TECHNICAL ANNEX – 2006 BASED HOUSEHOLD PROJECTIONS FOR NORTHERN IRELAND

1. Introduction

i. The 2006-based household projections for Northern Ireland are an update of the 2002-based household projections[1]. This document describes the methodology used in the 2006-based household projections with specific reference to the 2002-based household projections methodology.

2. 2006-based Population Projections used in Household Projections

ii. Northern Ireland level 2006-based population projections were published on 23 October 2007 and sub-regional level 2006-based population projections were published on 28 February 2008. The latest sub-regional population projections replace the 2002-based sub-regional population projections which were the basis for the 2002-based household projections.

iii. In the latest publication the household projection period has been extended to 2031 for Northern Ireland, and to 2021 for sub-regions. Assumptions underlying the 2006-based population projections are based on recent demographic trends, full details are available at:

http://www.nisra.gov.uk/archive/demography/population/household/NI06_House_Projs.pdf

3. Age-Sex Groups used in Household Projections

iv. The methodology used for the 2002-based household projections consisted of applying age-sex specific household membership probabilities to the 2002-based population projections. In total 20 age-sex groups were used; the relevant age-bands were 0-15 years, 16-24, 25-29, 30-34, 35-44, 45-54, 55-59, 60-64, 65-74 and 75+.

v. As part of the development of the 2006-based series further analysis has been carried out to refine age-sex bands so that they are as homogenous as possible in household membership probabilities (see Appendix A for full details). As a result, four of the original age bands were split in two groups:

- 0-15 years was split into two groups 0-3 years and 4-15 years;
- 16-24 years was split into two groups 16-18 years and 19-24 years;
- 45-54 years was split into two groups 45-49 years and 50-54 years; and
- 75 years and over was split into two groups 75-84 years and 85 years and over.

[1] http://www.nisra.gov.uk/demography/default.asp29.htm

vi. Thus, the new household projections use 28 age-sex groups; the relevant age-bands are 0-3 years, 4-15, 16-18, 19-24, 25-29, 30-34, 35-44, 45-49, 50-54, 55-59, 60-64, 65-74 and 75-84 and 85+. Appendix B presents the relevant age-sex specific household membership probabilities from the 1991 and 2001 Censuses.

4. Communal Establishment Population

vii. The method of projecting the population in communal establishments is unchanged from that used in the 2002-based household projections. In summary, the proportion of the projected population living in communal establishments was held at 2001 Census levels for each age-sex group (see Table 1) and removed from the projected population to leave the projected household population only. It should be noted that the assumption of a constant proportion of the population by age-sex group living in communal establishments takes no account of possible future changes in relevant policies, such as that relating to care of the elderly.

viii. Also worth noting is the impact of the increase in the number of age-sex groups, which has led to a small increase in the projected population living in communal establishments from the 2002-based household projections. This is primarily related to the splitting of the 75 years and over age group, with the projected population of communal establishments in Northern Ireland increasing from 30,200 people to 31,300 people in 2011 (+4%), and from 40,300 people to 44,500 people in 2031 (+10%).

Table 1: Proportion of population living in households, by age and sex (2001 Census)

Age group	*Males*	*Females*
Aged 0-3	1.000	0.999
Aged 4-15	0.998	0.999
Aged 16-18	0.987	0.989
Aged 19-24	0.949	0.965
Aged 25-29	0.976	0.993
Aged 30-34	0.986	0.996
Aged 35-44	0.992	0.997
Aged 45-49	0.993	0.996
Aged 50-54	0.992	0.995
Aged 55-59	0.992	0.994
Aged 60-64	0.991	0.993
Aged 65-74	0.984	0.984
Aged 75-84	0.950	0.924
Aged 85+	0.839	0.728

5. Two-point exponential – method used to project household membership probabilities

ix. The two-point exponential model based on the 1991 and 2001 Censuses household propensities emerged as the most robust projections technique in the 2002-based household projections for a number of reasons.

x. Firstly, the two-point exponential model constrains the projections by slowing down the trend as probabilities approach 0 or 1 and is therefore more in keeping with reality than a linear regression model which would allow projected negative or non-unitary probabilities. Secondly, the use of 1991 and 2001 Census data ensures that projections are based on the latest household formation trends (i.e. trends between 1981 and 1991 may be less relevant). Thirdly, the use of household propensities takes account of all household members and avoids the older male bias that is inherent in the traditional 'headship' method.

xi. The formula for the two point exponential model is as follows:

$$p_i = 1 + (p_{1991} - 1) \cdot \left(\frac{p_{2001} - 1}{p_{1991} - 1} \right)^{\frac{i-1991}{10}} \qquad \text{for } p_{2001} >= p_{1991}$$

