Accuracy and completeness of the December 2018 electoral registers in Great Britain and Northern Ireland

Appendices

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Appendix A: Measuring accuracy and completeness

The overarching objective of this study was to measure the accuracy and completeness of the December 2018 local government and parliamentary registers in Great Britain and Northern Ireland.

Producing accuracy and completeness estimates

There are various methods used to assess the quality of the electoral registers which differ mainly on the frequency with which they can be used and the reliability of the results. These approaches are presented below.

Using large-scale national surveys

Large-scale, representative or random social surveys can be used to produce reliable estimates of the completeness of the registers. Such surveys tend to use the postcode address file (PAF) as a sampling frame and cross-check the information gathered against actual entries on the electoral register.

The main limitation of this method is that it requires large sample sizes, meaning surveys are expensive to conduct.

Moreover, non-response to the surveys is likely to be highest among those who are eligible but not registered. This method does not allow estimating the number of duplicate entries across local registers

This is the methodology that was used for this study and for 'Electoral Registration in Northern Ireland: Accuracy and Comprehensiveness', 'Continuous Electoral Registration in Northern Ireland', 'The December 2015 electoral register in Northern Ireland', 'Great Britain's electoral registers 2011', 'The quality of the 2014 electoral registers in Great Britain' and 'The December 2015 electoral registers in Great Britain'.

This approach has been used again for the 2018 studies in Great Britain and Northern Ireland.

Comparing ONS electoral statistics (number of entries on the registers) with mid-year population estimates

These two datasets can be used to provide relatively crude estimates of the annual registration rates at national and subnational levels. Under this method, the registration rate is calculated by using data from the Office for National Statistics (ONS) for the total entries on the electoral registers as the numerator and dividing this by the ONS estimates for the population aged 16 and above as the denominator.

However, the method has many limitations:

- The approach cannot be used to report on the accuracy of the registers;
- It is not possible to derive a figure from the population estimates for the proportion of the population whose nationality means they would be ineligible to vote;
- The accuracy of population estimates is likely to decline each year after the Census on which they are based;
- ONS electoral statistics represent entries on the electoral registers, not individual electors. It is not possible to quantify the number of entries which are duplicates or which are illegitimate using this approach. This means that the ONS figures are likely to over-state the number of registered electors

Matching census records against the electoral register

A sample of census returns or data from the census coverage survey can be cross-matched against the electoral registers to derive estimates of completeness and accuracy. This approach provides reliable national estimates with detailed demographic breakdowns and is widely recognised as being the 'gold standard' for producing estimates of accuracy and completeness of the registers.

Variants of this approach were used in relation to the 1965, 1980, 1990, 2000 and 2010/2011 registers.

However, this approach also has two key limitations:

- The exercise can only be repeated every 10 years;
- Where census records are matched against register entries, there is a high probability that many of those missing from the registers are also missing from the census.

Accuracy

Accuracy means that 'there are no false entries on the electoral registers'.

The accuracy of the electoral registers is therefore a measure of the percentage of entries on the registers which relate to verified and eligible voters who are resident at that address. Inaccurate register entries may relate to entries which have become redundant (for example, due to home movement), are ineligible and have been included unintentionally, or which are fraudulent.

In order to establish accuracy, all register entries held for addresses where an interview was undertaken, as well as those addresses that were found to be vacant or derelict, were checked against the survey information collected in terms of:

- Whether a corresponding name at that address was gathered in the survey;

- If so, whether the individual's details on the register were correct.

Whether other details information related to date of birth (for attainers) and citizenship were correct on the register (including in terms of whether the person matched to the register entry was actually eligible to vote).

Three broad outcomes were possible:

- Major error: can be divided into three categories –

a) no corresponding name was collected by the survey OR

b) the register entry was matched to a person at the correct address but their name/other details were recorded incorrectly on the register to the extent that they would be unable to vote (e.g. their name would not be recognised/accepted if they tried to vote at a polling station or they would be barred from voting due to incorrect information on the register about their age or nationality) (major error type b) OR

c) the register entry was matched to a person at the correct address but they were ineligible to vote (and the register details were therefore incorrect).

- Minor error: the register entry was matched to a person at the correct address and their name/other details were recorded incorrectly, but the error would not prevent them from being able to vote

- No major or minor errors: the register entry was matched to a person at the correct address and their name/other details were correctly recorded.

No major or minor errors, or just a minor error mean that a person was counted as accurate. A major error meant that a person was counted as inaccurate.

Completeness

Completeness means that 'every person who is entitled to have an entry in an electoral register is registered'.

The completeness of the electoral registers therefore refers to the percentage of eligible people who are registered at their current address. The proportion of eligible people who are not included on the register at their current address constitutes the rate of under-registration.

In order to establish completeness, all household members for whom the survey collected information about were checked against the details on the electoral register in terms of:

- Whether they appeared on the register at all;

- Whether their name appeared correctly on the register;

- Whether other details information related to date of birth (for attainers) and citizenship appeared correctly on the register.

Three broad outcomes were possible:

- Major error: either they did not appear on the register OR they appeared on the register but their name/other details were recorded incorrectly to the extent that they would be unable to vote (e.g. their name would not be recognised/accepted if they tried to vote at a polling station or they would be barred from voting due to incorrect information on the register about their age or nationality);

- Minor error: they appeared on the register and their name/other details were recorded incorrectly, but the error would not prevent them from being able to vote;

- No major or minor errors: they appeared on the register and their name/other details were correctly recorded.

No major or minor errors, or just a minor error mean that a person was counted as complete. A major error meant that a person was counted as incomplete.

Where an entry contained more than one type of error, for instance a misspelled first and middle name, error codes were assigned based on a hierarchy where major errors were prioritized over minor errors, then surname errors over first name errors over middle name errors.

Appendix B: Logistic analysis

Multivariate analysis was conducted to explore the relationship between different demographic characteristics and the completeness and accuracy of the electoral registers. This approach allows the identification of particular demographic characteristics which are associated with higher or lower levels of completeness and accuracy after taking into account the impact of all of the other associations accounted for in the model, as well as the strength and statistical significance of these relationships.

