The Impact of Demographic Change on Demand for and Delivery of Health Services in Ireland 2006-2021

Report 2: Demographic Projections for the period until 2021

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Final Report

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Executive Summary

A growing population needs more health services, and since population growth is likely to be spatially uneven, the increase in demand for health services will be greater in some parts of the country than in others. Given that many health services are delivered on a regional or local rather than national basis, analysis of the regional distribution of future population growth is as important for future health service planning as is forecasting of overall population growth. Consequently it is necessary to examine future trends in the spatial distribution of the Irish population and how these are likely to affect demand for health care. Although population projections are available from a number of sources, it is shown that these are not sufficient for the present project and thus a new set of projections will be required. This report outlines the major demographic trends, the methodology used and assumptions made in deriving population projections for Ireland for the period 2006-2020, disaggregated by age-group, gender and county.

Given recent trends, the report outlines a set of assumptions that are required for the implementation of a cohort component population projection model. As the results are sensitive to the assumptions chosen a number of scenarios were used. These scenarios also provide a means to establish the main driving forces behind the projections. In particular, zero net-international migration scenarios highlight the impact of changes in fertility and mortality rates on the growth of the population. However these scenarios are not realistic and should therefore not be used for planning purposes. Instead the two scenarios with positive international immigration should be used. In this respect one should treat the F2 scenario as the central forecast as it is likely that fertility rates will decline further, since fertility rates across Europe have converged over a longer period, and Ireland still maintains an above average fertility rate.

The model results show two important trends. Firstly, the size of the older cohorts will increase very substantially over the forecast horizon to 2021 and indeed will increase beyond that date. The second finding is that while the number of births will increase slightly and thus the cohort of young children will increase in the short run, it is projected that the number of births will decline over the latter period of the forecasting period. The continued population increase along with changes in household formation patterns will increase the total number of households and thus increase the number of single households.

Given that the underlying demographic and economic variables are subject to change over time, the demographic projections and all calculations based on these should be updated on a regular basis.

1. Introduction

Along with the remarkable economic transition over the 1990's, Ireland has also been subject to substantial demographic changes. A growing population needs more health services, and since population growth is likely to be spatially uneven, the increase in demand for health services will be greater in some parts of the country than in others. The spatial distribution of the population in Ireland was traditionally dominated by trends towards urbanisation but the more recent trend is towards counter-urbanisation, the dispersal of population in the rural hinterlands of urban centres. Given that many health services are delivered on a regional or local rather than national basis, analysis of the regional distribution of future population growth is as important for future health service planning as is forecasting of overall population growth. Consequently it is necessary to examine future trends in the spatial distribution of the Irish population and how these are likely to affect demand for health care. Although population projections are available from a number of sources, for reasons set out below, these are not sufficient for the present project and a new set of projections will be required, and it is the purpose of this report to outline how these projections and the method by which they are calculated. This paper outlines the major demographic trends and sets out population projections for Ireland for the period 2006-2020, disaggregated by age-group, gender and county[1]. Summary tables for Health Service Executive (HSE) region will also be provided in this report.[2]

The main existing source of population projections is the Central Statistics Office, and the latest set it has provided is based on the results of Census 2002 (CSO, 2004a). These projections have a number of limitations from the point of view of the present project. Firstly, they are not available at a detailed spatially aggregated level (counties). Secondly, they do not provide projections disaggregated by some of the

[1] The analysis is carried out for 27 counties, where the Dublin counties are aggregated into the 'old' County Dublin and where Tipperary is split into North Riding and South Riding. This split is driven by the availability of detailed data on migration for Dublin. While the same problem also arises for Tipperary some historic data allows for a more informed split of the migration data for that county.

[2] The HSE regions are the Western Region comprising counties Donegal, Leitrim, Sligo, Mayo, Roscommon, Galway, Clare, Tipperary North Riding and Limerick; the Southern Region, comprising counties Wexford, Carlow, Kilkenny, Waterford, Tipperary South Riding, Cork and Kerry, Dublin and Mid-Leinster, comprising counties Longford, Westmeath, Offaly, Laois, Kildare, Wicklow and South Dublin and finally Dublin North-East, comprising Monaghan, Cavan, Louth, Meath and North Dublin. The nature of the split of Dublin turns out to introduce an added complication into the analysis since the split is not made along county boundaries.

variables we are interested in. Thirdly, the number of migrants is based on past trends and is independent of economic conditions for which forecasts and related migration forecasts are available. Finally, the CSO projections are based on the results of Census 2002[3].

The CSO also produces regional population projections (CSO 2004b), which in addition to the drawbacks identified above cover only the eight planning regions rather than countries. For counties, Connell and Pringle (2004) have produced projections that are disaggregated by marital status and household size. These suffer the drawback that they are now out of date and that they rely on migration assumptions that are based on historic migrations trends rather than behavioural migration projections driven by economic forecasts.

In this report the a model developed to produce county level population projections for Limerick County used by Morgenroth (2004) is extended and updated to produce projections for 27 counties, utilising the latest Census data and the migration estimates produced by the ESRI macroeconomic HERMES model[4]. The ESRI maintains a national demographic model which links migration flows to economic conditions, based on the ESRI's macroeconomic forecasting model HERMES (see FitzGerald et al. 2005). For the purposes of the present project, we propose to utilise the migration projections from the ESRI national demographic model.

Overall, this model will produce consistent projections of the population at the national and county level by sex and single year of age. Furthermore, these projections will also be used to estimate the number of households, household composition, migrant status and marital status. These outputs will be derived using trend extrapolation (see Morgenroth 2001, and Sexton et al. 2004). Given the fact that the results are dependent on the underlying assumptions on fertility and mortality and the estimated migration flows, projections will be produced for a number of scenarios.

It is important to note that new relevant information becomes available on a continuous basis. For example, while a detailed enumeration and breakdown of the population only becomes available every five years through the Census, data on migration, fertility and mortality is available on an annual basis. Furthermore, as the

[3] At the time of writing this report, the CSO were finalising their updated set of national projections that are based on the 2006 Census.
[4] Dublin is not disaggregated into its four constituent counties due to the lack of migration data, while Tipperary is split into North Riding and South Riding.

migration projections are based on an economic model, changes in the underlying economy result in changed migration projections. As a consequence, the demographic projections and all calculations based on these should be updated on a regular basis. This is particularly important if significant changes in the economy and demographic variables occur. In this context it is also important to note that given that the projections presented here were used as an input into the calculation of the implications of demographic change on health services need, and were thus prepared first, changes that have occurred since these projections were produced have not been taken into account[5].

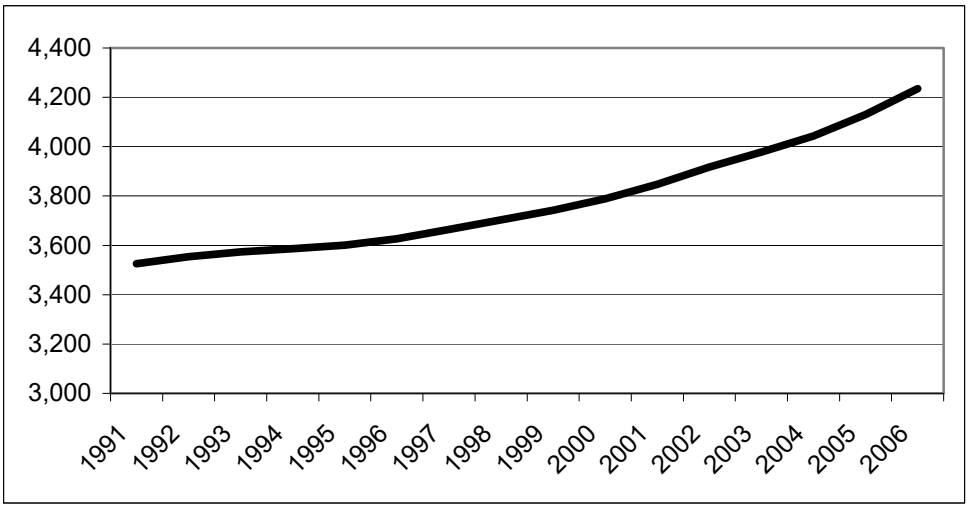
In order to allow the reader to assess the scale and nature of the projected demographic trends this report briefly outlines the major demographic developments over recent years. It then outlines the chosen projection methodology. As this methodology relies on a number of strong assumptions regarding the trends in key underlying variables, such as fertility, mortality and migration, these are outlined in detail. Finally the projection results for a number of scenarios are presented.

[5] The projections were finished in November 2007 and are thus based on the information available up to that point.

2. Broad Demographic Trends

It is well known that Ireland had suffered a long-run population decline over the period 1851 to 1961. Over that period the population declined by over two million (45%). Since then the population has increased strongly such that it is again above four million, and half of the long-run decline has been reversed. As Figure 1 shows, the population has grown particularly strongly over recent years with a period average growth rate of 1.35 percent per year between 1991 and 2006 and a particularly high average annual increase of over 2 percent between 2002 and 2006. Interestingly, if the population projections published by the Central Statistics Office (CSO), which did not foresee this very fast growth over the last intercensal period were to be realised, then the decline of the population by two million persons, which took over a century will be turned around in a period of about 60 years (from 1961 to 2026).

Figure 1 Total Population, 1991 to 2006 (1000s)

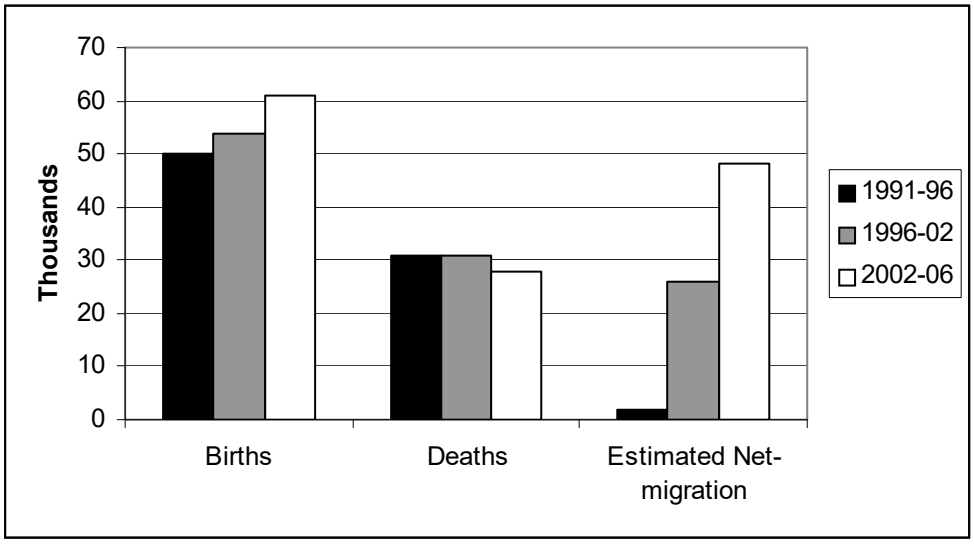


Source: CSO Population Estimates.

