

## **Non Domestic Rates Forecast Model – Draft Budget (2017/18) December 2016**

This paper provides an overview of the Non-Domestic Rates (NDR) forecast model and specific work undertaken for the revaluation of properties in 2017/18.

As 2017/18 was a revaluation year for the NDR tax base a number of analytical challenges were presented. This paper summarises these challenges, outlines the steps taken by analysts to address these challenges and discusses lessons learned for the next revaluation of the NDR tax base.

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### How does the model work?

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The Scottish Government's NDRi forecasting model uses valuation data available from the Assessors. Fairly simple methods are applied to this data to make forecasts.

The model can be split into four stages. The methods used at each stage are detailed below alongside a brief explanation of the key assumptions made at each stage:

#### **Stage 1: Estimating the size of the tax base**

Total rateable value of properties in Scotland is the Non-Domestic rates tax base. Changes in this tax base tend to be small from year to year. This means it is relatively easier to forecast changes in the tax base compared to other taxes. The model uses the most recent total rateable value (RV) data in Scotland and is adjusted using the following assumptions to forecast changes in the tax base:

- **Appeals loss:** An appeals loss assumption (allowing for RV reduction related to valuation appeals) is made for the next revaluation cycle and the current reval cycle. These assumptions are based on historic data and any specific intelligence about large potential appeals loss risks. The profile of appeals losses (i.e. when RV reductions are applied) is based on historic data.
- **Buoyancy:** Buoyancy is modelled as its own long-term average plus a cyclical adjustment. Further discussion of how this is derived can be found in correspondence with the Scottish Fiscal Commission on eRDM.
- **Annual average RV:** New RV (buoyancy) is taxed on a pro rata basis based on the number of days until 1<sup>st</sup> April of the next year. To estimate NDR from new RV, the model assumes this occurs evenly across the year by taking the mid-point between post appeal RV and post buoyancy RV.

#### **Stage 2: Estimating the (gross) bills faced by the tax base**

Next the total tax liability, before reliefs and other deductions, is estimated. Analysts refer to these as "Gross Bills". There are two rates applied to the tax base which both must be forecast:

- **Poundage:** The headline tax rate (poundage) is applied to the entire tax base. It is typically uprated each year by September RPI. The forecast model therefore uses OBR inflation forecasts to estimate future poundage rates.
- **Large Business Supplement (LBS):** LBS is an additional tax rate which is paid over and above poundage. Only properties over a certain RV threshold pay LBS. The entire RV of a property above the threshold is liable to pay LBS. A forecast is therefore required of both the RV liable for LBS and the rate of LBS. It is assumed (unless given instruction by policy) the LBS rate stays constant. The proportion of the RV liable to pay LBS is assumed to remain constant by uprating it by the change in RV as a whole.

### **Stage 3: Estimating the income foregone as a result of relief schemes**

Gross bills can be reduced by relief entitlement – analysts refer to post-relief liabilities as “Net Bills”. The forecast model usually uses data on current relief expenditure as the basis of future forecasts. Factors which affect the whole tax base (i.e. those estimated in stages 1 and 2) will also affect relief expenditure. Reliefs are generally modelled as follows:

- **3 year average uprated by gross income:** Most reliefs are forecast as the three year average total relief cost multiplied by the ratio of gross income in the forecast year to the average total gross income from the last three years. The normal formula used is below, where RC is total relief cost of a given relief, GI is gross income and t is the year:

$$RC_t = \left( \frac{(RC_{t-1} + RC_{t-2} + RC_{t-3})}{3} \right) \times \left( \frac{GI_t}{\left( \frac{(GI_{t-1} + GI_{t-2} + GI_{t-3})}{3} \right)} \right)$$

- **1 / 2 Years of Data, or Separate Forecasts:** Certain reliefs are forecast on the basis of one or two years of data. This is typically done because, for example, recent policy changes to the relief mean three year old data is not relevant. It could also be the case that known trends in the tax base (e.g. an observed increase uptake levels) mean that data from 3 years prior is no longer relevant. Where a known change (such as a new policy change) has not yet happened, a separate forecast is often employed.

### **Stage 4: Estimating any other adjustments**

Finally, there are a number of other factors which need to be accounted for before an estimate of income can be derived. The largest factor is backdating of appeals losses to reflect refunds of associated overpayments in prior years. Other examples include write offs where it has been identified that rates cannot be recovered from a particular property or accounting for bad debts.