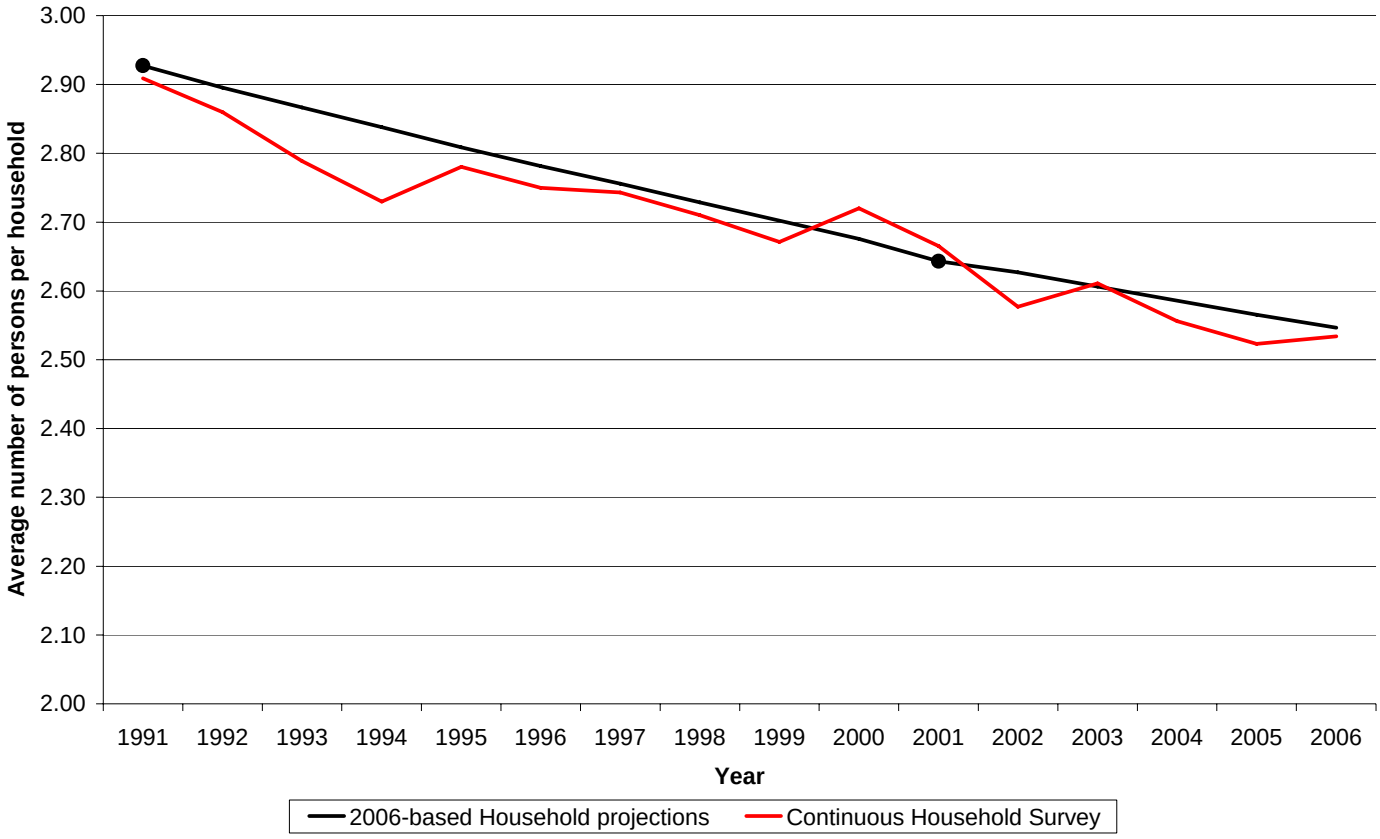
$$p_i = p_{1991} \cdot \left[\frac{p_{2001}}{p_{1991}} \right]^{\frac{i-1991}{10}} \qquad \text{for } p_{2001} < p_{1991}$$

where i is the projection year (2001, 2002, ….); and

p_i is the household membership probability in year i.

xii. Whilst the two-point exponential model uses two data points (namely the 1991 and 2001 Census data) on which to model household membership probabilities, the results should be no less reliable than those obtained using more data points taken from social survey data (which would contain sampling errors not present with Census data). The Continuous Household Survey, for example, provides a time series of data points, but each data point is subject to sampling variation as shown in the graph below for average household size. This variability is yet more pronounced when the Continuous Household Survey is used in sub-groups of the population such as the household types noted in this document. Accordingly, while models could be fitted using Continuous Household Survey time series data, the data would not be able to discriminate easily between competing models. The chosen model, the two-point exponential, has been selected on the basis that it is an excellent mathematical representation of what could reasonably be extrapolated to happen in the future. It is reassuring to note, that the overall trends evident from Continuous Household Survey and 1991 and 2001 Censuses are broadly consistent (Figure 1).

Figure 1: Average household size, 2006-based household projections and observed from Continuous Household Survey, 1991-2006 (non-zero y-axis)



6. Households with Children

xiii. The 2002-based projected household membership probabilities for children tended towards children living in smaller households and more lone adult with children households in the future. This was based on the trend between the 1991 and 2001 Censuses. Recent demographic evidence suggests that these trends have not continued post the 2001 Census. For example, the number of divorces has been stable over recent years; the number of births registered by the mother only has been constant since the later 1980s, and the distribution of parity of births has changed only for parities of 4 or more. Taking this into account, the household distribution of the projected children population over household types and size is likely to have remained relatively unchanged since the 2001 Census.

xiv. Therefore for the 2006-based household projections, the household membership probabilities for persons aged 18 and under are kept at their 2001 Census values. To complete households with children, adults were added to match the number of children according to the age-sex specific proportion within a particular household type (see Appendix C for further details). For example, say 100 children are projected to reside in a household type defined as “two adults plus one child”, then these 100 children are matched with 100 adult females and 100 adult males with a distribution of ages that corresponds with the age distribution of adults in that

household type according to the 2001 Census[2]. After the allocation of adults to complete households with children, the remaining adults are then distributed over childless household types using their projected household membership probabilities.

7. Elderly two-adult households

xv. A second trend is the continued significant improvement in mortality rates, which leads to larger estimated and projected populations aged 75 and over than was evident in the 2002-based population projections. The relative growth in this age group is larger for males, even though the number of females continues to remain higher than males. When applying the projected household membership probabilities to this age group leads to the projected number of males in two-adult households being higher than the number of females. This result whilst indicated to by the trend between the 1991 and 2001 Censuses is unlikely to continue beyond parity between males and females. Therefore the number of females aged 75 and over in two-adult households is projected relative to the number of males in such households. The number of females aged 75 and over in one-person households was used to source the additional females needed to create 2-adult households. Evidently the net result of this change in methodology is a reduction in the number of projected households (see section 10 and 11).

Table 2: Age-sex specific probabilities of sharing a two-adult household with a female aged 75+

Age-sex group	*Female, 75-84*	*Female, 85+*
Male, 25-59	0.005	0.001
Male, 30-34	0.009	0.001
Male, 35-44	0.057	0.003
Male, 45-49	0.079	0.016
Male, 50-54	0.048	0.018
Male, 55-59	0.018	0.012
Male, 60-64	0.009	0.010
Male, 65-74	0.049	0.003
Male, 75-84	0.437	0.020
Male, 85+	0.494	0.203
Female, 25-59	0.002	0.001
Female, 30-34	0.006	0.001
Female, 35-44	0.037	0.003
Female, 45-49	0.039	0.011
Female, 50-54	0.024	0.010
Female, 55-59	0.010	0.010
Female, 60-64	0.003	0.008
Female, 65-74	0.010	0.005
Female, 75-84	-	0.012

[2] These figures are illustrative only. Actual numbers from the 2001 Census show that 44,000 persons aged 18 and under lived in 2-adult-1-child households with 40,700 males aged 19 and over, and 44,100 females aged 19 and over, giving ratios of 92 and 100 adults per 100 children for males and females respectively.

xvi. The table above presents age-sex-specific probabilities of forming a two-adult household with a female aged 85 and over. The probabilities are applied to the number of persons in each age-sex group who form a two-adult household and aggregated to give the number of females aged 85 and over in two-adult households. For example, for every male aged 85 and over who is projected to live in a two-adult household, there will be 0.203 females aged 85 and over in two-adult households.