Population change comprises three components, namely, births, deaths and net-migration. The magnitude of each of these has important implications for the provision of health services. Consequently the trends in these components will be outlined in more detail below. In that context it is useful to first consider the broad trends in the components of population change together in order to provide an assessment of the relative contributions of each. As Figure 2 shows, births have been the largest contributor to population change since 1991 and the total number of births has been increasing. Deaths have been falling over the period while net-migration has

increased strongly from a very low level in 1991. Indeed over the most recent intercensal period, net-migration will have reached levels similar to births in individual years. The figure clearly shows that migration is the most volatile of the three components.

Figure 2 Components of Population Change, Average Annual Births, Deaths and Net-Migration for the period 1991-2006



Source: CSO Census of Population 2006, Principal Demographic Results.

The substantial population growth at the national level is mirrored at the county level, where there have been some interesting trends in terms of the spatial distribution of the population (see Table 1). While nationally, population growth has averaged 1.35 percent per annum over the period 1991 to 2006 the range of growth rates across counties is quite wide with Cork City losing on average 0.41 percent of its population while the population of Fingal grew by just over 3.8 percent per year. Counties in the greater metropolitan areas such as Meath, Kildare and Wicklow recorded particularly strong growth, while the major city areas such as Dublin City and Limerick city recorded very modest growth rates, reflecting the fact that these contain little space for further development. Correspondingly the population shares have also changed.

Table 1 County Population, 1991 and 2006

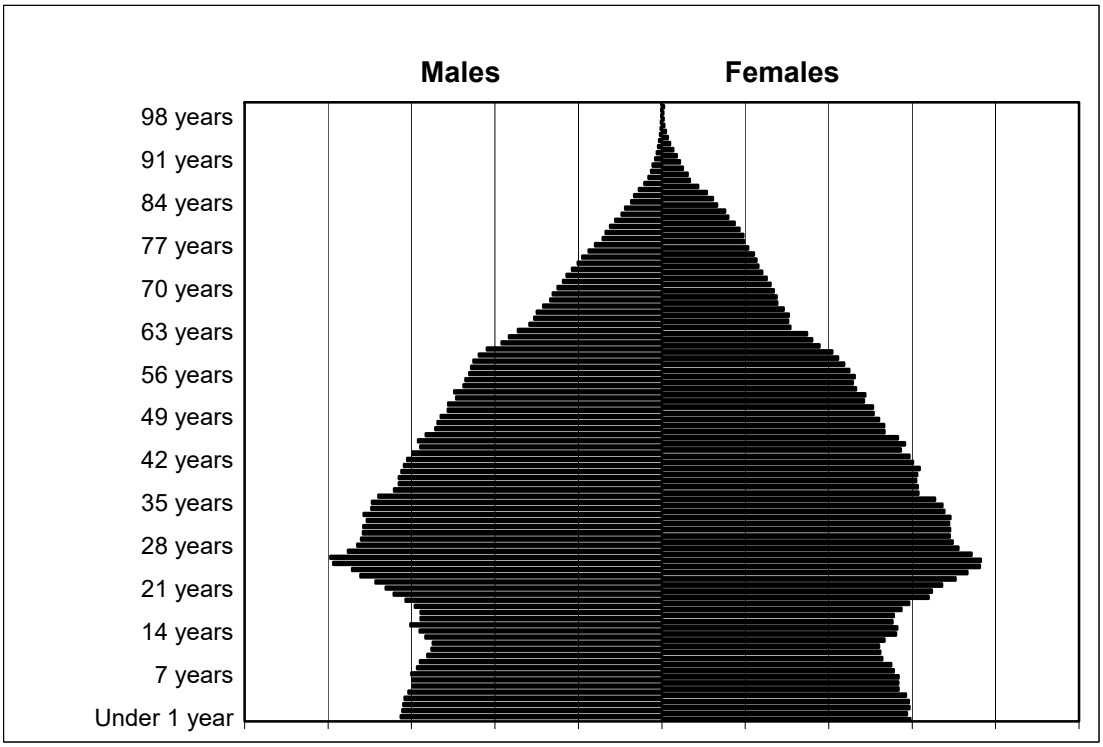
Area	Persons 1991	Share 1991	Persons 2006	Share 2006	Average Annual Growth 1991-2006
Carlow	40,942	1.2%	50,349	1.2%	1.5%
Dublin City	478,389	13.6%	506,211	11.9%	0.4%
Dun Laoghaire-Rathdown	185,410	5.3%	194,038	4.6%	0.3%
Fingal	152,766	4.3%	239,992	5.7%	3.8%
South Dublin	208,739	5.9%	246,935	5.8%	1.2%
Kildare	122,656	3.5%	186,335	4.4%	3.5%
Kilkenny	73,635	2.1%	87,558	2.1%	1.3%
Laois	52,314	1.5%	67,059	1.6%	1.9%
Longford	30,296	0.9%	34,391	0.8%	0.9%
Louth	90,724	2.6%	111,267	2.6%	1.5%
Meath	105,370	3.0%	162,831	3.8%	3.6%
Offaly	58,494	1.7%	70,868	1.7%	1.4%
Westmeath	61,880	1.8%	79,346	1.9%	1.9%
Wexford	102,069	2.9%	131,749	3.1%	1.9%
Wicklow	97,265	2.8%	126,194	3.0%	2.0%
Clare	90,918	2.6%	110,950	2.6%	1.5%
Cork City	127,253	3.6%	119,418	2.8%	-0.4%
Cork County	283,116	8.0%	361,877	8.5%	1.9%
Kerry	121,894	3.5%	139,835	3.3%	1.0%
Limerick City	52,083	1.5%	52,539	1.2%	0.1%
Limerick County	109,873	3.1%	131,516	3.1%	1.3%
Tipperary, N.R.	57,854	1.6%	66,023	1.6%	0.9%
Tipperary, S.R.	74,918	2.1%	83,221	2.0%	0.7%
Waterford City	40,328	1.1%	45,748	1.1%	0.9%
Waterford County	51,296	1.5%	62,213	1.5%	1.4%
Galway City	50,853	1.4%	72,414	1.7%	2.8%
Galway County	129,511	3.7%	159,256	3.8%	1.5%
Leitrim	25,301	0.7%	28,950	0.7%	1.0%
Mayo	110,713	3.1%	123,839	2.9%	0.8%
Roscommon	51,897	1.5%	58,768	1.4%	0.9%
Sligo	54,756	1.6%	60,894	1.4%	0.7%
Cavan	52,796	1.5%	64,003	1.5%	1.4%
Donegal	128,117	3.6%	147,264	3.5%	1.0%
Monaghan	51,293	1.5%	55,997	1.3%	0.6%
State	**3,525,719**	**100%**	**4,239,848**	**100%**	**1.4%**

Source: CSO Census of Population 1991 and 2006.

Figure 3 shows the age distribution of the population using the population pyramid. This shows that the largest cohorts for both males and females are found in the age groups between about 20 and 40 years of age for both males and females. Also noticeable are the large cohorts in the very young age groups, which of course reflect the fact that the largest cohorts of woman are in the age groups with the highest

fertility. Finally it is also apparent that the distribution is quite pointed towards the oldest age groups, which indicates that the cohorts in these age groups are relatively small, reflecting past emigration. Gender differences in life expectancy are also obvious with the cohorts of females aged over 80 years of age being significantly larger than those of males in this age group.

Figure 3 Population Pyramid, 2006



Source: CSO Census of Population, 2006

3. Methodology and Assumptions

The standard method used by demographers to project populations is the cohort component method. This method is based on the so called balancing equation where the population at a point in time is equal to the population at some previous point in time plus births, plus net in-migration minus deaths over the period between the two points in time. More formally this equation is written as:

$$P_1 = P_0 + B_{0-1} - D_{0-1} + NM_{0-1}$$

where the subscripts refer to the time periods, *P* refers to the population, *B* refers to births, *D* refers to deaths and *NM* refers to net in-migration. This relationship can be used for forecasting proposes if the starting population is known.

This balancing equation is used to project the population. These projections are calculated by using the baseline numbers for the population along with projections of births, deaths and net migration. Since we require county level projections this methodology is operationalised using county level data. Since the methodology and how it is applied have an important bearing on the projections it is useful to consider how this method is operationalised in a little more detail.

As indicated above, this method requires an accurate picture of the starting population. For this analysis the data from the CSO Census 2006 provides the most useful starting point since this gives the most recent accurate data on the number of persons in single year age groups and gender by county[6]. The use of this most recent data is important since this allows us to incorporate the most recent demographic trends into the analysis.

Deaths are generated by applying death rates for single years of age to the single year age groups. Obviously death rates for future years are not known so an important aspect of the projections is to make assumptions regarding these rates, based on the best information and analysis that is available. Likewise, age specific fertility rates, which again are not known for future years and thus require strong assumptions, are needed to derive estimates of births. Finally, assumptions regarding migration are required. In the case of sub-national projections such as those presented here, one

[6] It should be noted that persons aged 85 years and more are grouped together at the county level.