As in previous years of this study, logistic regression was used for the analysis. This is particularly suited to this research as it is used where the dependent variable is binary – that is, there are only two possible outcomes.

- For **completeness**, the analysis looked at whether each eligible person at an address is, or is not, on the register
- For **accuracy**, the analysis considered whether (or not) an entry on the register matches with an eligible person currently living at that address

The nature of these measures means that slightly different initial samples were use for the analysis. The completeness regression can use all eligible adults covered at the addresses interviewed, as their individual and household-level information was gathered during the interviews.

By contrast, when considering accuracy the sample is the entries on the register for the households which matched to an individual covered by the interview: the demographic information for those who were not interviewed cannot be determined. This means that the accuracy regression uses household-level demographics only. The only exception to this rule is the "duration at address" variable, as households tend to move together. This has been included as it proved to be a significant driver of accuracy.

Due to this sampling method the findings of the accuracy regressions need to be considered carefully. The biggest source of inaccuracy is likely to be in those households where interviews were not conducted and these households – by definition – cannot be included in the analysis. This is also reflected by much weaker explanatory power of these models when compared with the completeness regressions (this is detailed in the tables below).

Interpreting the findings

Regression analysis was conducted using both the local government and Parliamentary registers. The tables below show the full output for each analysis, including the b coefficient, the significance level and the odds ratio (Exp(B)).

The blank rows show the "reference" category for each variable. This is the category which has been chosen as the comparison point for other categories in the variable. To ensure consistency with previous years' analyses, this analysis employed the same reference categories for all factors except region in the Great Britain completeness analysis. Here the reference category was changed to the North East (the most complete region) to give a clearer view of the relationship between region and completeness.

The "b coefficient" shows the impact of the chosen category on the likelihood of an individual having a complete or accurate register entry, compared with the reference category. For completeness, this means the coefficient shows the impact that being in that category has on the probability of an individual having a complete register entry. For accuracy, it shows the impact of being in that category on chance of a register entry for an address accurately matching someone resident there.

- Where the b coefficient is **negative**, that category is less likely to be accurate/ complete than the reference category. In such cases, the odds ratio (Exp(B)) will be less than one.
- Where the b coefficient is **positive**, that category is more likely to be accurate/ complete than the reference category. In such cases, the odds ratio (Exp(B)) will be more than one.

Those cases where the probability of the relationship being significant is 95% or above have been highlighted in bold font.

Key findings

Great Britain

The regression analyses revealed similar patterns between the Parliamentary and Local Government registers for both completeness and accuracy: these are detailed below.

Completeness

Age, duration at address, tenure and nationality were among the key variables associated with differences in the probability of completeness for both Parliamentary and Local Government registers:

1   **The likelihood of having a complete register entry rose in line with age**. In the Parliamentary registers every age group was less likely to have a complete register entry than those aged 65 and over, although this relationship was slightly weaker for 45-54 year olds. Being an "attainer" (aged 16-17) was especially strongly correlated with a lower likelihood of having a complete register entry: this was the strongest factor in the analysis.

2   Similarly, **a longer period of residence at an address was also correlated with a higher likelihood of a complete register entry.** For the Parliamentary registers those who have lived at their current address for two years or less were significantly less likely to have a complete register entry, than those who have lived there for more than five years, while for the local government registers this was the case for all who have lived at their current address for five years or less. Being resident for less than one year was the second-strongest factor in the analysis.

3   On tenure, **those in households in the private rented sector were less likely to have complete register entries** than owner-occupiers. Renting from the council or a Housing Association was not associated with any significant difference in probability.

4   Ethnicity was also a factor: **those from black and minority ethnic backgrounds were less likely to have complete register entries**, although the strength of this relationship was less than for many other factors.

5   **Being an EU citizen was also associated with a significantly lower chance of having a complete register entry,** compared with UK or Irish citizens. By contrast, this relationship was not observed among Commonwealth citizens. There is no figure for EU citizens in the Parliamentary regression as they are not eligible for inclusion on this register.

6   There was also a difference by education; **those with no formal qualifications were less likely to appear on both Parliamentary and local government registers** than those with degrees. However the effect of this relationship was relatively weak.

7   Different regions were also associated with differing likelihoods of completion; **being resident in London, Wales or Eastern England was associated with a lower likelihood of having a complete register entry**. For the Parliamentary registers this relationship was also noted for North West England. The regional effect is strongest in Wales, which has the biggest impact on the likelihood of register completion.

8   Finally, the type of area lived in had an impact as **those living in rural areas (as defined by ONS) were also less likely to have complete register entries**. By contrast, there was no relationship between nation (or English region) of residence and the probability of a complete register entry.

Accuracy

As with completeness, trends in accuracy were the same across the local government and parliamentary register analyses:

9   **Households where the person responding had lived at the address for less than one year were significantly less likely to contain accurate register entries,** across both registers. This was the strongest determinant of accuracy for both registers.

10   **Register entries in households which rent from a private landlord were significantly more likely to be inaccurate** than owner-occupiers, across both local government and parliamentary registers. A similar, slightly weaker relationship was also observed for those who live rent free, or in other types of tenure arrangement (aside from social renting or owner-occupation).

11   **Households with greater numbers of adults were more likely to have accurate register entries**. Households with two, and between three and five, adults were almost equally more likely to have accurate entries than single person households, across both register types.

12   There was also a gradient by social grade – **households in social grades AB and C2 were more likely to have accurate register entries than those in social grades DE**. C1 households were also more likely to have accurate entries, but this relationship was weaker than for other social grades.

13   **Households in Scotland and London were less likely to contain accurate register entries**. This relationship was not observed for households in any other region of Great Britain.

Northern Ireland

As in Great Britain, the results of regression analysis into accuracy and completeness for the local government and parliamentary registers were similar:

Completeness

Compared with the Great Britain analysis, regression on the Northern Ireland data found fewer factors were significantly related to completeness:

- **Those aged under 35 were significantly less likely to have complete register entries than older people**. This relationship was especially strong for the 18-19 year old group. There was no significant correlation between completeness and attainers (aged 16-17), although this is likely due to the very small base size for this group.