8. Sub-Regional Projections

xvii. The same methodology has been used to create household projections for each Local Government District (LGD) using the associated 2006-based population projections and LGD-specific 1991 and 2001 Census tables on communal establishment population probabilities, household membership probabilities and age-sex structure of adults in households with children. The adjustment for elderly couples is based on Northern Ireland level data, as the number of couple households with females aged 75 and over is too small at LGD level to obtain reliable ratios.

xviii. Adjustments were made to remove any discrepancies between the aggregated LGD-level and Northern Ireland household projections for each household type and year (see Appendix D). With regards to the total number of households, these adjustments account for less than 1 per cent of the projected total number of households. More significant adjustments were made to particularly the number of large households without children; there were relatively few numbers of these households in the 1991 and 2001 Censuses at the LGD level and therefore their projected household membership probabilities were less reliable. In terms of household size, the adjustments did not exceed 2 per cent of the projected number of households.

xix. The results for the NUTS III areas and regions used in the Regional Development Strategy are the aggregated adjusted LGD-level household projections.

9. Sensitivity Analysis – Impact of additional persons

xx. The sensitivity of the methodology was tested in a number of ways. Firstly, by adding 1,000 persons to the 28 different age-sex population groups (see Table 3). It shows that, when adding 1,000 children, the number of households falls slightly. This is the result of adults sourced from childless households (including one-person households) being used to complete household types with children.

Table 3: Additional households generated by additional 1,000 persons, by age and sex, 2006 and 2021

Age band	*Additional households when adding 1,000 persons (2006)*		*Additional households when adding 1,000 persons (2021)*	
	Males	*Females*	*Males*	*Females*
Aged 0-3	-37	-39	-82	-84
Aged 4-15	-53	-53	-90	-90
Aged 16-18	-23	-31	-59	-69
Aged 19-24	375	379	389	382
Aged 25-29	494	498	519	519
Aged 30-34	584	579	614	606
Aged 35-44	619	591	656	654
Aged 45-49	569	509	637	572
Aged 50-54	516	497	564	543
Aged 55-59	509	515	541	543
Aged 60-64	525	552	548	558
Aged 65-74	542	637	558	633
Aged 75-84	477	938	490	950
Aged 85+	529	933	564	964

xxi. There is very little difference in the findings between males and females up to the 60-64 age group. It is important to note additional adults aged 19 and over will be distributed over childless household types, as adults to complete households with children have already been allocated (see Section 6). This results in roughly one household being created for every additional two adults aged 19 and over added to the household population.

xxii. The relatively high number of additional households created when adding females aged 75 and over is a direct result of the adjustment made in the model for elderly couples (see Section 7). This means that, in effect, an additional 1,000 females aged 75 and over will be allocated to either single person households or 3+ adult households, with the former accounting for 5-10% of females. The findings for 2021 are slightly higher in absolute terms compared to the 2006 findings, as a larger proportion of the population is projected to reside in smaller households according to the 2-point exponential household membership probability projections.

10. Sensitivity Analysis – Impact of changes in methodology on 2002-based household projections

xxiii. The adjustments made to the methodology have each individually had an impact on the projected number of households. To isolate the effect of each of the changes, the new household projection model was run with the 2002-based population projections and adjustments were *switched on* in sequence. The findings are reported in Table 4 below.

Table 4: Impact of change methodology on 2002-based projections

	2006	*2011*	*2021*
2002-based projections	**668,800**	**710,900**	**790,200**
additional age bands	+700	+1,700	+4,000
constant probabilities for children	-4,100	-7,500	-13,600
completing households with children	+400	-1,100	-10,700
adjustment for elderly couples	-700	-1,700	-2,600
New projections (2002-based)	**665,100**	**702,300**	**767,300**
Difference	-3,700	-8,600	-22,900

xxiv. The sequence of adjustments reflects the projection methodology. The long-run sum of the impact of model adjustments was nearly 23 thousand fewer projected households by 2021, accounting for just under three per cent of the previously published projection. Relative small but opposite contributions to this change were made by additional age bands and the adjustment for elderly couples. More significant were the impact of constant household membership probabilities for children and the completion of household with children.

11. Sensitivity Analysis - comparison of 2006-based and 2002-based household projections

xxv. A further comparison has been made between the 2002-based and 2006-based household projections, which differ as a result of both the updated population projections and the changes made to the methodology. Figure 2 plots the two series of household projections for Northern Ireland.

xxvi. Table 5 provides a breakdown of the differences for several years. The revised population projections are the main contributor to the higher household projections. The next largest impact on household projections is the change in methodology to project the number of households with children by the projected number of children, and completing these households with adults. Despite the differences in household membership probabilities, the extension of the number of age bands has had little effect on the number of households. The adjustment for elderly couples has a relatively small impact on the total number of households.

Figure 2: 2002-based and 2006-based household projections, Northern Ireland, 1991-2025 (non-zero y-axis)