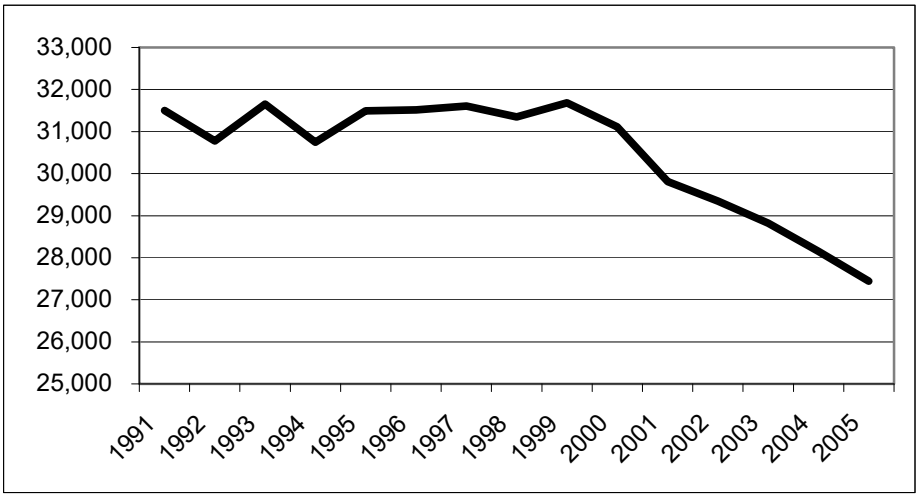
needs to consider not just international migration but also needs to take internal migration across counties into account.

Since the assumptions regarding mortality, fertility and migration crucially determine the overall projections the following sections will show the key trends in these variables and outline the assumptions that will be used for the projections.

3.1 Mortality

As was highlighted above, the number of deaths occurring within the State has been declining over time. This is more clearly seen in Figure 4, which shows that the number of deaths that occurred in 2005 was about 4,000 lower than the number that occurred during the 1990's, which given the growth of the population implies a substantial drop in the crude rate of deaths, which declined from 9 per 1000 in 1991 to 6.6 per 1000 in 2005.

Figure 4 Total Number of Deaths Recorded in Each Year From 1991 to 2005.



Source: CSO Vital Statistics

There has been a remarkable improvement in life expectancy over the last decade and a half. For example for males, the life expectancy at birth has increased from 72.3 years in 1990 to 75.1 years in 2002, with further improvements expected over the last four years. Age specific mortality rates have changed dramatically. For example that of 55 and 60 year olds has halved since 1986, while that for 80 year olds has improved by a third.

At the county level the most readily available indicator is the crude death rate, that is the number of deaths per 1000 of the population. Clearly this measure may give

somewhat misleading results as it does not reflect the age structure of the population in each county. A county that has a disproportionately older population will have more deaths and thus a higher crude death rate, even if for a given age group it has a lower mortality than other counties. However, if one is particularly interested in overall patterns of mortality then this indicator is nevertheless useful. As Table 2 shows the crude death rates are declining and further analysis of the data reveals that they are also converging towards the national average.

Table 2 Crude Death Rate (Rates per 1000 persons)

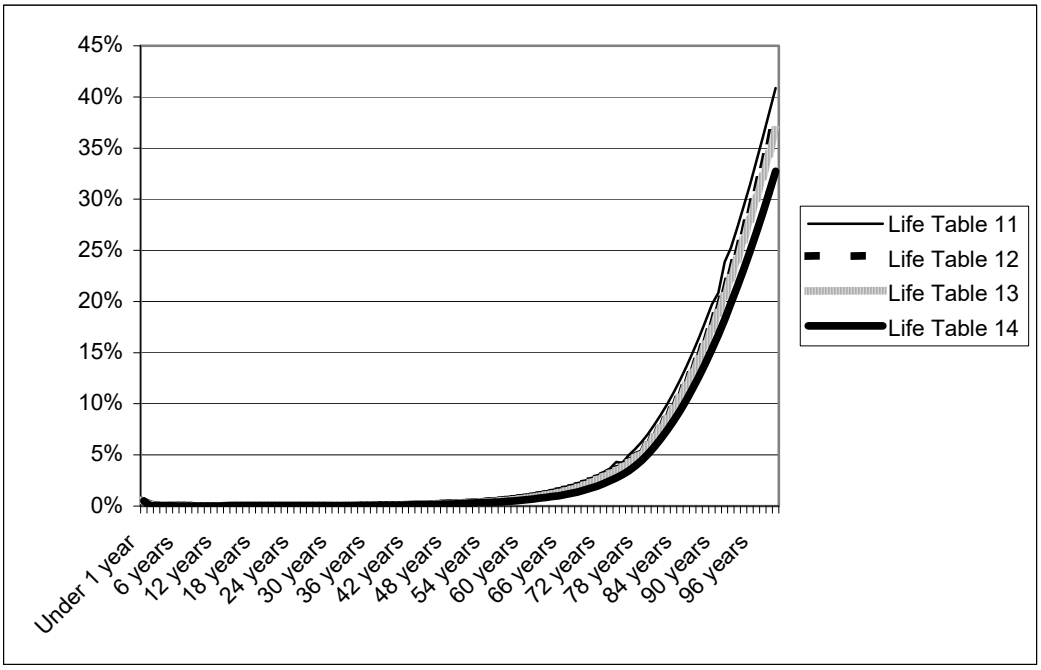
County	1991-96	1996-02	2002-06	County	1991-96	1996-02	2002-06
Carlow	9.3	8.7	7.2	**Louth**	8.5	8.1	6.6
Cavan	10.7	9.8	8.7	**Mayo**	12.4	11.8	9.4
Clare	9.2	8.7	7.5	**Meath**	7.1	6.3	5
Cork	9.2	8.6	7.3	**Monaghan**	9.6	8.9	7.6
Donegal	10.1	9.5	8	**Offaly**	9.2	8.3	9.1
Dublin	7.4	7.2	6.2	**Roscommon**	11.5	11.2	7.2
Galway	9	8.5	7	**Sligo**	10.8	10.2	8.5
Kerry	11.3	10.4	8.7	**Tipperary NR**	10.5	10.5	8.2
Kildare	6.1	5.4	4.6	**Tipperary SR**	10	9.2	7.8
Kilkenny	8.6	8	6.8	**Waterford**	8.8	8	7
Laois	9	8.1	6.1	**Westmeath**	9.4	9	7.3
Leitrim	15.1	13.5	11	**Wexford**	9.6	8.5	7.3
Limerick	8.8	8.3	7.5	**Wicklow**	7.8	7.8	6.5
Longford	10.8	10.6	9	**State**	8.8	8.3	7

Source: CSO Census of Population, various issues.

For the projection model we need to make assumptions about the age specific mortality rates. The CSO publish Life Tables, which contain such rates, that are based on mortality in a three year period around a census. The last such Life Table (No. 14), which had a reference period of 2001-2003, was published in 2004 and a new Life Table based on data from the Census and Vital Statistics 2005-2007 was not yet available when this report was drafted. It is nevertheless useful to consider how age specific mortality rates have improved over a longer period. This is most readily achieved by plotting the mortality rates of a number of Life Tables (see Figure 5). In the Figure the mortality rates for females at each year of age are shown. These data are taken from Life Tables 11 to 14 which, have been calculated for the periods 1985-1987, 1990-1992, 1995-1997 and 2001-2003 respectively. The figure clearly shows the quite substantial improvements in age specific mortality rates at all ages but

particularly at the older age groups. This mirrors similar trends in other developed countries and in this respect it should be noted that life expectancy in Ireland has converged rapidly to the EU-15 average over recent years.

Figure 5 Age Specific Mortality Probabilities for a Number of Life Tables



Source: CSO Irish Life Tables various issues.

While it is straightforward to calculate life tables for periods in the recent past, projecting these forward requires some strong assumptions. The simplest way to project mortality probabilities is to assume that improvements will occur at the historic rate which gives rise to a linear projection. This is the method chosen in the past by the CSO[7]. The advantage of this method is that it is simple to implement. The disadvantage is that the results are dependent on the time period that is chosen to base the rate of improvement on, and furthermore if there are any non-linearities these cannot be accommodated. Thus, if one suspects that there are cohort effects or that the rate of improvement will gradually decrease due to some limitation, then this linear projection is likely to overestimate the improvements in the long-run. Internationally research has pointed to a cohort effect where a particular cohort benefits from

[7] In the last published population projections the CSO projected mortality improvements according to historic improvements over the period 1986 to 2002, with the exception of males aged 20-29 for whom the improvements over the 1996 to 2002 were applied.

accelerated improvements in age specific mortality rates that are not achieved by subsequent cohorts. In particular this appears to affect the cohort born between 1923 and 1943 (the 'Inter War Cohort'). Recent research by Armstrong et.al. (2007) suggests that the cohort effect for Irish males is weak. Nevertheless, the simple trend extrapolation may not be as accurate as alternative methods.

An alternative method to the simple extrapolation is to assume that over the long-term the rate of improvement will return to its long-run rate which given historic data may be somewhere between one and two percent per year. In the interim period the rate of improvement is that pertaining to the recent past. This allows for a non-linearity in the rate of improvement without becoming overly technical. This method has recently been applied to Ireland by Shane Whelan of UCD who assumed a long-run rate of improvement of 1.5%, which is set to apply after 2031. The rate of improvement between 2005 and 2031 was calculated as a linear extrapolation between the rate of improvement in 2005 and that of 2031 (1.5%). As these mortality projections are taken to be the best estimates available it is these that are used in the model presented here[8,9]. As the calculation of county level life tables is beyond the scope of this project these national tables are used, which implies that local differences in mortality, which might exists, are not taken into account[10].