Where these can be modelled using other data in the forecast model (for example, the backdating of appeals loss), this is done so. Rolling averages of outturn data are used elsewhere to forecast these factors – these are uprated by changes in gross income similar to relief expenditures where appropriate.

## **Challenges Faced at Revaluation and Actions taken**

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NDR Revaluations present a number of analytical challenges. This is because all properties have been assigned a new rateable value but the NDR model is based on the latest outturn valuation roll data (i.e. before revaluation). This section outlines the challenge of marrying together the old and new valuation roll. This section also discusses the other key challenges faced at revaluation and how these were addressed in forecasting.

### **1. Assumptions on Loss of Rateable Value**

At revaluation assumptions must be made about the amount of appeals likely to be faced over the next revaluation cycle. Whilst the vast majority of appeals are related to the new revaluation cycle, there are often a small number outstanding appeals from previous cycles which must be modelled too.

The starting point for new revaluation cycle appeals is historic data. The average appeals loss from past revaluations is around 4%.

Some very high value properties, in particular large utility companies, faced large increases in RV at 2017 revaluation. Fewer than 20 of the 220,000+ entries on the roll accounted for over half of the total increase in RV seen at revaluation. This presented a specific risk of additional appeals losses. Analysts and policy officers therefore felt it was appropriate to raise the appeals loss assumption above 4%. An analysis of additional appeals loss has been prepared by analysts.

This analysis initially suggested an appeals loss of 6%. As the analysis outlines, assessors felt the provisional valuations given to large utility companies in October 2016 were likely to be revised downwards once they receive further evidence from these companies.

Electricity properties in particular provisionally saw high increases in RV but were expected to see a downward amendment to that following meetings between the assessors and electricity companies but prior to the revaluation itself. As a result, it was decided to implement both a pre-revaluation RV loss assumption, and a post revaluation appeals loss assumption.

Given the lack of evidence base, analysts used the growth in electricity transmission and distribution properties in England as a proxy for the level that valuations in Scotland might reach come the final revaluation. After this was applied, analysts and policy officials considered that some risks in the tax base had been accounted for. Therefore, the appeals loss assumption was revised to be 5% for the 2017 revaluation cycle. Specific detail on how this figure was derived can be found in the paper above.

The “profile” of appeals loss (when RV reductions are applied) was based on the historic average of the percentage of appeals addressed by year in the revaluation cycle.

## **2. Outstanding Appeals Loss Assumption**

The outstanding 2010 appeals loss was estimated at £8.5m. This was estimated based on historic appeals loss on remaining appeals at this stage in the cycle (5%) applied to the remaining total RV under appeal (£170.6m).

The profile of this outstanding appeals loss was based on historic data and discussions with assessors. Historic data shows that of the remaining appeals RV (typically a relatively small amount), 90% is resolved between years 7 and 8 of the cycle. Given the difficulty in predicting when appeals cases will be heard, analysts judged the appeal loss should be split equally between these years. The remaining 10% was split equally over years 9 and 10 of the cycle. This methodology was discussed and validated with Scottish Assessors.

## **3. Up- and Down- scaling for Revaluation (“Transition/Reval Factor”)**

Revaluation will have a different effect on the RV of different groups of properties (e.g. RV of properties receiving empty relief fell this revaluation whilst charity RV increased slightly, without any change to the reliefs themselves). Therefore the forecast cost of different reliefs cannot simply be up- or down-scaled in line with the total change in RV using “transition factors”.

Transition factors were calculated as the percentage change in Gross Bill of the properties in each item. This was done in SAS. So for example, modelling suggested the Gross Bill of properties receiving unoccupied property relief is forecast<sup>1</sup> to fall by 6.4%, so the total amount of pre revaluation relief was multiplied by -6.4% to provide a 2017/18 forecast of the total relief cost.

Before the effects of revaluation are modelled, the value of items before revaluation were estimated using the standard formulae. “Transition factors” were then used to up- or down-scale the pre-revaluation value of these items.

For reliefs where there is not a large sample of data that could be used to forecast movements in gross bill (an expenditure of £1m in 2016/17 was used as a threshold), the transitional factor used was the average change in gross bill for Scotland as a whole. This was 3.5%. In addition to this, for items analysts assessed should not be related to gross bills (and therefore revaluation), such as bad debts, no transition factor was applied.

Separate transition costings were made for SBBS, based on the RV at each band, due to the policy changes announced at Draft Budget 2017/18.