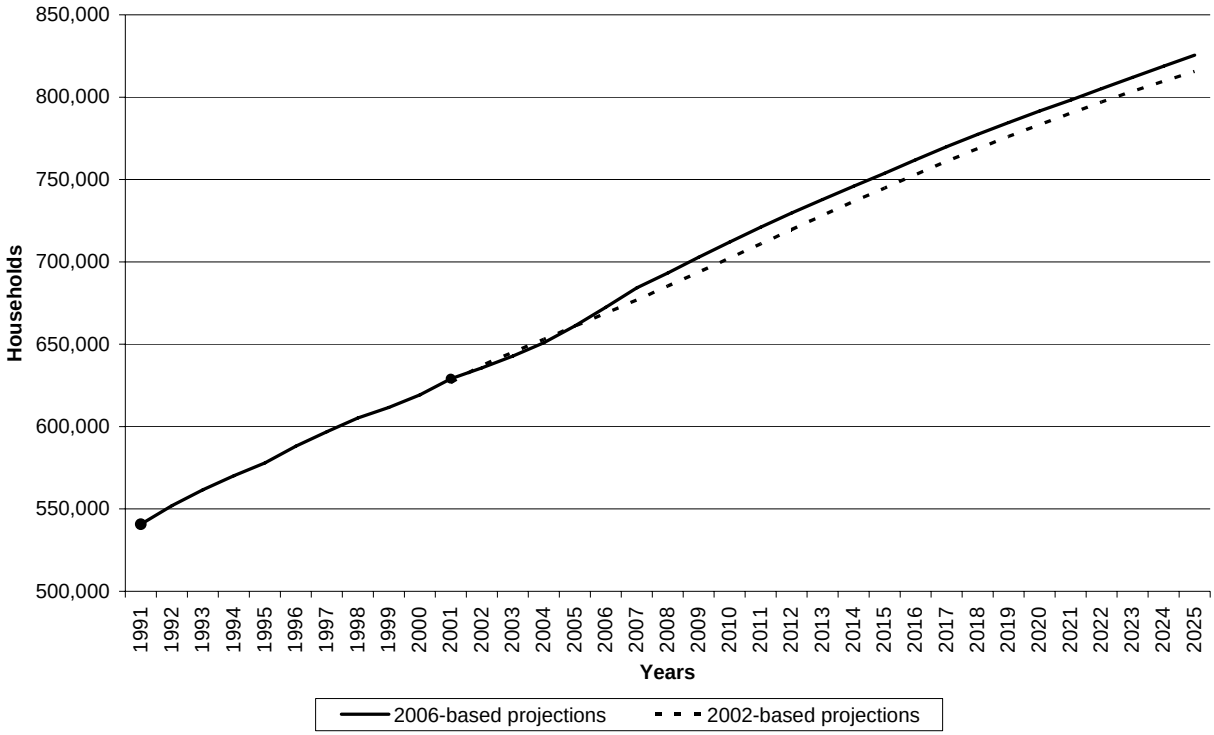


Table 5: Breakdown of difference between 2002 and 2006-based household projections

	2006	*2011*	*2021*
2002-based projections	668,800	710,900	790,200
2006-based projections	672,600	721,100	798,300
Difference	**+3,800**	**+10,200**	**+8,100**
population projection	+7,800	+25,800	+46,700
additional age bands	+1,000	-1,500	-300
constant probabilities for children	-4,200	-7,900	-15,400
completing households with children	-100	-4,600	-19,900
adjustment for elderly couples	-600	-1,600	-2,900

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Appendix A Chi-square test for homogeneity of household membership probabilities, by age and sex