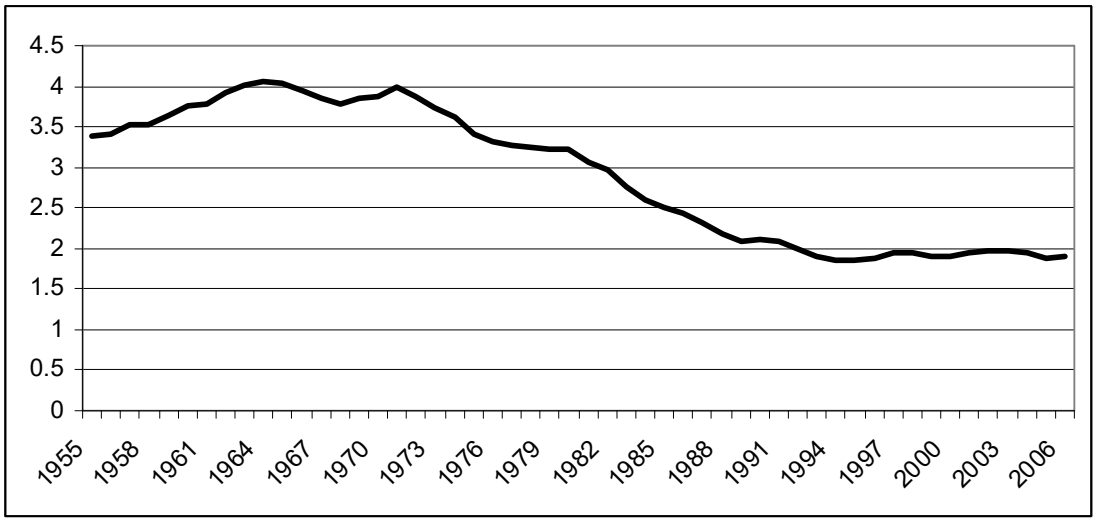
3.2 Fertility

Ireland maintained a high fertility rate until approximately 1980, after which fertility declined markedly (in 1965 it peaked at 4.03). Fertility has been below replacement (2.1) since 1991. As Figure 6, there was a further significant decline in fertility in the early 1990's, after which it fluctuated around a flat trend. Considering the period from 1955 to the present there is a clear long-term downward trend in fertility. This would suggest that the recent experience is merely a short-term deviation from that trend, which is likely to be explained by a trend of increasing age at first birth, which is reflected in an increase in the average age of mothers at birth,

[8] It has been accepted by the CSO that these projections are superior to their traditional trend extrapolation method and hence the CSO will use these in their next set of population projections.
[9] Some sensitivity analysis using alternative assumptions shows that over the relatively short forecast horizon to 2021 a range of plausible assumptions yields very similar results, since the size of the cohorts that will be aged over 75 by the forecast horizon is relatively small.
[10] Indeed, data limitations would make such analysis exceedingly difficult.

which rose from 28.5 in 1991 to 31 in 2006[11]. Indeed an analysis of age specific fertility rates reveals that the decline in fertility in the early 1990's was primarily driven by a decline in fertility among woman aged 20-29 for which age specific fertility rates have continued to decline to the present. On the other hand age specific fertility rates for woman aged 30 to 34 and particularly those aged 35-39 have increased. This may be explained by changing economic and sociological factors. The economic factors relate to the marked increase in labour market participation by woman, which is in part driven by the increasing educational attainment among females. Alternatively, if one considers recent trends to be the best guide to future fertility trends then one would expect fertility to remain roughly constant.

Figure 6 Total Fertility Rate, 1955 to 2006



Source: CSO Vital Statistics.

As will be seen below, Ireland has received substantial international immigration flows over recent years. It is sometimes asserted that these migration flows will increase fertility rates within Ireland. It is therefore useful to consider fertility levels in the countries from which migration into Ireland originates. Table 3 shows that in the newer EU member states of Central and Eastern Europe, which account for the bulk of recent immigration to Ireland, fertility rates are far lower than in Ireland. Africans immigrants account for less than 8% of the stock of migrants and less than one percent of the total population. This means that the higher fertility among this

[11] Accurate comparisons of the age at first birth are not possible as data for 1991 is only available for first births within marriage (83% of all births) and for mothers aged above 29 years only for age groups rather than single year of age.

latter group of immigrants will not impact significantly on the overall pattern of Irish fertility rates.

The trends pertaining to other EU Member States might point to the most likely trends in Irish fertility over coming years. Firstly, Ireland has the highest fertility among EU Member States. On average the fertility rates in the EU have declined continuously, although of course some countries recorded an increase. Furthermrore, there is evidence of strong convergence to the EU average which for the EU 15, was 1.60 in 2004, which of course was 21% higher than that for Ireland. Overall, over the period between 1990 and 2004 fertility declined in 23 out of the 30 countries.

Table 3 Total Period Fertility Rates for Selected Countries

Country Name	1990	1995	2000	2004
Nigeria	6.72	6.40	6.01	5.64
Cyprus	2.42	2.00	1.60	1.50
Sweden	2.13	1.73	1.54	1.75
Ireland	2.12	1.87	1.89	1.95
China	2.10	1.92	1.89	1.85
Slovak Republic	2.09	1.52	1.3	1.25
Malta	2.05	1.83	1.72	1.37
Estonia	2.04	1.32	1.34	1.4
Poland	2.04	1.61	1.34	1.23
Lithuania	2.03	1.49	1.27	1.26
Latvia	2.02	1.25	1.24	1.24
Czech Republic	1.89	1.28	1.14	1.23
Hungary	1.84	1.57	1.32	1.28
Romania	1.84	1.34	1.31	1.29
United Kingdom	1.83	1.71	1.68	1.74
Bulgaria	1.81	1.23	1.27	1.30
Finland	1.78	1.81	1.73	1.80
France	1.78	1.71	1.88	1.90
Denmark	1.67	1.81	1.77	1.76
Belgium	1.62	1.57	1.66	1.62
Luxembourg	1.62	1.68	1.78	1.70
Netherlands	1.62	n.a.	1.72	1.73
Slovenia	1.46	1.29	1.21	1.22
Austria	1.45	1.40	1.36	1.42
Germany	1.45	1.25	1.36	1.37
Portugal	1.43	1.38	1.52	1.42
Greece	1.4	1.32	1.29	1.29
Spain	1.33	1.18	1.24	1.32
Italy	1.26	1.18	1.24	1.33

Source: World Bank World Development Indicators, 2006.

At the County level a number of interesting trends emerge (see Table 4). Firstly, crude birth rates have increased over time. Furthermore, in relation to crude rates at least, there appears to be some divergence across counties. Secondly, there appears to be a pattern of lower rates in more remote counties and high rates in the chief commuting counties, particularly around Dublin. However, once one calculates the total period fertility rates (TPFR), which indicate the total number of children a woman will have over her lifetime based on age specific fertility rates, this pattern changes (see Table 5). While commuting counties have high rates of fertility, counties that contain a large city tended to have lower fertility and a mixed picture emerges for the remainder of the counties. For example while Monaghan has a low crude birth rate and a low TPFR, Leitrim has a low crude rate but a relatively high TPFR. These patterns are likely to be related to the age structure within each county. There is no pattern of continued convergence between the trends in county TPFRs relative to the national average. There was some convergence between 1991 and 1996, followed by divergence until 2002 after which there has been some renewed convergence. If one compares the county TPFRs of 1996, 2002 and 2006 with that of 1991 one finds that the difference is smallest for 2006 which suggests that over the 15 year period the county deviations from the national average have not changed substantially. This finding is also confirmed if one estimates the correlation coefficients between the different years. The variation across counties with regard to age specific fertility rates appear to remain roughly constant which suggests that the same trends in age specific rates pertain to all counties.

Table 4 Crude Birth Rate (Rates per 1000 persons)

County	1991-96	1996-02	2002-06	County	1991-96	1996-02	2002-06
Carlow	15	14.8	17.2	**Louth**	13.4	15	15.7
Cavan	13.9	13.6	13.8	**Mayo**	12.5	12.5	13.1
Clare	13.1	14	15.7	**Meath**	13.7	14.9	17.5
Cork	13.8	13.9	14.7	**Monaghan**	12.7	12.4	12.7
Donegal	13.7	13.6	13.5	**Offaly**	13.6	14.1	15.8
Dublin	14.5	14.9	15.3	**Roscommon**	11.1	10.2	14.8
Galway	13.8	13.7	14.9	**Sligo**	13.1	12.9	11.3
Kerry	12.1	12.3	12.8	**Tipperary NR**	14.6	14.8	12.9
Kildare	16.1	17.7	18.6	**Tipperary SR**	13	13	13.2
Kilkenny	13.2	13	13.4	**Waterford**	13.5	14.5	15.4
Laois	13.3	13.8	15.2	**Westmeath**	15.4	15.5	16.2
Leitrim	11.9	11.4	12.9	**Wexford**	14.6	14.8	16
Limerick	14.2	14.3	14.3	**Wicklow**	15.2	15.9	16.1
Longford	13.3	13.9	15.2	**State**	14.0	14.3	15

Source: CSO Census of Population, various issues.

Given the analysis of fertility trends at the national and county level it is possible to derive a number of plausible assumptions. Since it appears that the deviations of the county TPFRs are roughly constant, it appears reasonable to assume that the deviation of the county TPFRs from the national average will remain constant at their 2006 levels. For the projection model the TPFRs have to be transposed into age specific fertility rates which are then applied to the cohorts of females. Given that the variation in age specific fertility rates across counties appears to be relatively stable these are assumed to change at an equal rate for each age group, which preserves this pattern. Given these assumptions one requires just an assumption for the national TPFR in order to derive county level fertility rates. Regarding the national trend two plausible scenarios can be identified from the trends in Figure 6. Firstly if one considers only the more recent period then a constant TPFR would seem plausible (this corresponds to the values for 2006 being carried through until 2021). This is our first scenario, which we term F1, following the terminology used by the CSO. Secondly, if one considers the longer-term trends then one would expect TPFR to follow a long-term decline. The second scenario, F2, assumes that TPFR will decline to 1.65 by 2016 after which it will remain constant. The last two columns of Table 5 show how these assumptions are transposed into county level TPFRs. Since these are assumptions the columns are labelled A2011 and A2016.

