Calibrating FBS

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# Calibration Groups and Model

A three-way split of the categorical variables tenure, type and size was not possible using the categories provided in the survey and in common with the census.

The table below shows the census populations (holdings) and survey representation (sample points) for the categories in multiple combinations (three- and two-way products).

Table 1: Census holdings in three-way groupings with no survey sample

|  |  |  |  |
| --- | --- | --- | --- |
| Type | Tenure | Size | Census Holdings |
| Specialist Sheep (LFA) farms | Wholly Tenanted | 3 to 5 slr | 98 |
| Dairy farms | Wholly Owner Occupied | 2 to 3 slr | 63 |
| General Cropping farms | Wholly Tenanted | 2 to 3 slr | 49 |
| Mixed farms | Wholly Tenanted | 0.5 to 1 slr | 41 |
| Lowland Cattle & Sheep farms | Part Occupier/Tenanted | 5+ slr | 33 |
| SDA Sheep & Cattle farms | Wholly Owner Occupied | 0.5 to 1 slr | 26 |
| Lowland Cattle & Sheep farms | Wholly Tenanted | 0.5 to 1 slr | 24 |
| Specialist Sheep (LFA) farms | Part Occupier/Tenanted | 0.5 to 1 slr | 23 |
| SDA Sheep & Cattle farms | Wholly Tenanted | 0.5 to 1 slr | 22 |
| General Cropping farms | Part Occupier/Tenanted | 0.5 to 1 slr | 18 |
| Dairy farms | Wholly Tenanted | 2 to 3 slr | 15 |
| SDA Sheep & Cattle farms | Part Occupier/Tenanted | 0.5 to 1 slr | 11 |
| Cereal farms | Wholly Tenanted | 3 to 5 slr | 8 |
| Dairy farms | Wholly Tenanted | 1 to 2 slr | 6 |
| Dairy farms | Part Occupier/Tenanted | 0.5 to 1 slr | 2 |
| Dairy farms | Wholly Owner Occupied | 0.5 to 1 slr | 2 |

Table 2: Census holdings in two-way groupings with no survey sample

|  |  |  |
| --- | --- | --- |
| SDA Sheep & Cattle farms | 0.5 to 1 slr | 59 |
| Dairy farms | 0.5 to 1 slr | 4 |

It is therefore only possible to calibrate by two of the possible two-category groupings for these survey data without combining categories in some way:

* Type x Tenure
* Tenure x Size

Looking at the reporting on the survey I have chosen to use type and tenure in combination (typetenure), keeping “size” as a free variable.

The inability to include “size” as subgroups within type x tenure groups could potentially affect the outcome of this calibration. I have therefore included a further term (typetenure\*tot\_area) to maintain the total area (in hectares) within type x tenure groups.

The total area rented, and given over to various crops, as well as the total herd size for Ewes and Dairy and Beef cattle is calibrated at the national level.

The calibration model is:

model = typetenure + typetenure\*tot\_area + size + barley\_hct + oats\_hct + pota\_hct + wheat\_hct + tot\_area + rent\_area + DairyCows + BeefCows + Ewes - 1

# Calibration Process

The following tables provide the process for calibrating data from the FBS to Farm Census totals.

| Inputs | Processes | Outputs |
| --- | --- | --- |
| **SAS Processes**  **- FBS Calibration.egp** |  |  |
| **Setup Work Area.sas** | define a macro variable as the path to a folder used for input and output data throughout this process | &datapath. |
| **farmcensus.csv**  Extracted from the “Individual data for weighting” workbook, “Census 2017 data” worksheet. | **Census Data.sas**  Import census data  Group categorical variables | **work.census** |
| **fbsdata.csv**  Extracted from the “Individual data for weighting” workbook, “FBS 2017 individual data” worksheet. | **Survey Data.sas**  Import survey data  Relabel categorical variables to match census values (type and tenure)  Determine cross-group samples sizes  Group categorical variables (typetenure) | **work.survey1** |
| work.census  work.survey1 | **Calibration Totals.sas**  Determine the number of holdings and the size of area variables of sub groups. These tables are used to populate the calibration target files | **work.cali4** |
|  | **MACRO calSet.sas**  A macro to produce an R script to run the calibration | **%calSet;** |
| work.census  work.survey1 | **Calibration Setup.sas**  Calculates preweights  Formats data for R procedure  Runs the %calSet macro to either:   1. Write a script to run the calibration in R 2. Write a script to produce the calibration total template | **FBSurvey.csv**  and either:   1. FBSWT.R 2. FBSWTpoptemp.R |
| **R Processes** |  |  |
| **Calibration Template**:   1. Regenesees.R 2. FBSWTpoptemp.R 3. FBSurvey.csv | 1. Installs the ReGenesees package 2. Produces the calibration target template based on the **model** and 3. the **dataset** provided | **Poptemplate.csv** |
| Poptemplate.csv  work.cali4 | (In Excel) take values from the SAS dataset produced earlier to populate the template file. Save the resulting document as: | **CensusTotals.csv** |
| **Calibration:**   1. Regenesees.R 2. FBSWT.R 3. FBSurvey.csv 4. CensusTotals.csv | 1. Installs the ReGenesees package 2. Calibrates the data by raking based on the **model** and 3. the **dataset** provided to match 4. the population targets | **FBSWT.csv**  The weighted survey data, which can be read into SAS or another analytical package for analysis.  The variable fbswt sums to the total number of holdings in the census.  fbswt\_scale will sum to the sample size  **FBSWT\_Histogram.pdf**  A density plot of the final weight values |