i. For each pair of single ages, a chi-square statistic is calculated on the differences between the household membership probabilities as derived from the 2001 Census (see figures below). Note that these findings are only valid for the chosen number and definition of household types. Shading has been applied to highlight the pairs that are most homogenous (dark grey).

ii. It is obvious that pairs of close ages are most homogenous. The age bands used in the 2002-based household projections are marked with red borders. Four of these age bands (0-15, 16-24, 45-54 and 75+) have been split for the 2006-based household projections and are marked with dotted red lines.

Figure A.1. Chi-square statistics by age, males, household membership probabilities 2001 Census

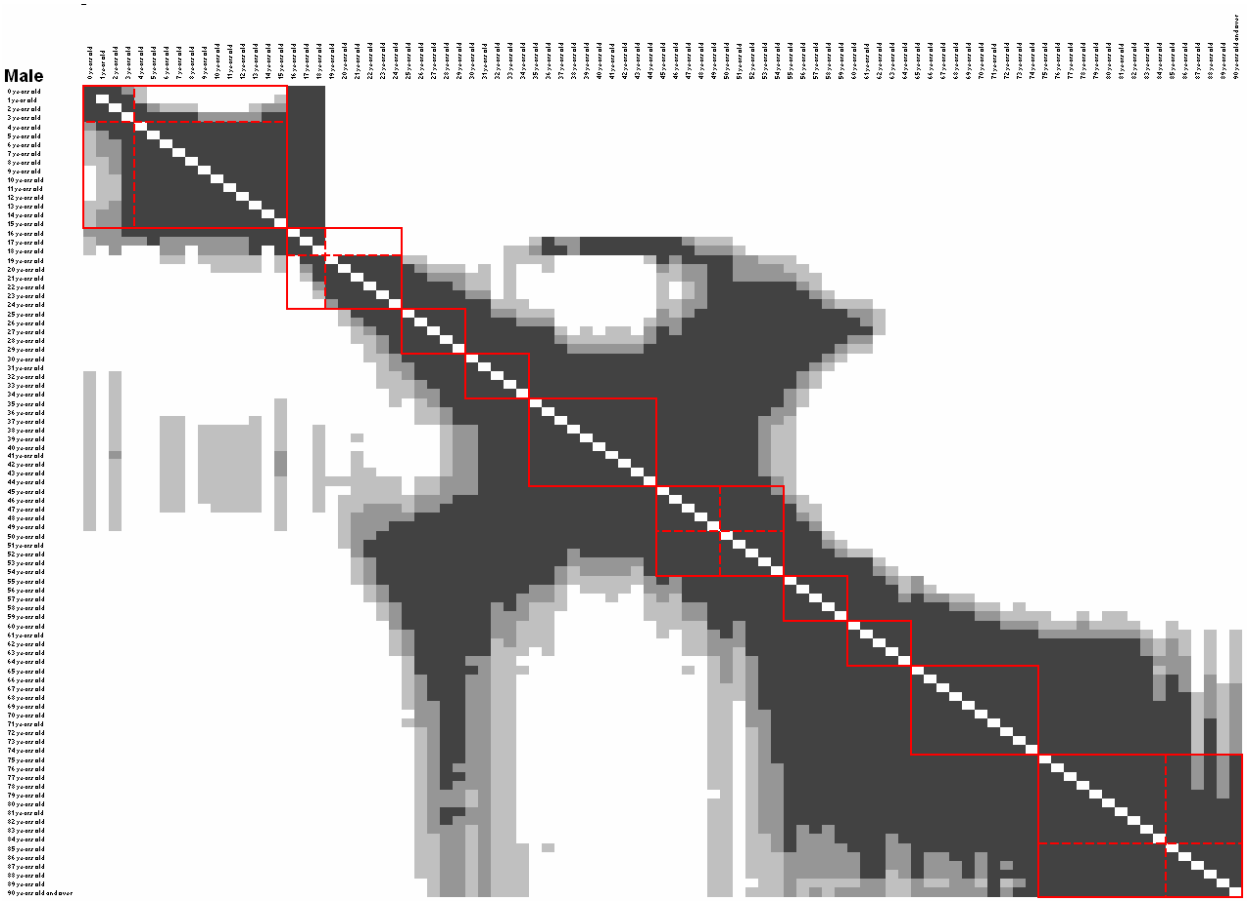
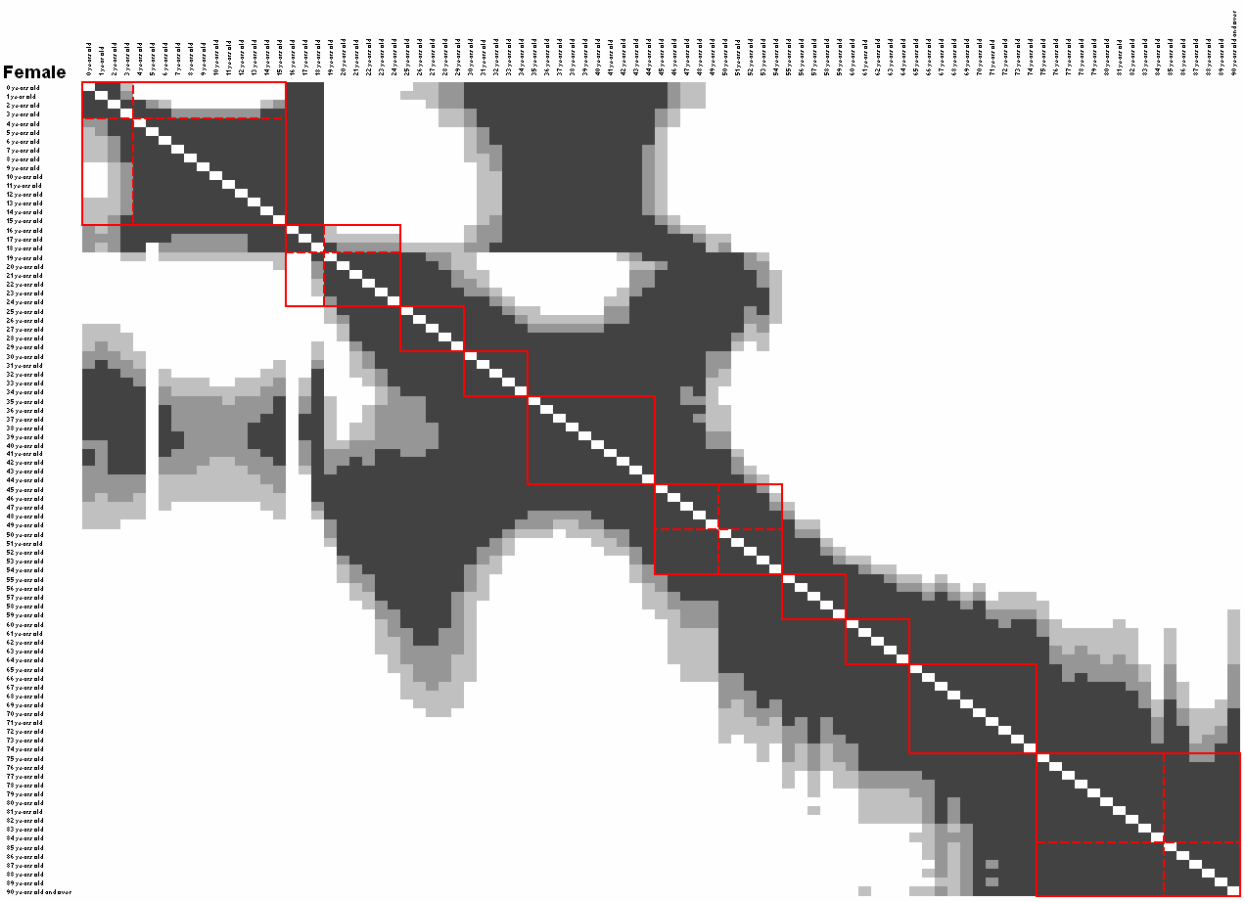