- Duration at address also had an impact, with **those resident for less than five years at their address also less likely to appear on the electoral register.**

No other factors – including social grade, ethnicity, nationality and tenure – were found to have a significant relationship with completeness for either local government or parliamentary registers.

Accuracy

The accuracy regression analysis found only one factor to be related to the likelihood that register entries at a given address were accurate:

- **Households where the person responding had lived at the address for less than one year were significantly less likely to contain accurate register entries.** This was a strong relationship, with a B coefficient greater than -3 for both registers. This relationship was not significant for those who had been resident at their household for between one and two years.

Tenure, social grade, the number of adults in the household and urban/rural status were not found to have a significant relationship with the accuracy of either local government or parliamentary register entries at a given address. The sole exception was for social renters, who are associated with a small but significant decrease in accuracy for the parliamentary registers.

The Electoral Commission

Logistic regression modelling – completeness in Great Britain

Completeness – Great Britain		Local government registers			Parliamentary registers		
Variables		**B coefficient**	**Significance**	**Exp(B)**	**B coefficient**	**Significance**	**Exp(B)**
Gender	Male	-0.046	0.518	0.955	-0.084	0.268	0.919
	Female						
Age	16-17	**-4.038**	**0.000**	**0.018**	**-4.067**	**0.000**	**0.017**
	18-19	**-1.933**	**0.000**	**0.145**	**-1.964**	**0.000**	**0.140**
	20-24	**-1.403**	**0.000**	**0.246**	**-1.426**	**0.000**	**0.240**
	25-34	**-0.953**	**0.000**	**0.386**	**-0.910**	**0.000**	**0.403**
	35-44	**-0.821**	**0.000**	**0.440**	**-0.906**	**0.000**	**0.404**
	45-54	**-0.364**	**0.017**	**0.695**	**-0.492**	**0.002**	**0.611**
	55-64	**-0.535**	**0.000**	**0.585**	**-0.507**	**0.001**	**0.602**
	65+						
Duration at address	Up to 1 year	**-2.521**	**0.000**	**0.080**	**-2.605**	**0.000**	**0.074**
	More than 1, up to 2 years	**-1.096**	**0.000**	**0.334**	**-1.217**	**0.000**	**0.296**
	More than 2, up to 5 years	**-0.333**	**0.002**	**0.717**	-0.191	0.103	0.826
	More than 5 years						
Tenure	Owner-occupier						
	Social rent	-0.099	0.391	0.906	-0.106	0.379	0.900
	Private rent	**-0.676**	**0.000**	**0.509**	**-0.640**	**0.000**	**0.527**
	Rent free/other	**-0.998**	**0.000**	**0.368**	**-0.998**	**0.000**	**0.369**

Completeness – Great Britain		Local government registers			Parliamentary registers		
Variables		B coefficient	Significance	Exp(B)	B coefficient	Significance	Exp(B)
Ethnicity	White						
	Non-white	**-0.345**	**0.003**	**0.708**	**-0.383**	**0.003**	**0.682**
Disability status	No						
	Yes	0.068	0.586	1.071	0.094	0.468	1.098
Nationality	UK/RoI						
	Commonwealth	-0.036	0.876	0.965	-0.262	0.264	0.770
	EU	**-0.770**	**0.000**	**0.463**	n/a	n/a	n/a
Highest qualification	Higher degree	0.202	0.186	1.224	0.300	0.079	1.349
	Degree						
	BTEC	0.064	0.660	1.066	0.015	0.925	1.015
	A level/Higher	0.075	0.573	1.077	0.046	0.747	1.047
	GCSE	-0.259	0.029	0.772	-0.217	0.087	0.805
	Other	-0.192	0.302	0.826	-0.259	0.209	0.772
	None	**-0.441**	**0.002**	**0.643**	**-0.433**	**0.005**	**0.649**
	Don't know	-0.378	0.039	0.685	**-0.523**	**0.007**	**0.593**
Number of adults in household	1						
	2	-0.024	0.832	0.977	-0.036	0.758	0.965
	3 to 5	0.063	0.618	1.065	0.045	0.733	1.046
	6+	-0.163	0.547	0.849	-0.070	0.818	0.932
Social grade	AB	0.007	0.955	1.007	0.048	0.716	1.049
	C1	0.159	0.143	1.172	0.145	0.214	1.156
	C2	-0.210	0.053	0.811	-0.159	0.184	0.853
	DE						
Rural/urban status	Urban						
	Rural	**-0.346**	**0.000**	**0.708**	**-0.295**	**0.003**	**0.744**
Region	North East						
	East Midlands	-0.512	0.073	0.599	-0.549	0.062	0.577
	East of England	**-0.643**	**0.021**	**0.525**	**-0.664**	**0.020**	**0.515**
	London	**-0.720**	**0.009**	**0.487**	**-0.724**	**0.011**	**0.485**
	North West	-0.498	0.075	0.608	**-0.568**	**0.046**	**0.567**

Completeness – Great Britain		Local government registers			Parliamentary registers		
Variables		**B coefficient**	**Significance**	**Exp(B)**	**B coefficient**	**Significance**	**Exp(B)**
	South East	-0.281	0.308	0.755	-0.318	0.260	0.727
	South West	-0.430	0.131	0.651	-0.368	0.208	0.692
	West Midlands	-0.325	0.258	0.723	-0.377	0.200	0.686
	Yorks & Humber	-0.414	0.150	0.661	-0.444	0.130	0.641
	Wales	**-0.811**	**0.006**	**0.445**	**-0.837**	**0.006**	**0.433**
	Scotland	-0.430	0.129	0.650	-0.454	0.118	0.635
	Constant	4.009	0.000	55.091	4.003	0.000	56.437

Base: Local government 9,656; Parliamentary 9,106
Pseudo R-square (Nagelkerke) score: Local government 0.365; Parliamentary 0.335