# Samples and Populations 2017

The resulting totals from this process are listed in the table below.

| Group | Category | | FBS Sample | Census Level | FBS Weighted |
| --- | --- | --- | --- | --- | --- |
| **Type | Tenure** | | | *(n)* | *(holdings)* | *(holdings)* |
| Cereal farms|Part Occupier/Tenanted | | | 19 | 126 | 126 |
| Cereal farms|Wholly Owner Occupied | | | 28 | 767 | 767 |
| Cereal farms|Wholly Tenanted | | | 11 | 169 | 169 |
| Dairy farms|Part Occupier/Tenanted | | | 21 | 106 | 106 |
| Dairy farms|Wholly Owner Occupied | | | 19 | 551 | 551 |
| Dairy farms|Wholly Tenanted | | | 4 | 86 | 86 |
| General Cropping farms|Part Occupier/Tenanted | | | 22 | 180 | 180 |
| General Cropping farms|Wholly Owner Occupied | | | 19 | 964 | 964 |
| General Cropping farms|Wholly Tenanted | | | 12 | 236 | 236 |
| Lowland Cattle & Sheep farms|Part Occupier/Tenanted | | | 10 | 104 | 104 |
| Lowland Cattle & Sheep farms|Wholly Owner Occupied | | | 14 | 595 | 595 |
| Lowland Cattle & Sheep farms|Wholly Tenanted | | | 5 | 124 | 124 |
| Mixed farms|Part Occupier/Tenanted | | | 31 | 209 | 209 |
| Mixed farms|Wholly Owner Occupied | | | 31 | 767 | 767 |
| Mixed farms|Wholly Tenanted | | | 10 | 216 | 216 |
| SDA Sheep & Cattle farms|Part Occupier/Tenanted | | | 21 | 230 | 230 |
| SDA Sheep & Cattle farms|Wholly Owner Occupied | | | 24 | 596 | 596 |
| SDA Sheep & Cattle farms|Wholly Tenanted | | | 17 | 338 | 338 |
| Specialist Cattle (LFA) farms|Part Occupier/Tenanted | | | 43 | 468 | 468 |
| Specialist Cattle (LFA) farms|Wholly Owner Occupied | | | 56 | 2012 | 2012 |
| Specialist Cattle (LFA) farms|Wholly Tenanted | | | 25 | 469 | 469 |
| Specialist Sheep (LFA) farms|Part Occupier/Tenanted | | | 16 | 230 | 230 |
| Specialist Sheep (LFA) farms|Wholly Owner Occupied | | | 23 | 860 | 860 |
| Specialist Sheep (LFA) farms|Wholly Tenanted | | | 9 | 470 | 470 |
| **- Type** | | Cereal farms | 58 | 1062 | 1062 |
|  | | Dairy farms | 44 | 743 | 743 |
|  | | General Cropping farms | 53 | 1380 | 1380 |
|  | | Lowland Cattle & Sheep farms | 29 | 823 | 823 |
|  | | Mixed farms | 72 | 1192 | 1192 |
|  | | SDA Sheep & Cattle farms | 62 | 1164 | 1164 |
|  | | Specialist Cattle (LFA) farms | 124 | 2949 | 2949 |
|  | | Specialist Sheep (LFA) farms | 48 | 1560 | 1560 |
| **- Tenure** | | Part Occupier/Tenanted | 183 | 1653 | 1653 |
|  | | Wholly Owner Occupied | 214 | 7112 | 7112 |
|  | | Wholly Tenanted | 93 | 2108 | 2108 |
| **Size** | | | *(n)* | *(holdings)* |  |
|  | | 0.5 to 1 slr | 37 | 1815 | 1815 |
|  | | 1 to 2 slr | 104 | 2793 | 2793 |
|  | | 2 to 3 slr | 84 | 1781 | 1781 |
|  | | 3 to 5 slr | 132 | 2164 | 2164 |
|  | | 5+ slr | 133 | 2320 | 2320 |
| **Areas** | | | *(total)* | *(total)* | (total) |
|  | tot\_area | | 164803.6 | 3568694.4 | 3568694.4 |
|  | barley\_hct | | 15796.7 | 251468.3 | 251468.3 |
|  | wheat\_hct | | 5196.9 | 100816.5 | 100816.5 |
|  | oats\_hct | | 1494.0 | 27273.1 | 27273.1 |
|  | pota\_hct | | 737.4 | 26065.1 | 26065.1 |
|  | rent\_area | | 73024.5 | 1072664.6 | 1072664.6 |
| **Herd** | | | *(total)* | *(total)* | (total) |
|  | Ewes | | 127230 | 2323036 | 2323036 |
|  | BeefCows | | 24091 | 412967 | 412967 |
|  | DairyCows | | 9324 | 173857 | 173857 |