Figure A.2. Chi-square statistics by age, females, household membership probabilities 2001 Census



Appendix B 1991 and 2001 Census Household Membership Probabilities

Table B.1. 1991 Household Membership Probabilities

	1 adult (no children)	2 adults (no children)	2 Person with children (1 adult)	3 adults (no children)	3 Person with children (2 adults)	3 Person with children (1 adult)	4 adults (no children)	4 Person with children (2+ adult)	4 Person with children (1 adult)	5 adults (no children)	5 Person with children (2+ adult)	5 Person with children (1 adult)	6 adults (no children)	6 Person with children (2+ adult)	6 Person with children (1 adult)	7+ adults (no children)	7+ Person with children (2+ adult)	7+ Person with children (1 adult)
Males Aged 0-3	-	-	0.042	-	0.185	0.044	-	0.298	0.028	-	0.190	0.013	-	0.108	0.005	-	0.081	0.005
Males Aged 4-15	-	-	0.020	-	0.046	0.040	-	0.246	0.033	-	0.257	0.018	-	0.176	0.008	-	0.151	0.007
Males Aged 16-18	0.003	0.020	0.013	0.048	0.059	0.014	0.056	0.205	0.009	0.025	0.211	0.005	0.010	0.157	0.002	0.004	0.159	0.002
Males Aged 19-24	0.034	0.108	0.001	0.146	0.055	0.001	0.148	0.098	0.000	0.070	0.113	0.000	0.030	0.090	0.000	0.009	0.096	0.000
Males Aged 25-29	0.071	0.218	0.001	0.118	0.146	0.001	0.091	0.146	0.000	0.046	0.071	0.000	0.021	0.035	0.000	0.007	0.027	0.000
Males Aged 30-34	0.070	0.162	0.002	0.071	0.142	0.002	0.039	0.250	0.001	0.018	0.144	0.000	0.008	0.060	0.000	0.003	0.027	0.000
Males Aged 35-44	0.069	0.111	0.003	0.053	0.082	0.003	0.025	0.259	0.001	0.008	0.200	0.001	0.003	0.110	0.000	0.001	0.070	0.000
Males Aged 45-49	0.076	0.138	0.003	0.100	0.068	0.002	0.070	0.192	0.001	0.021	0.156	0.000	0.006	0.094	0.000	0.001	0.074	0.000
Males Aged 50-54	0.088	0.208	0.002	0.168	0.058	0.001	0.101	0.121	0.000	0.035	0.095	0.000	0.010	0.062	0.000	0.003	0.047	0.000
Males Aged 55-59	0.105	0.314	0.001	0.204	0.041	0.001	0.104	0.065	0.000	0.034	0.051	0.000	0.011	0.034	0.000	0.003	0.030	0.000
Males Aged 60-64	0.129	0.424	0.001	0.206	0.022	0.000	0.081	0.033	0.000	0.030	0.027	0.000	0.012	0.017	0.000	0.003	0.015	0.000
Males Aged 65-74	0.170	0.527	0.000	0.168	0.008	0.000	0.055	0.014	0.000	0.018	0.013	0.000	0.007	0.009	0.000	0.002	0.009	0.000
Males Aged 75-84	0.253	0.530	0.000	0.125	0.003	0.000	0.031	0.008	0.000	0.009	0.012	0.000	0.004	0.011	0.000	0.001	0.012	0.000
Males Aged 85+	0.340	0.411	0.000	0.120	0.004	0.000	0.034	0.009	0.000	0.012	0.020	0.000	0.004	0.021	0.000	0.003	0.022	0.000
Females Aged 0-3	-	-	0.041	-	0.182	0.044	-	0.301	0.028	-	0.195	0.013	-	0.104	0.006	-	0.081	0.005
Females Aged 4-15	-	-	0.019	-	0.046	0.040	-	0.243	0.033	-	0.255	0.019	-	0.176	0.008	-	0.154	0.007
Females Aged 16-18	0.005	0.016	0.023	0.032	0.069	0.019	0.036	0.210	0.011	0.017	0.219	0.006	0.007	0.160	0.003	0.002	0.160	0.003
Females Aged 19-24	0.027	0.140	0.043	0.109	0.088	0.021	0.112	0.111	0.005	0.052	0.102	0.001	0.021	0.078	0.000	0.007	0.082	0.000
Females Aged 25-29	0.040	0.200	0.038	0.065	0.161	0.037	0.052	0.187	0.019	0.027	0.089	0.007	0.012	0.037	0.002	0.004	0.023	0.000
Females Aged 30-34	0.040	0.112	0.028	0.036	0.120	0.035	0.019	0.266	0.024	0.008	0.173	0.012	0.004	0.077	0.004	0.001	0.036	0.003
Females Aged 35-44	0.035	0.088	0.020	0.046	0.080	0.023	0.028	0.251	0.013	0.007	0.200	0.006	0.002	0.116	0.002	0.001	0.080	0.002
Females Aged 45-49	0.051	0.153	0.014	0.126	0.074	0.008	0.086	0.169	0.003	0.028	0.134	0.001	0.008	0.080	0.000	0.002	0.062	0.000
Females Aged 50-54	0.076	0.258	0.010	0.198	0.057	0.003	0.108	0.091	0.001	0.037	0.067	0.000	0.012	0.044	0.000	0.004	0.033	0.000
Females Aged 55-59	0.120	0.375	0.006	0.215	0.033	0.001	0.096	0.041	0.000	0.032	0.030	0.000	0.013	0.018	0.000	0.003	0.015	0.000
Females Aged 60-64	0.199	0.458	0.003	0.185	0.012	0.000	0.069	0.014	0.000	0.023	0.013	0.000	0.008	0.008	0.000	0.002	0.005	0.000
Females Aged 65-74	0.343	0.452	0.001	0.122	0.005	0.000	0.032	0.009	0.000	0.009	0.010	0.000	0.003	0.007	0.000	0.001	0.006	0.000
Females Aged 75-84	0.512	0.328	0.001	0.078	0.003	0.000	0.020	0.009	0.000	0.006	0.015	0.000	0.003	0.012	0.000	0.001	0.012	0.000
Females Aged 85+	0.506	0.254	0.000	0.110	0.002	0.000	0.038	0.012	0.000	0.014	0.018	0.000	0.007	0.016	0.000	0.002	0.020	0.000