Table 5 Total Period Fertility Rate (TPFR)

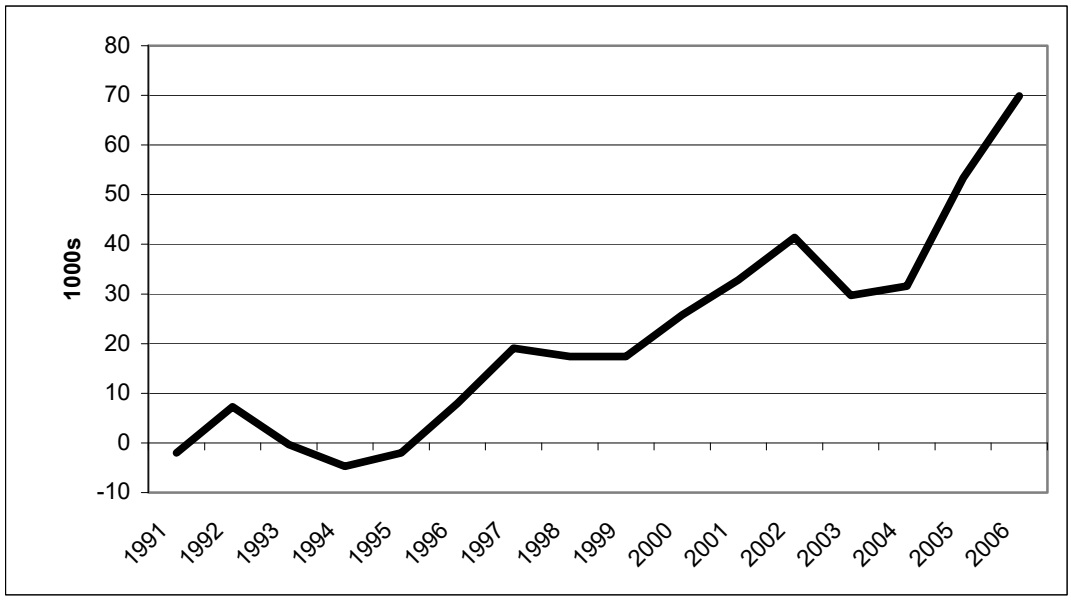
	1991	1996	2002	2006A	2011A	2016
Carlow	2.27	2.06	2.40	2.18	2.05	1.93
Dublin	1.87	1.71	1.77	1.67	1.55	1.42
Kildare	2.29	2.09	2.34	2.12	1.99	1.86
Kilkenny	2.13	1.86	1.97	1.89	1.75	1.63
Laois	2.26	2.00	2.26	2.12	1.98	1.85
Longford	2.44	2.26	2.73	2.42	2.30	2.17
Louth	1.97	1.88	2.06	1.91	1.78	1.65
Meath	2.19	1.98	2.20	2.09	1.95	1.82
Offaly	2.15	2.10	2.23	2.10	1.96	1.83
Westmeath	2.19	2.13	2.19	2.22	2.09	1.96
Wexford	2.43	2.10	2.21	2.23	2.08	1.95
Wicklow	2.23	2.01	2.16	2.13	2.00	1.87
Clare	2.13	2.01	2.34	2.16	2.03	1.90
Cork	2.04	1.89	1.95	1.96	1.83	1.70
Kerry	2.09	1.90	1.95	1.88	1.75	1.62
Limerick	1.56	2.01	1.90	1.94	1.80	1.68
Tipperary NR	2.43	2.20	2.25	2.31	2.18	2.05
Tipperary SR	2.06	2.02	1.79	1.87	1.74	1.61
Waterford	2.21	2.10	1.99	2.20	2.07	1.94
Galway	1.85	1.92	1.92	1.81	1.69	1.57
Leitrim	2.25	2.09	2.29	2.14	2.01	1.88
Mayo	2.39	2.11	2.01	2.06	1.93	1.80
Roscommon	2.27	1.82	1.95	2.06	1.94	1.81
Sligo	2.14	1.94	1.82	1.98	1.86	1.73
Cavan	2.41	2.18	2.19	2.23	2.10	1.97
Donegal	2.32	2.05	2.00	2.01	1.88	1.75
Monaghan	2.11	1.96	1.86	1.73	1.61	1.48
STATE	2.07	1.89	1.97	1.91	1.78	1.65

Source: CSO Report on Vital Statistics various issues and Own Calculations

3.3 Migration

One of the most remarkable features of demographic change over the last 15 years has been the turnaround in migration. While there was some positive net immigration in the 1970's the recent trends which are shown in Figure 7 differ from that earlier period in that Ireland has received significant numbers of immigrants with no previous connection to Ireland. This is further highlighted in Table 6, which shows that immigration trebled from just over 40,000 in 1996 to almost 122,000 in 2006. While almost half of the immigrants in 1996 were born in Ireland and were thus return migrants, this proportion had declined to a fifth by 2006. This change is largely driven by the change in predominant origin region. In 1996 the UK accounted for more than half of all migrants while in 2006 non EU-15 European countries accounted for 45% of immigrants, and indeed of those a large majority originated in Poland (see Table 7). Another notable feature of Table 6 is the fact that the number of immigrants from African countries has declined significantly since 2002.

Figure 7 Net Migration (1000s) for the period 1955 to 2006



Source: Central Statistics Office

Table 6 Origin and Birthplace of Immigrants who took up residence in Ireland during the Year Preceding the Census

	Total			Birthplace in RoI			Birthplace elsewhere		
	1996	2002	2006	1996	2002	2006	1996	2002	2006
UK	20,747	25,654	22,641	10,022	10,208	8,571	10,725	15,446	14,070
Other EU 15	7,459	9,948	14,783	2,408	3,021	2,948	5,051	6,927	11,835
Other Europe	1,069	8,335	54,673	371	486	991	698	7,849	53,682
US & Canada	5,626	6,814	6,859	2,828	3,639	3,074	2,798	3,175	3,785
Other Americas	398	987	2,132	122	180	300	276	807	1,832
Africa	1,122	7,087	3,260	446	483	322	676	6,604	2,938
Asia	1,279	7,921	8,749	315	869	949	964	7,052	7,800
Australia & New Zealand	2,082	8,886	8,144	1,376	6,440	5,952	706	2,446	2,192
Other	786	472	698	486	253	441	300	219	257
Total	40,568	76,104	121,939	18,374	25,579	23,548	22,194	50,525	98,391

Source: CSO Census of Population 1996 and 2006.

Table 7 Origin of Other Europe Immigrants who took up residence in Ireland during the Year Preceding the Census, 2006

	Total	Birthplace in RoI	Birthplace elsewhere
Cyprus	141	49	92
Czech Republic	1,917	58	1,859
Estonia	661	9	652
Hungary	1,356	23	1,333
Latvia	4,052	40	4,012
Lithuania	7,376	94	7,282
Malta	51	9	42
Poland	33,397	400	32,997
Slovakia	3,622	57	3,565
Slovenia	72	5	67
Other European Countries	2,028	247	1,781
Total	54,673	991	53,682

Source: CSO Census of Population, 2006.

Given that immigration has contributed substantially to population growth it is important to consider the geographic dispersion of migrants to Ireland. Of course, at a spatially disaggregated level migration refers to internal and international migration, which complicates the construction of population projections. The components of population change identify total migration, which is a combination of internal and international migration at the county level. Table 8 shows that the remarkable change in national migration statistics is largely echoed at the county level in that rates of immigration have increased, but that there are also some interesting differences. For example, some counties have recorded very low rates of net-immigration. These include Dublin, which may be somewhat surprising. However, the internal migration

patterns for 2001/2002 and 2005/06 show that Dublin lost a substantial number of persons to other counties within Ireland through internal migration so that the overall migration figures for Dublin are consistent with substantial international immigration. Likewise some counties that have benefited substantially from internal migration have received only a small number of international migrants.

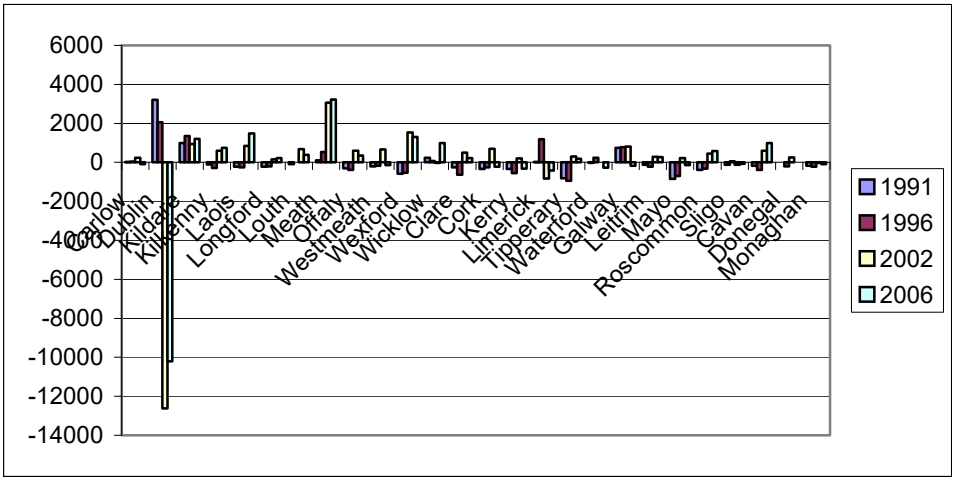
Table 8 Average Annual Rate of Net Migration (per 1000)

County	1991-96	1996-02	2002-06	County	1991-96	1996-02	2002-06
Carlow	-2.4	10.6	13.1	**Louth**	-1.7	9.7	12.2
Cavan	-2.6	7.2	25.6	**Mayo**	1.4	8	9.2
Clare	2.7	10.4	9.4	**Meath**	1.5	24.6	35.7
Cork	0.2	5.2	10.4	**Monaghan**	-3.1	0.7	9.8
Donegal	-0.7	5.3	11.0	**Offaly**	-2.2	6.6	13.0
Dublin	-0.7	2.1	4.7	**Roscommon**	0.7	6.7	18.3
Galway	4.5	11.7	17.0	**Sligo**	1.6	4.2	19.0
Kerry	6	6.3	8.9	**Tipperary NR**	-3.5	4.1	6.4
Kildare	9.2	20	17.6	**Tipperary SR**	-1.3	4	6.7
Kilkenny	0	5.7	14.4	**Waterford**	1.8	5.2	6.9
Laois	-1.9	11.7	23.6	**Westmeath**	-1.5	14.5	16.1
Leitrim	1.3	6.9	25.8	**Wexford**	-0.6	12.2	21.5
Limerick	-1.6	4	5.1	**Wicklow**	3.4	10.3	14.6
Longford	-3.4	1.6	18.9	**State**	0.5	6.8	11.4

Source: CSO Census of Population, various issues.

One complication relates to the fact that the migration data from the Census refers to just one year as respondents are asked about their place of residence one year previously. Thus there is a danger that the data might not be representative of the overall trends. This is particularly relevant in the case of internal migration where there appear to have been substantial changes since 1996. Figure 8 shows that for most counties there has been a sign change in net migration since 1996. The most dramatic change has been recorded for Dublin, which received a positive net internal migration flow of about 3000 in both 1991 and 1996, but has more recently lost more than 10,000 persons through internal migration per year.