Logistic regression modelling – accuracy in Great Britain

Accuracy – Great Britain		Local government registers			Parliamentary registers		
Variables		**B coefficient**	**Significance**	**Exp(B)**	**B coefficient**	**Significance**	**Exp(B)**
Duration at address	No response	0.122	0.822	1.130	0.182	0.737	1.200
	Up to 1 year	**-2.544**	**0.000**	**0.079**	**-2.609**	**0.000**	**0.074**
	More than 1, up to 2 years	-0.247	0.214	0.781	-0.356	0.069	0.700
	More than 2, up to 5 years	-0.138	0.354	0.871	-0.185	0.213	0.831
	More than 5 years						
Tenure	Owner-occupier						
	Social rent	-0.108	0.465	0.898	-0.093	0.530	0.911
	Private rent	**-0.532**	**0.000**	**0.587**	**-0.820**	**0.000**	**0.441**
	Rent free/other	**-0.778**	**0.009**	**0.460**	**-0.867**	**0.003**	**0.420**
Adults in household	1						
	2	**0.457**	**0.000**	**1.579**	**0.358**	**0.005**	**1.431**
	3 to 5	**0.301**	**0.026**	**1.351**	0.181	0.186	1.199
	6+	**1.309**	**0.049**	**3.701**	0.345	0.443	1.412
Social grade	AB	**0.485**	**0.002**	**1.625**	**0.592**	**0.000**	**1.808**
	C1	**0.288**	**0.031**	**1.334**	**0.347**	**0.010**	**1.414**
	C2	**0.296**	**0.047**	**1.344**	**0.298**	**0.047**	**1.348**
	DE						
Urban/rural status	Urban						
	Rural	-0.022	0.878	0.979	0.034	0.811	1.034
Region	East Midlands						
	Eastern	0.090	0.734	1.094	-0.038	0.889	0.963
	London	**-0.903**	**0.000**	**0.405**	**-1.047**	**0.000**	**0.351**
	North East	-0.229	0.513	0.796	-0.228	0.522	0.796
	North West	-0.277	0.267	0.758	-0.364	0.151	0.695
	South East	-0.033	0.890	0.967	-0.119	0.629	0.887

Accuracy – Great Britain		Local government registers			Parliamentary registers		
Variables		**B coefficient**	**Significance**	**Exp(B)**	**B coefficient**	**Significance**	**Exp(B)**
	South West	0.104	0.706	1.109	0.100	0.723	1.105
	West Midlands	-0.431	0.091	0.650	-0.483	0.064	0.617
	Yorks & Humber	-0.191	0.476	0.826	-0.202	0.462	0.817
	Wales	-0.478	0.098	0.620	-0.552	0.059	0.576
	Scotland	**-0.623**	**0.011**	**0.536**	**-0.706**	**0.005**	**0.494**
	Constant	2.849	0.000	17.264	2.941	0.000	18.944

Base: Local government 8,766; Parliamentary 8,455

Pseudo R-square (Nagelkerke) score: Local government 0.209; Parliamentary 0.228

Logistic regression modelling – completeness in Northern Ireland

Completeness – N Ireland		Local government registers			Parliamentary registers		
Variables		**B coefficient**	**Significance**	**Exp(B)**	**B coefficient**	**Significance**	**Exp(B)**
Gender	Male	-0.147	0.725	0.864	-0.191	0.655	0.826
	Female						
Age	16-17	-24.470	0.999	0.000	-24.489	0.999	0.000
	18-19	**-4.390**	**0.000**	**0.012**	**-4.420**	**0.000**	**0.012**
	20-24	**-2.215**	**0.039**	**0.109**	**-2.225**	**0.039**	**0.108**
	25-34	**-1.994**	**0.024**	**0.136**	**-1.996**	**0.025**	**0.136**
	35-44	-1.409	0.097	0.244	-1.393	0.106	0.248
	45-54	-1.122	0.203	0.326	-1.101	0.214	0.332
	55-64	-0.854	0.315	0.426	-0.825	0.334	0.438
	65+						
Duration at address	Up to 1 year	**-3.808**	**0.000**	**0.022**	**-3.828**	**0.000**	**0.022**
	More than 1, up to 2 years	**-2.572**	**0.000**	**0.076**	**-2.494**	**0.001**	**0.083**
	More than 2, up to 5 years	**-1.132**	**0.043**	**0.322**	**-1.231**	**0.032**	**0.292**
	More than 5 years						
Tenure	Owner-occupier						
	Social rent	-0.432	0.514	0.649	-0.447	0.513	0.639
	Private rent	-0.818	0.171	0.441	-0.906	0.146	0.404
	Rent free/other	-0.211	0.902	0.810	-0.223	0.896	0.800
Disability status	No						
	Yes	0.148	0.831	1.160	0.146	0.835	1.157
Nationality	UK/RoI						
	Commonwealth	1.874	0.630	6.514	2.305	0.594	10.024
	EU	0.222	0.833	1.248	n/a	n/a	n/a
	Higher degree	0.553	0.561	1.739	0.631	0.526	1.880

Completeness – N Ireland		Local government registers			Parliamentary registers		
Variables		B coefficient	Significance	Exp(B)	B coefficient	Significance	Exp(B)
Highest qualification	Degree						
	BTEC	-0.137	0.874	0.872	-0.293	0.733	0.746
	A level/Higher	0.112	0.878	1.118	0.135	0.858	1.144
	GCSE	-0.169	0.804	0.844	-0.182	0.794	0.834
	Other	-0.605	0.537	0.546	-0.691	0.494	0.501
	None	-0.392	0.635	0.676	-0.436	0.609	0.646
	Don't know	-0.841	0.571	0.431	-0.293	0.733	0.746
Number of adults in household	1						
	2	0.257	0.665	1.293	0.172	0.777	1.187
	3 to 5	0.441	0.515	1.554	0.387	0.576	1.473
	6+	2.977	0.365	19.622	2.974	0.369	19.572
Social grade	AB	0.352	0.647	1.421	0.324	0.680	1.382
	C1	-0.033	0.958	0.968	-0.104	0.871	0.901
	C2	0.292	0.652	1.339	0.310	0.644	1.364
	DE						
Rural/urban status	Urban						
	Rural	-0.050	0.909	0.951	0.020	0.964	1.020
	Constant	3.283	0.004	26.653	3.396	0.004	29.838