Table B.2. 2001 Census Household Membership Probabilities

	1 adult (no children)	2 adults (no children)	2 Person with children (1 adult)	3 adults (no children)	3 Person with children (2 adults)	3 Person with children (1 adult)	4 adults (no children)	4 Person with children (2+ adult)	4 Person with children (1 adult)	5 adults (no children)	5 Person with children (2+ adult)	5 Person with children (1 adult)	6 adults (no children)	6 Person with children (2+ adult)	6 Person with children (1 adult)	7+ adults (no children)	7+ Person with children (2+ adult)	7+ Person with children (1 adult)
Males Aged 0-3	-	-	0.070	-	0.190	0.061	-	0.304	0.031	-	0.183	0.015	-	0.091	0.008	-	0.044	0.003
Males Aged 4-15	-	-	0.039	-	0.060	0.069	-	0.275	0.047	-	0.252	0.022	-	0.146	0.010	-	0.075	0.004
Males Aged 16-18	0.005	0.023	0.029	0.042	0.100	0.030	0.039	0.234	0.016	0.018	0.220	0.008	0.007	0.143	0.004	0.002	0.080	0.001
Males Aged 19-24	0.046	0.113	0.001	0.179	0.040	0.000	0.159	0.099	0.000	0.069	0.120	0.000	0.026	0.087	0.000	0.006	0.054	0.000
Males Aged 25-29	0.126	0.252	0.002	0.159	0.102	0.001	0.109	0.087	0.000	0.044	0.049	0.000	0.018	0.030	0.000	0.005	0.017	0.000
Males Aged 30-34	0.142	0.208	0.004	0.090	0.142	0.002	0.047	0.202	0.001	0.018	0.093	0.000	0.007	0.033	0.000	0.002	0.011	0.000
Males Aged 35-44	0.117	0.135	0.006	0.060	0.099	0.004	0.025	0.263	0.001	0.007	0.171	0.000	0.003	0.080	0.000	0.000	0.029	0.000
Males Aged 45-49	0.120	0.156	0.006	0.089	0.093	0.004	0.052	0.203	0.001	0.015	0.147	0.000	0.004	0.075	0.000	0.001	0.033	0.000
Males Aged 50-54	0.125	0.241	0.005	0.159	0.080	0.002	0.082	0.125	0.000	0.023	0.085	0.000	0.007	0.042	0.000	0.001	0.022	0.000
Males Aged 55-59	0.134	0.376	0.002	0.194	0.046	0.001	0.087	0.056	0.000	0.023	0.039	0.000	0.007	0.022	0.000	0.002	0.011	0.000
Males Aged 60-64	0.149	0.493	0.001	0.188	0.020	0.000	0.064	0.025	0.000	0.019	0.017	0.000	0.006	0.011	0.000	0.001	0.006	0.000
Males Aged 65-74	0.185	0.561	0.001	0.154	0.008	0.000	0.044	0.011	0.000	0.012	0.008	0.000	0.005	0.006	0.000	0.001	0.003	0.000
Males Aged 75-84	0.273	0.544	0.001	0.113	0.004	0.000	0.029	0.007	0.000	0.008	0.009	0.000	0.002	0.006	0.000	0.001	0.004	0.000
Males Aged 85+	0.397	0.424	0.001	0.094	0.005	0.000	0.026	0.010	0.000	0.009	0.012	0.000	0.002	0.011	0.000	0.001	0.009	0.000
Females Aged 0-3	-	-	0.068	-	0.195	0.060	-	0.302	0.032	-	0.184	0.014	-	0.088	0.007	-	0.046	0.003
Females Aged 4-15	-	-	0.040	-	0.060	0.069	-	0.276	0.046	-	0.248	0.023	-	0.148	0.011	-	0.076	0.004
Females Aged 16-18	0.007	0.020	0.040	0.023	0.108	0.035	0.022	0.247	0.018	0.009	0.224	0.011	0.004	0.142	0.005	0.001	0.082	0.002
Females Aged 19-24	0.037	0.144	0.066	0.135	0.064	0.021	0.135	0.093	0.004	0.059	0.096	0.001	0.024	0.071	0.000	0.007	0.044	0.000
Females Aged 25-29	0.074	0.246	0.061	0.088	0.132	0.043	0.064	0.125	0.016	0.027	0.060	0.005	0.011	0.028	0.001	0.003	0.014	0.000
Females Aged 30-34	0.071	0.152	0.049	0.041	0.139	0.055	0.021	0.236	0.029	0.008	0.117	0.012	0.003	0.046	0.005	0.001	0.014	0.001
Females Aged 35-44	0.061	0.102	0.038	0.040	0.098	0.040	0.020	0.261	0.020	0.005	0.180	0.008	0.002	0.087	0.003	0.000	0.033	0.001
Females Aged 45-49	0.080	0.172	0.029	0.112	0.102	0.015	0.065	0.181	0.004	0.019	0.123	0.001	0.005	0.062	0.000	0.001	0.029	0.000
Females Aged 50-54	0.107	0.296	0.016	0.182	0.073	0.005	0.088	0.091	0.001	0.025	0.060	0.000	0.008	0.032	0.000	0.001	0.016	0.000
Females Aged 55-59	0.144	0.430	0.006	0.203	0.032	0.001	0.080	0.032	0.000	0.023	0.021	0.000	0.007	0.013	0.000	0.002	0.006	0.000
Females Aged 60-64	0.197	0.514	0.002	0.171	0.010	0.000	0.054	0.013	0.000	0.015	0.008	0.000	0.005	0.006	0.000	0.002	0.002	0.000
Females Aged 65-74	0.336	0.481	0.002	0.115	0.005	0.000	0.028	0.008	0.000	0.007	0.007	0.000	0.002	0.005	0.000	0.001	0.002	0.000
Females Aged 75-84	0.529	0.343	0.002	0.071	0.004	0.000	0.017	0.007	0.000	0.004	0.009	0.000	0.001	0.007	0.000	0.000	0.005	0.000
Females Aged 85+	0.619	0.228	0.001	0.077	0.003	0.001	0.022	0.010	0.000	0.011	0.008	0.000	0.003	0.008	0.000	0.001	0.008	0.000

Appendix C Age-sex structure of adults in households with children

i. The table below presents the ratios of adults per person aged under 19 by household type and age-sex of the adult, as derived from the 2001 Census. For example, for every person aged under 19 in a two-person household there are 0.226 females aged 35-44 years. Similarly, for every person aged under 19 in a four-person household with children (2+ adults) there are 0.241 males aged 35-44 years.

ii. Note that the column total do not add up to the expected figures, as the number of adults is unknown in household types with 2+ adults and some persons aged 16-17 are not in full-time education and thus classified as adults

Table C.1. Age-sex distribution of household members, by household type (2001 Census)

	2 Person with children (1 adult)	3 Person with children (2 adults)	3 Person with children (1 adult)	4 Person with children (2+ adult)	4 Person with children (1 adult)	5 Person with children (2+ adult)	5 Person with children (1 adult)	6 Person with children (2+ adult)	6 Person with children (1 adult)	7+ Person with children (2+ adult)	7+ Person with children (1 adult)
Males Aged 19-24	0.002	0.057	0.001	0.048	0.000	0.069	0.000	0.085	0.000	0.102	0.000
Males Aged 25-29	0.006	0.128	0.002	0.037	0.001	0.024	0.000	0.026	0.001	0.028	0.000
Males Aged 30-34	0.010	0.199	0.005	0.095	0.002	0.052	0.001	0.031	0.001	0.020	0.000
Males Aged 35-44	0.032	0.271	0.017	0.241	0.008	0.185	0.005	0.149	0.003	0.104	0.002
Males Aged 45-49	0.015	0.108	0.007	0.080	0.002	0.068	0.000	0.060	0.002	0.051	0.002
Males Aged 50-54	0.011	0.087	0.003	0.046	0.001	0.037	0.001	0.031	0.000	0.032	0.000
Males Aged 55-59	0.005	0.046	0.001	0.018	0.000	0.015	0.000	0.015	0.000	0.014	0.000
Males Aged 60-64	0.002	0.016	0.000	0.007	0.000	0.005	0.000	0.006	0.001	0.006	0.000
Males Aged 65-74	0.002	0.010	0.000	0.005	0.000	0.004	0.000	0.005	0.000	0.005	0.000
Males Aged 75-84	0.001	0.002	0.000	0.001	0.000	0.002	0.000	0.003	0.000	0.004	0.000
Males Aged 85+	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.001	0.000
Females Aged 19-24	0.200	0.093	0.046	0.045	0.013	0.055	0.004	0.070	0.002	0.084	0.000
Females Aged 25-29	0.168	0.172	0.085	0.055	0.051	0.031	0.031	0.025	0.015	0.025	0.012
Females Aged 30-34	0.151	0.204	0.121	0.117	0.101	0.069	0.086	0.046	0.076	0.028	0.060
Females Aged 35-44	0.226	0.280	0.173	0.251	0.139	0.204	0.113	0.169	0.092	0.125	0.075
Females Aged 45-49	0.070	0.117	0.026	0.070	0.011	0.056	0.006	0.048	0.004	0.044	0.004
Females Aged 50-54	0.037	0.082	0.009	0.035	0.003	0.027	0.001	0.025	0.001	0.023	0.000
Females Aged 55-59	0.013	0.033	0.001	0.011	0.000	0.009	0.001	0.009	0.001	0.008	0.000
Females Aged 60-64	0.004	0.009	0.000	0.004	0.000	0.003	0.000	0.003	0.000	0.003	0.000
Females Aged 65-74	0.005	0.008	0.000	0.004	0.000	0.004	0.000	0.005	0.000	0.004	0.000
Females Aged 75-84	0.003	0.004	0.000	0.002	0.000	0.004	0.001	0.005	0.000	0.006	0.000
Females Aged 85+	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.002	0.000	0.003	0.000

