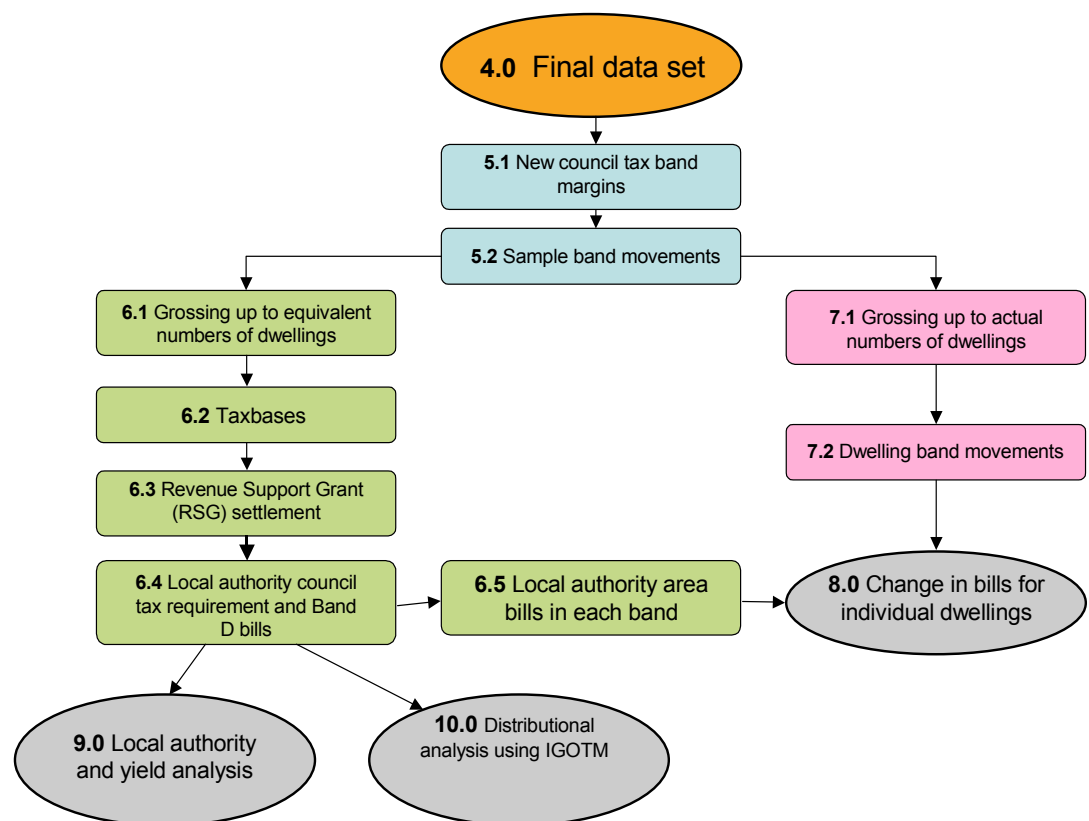
set does not require validation, as the property values are live valuations carried out by local surveyors. The test modelling data already contain information on social sector properties.

Creating the final data set **B.12** The three data sets are combined to create a final revaluation data set (step 4.0). Subsequent modelling and analysis is run on this final data set. The data set contains information on a 10 per cent sample of dwellings across the country.

Modelling the impact of revaluation on different outcomes

B.13 The council tax revaluation model uses the final data set to predict the changes that would result from revaluation at a local and national level. The model represents the effects of a revaluation on the 1 April 2005 applied to the 2005-06 financial year. Any changes as a result of revaluation are calculated by comparing the 2005-06 figures after revaluation to the identical 2005-06 figures before revaluation.

Chart B2: Modelling the impact of revaluation



Setting the new band margins **B.14** Firstly the revaluation model calculates new council tax band margins (step 5.1). In general the new band margins are set based on the average value of properties in the existing bands at the AVD. In the national update model, which retains the current band and ratio structure, the new upper limit for each band is set at the mid-point of the average property value in the existing band and the following band. For example the new Band B upper limit is set at the mid-point of the Band B average value and the

Band C average value. In the extra bands model Band A is split into Band A1 and Band A2 and the Band A1 upper limit is set such that a half of all existing Band A properties are expected to move down to the new lowest band. Band G is split into Band G1 and Band G2. The Band G1 upper limit is set at the average Band G property value. Finally two bands are added to the top of the existing structure to create Bands H1, H2 and H3. After considering the distribution of property values at the top end of the market the Band H1 and H2 upper limits are set at round numbers of £1.5 million and £2.5 million respectively, these values ensure a spread of properties across the highest bands. Any property with a value greater than £2.5 million is placed into the highest band, H3.