Base: Local government 1,937; Parliamentary 1,880

Pseudo R-square (Nagelkerke) score: Local government 0.555; Parliamentary 0.555

Logistic regression modelling – accuracy in Northern Ireland

Accuracy – N Ireland		Local government registers			Parliamentary registers		
Variables		**B coefficient**	**Significance**	**Exp(B)**	**B coefficient**	**Significance**	**Exp(B)**
Duration at address	Up to 1 year	**-3.181**	**0.000**	**0.042**	**-3.288**	**0.000**	**0.037**
	More than 1, up to 2 years	-1.583	0.062	0.205	-1.560	0.067	0.210
	More than 2, up to 5 years	-0.247	0.725	0.781	-0.337	0.630	0.714
	More than 5 years						
Tenure	Owner-occupier						
	Social rent	0.129	0.857	1.137	**0.139**	**0.037**	**1.149**
	Private rent	-0.128	0.854	0.879	-0.264	0.143	0.768
	Rent free/other	-0.371	0.850	0.690	-0.330	0.029	0.719
Adults in household	1						
	2	0.759	0.148	2.136	0.710	0.180	2.034
	3+*	0.689	0.222	1.992	0.649	0.255	1.914
Social grade	AB	0.523	0.447	1.688	0.260	0.452	1.689
	C1	0.387	0.531	1.473	0.238	0.585	1.405
	C2	0.099	0.873	1.104	0.088	0.901	1.080
	DE						
Urban/rural status	Urban						
	Rural	-0.162	0.710	0.850	-0.138	0.753	0.872
	Constant	1.213	0.058	3.364	1.258	0.051	3.517

Base: Local government 1,717; Parliamentary 1,690

Pseudo R-square (Nagelkerke) score: Local government 0.216; Parliamentary 0.224

*N.B. The sample size for 6+ adult households is too small for analysis so this has been included in the 3-5 group here

Appendix C: Technical Report

Technical Report

This report provides the technical details behind the survey of accuracy and completeness conducted using the December 2018 Electoral Registers in Great Britain and Northern Ireland.

Background

This is the latest wave in a series of electoral research projects into the accuracy and completeness of the electoral registers in Great Britain and Northern Ireland. The methodology used is the same as that designed over recent waves:

- 'The December 2015 electoral registers in Great Britain' (published July 2016);
- 'The quality of the 2014 electoral registers in Great Britain' (published in July 2014);
- 'Great Britain's electoral registers 2011' (published in December 2011), and;
- 'The completeness and accuracy of electoral registers in Great Britain' (published in March 2010).

The 2011 study was the first one to use a nationally representative sample to provide an overall estimate of the accuracy and completeness of the registers across Great Britain, and the same broad methodology has been used in the 2014, 2015 and 2018 waves of the research.

The same approach has also been used to assess accuracy and completeness of the electoral register in Northern Ireland. Previous waves of research were conducted, again using the same overall methodology, in 2012 and 2015.

The findings presented are the result of a large scale house-to-house survey carried out by Ipsos MORI across the United Kingdom between January and April 2019. In Great Britain a total of 5,079 households were interviewed between the 2 January and the 29 April 2018 (4,968 face-to-face and 111 through postal surveys). In Northern Ireland 1,003 households over the same period (993 face-to-face, 10 postal).

The number of addresses from Scotland, Wales and Northern Ireland included in the sample were boosted beyond their proportion in relation to the total population of the UK to enable analysis of the results by country as well as for Great Britain as a whole. The table below details the totals by country.

Table 1: Total response (to face-to-face and postal surveys)

	England	Scotland	Wales	Great Britain	Northern Ireland
Completed face-to-face interviews	3,473	770	725	4,968	993
Completed postal questionnaires	77	15	19	111	10
Total	3,550	785	744	5,079	1,003

Sample Design

The sampling approach in both Great Britain and Northern Ireland involved a multi-stage random sampling strategy, as in the previous waves of this study, with the intention of aiming to achieve probability of address selection proportional to population distribution.

Slightly different approaches were taken in each country, reflecting past approaches and the different electoral geographies in each area; the details are provided below:

Great Britain

The approach taken in Great Britain followed the approach of the 2015 and 2014 waves of the survey, but with some minor amendments. An additional stage of selection (OA within Ward) that was utilised in 2015 was not used for this wave of the research.

The chosen primary sampling unit (PSU) for sampling was local government ward (in 2015, the PSU was chosen as Census Output Area, or OA)[1]. Within each ward individual addresses were selected from the Postcode Address File (PAF). An element of clustering was introduced here to allow efficient fieldwork assignments, with the population of adults aged 17+ (electors) used for this purpose.

The sampling process began at the local authority level, with a **stratified random sample of local authorities** drawn based on their relevant population size. Within each

Country Local Authorities were stratified by the following factors:

- **England**: region, local authority type, population density and the proportion in NS-SEC categories I and II

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[1] Wards selected in Scotland, where Local Government wards are now larger (reflecting a change in voting system for local government elections), were monitored for their size.

- **Wales**: Indices of Multiple Deprivation (IMD), population density, and the proportion in NS-SEC categories I and II
- **Scotland**: Valuation Joint Board identity, Scottish IMD score, population density and the proportion in NS-SEC categories I and II

The required number of local authorities for each nation (89 in England and 19 each in Scotland and Wales) were then selected from a random starting point with fixed interval sample and probability of selection proportional to population size[2].

The next stage was to sample four wards within each selected local authority, in line with the 2014 study design, giving 508 wards in total. Wards were selected using a stratified random sampling technique based on population density, and the proportion in NS-SEC classes I and II, with probability proportional to size. In selected Local Authorities in the remoter parts of Scotland, where local government wards were too large to produce effective interviewer allocations, Intermediate Zones (a census geography) were used instead. This approach was used in eight Scottish Local Authorities.[3]

The third stage involved the selection of addresses within the selected wards. Twenty addresses were selected in each PSU using a "1 in n" selection, with 15 issued as main sample and five chosen at random to be held as reserve sample. A total of 7,620 addresses were issued as sample across England (5,340 addresses), Wales and Scotland (both 1,140 addresses).