Appendix D Adjustment for discrepancies between aggregate LGD and Northern Ireland projections, by type and year

i. The coefficients in the table below are multiplied by the LGD-level household projections by household type and year. For example, the projected number of two-person (one child and one adult) households in 2006 from each LGD model is multiplied by 1.010 so that the aggregate number of all LGDs equals the Northern Ireland projection of two-person (one child and one adult) households in 2006.

Table D.1. Adjustments for discrepancies between aggregate LGD-level and Northern Ireland projections, by size/type and projection year

Household Type	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1 person	1.004	1.005	1.006	1.007	1.008	1.009	1.010	1.012	1.013	1.014	1.015	1.016	1.017	1.018	1.018	1.019
2 person (no children)	1.000	1.001	1.002	1.003	1.004	1.005	1.007	1.008	1.009	1.009	1.010	1.011	1.012	1.013	1.014	1.015
2 person (1 adult + 1 child)	1.010	1.011	1.012	1.014	1.015	1.016	1.018	1.019	1.021	1.022	1.024	1.025	1.027	1.029	1.031	1.032
3 person (no children)	0.992	0.991	0.990	0.989	0.988	0.987	0.986	0.985	0.983	0.981	0.980	0.978	0.976	0.974	0.972	0.970
3 person (2 adults + 1 child)	1.002	1.002	1.002	1.002	1.003	1.003	1.004	1.005	1.005	1.006	1.007	1.007	1.008	1.009	1.010	1.010
3 person (1 adult + 2 children)	1.011	1.013	1.014	1.016	1.018	1.019	1.021	1.023	1.024	1.026	1.027	1.029	1.031	1.033	1.035	1.037
4 person (no children)	0.981	0.978	0.975	0.972	0.969	0.966	0.963	0.959	0.956	0.953	0.949	0.945	0.940	0.936	0.931	0.927
4 person (2+ adults + 1+ children)	1.001	1.001	1.001	1.001	1.001	1.001	1.002	1.003	1.003	1.004	1.005	1.006	1.006	1.007	1.008	1.008
4 person (1 adult + 3 children)	1.016	1.017	1.020	1.022	1.024	1.026	1.028	1.030	1.031	1.033	1.034	1.036	1.038	1.040	1.042	1.044
5 person (no children)	0.979	0.976	0.974	0.971	0.969	0.964	0.959	0.955	0.950	0.946	0.941	0.936	0.931	0.925	0.917	0.908
5 person (2+ adults + 1+ children)	1.002	1.002	1.001	1.000	1.000	0.999	0.999	0.998	0.998	0.998	0.997	0.996	0.996	0.995	0.995	0.994
5 person (1 adult + 4 children)	1.018	1.020	1.023	1.026	1.029	1.031	1.033	1.035	1.036	1.038	1.039	1.041	1.043	1.045	1.047	1.049
6 person (no children)	0.926	0.913	0.902	0.891	0.881	0.870	0.857	0.842	0.829	0.815	0.801	0.786	0.771	0.755	0.737	0.719
6 person (2+ adults + 1+ children)	1.005	1.005	1.004	1.003	1.001	1.000	0.998	0.996	0.995	0.993	0.991	0.990	0.988	0.986	0.985	0.983
6 person (1 adult + 5 children)	1.024	1.026	1.029	1.032	1.034	1.036	1.037	1.038	1.039	1.039	1.040	1.041	1.042	1.043	1.045	1.046
7+ person (no children)	0.861	0.833	0.806	0.780	0.753	0.725	0.696	0.666	0.640	0.614	0.588	0.565	0.543	0.520	0.496	0.472
7+ person (2+ adults + 1+ children)	1.007	1.007	1.006	1.004	1.002	1.000	0.997	0.995	0.992	0.990	0.987	0.984	0.982	0.979	0.977	0.974
7+ person (1 adult + 6+ children)	0.982	0.982	0.984	0.985	0.986	0.987	0.988	0.989	0.990	0.991	0.993	0.994	0.996	0.997	1.000	1.002
All Households	**1.001**	**1.001**	**1.002**	**1.002**	**1.003**	**1.003**	**1.004**	**1.004**	**1.005**	**1.005**	**1.006**	**1.006**	**1.007**	**1.007**	**1.008**	**1.008**

Table D.2 Adjustment for discrepancies between aggregate LGD-level and Northern Ireland projections, by size, type and projection year

Household	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1 person household	1.004	1.005	1.006	1.007	1.008	1.009	1.010	1.012	1.013	1.014	1.015	1.016	1.017	1.018	1.018	1.019
2 person household	1.001	1.002	1.003	1.004	1.005	1.006	1.008	1.009	1.010	1.011	1.011	1.012	1.013	1.014	1.015	1.017
3 person household	0.998	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.997	0.996	0.996	0.996	0.995	0.995	0.994	0.994
4 person household	0.998	0.997	0.996	0.996	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.994	0.994
5+ person household	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
Single adult household	1.004	1.005	1.006	1.007	1.008	1.009	1.010	1.012	1.013	1.014	1.015	1.016	1.017	1.018	1.018	1.019
Two adult household	1.000	1.001	1.002	1.003	1.004	1.005	1.007	1.008	1.009	1.009	1.010	1.011	1.012	1.013	1.014	1.015
Other households without children	0.986	0.985	0.983	0.981	0.979	0.977	0.975	0.972	0.970	0.967	0.965	0.962	0.959	0.956	0.953	0.950
One adult with children	1.012	1.013	1.015	1.016	1.018	1.020	1.021	1.023	1.024	1.026	1.027	1.029	1.031	1.032	1.035	1.037
Other households with children	1.002	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
All Households	**1.001**	**1.001**	**1.002**	**1.002**	**1.003**	**1.003**	**1.004**	**1.004**	**1.005**	**1.005**	**1.006**	**1.006**	**1.007**	**1.007**	**1.008**	**1.008**