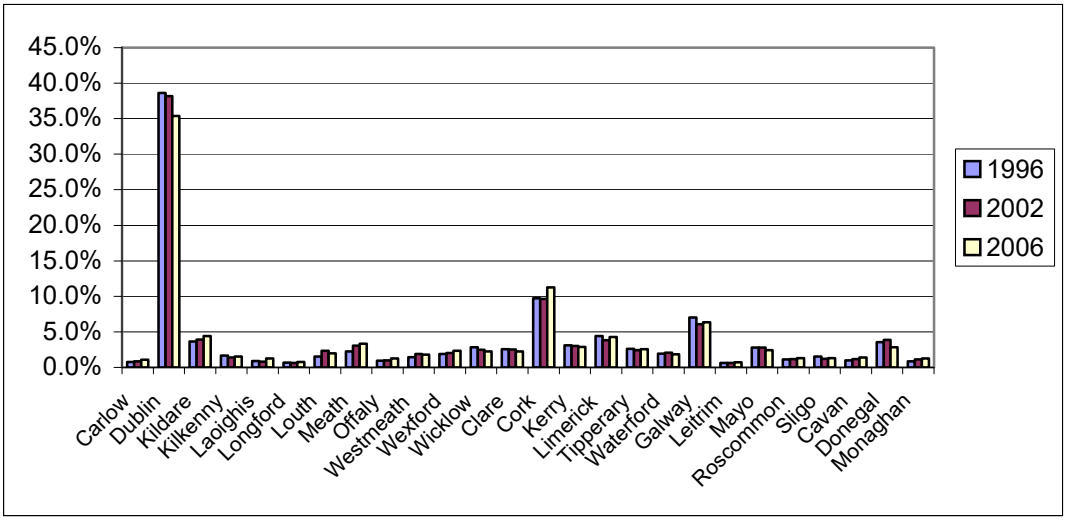
Figure 8 Net Internal Migration



Source: CSO Census of Population, various issues.

In contrast to internal migration, the pattern of international migration at the county level has been remarkably stable as is shown in Figure 9. This figure shows that international migrants tend to migrate disproportionately to the counties containing the larger urban centres such as Dublin, Cork and Galway. One outlier is Donegal, which may be accounted for by cross border migration. Given the stability of this pattern for census years it seems reasonable to assume that this pattern is stable for other years between censuses. It is thus possible to distribute the international migration, taken from the CSO Population and Migration Estimates, across counties. As data for both births and deaths is available it is then possible to 'back out' the net internal migration per year and thus derive a time series of internal migration. This analysis shows that the net migration pattern for 23 counties is subject to sign changes, and of these 18 experience the sign change in the 1996-2002 period after which the new pattern is stable. Only in the case of a few counties is the relationship erratic.

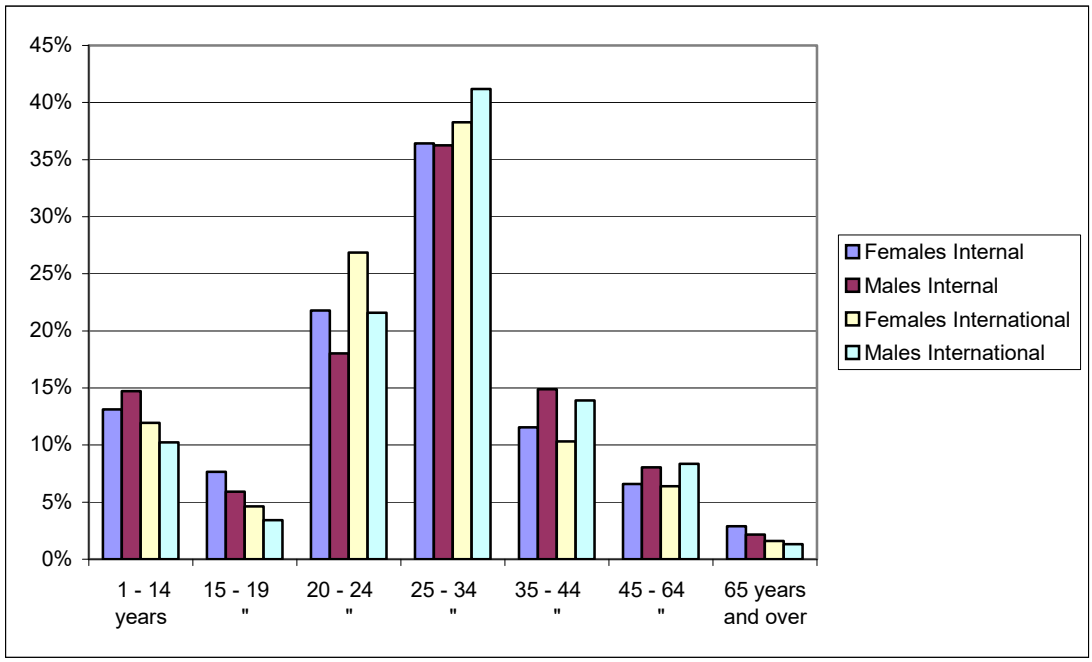
Figure 9 Distribution of International Immigrants



Source: CSO Census of Population various issues.

Given the finding that the pattern of internal migration has been stable since the substantial changes in the 1990s, it seems reasonable to assume that the pattern seen in 2006 will continue. Furthermore, the age structure of internal migration is also assumed to remain stable over the projection horizon. In general migrants, internal and international are predominantly in the 20 to 34 age group (see Figure 10). Also notable is that international migrants are less likely to migrate with children than internal migrants, which is reflected in the smaller proportion of migrants in the 1- 14 age group. This may either reflect the fact that international migrant are more likely to be single, they have fewer children or that they leave their family in their home country. Overall, few migrants are aged over 65 years.

Figure 10 Age Profile of Internal and International Migrants 2006



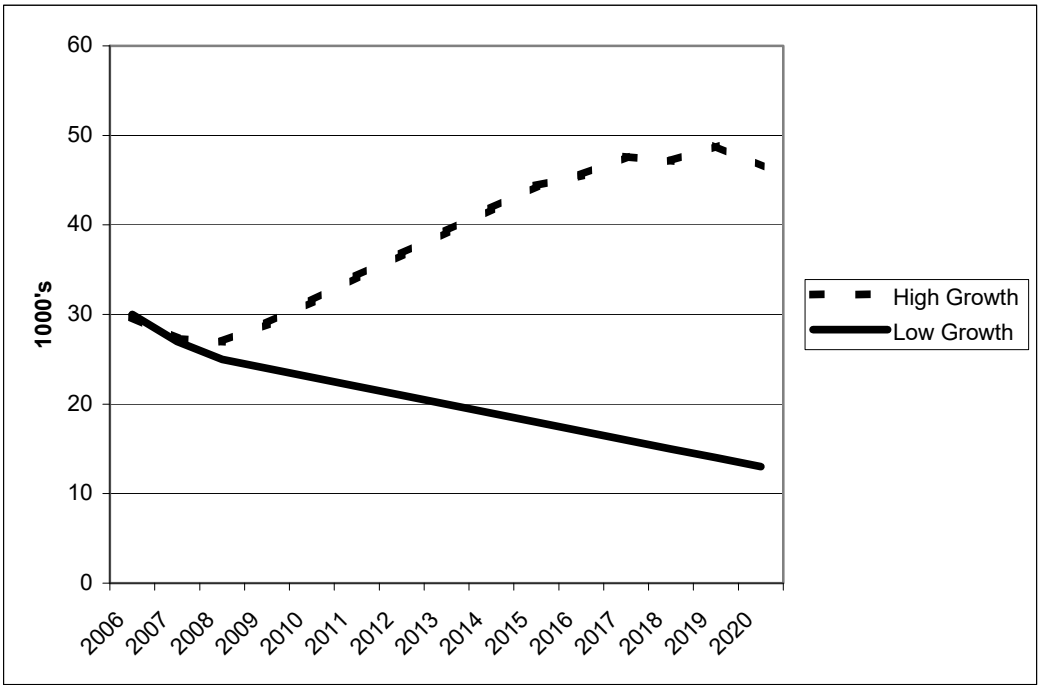
Source: CSO Census 2006.

As was mentioned above, we use the forecasts of international migration from the ESRI HERMES model. These have the advantage that they are not merely a backward looking projection but that they explicitly account for the relationship between economic growth in Ireland, mediated through labour demand, and international migration. Thus the important economic pull factors for migration are taken into account. The last projections from that model were made as part of the last ESRI Medium-Term Review (MTR) (see Fitz Gerald et.al. 2005)[12]. The MTR proposed two economic scenarios, a high growth scenario and a low growth scenario. The expectation at the point of publication was that Ireland would continue on the high growth scenario but make a transition to the low growth scenario at some point due to a deterioration of external circumstances (see also Morgenroth et.al. 2006). As can be seen in Figure 11 the two growth scenarios have very different implications for net migration in that a continued high growth scenario would lead to increasing net-immigration while the low growth scenario would have the opposite effect. Recent economic trends would suggest that the Irish economy is now facing the low-growth scenario and indeed the changing underlying economic structure of the Irish economy along with the changing external environment would have resulted in a move to this

[12] A subsequent MTR has been published in the spring of 2008.

low-growth scenario sooner or later. Consequently it seems most appropriate to calculate our population projections on the basis of the low-growth scenario. However, in order to avoid a discontinuity in the data over time some adjustments need to be made to the data in the initial years. Thus, the 2006 figure is taken from the Census and this is then reduced for the following years down to 25,000 in 2009 after which it follows the MTR forecasts. There is no reason to suggest that there will be changes to the age and gender pattern of migration and consequently these patters are maintained at their 2006 level.

Figure 11 ESRI MTR 2005-2021 Net-Migration Forecasts



Source: ESRI

3.4 Household Structure

An important consideration for health services demand is the nature of household structure. In particular, older persons living alone will often have substantially different needs to younger persons who live in large households. As Table 9 shows, the number of households has increased very substantially in all counties over the recent period. Indeed the number of households has increased at about twice the rate of population increase such that the average household size has declined very substantially. Despite this decline Ireland continues to have above average household

size relative to other West European countries as is shown in Figure 12[13]. Indeed the household size in a number of these countries continues to fall although the rate of decline is decreasing and will eventually stabilise[14]. Given these facts it seems reasonable to assume that the average household size in Ireland will continue to decline at least until the forecast horizon. In this regard we assume that at the national level the average household size will decline to 2.45 by 2021[15]. Since the observed pattern of decline in household size at the county level shows a strong process of convergence towards the national average, we allow this process to continue. It should be noted that this assumption implies a slower rate of change than had been experienced in the period up to 2006.