Northern Ireland

The sampling approach in Northern Ireland is simpler: as the Northern Irish electoral register is held centrally there is no need to stratify the sample by Local Authority. The approach this time was again a slight variation from the established method in 2015, with 100 Wards selected rather than 50.

Local Government ward was also the PSU for the Northern Irish sample. The 100 wards were selected using a stratified random sampling approach with local authority district (ordered alphabetically), population density and Northern Irish Indices of Multiple Deprivation (NIMDM) used as the stratification variables.

Twenty addresses were chosen within each selected Ward using a "1 in n" selection and the existing ordering of addresses in PAF. In even-numbered wards (those numbered 2 – 100), five of the twenty were randomly selected to be held as reserve sample and in odd-numbered Wards (1-99) six households were reserved. This produced a sample of 1,450 addresses for use in fieldwork.

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[2] The selection in Wales and Scotland was adjusted to ensure that no Local Authority was selected more than once – this has been reflected in the design weights for the data

[3] Aberdeenshire, Angus, Argyll and Bute, East Ayrshire, Highland, Moray, South Ayrshire and Stirling.

Sample Preparation

Once the address sample had been drawn, this had to be matched with the elector information for each address within the registers provided for the project. Selected Local Authorities were informed of the project and provided their copies of the December 2018 register. The names attached to selected addresses were merged into the main sample through use of the Address Key identifier provided by the PAF.

Fieldwork

Questionnaire development

As the aims of the survey remain the same as in previous years, the questionnaires for both Great Britain and Northern Ireland were used mostly unchanged from the 2015 waves of the survey. A few questions were updated or added to each to reflect changing circumstances; these are listed below:

Changes made to both GB and NI surveys:
- Q17a was amended to ask about who normally fills out forms in the household in a different way
- Q24 was changed to ask about voting in the June 2017 General Election, rather than the 2015 General Election
- A new question (Q24b) was added to ask participants if they voted at the 2016 referendum on the UK's EU membership

Northern Ireland-specific[4]:
- Q9c and Q9d were removed from the 2015 version to reflect differences in eligibility to vote for new residents
- Q19b and 19c were added to explore the impact of the introduction of online registration.

Fieldwork

Every address selected in the main sample of the research was sent an advanced mailing ahead of fieldwork. This was addressed to 'the householder' and explained the purpose of the study, why the household had been chosen and who would be calling at the address. This letter was signed by the Commission's Head of Research in England and by respective Heads of Office in Scotland, Wales and Northern Ireland. It offered contact details (both a freephone number and email address) for householders to get in touch with Ipsos MORI if they wanted more information, or to opt out of the research.

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[4] In Northern Ireland the questionnaire also contains a question on political opinion and religion. Section 75 of the Northern Ireland Act 1998 sets out a number of characteristics between which public bodies need to have due regard to promoting equality of opportunity. This includes political opinion and religion.

During fieldwork, interviewers were required to make six or more calls to each sampled address (including weekend and evening calls) before an address could be viewed as unproductive. The first stage of the questionnaire acted as a screener so interviewers could introduce the survey and to check the household's eligibility. It also allowed the interviewer to generate multiple interviews for cases where a selected address was sub-divided into multiple households (up to a limit of four). No selected households were deemed ineligible; where all residents had moved into the address after December 2018 (and would therefore not be listed on the electoral register being tested) participants were given a shorter questionnaire to understand what they knew about the previous residents.

The interview could be carried out with any household member aged 16+ and was conducted using computer-assisted personal interviewing (CAPI). Where applicable, the CAPI questionnaire featured sample information matched from the electoral registers (as detailed above). During the interview, interviewers collected the full names and additional demographic information for each household member aged 16 and over and then matched and compare this to the information on the electoral register. This included identifying where a discrepancy existed between a name collected during the interview and the name on the register (such a where a name was misspelled) and identifying residents who were not listed on the electoral register for the property.

Survey Response

In Great Britain a total of 5,079 households were interviewed (4,968 face-to-face and 111 through postal surveys) while in Northern Ireland 1,003 households were interviewed (993 face-to-face and 10 postal).

Below we include a detailed breakdown of responses for the face-to-face surveys to provide the response rate.

Table 2: Fieldwork outcomes table

Address outcome:	Great Britain		N Ireland	
	N	%	N	%
Total issued[5]	7,651	-	1,451	-
Deadwood	**511**	**6.7%**	**114**	**7.9%**
Property vacant	356	4.7%	82	5.7%
Property derelict/demolished or under construction	32	0.4%	10	0.7%
Communal establishment/institution	32	0.4%	3	0.2%
Non-residential address	91	1.2%	19	1.3%
Ineligible	**166**	**2.2%**	**33**	**2.3%**
Occupied but no resident household	61	0.8%	12	0.8%
Address inaccessible	38	0.5%	7	0.5%
Unable to locate address	67	0.9%	14	1.0%
Non contact	**662**	**8.7%**	**78**	**5.4%**
Occupied, no contact after 6+ calls	509	6.7%	68	4.7%
Some contact but not interview after 6+ calls	24	0.3%	0	0.0%
Unsure if occupied and no contact	129	1.7%	10	0.7%
Refusal	**1077**	**14.1%**	**181**	**12.5%**
Refusal to head office	92	1.2%	16	1.1%
Suitable participant refused	905	11.8%	159	11.0%
Proxy refusal	51	0.7%	4	0.3%
Broken appointment – no recontact	29	0.4%	2	0.1%

[5] The "total issued" figures in this table are higher than the total number of selected addresses as it reflects multiple households identified during fieldwork

Other	**267**	**3.5%**	**52**	**3.6%**
At home ill during fieldwork	16	0.2%	1	0.1%
Participant away during fieldwork	40	0.5%	5	0.3%
Language difficulties	13	0.2%	3	0.2%
Participant unable to participate	40	0.5%	7	0.5%
Other	158	2.1%	36	2.5%
Interview	**4,966**	**64.9%**	**993**	**68.4%**
Successful face-to-face interview	4,966	64.9%	993	68.4%
Adjusted response rate[6]	**71.2%**		**76.2%**	
Postal responses	111		10	
Total completes	5,077		1,003	
Unadjusted response rate including postals	**66.4%**		**69.1%**	
Adjusted response rate including postals	**72.8%**		**76.9%**	

Non-response postal survey

After the closure of the face-to-face fieldwork period, unproductive addresses were selected for a postal survey with the aim of boosting response further. Not all unproductive addresses were selected for inclusion – for instance, no addresses marked as a refusal were chosen. Rather, those addresses with 'non contact' or interim outcomes were selected. The final outcomes for selected households included:

- Any addresses where an appointment had been made, but not kept
- Addresses where no contact was made at all, or where there was some contact but not enough to conduct an interview
- Addresses where the household was away during the fieldwork period
- Addresses which interviewers were not able to access or locate.