Band movements in the sample data set **B.15** The new band margins are overlaid onto the sample data set and each dwelling is placed into a new band according to its value at the AVD. The data set now has information on old band and new band and thus the model can track band movements resulting from revaluation (step 5.2).

Taxbases and local authority Band D bills **B.16** In order to calculate local authority taxbases after revaluation (step 6.2) the model grosses up the sample band movements to the number of equivalent dwellings as reported by local authorities (step 6.1). Equivalent dwelling figures take into account discounts and exemptions from the council tax.

B.17 The revaluation model runs the post-revaluation taxbases through a simplified version of the local government finance settlement model to calculate the amount of Revenue Support Grant (RSG) payable to each local authority after revaluation (step 6.3). The revaluation model then calculates the new council tax requirement and Band D bill for each authority and local authority area (step 6.4). The settlement model assumes no change in local authority spending levels after revaluation and calculates levels of grant before floors (and ceilings).

Band movements **B.18** In order to estimate the number of properties moving bands in the illustrative options the model grosses up the sample band movements to the number of dwellings on the VOA valuation list (step 7.1).

Changes in council tax bills **B.19** The model calculates the council tax bill for every dwelling in the country by multiplying the local authority area Band D bills by the new band ratios (step 6.5). The model then calculates the change in bill for each property (ignoring discounts, exemptions and council tax benefit) by comparing the bill for each dwelling after revaluation with the bill before revaluation in 2005-06 based on grant before floors (step 8.0).

Local authority and yield analysis **B.20** The RSG settlement model (step 6.3) can be used to calculate changes in the national taxbase, resulting changes in the Assumed National Council Tax (ANCT) and shifts in grant round the country. Information on local authority Band D bills and taxbases after revaluation can also be used to calculate the impact of revaluation on the national gross council tax yield.

Discussion of key modelling assumptions

Commitment not to increase the yield from council tax **B.21** In order to keep the yield from council tax constant after revaluation the Inquiry's model sought to hold the national taxbase (number of Band D equivalent properties) stable. However in practice it is near impossible to achieve a precise zero change in tax base. Therefore small changes in the taxbase after revaluation were offset by increasing or decreasing the Assumed National Council Tax (ANCT) such that the product of the national taxbase and ANCT was the same before and after revaluation. In general if the national taxbase were to rise marginally then ANCT would fall and as a result many homes staying in the same band would see a slight fall in their bills. The opposite is also true; if the national taxbase were to fall then ANCT would rise and many homes staying in the same band would see a slight rise in their bills. The size of the change in bill would vary in each authority depending on the level of the local authority council tax requirement and post-revaluation taxbase. Future models could make slight changes to band limits and/or multipliers to achieve even smaller changes in taxbase. In the modelling to date the national taxbase would increase by around 0.5 per cent under the national or regional update models. All three Extra Bands models would reduce the taxbase; the largest fall would be for the limited upward movement model (-0.9%).

Treatment of second homes in the extra bands with limited upward movement model **B.22** In line with local authority discretion to reduce council tax discounts for second homes the Inquiry Team assumed that second homes would not be eligible for a capped upward movement after revaluation in the above model. However, as it was not possible to obtain second home information for each property in the country, the revaluation model does not attempt to model second homes separately.

B.23 Instead, a basic model was created to estimate the number of second homes moving up two bands or more. The model assumes that the pattern of band movements for second homes would be similar to the national pattern of band movements as estimated by the revaluation model. In order to approximate the number of second homes moving up two bands or more, the model combines estimates of band movements from the revaluation model with local authority data on the number of second homes in each existing band.