Revaluation adds additional complexities to forecasting so it was decided 2017-18 forecasts would be more appropriate. The former would have required a secondary

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<sup>1</sup> Due to the fact that the latest property by property data that is held on properties in receipt of relief was from 2015, precise movements in gross bill could not be known ahead of revaluation.

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round of adjustments being applied to the 2015-16 and 2016-17 data to account for both revaluation and for changes to the tax base in 2017-18.

### **Lessons Learned and Recommendations for Future Revaluations**

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Following the analytical work undertaken for revaluation 2017, analysts have detailed below some key lessons learned and recommendations for future revaluations.

#### **1. Representative Sample of Properties**

Obtaining earlier representative samples of revalued properties throughout the valuation process is the most significant reflection from analysts. It would allow a wider timeframe for scenario analysis on poundage, SBBS bands, the LBS rate and TR.

The valuation of properties by assessors is an iterative process. Properties are assigned a new, provisional valuation, which is subject to change and added to the assessors online portal throughout 2016. This meant analysts were able see changes in property RVs throughout 2016.

Unfortunately, the assessors' provisional revaluation of respective types of properties proceeded, for the purposes of our analysis, in an ad hoc manner. This meant the provisional revaluations at points in time were not representative of the population as a whole. This made it difficult for much analysis of data on the roll to be undertaken. Spreadsheets were instead developed for when full roll data became available.

At the next revaluation, analysts should agree with assessors that a representative sample of revalued properties be produced throughout the revaluation process. This was in place at the 2005 Scottish revaluation and in the English and Welsh 2017 revaluation so is not without precedent.

It is worth noting however it likely isn't possible to get a representative sample for large utility companies. This will limit the extent to which firm conclusions could be drawn from this sort of data prior to provisional values being published and finalised.

#### **2. Revenue Neutrality**

It is widely understood that government NDR policies relating to revaluations are generally designed to be "revenue neutral". However, the definition of revenue neutrality is complex and not well understood<sup>2</sup>. Revenue neutrality is defined over the revaluation cycle as a whole. This is problematic because the effect of appeals means that, all else held equal, revenues will be higher earlier in a revaluation cycle, and lower later in a revaluation cycle. As a result, the revenues in the first year of a revaluation cycle will not be broadly in line with those of the final year of the preceding revaluation cycle – they will be higher.

In England, appeals loss is accounted for in the tax rate set at revaluation<sup>3</sup>. So if the UK government expects a net appeals loss of say 10%, the tax rate is set 10% higher than one might expect, as it is based on expected post-appeals rateable

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<sup>2</sup> This has drawn some commentary at the 2017 revaluation: <http://www.bbc.co.uk/news/uk-politics-39041300>

<sup>3</sup> See legislation governing how the English business rates multiplier is set: <http://www.legislation.gov.uk/ukpga/1988/41/schedule/7>

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value, not on the provisional rateable values known at the time. This leads to a jump in income in year one of the revaluation cycle, when few appeals have been dealt with, and RV is artificially high. As appeals are resolved, RV will reduce, and so will NDRi. The backdating of appeals loss will amplify this cycle, as some of the taxes collected in year 1 are refunded to tax payers.

This presents a potential difficulty for long term NDRi forecasts. The forecast model accounts for the appeals loss profile over the current revaluation cycle, but it is unclear when and how to model the start of a new revaluation cycle. In practice, recent draft budget forecasts have not had to address this difficulty, as none of them prior to Draft Budget 2017-18 extended to a (presumed) new revaluation cycle.

Investing time and resources in establishing a shared definition of revenue neutral poundage which analysts, policy and key stakeholders agree on would help when undertaking future policy modelling.

The English legislation defines “revenue neutral poundage” as poundage from the current year uprated by growth in rateable value and inflation – but also adjusted to reflect the appeals assumption. A calculator which assesses revenue neutral poundage, according to these criteria can be supplied to further explain this point.

### **3. Model Quality Assurance (QA) Processes**

Analysts agree improved QA processes would have meant forecasts were produced in a more efficient way and could have reduced some human made errors. Analysts have agreed to the following:

- A more structured format for undertaking QA and a commitment to invest specific time to validating formulas in the model.
- “Running the model” earlier. Analysts waited until data was available before undertaking modelling work. Running “dummy” forecasts before data was available would have provided more time to some of the “smaller” workings of the forecast spreadsheet.

Analysts may also wish to consider building the model in an alternative program to excel, such as SAS or R. This could make QA processes easier and reduce the time required when modelling different scenarios. This would a large undertaking so would naturally be subject to work priorities.