[13] The weighted average across those countries is 2.45.

[14] While the average household size is mathematically bounded at one, given that children are part of a proportion of households and many households comprise cohabiting/married adults the lowest feasible household size is somewhere just above 2. Both Norway and Germany have an average household size of 2.2 and for Finland this value is just 2.1.

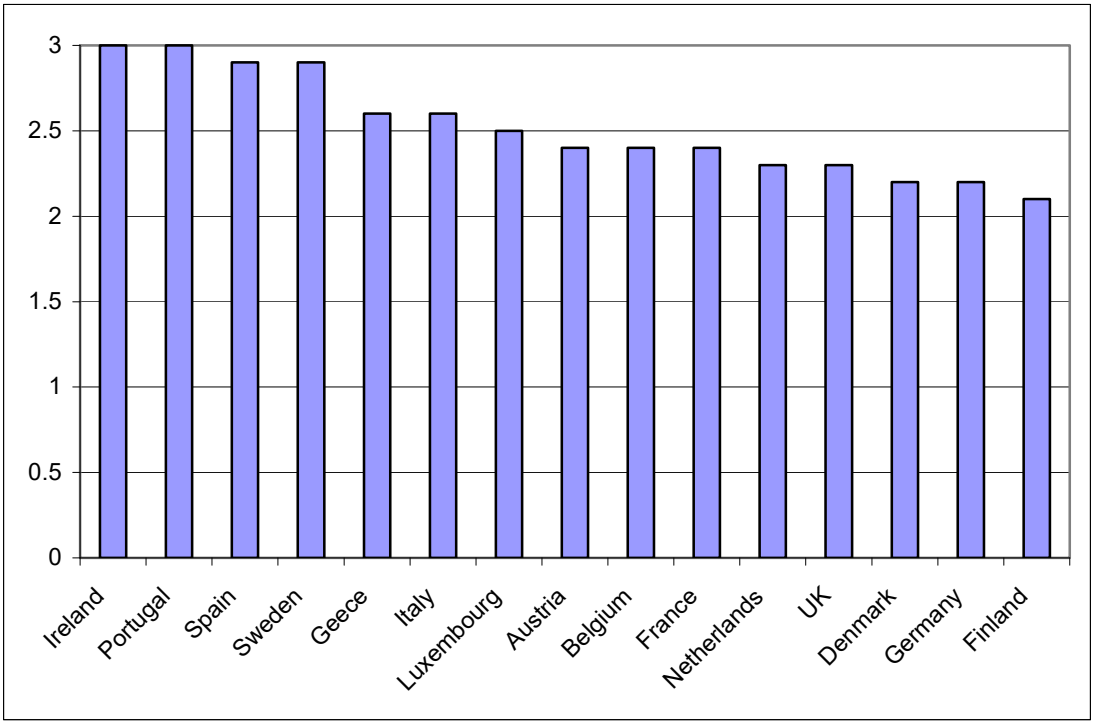
[15] A further minor assumption is necessary to derive household numbers and that is that the proportion of the population that resides in non-private households is 3%. This proportion has actually declined recently to 2.75% but it had been 3.2% in 2002. Non-private households include boarding houses hotels, guesthouses, hostels, hospitals, nursing homes, boarding schools, religious institutions, welfare institutions and prisons. In this respect it should also be noted that the percentage of persons aged over 65 years residing in private households has been constant over the period 1996 to 2006.

Table 9 Number of households and household size

	Number of Households				Average Household Size			
	1991	1996	2002	2006	1991	1996	2002	2006
Carlow	11,293	12,356	14,931	17,195	3.55	3.32	3.00	2.87
Dublin	311,009	344,264	379,372	420,429	3.21	2.99	2.86	2.73
Kildare	32,956	39,041	50,477	60,957	3.63	3.39	3.18	3.01
Kilkenny	20,592	22,371	25,603	29,651	3.46	3.26	3.03	2.88
Laois	14,394	15,672	18,556	22,591	3.54	3.32	3.09	2.91
Longford	8,922	9,410	10,375	12,111	3.32	3.14	2.92	2.79
Louth	25,916	28,207	33,495	38,703	3.43	3.21	2.99	2.83
Meath	28,806	31,863	41,675	53,938	3.60	3.41	3.17	2.99
Offaly	16,251	17,510	20,144	23,769	3.53	3.32	3.09	2.92
Westmeath	17,626	19,216	23,360	27,064	3.38	3.21	2.98	2.85
Wexford	28,758	31,502	38,011	45,566	3.47	3.26	3.00	2.84
Wicklow	28,066	31,263	36,572	42,870	3.40	3.22	3.06	2.89
Clare	26,400	29,247	33,874	38,210	3.34	3.13	2.92	2.79
Cork	119,107	130,385	147,990	167,234	3.35	3.16	2.94	2.81
Kerry	36,163	39,302	43,322	48,110	3.26	3.07	2.85	2.74
Limerick	46,574	50,540	57,323	64,225	3.38	3.19	2.93	2.78
Tipperary N.R.	16,631	17,771	20,213	22,992	3.40	3.20	2.94	2.80
Tipperary S.R.	21,781	23,440	26,410	29,375	3.35	3.16	2.91	2.77
Waterford	26,695	29,726	33,905	38,580	3.34	3.10	2.87	2.71
Galway	50,795	56,183	66,306	78,661	3.44	3.26	2.99	2.83
Leitrim	8,252	8,374	9,099	10,646	3.02	2.94	2.76	2.65
Mayo	32,792	34,624	39,354	43,431	3.30	3.16	2.87	2.75
Roscommon	15,874	16,513	18,142	20,734	3.21	3.09	2.88	2.76
Sligo	16,424	17,629	19,643	21,480	3.20	3.08	2.84	2.71
Cavan	15,730	16,321	18,340	21,929	3.29	3.19	3.00	2.87
Donegal	36,613	39,312	44,713	50,415	3.44	3.26	3.01	2.86
Monaghan	14,664	15,276	16,753	18,655	3.42	3.31	3.09	2.96
State	1,029,084	1,127,318	1,287,958	1,469,521	3.34	3.14	2.94	2.81

Source: CSO Census of Population various issues.

Figure 12 Comparison of EU-15 Household Size, 2001



Source: UNECE Statistical Yearbook of the Economic Commission for Europe, 2005

Of particular significance for health services provision is the proportion of older persons that live alone. As was already mentioned above, the proportion of older persons living in non-private households has remained constant at 10%.

Table 10 shows the proportion of males and females in each county aged over 65 and living alone in private households as a percentage of the total age group living in private households. The table shows that for males there has been no change in that percentage at the national level, while that for females has increased slightly. Furthermore, while there is some convergence across counties regarding the female proportion no convergence is observed for males. Given the absence of significant change for males it would appear reasonable to assume that the proportion living alone will remain constant, while for females current rates of improvement and convergence are assumed to persist. These assumptions are somewhat crude, but in the absence of robust research on the drivers of the proportion of the older population that are living alone it is not possible to apply a more sophisticated approach at this point.

Table 10 Proportion of Persons aged 65+ Living Alone in Private Households

	1996	2002	2006	1996	2002	2006
	Males			Females		
Carlow	21.1	21.7	21.7	30	31.4	32.2
Dublin	18.5	18.2	18.9	36	36.2	35.6
Kildare	19.7	18	18.5	29.7	30.2	31.1
Kilkenny	21.3	21	21.3	30.3	32.4	32
Laois	21.1	20.8	22.2	31	33.2	32.9
Longford	27.9	29.6	28.2	31.2	35	34.8
Louth	21.6	21.2	20.8	37	37	35.1
Meath	19	18.4	18.4	30.6	31.4	30.6
Offaly	22.7	22.8	21.5	31.3	33.3	32.8
Westmeath	24.9	22.4	21.8	32.7	36.4	34.9
Wexford	20.4	19.8	20.6	32.3	33	33
Wicklow	19.8	19.2	18.2	33.5	34	32.6
Clare	24.9	25.4	25.1	32.2	34.6	34.6
Cork	20.5	20.7	21.3	34.2	35.1	34.4
Kerry	24	25	25	30.7	33.7	33.6
Limerick	22.4	22	22.2	33.2	34.4	34.3
North Tipperary	21	21.2	21.1	32.7	34.1	34.3
South Tipperary	24.6	24.2	24.3	34.3	35.6	34.3
Waterford	21.7	21.9	22.2	35.8	35.9	34.9
Galway	22.7	23.6	23.4	27.8	31.5	31.5
Leitrim	31.8	31.2	31.5	36	38.2	37.6
Mayo	24.9	27.3	27.5	29.9	34.7	35
Roscommon	28.1	28	28.2	31.3	34.4	34.2
Sligo	25	25.9	25.9	31.8	35.3	36.5
Cavan	27.5	28.8	29.4	31	34.3	35.1
Donegal	24.8	24.9	24.9	32.6	34.8	34.2
Monaghan	24.8	24.5	23.9	34	36.5	36.6
State	21.9	21.8	21.9	33.3	34.8	34.3

Source: CSO Census of Population various issues.

4 Projection Results

In this chapter we outline the results of our projections. These results are produced for four scenarios, thus allowing for a better identification of the driving forces behind the projection and provide a range within which the actual population evolution is likely to lie. These scenarios will refer to alternative migration assumptions with one using the Medium-Term Review low growth forecasts (M2) and a zero international migration scenario (M0)[16]. Furthermore, two fertility scenarios are also provided with one assuming unchanged fertility going forward (F1) and one, which assumes that fertility will be declining (F2). The zero migration scenario, while unlikely to materialise over the complete projection horizon, provides a useful benchmark against which the implications of the two alternative fertility scenarios and the migration scenario can be judged.

4.1 Total Population

In this section the overall aggregate population projections are outlined. This is done for the four scenarios described above. Starting with the zero international net-migration baseline for which the results are shown in Table 11. The table shows that under both scenarios the population is projected to continue increasing even if there is no net-immigration from outside the country. Indeed this trend continues despite the fact that TPFRs are below replacement and even when the TPFR declines substantially (F2). The reason for this is that the current age structure has relatively few older people so that the number of deaths is quite low (and of course age specific mortality rates are assumed to decline) and as was pointed out above, the largest female age cohorts are those in the age group from 20 to 40 years of age. By 2021 the difference between the two projections is almost 80,000. At the county level the most noticeable changes relate to the population share of the counties in the Greater Dublin Area. Under the zero international migration assumption Dublin is projected to suffer a significant loss of population share which is accounted for by the negative internal migration and lower fertility. In contrast Meath and Kildare are set to gain population share as are a number of other counties that have more recently become part of the commuter belt around Dublin, such as Laois and Wexford.