B.24 The revised estimate of the number of properties eligible for a limited upward movement was not included in either the revaluation or the settlement model. However, due to the small number of second homes moving up two bands or more after revaluation, this omission is not expected to have had a significant impact on the modelling results.

Government micro-simulation models

B.25 The Inquiry Team has run analysis using the Inter-Governmental Tax Benefit Model (IGOTM) and the Department for Work and Pensions (DWP) Policy Simulation Model (PSM). Both are static micro-simulation models of the UK tax and income related benefit system and can be used to estimate the impact of changes on different types of household and on the overall government budget. The Inquiry Team used these simulation models to estimate the impact of revaluation on household bills and the overall cost of Council Tax Benefit to government.

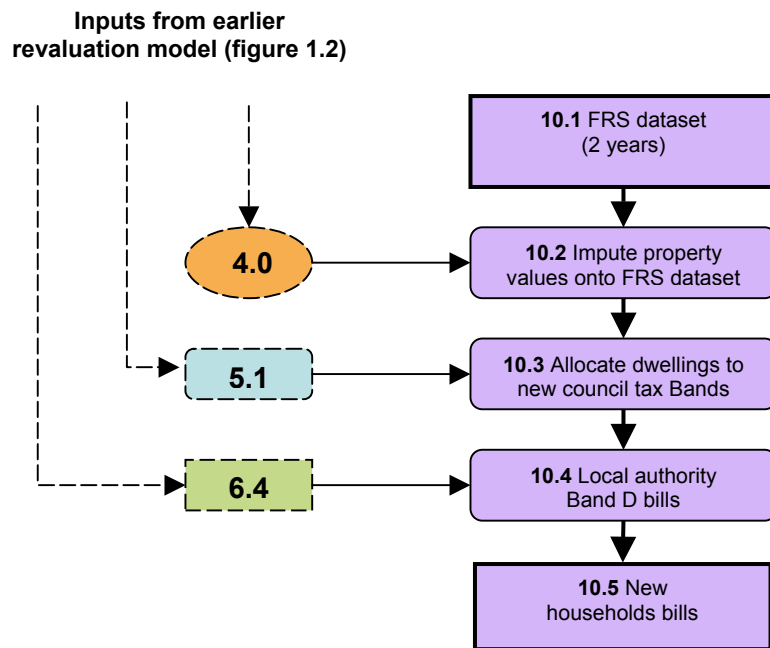
B.26 Both simulation models use Family Resources Survey (FRS) data and calculate household or benefit unit liability for taxes and entitlement to benefits. Although similar the models are not identical and each has particular strengths for different areas of the tax and benefit system.

B.27 The majority of the council tax revaluation analysis was run using the IGOTM model; however a smaller selection of this analysis was also run on the PSM to check the implications for the overall government budget at full-take-up of Council Tax Benefit.

Revaluation analysis using IGOTM

B.28 The Inquiry made a number of changes to the FRS input data set and to the IGOTM model in order to run the revaluation analysis. These steps are described below.

Chart B3: Creating the Lyons Inquiry IGOTM data set



B.29 Firstly, two sweeps of the FRS are combined (step 10.1), both years updated to reflect 2005-6 incomes and prices. The resulting data set contains information on 42,000 households in England and allows more robust analysis at a sub-national level.

B.30 Estimated property values at the AVD, calculated from the VOA sales data, are imputed onto the FRS data set by council tax band and billing authority (step 10.2). Each household on the data set is then allocated to a new band after revaluation on the basis of its imputed property value and the new band margins calculated in the earlier revaluation model (step 10.3). It should be noted that due to the property value imputation methodology (step 10.2) there are no households in the highest council tax band (H3) on the IGOTM input data set in any of the Extra Bands reform options.

B.31 The new local authority area Band D bills calculated previously are merged onto the two-year FRS data set. Household bills after revaluation are calculated by multiplying the band ratios in the new council tax banding structure by the new local authority area Band D bills.

B.32 The Inquiry Team introduced an additional survey grossing factor to ensure that the number of equivalent households after discounts and exemptions in each region and council tax band matched the number calculated in the Inquiry’s earlier revaluation models.

B.33 Taken together the above steps create a new input data set for the IGOTM model that contains information on council tax band and council tax bill before and after revaluation.