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[6] The adjusted response rate is calculated by dividing the number of completed interviews by all issued addresses, less those classified as "deadwood" or ineligible

In total, 1,152 postal questionnaires were dispatched, and 124 were returned (three of these were returned blank). This equates to a response rate of eleven per cent.

The sample gathered through the postal survey appears to be more engaged and more likely to be from social grades AB and C1 than the overall population. Looking at unweighted demographic figures for the postal responses, 37 per cent were coded as households from social grades AB and 32 per cent were put into the C1 grade, meaning that just 32 per cent of households covered by postal surveys were from social grades C2DE. The residents of the households responding to the postal survey were also older, with 28 per cent aged 65 or above and just eight per cent aged between 18 and 24.

The individual characteristics of the people filling out the postal surveys reinforces this finding; 86 per cent of those giving a response claimed to have voted at the 2017 General Election and 91 per cent said the same about the 2016 EU Referendum. Eighty-six per cent also agree that "it is everyone's duty to register to vote".

Weighting and confidence intervals

In surveys which use probability sampling, the data must be weighted to correct unequal probabilities of selection to participate (unless all members of the population had precisely equal probabilities of selection).

As boosted sample sizes were used for Wales, Scotland and Northern Ireland to allow the registers in these countries to be examined separately, addresses in the nations all had higher than average probabilities of selection. Similarly, it was necessary to reduce the probability of selection of the largest local authorities to avoid their being selected twice in the sampling process. Corrective "design weights" were required to reverse the effects of this disproportional sampling when the data was combined to make national measurements.

It is also necessary to consider the effect of response rates, since a systematically lower response from one part of the population than from another could distort the representative nature of the sample and affect the estimates. To counter this an extra weight was added, equalising the non-response rate in every local authority.

The survey methodology used in this research means that the data is also subject to **confidence intervals**. As the results are taken from a sample of the overall population, we cannot immediately be sure of the "true" figure for the entire population for any given question. What confidence intervals denote is the range around any sample statistic where the true population value is likely to lie, by estimating the variation caused by the fact that the survey was conducted with a randomly-selected sample, rather than the entire population.

Confidence intervals are affected primarily by two factors – the size of the sample population and the percentage which is being reported:

- Generally speaking, the larger the sample, the thinner the range of the confidence intervals become – although the return for a larger sample size diminishes as it increases further

- The percentage being reported also has an impact; confidence intervals are wider when the percentage is close to 50%, and thinner with percentages below 10 per cent or over 90 per cent.

The tables below provide the confidence intervals associated with the completeness and accuracy findings for this survey for Great Britain and Northern Ireland, calculated based on the effective sample size. The calculations provide the 95% confidence interval: this means that there is a 5% chance that the true figure for the entire population does not lie within the interval estimated from the survey results.

In the accuracy tables some figures are shown as "n/a". Accuracy can only be gauged properly for household-level variables and so those which depend on individual demographic variables are marked as not applicable. In other cases, the combination of a score close to 100 per cent and a small base size means that confidence intervals cannot be calculated precisely – these are marked with an asterisk.

The table shows that, for example, for the local government completeness figure of 83.5% in Great Britain, the confidence interval is ± 1.1ppts. This means that we can be 95% certain that the true local government completeness figure in the (overall) population of Great Britain would be between 82.4% and 84.6%. The confidence intervals associated with the completeness and accuracy findings for each variable analysed in this study can be found below:

Table 3: Completeness and accuracy confidence intervals – Great Britain

		Completeness		Accuracy	
		Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
		±	±	±	±
	Total	1.1%	1.1%	1.0%	1.0%
Gender	Male	1.3%	1.3%	n/a	n/a
	Female	1.2%	1.2%	n/a	n/a
Age	16-17	5.1%	5.1%	n/a	n/a
	18-19	5.3%	5.3%	n/a	n/a
	20-24	4.4%	4.4%	n/a	n/a
	25-34	2.9%	2.9%	n/a	n/a

		Completeness		Accuracy	
		Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
		±	±	±	±
	35-44	2.3%	2.3%	n/a	n/a
	45-54	1.9%	1.9%	n/a	n/a
	55-64	1.9%	1.9%	n/a	n/a
	65+	1.4%	1.4%	n/a	n/a
	NET: 18+	1.1%	1.1%	n/a	n/a
Tenure	Own outright	1.6%	1.6%	1.0%	1.0%
	Mortgage/shared ownership	1.7%	1.7%	1.0%	1.0%
	Private renter	3.4%	3.4%	3.1%	3.6%
	Rent from Council	3.0%	3.0%	2.3%	2.5%
	Rent from Housing association	4.1%	4.1%	3.1%	3.2%
	NET: All social renters	2.5%	2.5%	1.9%	2.0%
	Rent free/other	8.0%	8.0%	6.0%	6.1%
Social Grade	AB	2.1%	2.1%	1.6%	1.6%
	C1	1.6%	1.6%	1.1%	1.2%
	C2	2.4%	2.4%	1.4%	1.5%
	DE	2.7%	2.7%	2.3%	2.4%
Adults in household	1	1.9%	1.9%	1.9%	1.9%
	2	1.6%	1.6%	1.0%	1.0%
	3 to 5	1.9%	1.9%	1.6%	1.7%
	6 or more	*	*	*	*

			Completeness		Accuracy	
			Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
			±	±	±	±
Duration at address		Up to 1 year	4.2%	4.2%	5.6%	6.0%
		More than 1, up to 2 years	3.9%	3.9%	2.8%	3.1%
		More than 2, up to 5 years	2.5%	2.5%	1.5%	1.6%
		More than 5, up to 10 years	2.1%	2.1%	1.3%	1.5%
		More than 10, up to 16 years	2.2%	2.2%	1.2%	1.2%
		16 years or more	1.6%	1.6%	1.0%	1.0%
Nationality		UK or RoI	1.1%	1.1%	n/a	n/a
		Non-UK or RoI	4.5%	4.5%	n/a	n/a
		EU	4.9%	-	n/a	n/a
		Commonwealth	7.9%	7.9%	n/a	n/a
Urban/rural status		Urban	1.2%	1.2%	1.1%	1.1%
		Rural	2.1%	2.1%	1.5%	1.5%
Region		East Midlands	4.6%	4.6%	2.2%	2.2%
		Eastern England	5.2%	5.2%	2.5%	2.6%
		London	3.3%	3.3%	3.4%	3.4%
		North East	4.9%	4.9%	8.2%	8.2%
		North West	3.1%	3.1%	2.2%	2.2%
		South East	1.7%	1.7%	2.0%	2.1%
		South West	3.1%	3.1%	2.5%	2.6%
		West Midlands	3.0%	3.0%	3.6%	3.9%

		Completeness		Accuracy	
		Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
		±	±	±	±
	Yorks & Humber	4.9%	4.9%	3.0%	3.0%
	NET: England	1.2%	1.2%	1.0%	1.1%
	NET: England (excl. London)	1.3%	1.3%	1.0%	1.1%
	Scotland	2.9%	2.9%	4.2%	3.7%
	Wales	2.9%	2.9%	3.0%	3.1%
	NET: Great Britain	1.1%	1.1%	1.0%	1.0%
Council type	District	1.9%	1.9%	1.3%	1.3%
	London Borough	3.3%	3.3%	3.4%	3.8%
	Met. Borough	2.5%	2.5%	2.6%	2.7%
	English Unitary	2.8%	2.8%	1.8%	2.0%
	Scottish Unitary	2.9%	2.9%	4.2%	3.7%
	Welsh Unitary	2.9%	2.9%	3.0%	3.1%
	NET: Unitary	1.9%	1.9%	1.6%	1.6%
Highest qualification	Higher Degree	3.5%	3.5%	n/a	n/a
	Degree	2.2%	2.2%	n/a	n/a
	BTEC/equivalent	2.4%	2.4%	n/a	n/a
	A Level/Higher	2.9%	2.9%	n/a	n/a
	GCSE	1.9%	1.9%	n/a	n/a
	Other	3.0%	3.0%	n/a	n/a
	None	2.8%	2.8%	n/a	n/a

Table 4: Completeness and accuracy confidence intervals – Northern Ireland

		Completeness		Accuracy	
		Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
		±	±	±	±
	Total	2.6%	2.6%	2.2%	2.3%
Gender	Male	3.1%	3.1%	n/a	n/a
	Female	2.9%	2.9%	n/a	n/a
Age	16-17	*	*	n/a	n/a
	18-19	11.7%	11.7%	n/a	n/a
	20-24	10.0%	10.0%	n/a	n/a
	25-34	5.8%	5.8%	n/a	n/a
	35-44	5.5%	5.5%	n/a	n/a
	45-54	5.6%	5.6%	n/a	n/a
	55-64	4.4%	4.4%	n/a	n/a
	65+	2.3%	2.3%	n/a	n/a
	NET: 18+	2.6%	2.6%	n/a	n/a
Tenure	Own outright	2.9%	2.9%	2.6%	2.6%
	Mortgage/shared ownership	4.2%	4.2%	3.6%	3.6%
	Private renter	6.4%	6.4%	7.5%	7.5%
	Rent from Council	11.7%	11.7%	10.6%	10.6%
	Rent from Housing association	8.2%	8.2%	5.6%	5.6%
	NET: All social renters	6.6%	6.6%	5.4%	5.4%
	Rent free/other	27.2%	27.2%	15.8%	15.8%

		Completeness		Accuracy	
		Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
		±	±	±	±
Social Grade	AB	5.2%	5.2%	4.6%	4.6%
	C1	4.4%	4.4%	3.2%	3.2%
	C2	4.9%	4.9%	4.9%	4.9%
	DE	5.1%	5.1%	4.5%	4.5%
Adults in household	1	5.1%	5.1%	5.4%	5.4%
	2	3.4%	3.4%	3.0%	3.0%
	3 to 5	4.3%	4.3%	2.9%	2.9%
	6 or more	*	*	*	*
Duration at address	Up to 1 year	6.4%	6.4%	11.9%	11.9%
	More than 1, up to 2 years	10.0%	10.0%	13.3%	13.3%
	More than 2, up to 5 years	7.4%	7.4%	5.3%	5.3%
	More than 5, up to 10 years	5.4%	5.4%	5.2%	5.2%
	More than 10, up to 16 years	5.0%	5.0%	3.9%	3.9%
	16 years or more	2.4%	2.4%	2.5%	2.5%
Nationality	UK or RoI	2.6%	2.6%	n/a	n/a
	Non-UK or RoI	13.6%	13.6%	n/a	n/a
	EU	14.4%	-	n/a	n/a
	Commonwealth	35.9%	35.9%	n/a	n/a
Urban/rural status	Urban	3.5%	3.5%	3.3%	3.3%
	Rural	3.5%	3.5%	2.8%	2.8%

		Completeness		Accuracy	
		Local Gov register	Parlia-mentary register	Local Gov register	Parlia-mentary register
		±	±	±	±
Highest qualification	Higher Degree	7.9%	7.9%	n/a	n/a
	Degree	4.7%	4.7%	n/a	n/a
	BTEC/equivalent	8.4%	8.4%	n/a	n/a
	A Level/Higher	6.5%	6.5%	n/a	n/a
	GCSE	5.0%	5.0%	n/a	n/a
	Other	8.0%	8.0%	n/a	n/a
	None	5.3%	5.3%	n/a	n/a