[16] M2 is used here rather than M1 since the CSO use M2 for their lower migration scenario.

Table 11 Population Projections Assuming Zero International Net-Migration (M0)

			F1	F1	F1	F2	F2	F2
	2002	2006	2,011	2,016	2,021	2011	2016	2021
Carlow	46,014	50,349	53,335	56,242	58,897	53,211	55,754	57,941
Dublin	1,122,821	1,187,176	1,186,724	1,178,513	1,151,691	1,184,059	1,167,478	1,131,461
Kildare	163,944	186,335	205,085	223,759	241,729	204,570	221,707	237,661
Kilkenny	80,339	87,558	94,337	101,528	108,928	94,127	100,661	107,146
Laois	58,774	67,059	76,978	87,640	98,844	76,802	86,875	97,219
Longford	31,068	34,391	37,040	39,877	42,836	36,963	39,560	42,185
Louth	101,821	111,267	119,077	126,852	134,383	118,791	125,711	132,119
Meath	134,005	162,831	190,166	218,590	247,484	189,693	216,604	43,377
Offaly	63,663	70,868	76,520	82,371	88,307	76,348	81,669	86,884
Westmeath	71,858	79,346	84,528	89,695	94,716	84,334	88,923	93,185
Wexford	116,596	131,749	145,414	159,664	174,344	145,096	158,346	71,623
Wicklow	114,676	126,194	136,318	146,420	156,157	136,001	145,155	53,644
Clare	103,277	110,950	117,480	123,854	130,109	117,230	122,874	28,157
Cork	447,829	481,295	503,835	526,077	545,799	502,646	521,403	36,718
Kerry	132,527	139,835	142,710	145,403	147,736	142,417	144,259	45,496
Limerick	175,304	184,055	189,388	194,601	198,657	188,936	192,818	95,225
Tipperary	61,010	66,023	69,530	73,032	76,541	69,387	72,463	75,401
Tipperary	79,121	83,221	86,139	89,133	92,137	85,960	88,416	90,702
Waterford	101,546	107,961	112,272	116,327	119,853	112,022	115,353	17,957
Galway	209,077	231,670	242,756	254,420	265,241	242,149	252,003	260,526
Leitrim	25,799	28,950	31,206	33,701	36,365	31,144	33,439	35,815
Mayo	117,446	123,839	126,850	130,071	133,468	126,605	129,092	31,500
Roscommon	53,774	58,768	62,921	67,495	72,458	62,800	66,982	71,381
Sligo	58,200	60,894	62,725	64,285	65,729	62,588	63,746	64,669
Cavan	56,546	64,003	71,097	78,788	86,994	70,946	78,148	85,645
Donegal	137,575	147,264	152,872	158,630	164,502	152,548	157,344	61,921
Monaghan	52,593	55,997	57,169	58,379	59,500	57,045	57,888	58,531
Total	3,917,203	4,239,848	4,434,473	4,625,347	4,793,406	4,424,419	4,584,669	4,714,088

Source: Own Calculations. Note F1 refers to unchanged fertility from 2006 while F2 refers to declining fertility scenarios.

Obviously the zero international net-migration scenario (M0) is not a realistic scenario over the full projection horizon and consequently the M2 migration scenario is seen as the central projection scenario. The results for this assumption are shown in Table 12. As would be expected the totals are substantially larger reflecting the fact that under this scenario net-migration is positive for every year and indeed quite large for the initial years. This also explains the time profile of the increases which are most marked in the early years. The difference between the two fertility scenarios is almost 90,000 by 2021, which is larger than that seen for the zero net international migration. This reflects the fact that the migrants will add to the number of births. The pattern of population growth across counties is very similar to that found in the zero net-international migration. However, the population share of Dublin does not decline as much.

Table 12 Population Projections Assuming Positive International Net-Migration (M2)

			F1	F1	F1	F2	F2	F2
	2002	2006	2011	2016	2021	2011	2016	2021
Carlow	46,014	50,349	55,730	60,128	63,969	55,600	59,598	62,915
Dublin	1,122,821	1,187,176	1,256,872	1,293,050	1,302,786	1,253,998	1,280,523	1,278,771
Kildare	163,944	186,335	213,778	237,974	260,437	213,235	235,757	255,982
Kilkenny	80,339	87,558	96,675	105,304	113,842	96,458	104,394	111,959
Laois	58,774	67,059	78,052	89,376	101,097	77,873	88,592	99,429
Longford	31,068	34,391	38,897	42,917	46,832	38,815	42,567	46,104
Louth	101,821	111,267	122,878	133,008	142,402	122,579	131,792	139,964
Meath	134,005	162,831	199,419	233,686	267,309	198,917	231,530	262,801
Offaly	63,663	70,868	80,163	88,306	96,080	79,980	87,535	94,493
Westmeath	71,858	79,346	88,986	96,978	104,289	88,778	96,123	102,564
Wexford	116,596	131,749	151,036	168,771	186,211	150,701	167,353	183,256
Wicklow	114,676	126,194	141,071	154,172	166,336	140,739	152,817	163,613
Clare	103,277	110,950	120,516	128,775	136,537	120,258	127,743	134,464
Cork	447,829	481,295	523,808	558,875	589,174	522,549	553,776	579,094
Kerry	132,527	139,835	148,518	154,723	159,800	148,208	153,479	157,326
Limerick	175,304	184,055	195,930	205,252	212,653	195,456	203,338	208,909
Tipperary	61,010	66,023	71,602	76,419	80,999	71,453	75,814	79,771
Tipperary	79,121	83,221	88,144	92,344	96,283	87,958	91,592	94,765
Waterford	101,546	107,961	116,096	122,586	128,084	115,834	121,537	126,014
Galway	209,077	231,670	258,421	279,977	298,911	257,759	277,228	293,414
Leitrim	25,799	28,950	33,133	36,792	40,370	33,065	36,499	39,749
Mayo	117,446	123,839	131,684	137,811	143,468	131,425	136,757	141,322
Roscommon	53,774	58,768	65,231	71,187	77,222	65,104	70,641	76,066
Sligo	58,200	60,894	64,628	67,459	69,975	64,487	66,886	68,830
Cavan	56,546	64,003	74,127	83,706	93,408	73,967	83,014	91,940
Donegal	137,575	147,264	159,345	168,997	177,881	159,002	167,602	175,046
Monaghan	52,593	55,997	59,869	62,737	65,168	59,736	62,192	64,073
Total	3,917,203	4,239,848	4,634,608	4,951,309	5,221,522	4,623,936	4,906,680	5,132,633

Source: Own Calculations. Note F1 refers to unchanged fertility from 2006 while F2 refers to declining fertility scenarios. M2 refers to a moderate net-immigration scenario based on the ESRI MTR low-growth scenario.

4.2 Births

The above section already indicated the implication of the various scenarios on births, but did not quantify births precisely. Since the number of births are the key determinant for the provision of maternity and related ante-natal facilities it is important to outline in more detail the projected number of births. As before the initial scenario that is outlined here is the zero net-international migration scenario. Under the F1 assumption (which maintains the 2006 age specific fertility rates) the number of births will fall eventually reflecting the decline in the most fertile female age cohorts. However, with the F2 assumption of declining fertility this decline happens at a much faster rate even though in both scenarios the peak is reached in the same

year[17]. At the county level interesting differences emerge with Dublin experiencing the largest decline while a few counties such as Roscommon and Leitrim would experience an increase in the number of births, reflecting a different age structure and internal migration pattern.

Table 13 Projected Births Assuming Zero International Net-Migration (M0)

		F1	F1	F1		F2	F2	F2
	2002	2006	2011	2016	2021	2011	2016	2021
Carlow	851	847	851	824	783	802	728	692
Dublin	17,599	17,623	17,333	14,987	10,913	16,279	12,983	9,336
Kildare	3,277	3,405	3,470	3,435	3,365	3,306	3,067	2,963
Kilkenny	1,106	1,197	1,258	1,331	1,398	1,191	1,171	1,211
Laois	935	1,060	1,196	1,346	1,472	1,139	1,201	1,295
Longford	545	564	594	626	651	569	567	583
Louth	1,683	1,703	1,725	1,701	1,683	1,633	1,496	1,459
Meath	2,347	2,907	3,191	3,393	3,567	3,038	3,025	3,135
Offaly	1,020	1,102	1,140	1,176	1,215	1,085	1,048	1,068
Westmeath	1,206	1,361	1,362	1,346	1,332	1,300	1,208	1,180
Wexford	1,852	2,120	2,221	2,356	2,507	2,118	2,113	2,221
Wicklow	1,905	2,112	2,131	2,118	2,095	2,030	1,891	1,846
Clare	1,754	1,741	1,706	1,661	1,680	1,626	1,486	1,484
Cork	6,708	7,326	7,397	7,213	6,733	7,018	6,383	5,868
Kerry	1,746	1,789	1,736	1,676	1,628	1,642	1,473	1,410
Limerick	2,537	2,736	2,766	2,693	2,436	2,621	2,376	2,118
Tipperary	919	1,056	1,041	1,038	1,058	995	936	943
Tipperary	1,024	1,065	1,055	1,059	1,075	998	930	930
Waterford	1,674	1,755	1,730	1,662	1,577	1,650	1,490	1,396
Galway	3,174	3,404	3,519	3,531	3,313	3,325	3,099	2,864
Leitrim	355	396	424	463	498	404	414	439
Mayo	1,537	1,623	1,594	1,601	1,650	1,516	1,425	1,449
Roscommon	609	762	800	875	960	760	779	844
Sligo	757	843	857	842	810	813	746	707
Cavan	807	990	1,074	1,180	1,291	1,025	1,059	1,145
Donegal	1,911	2,067	2,048	2,053	2,104	1,944	1,821	1,842
Monaghan	665	683	681	670	655	641	582	560
Total	60,503	64,237	64,899	62,854	58,450	61,471	55,497	50,987

Source: Own Calculations. Note F1 refers to unchanged fertility from 2006 while F2 refers to declining fertility scenarios.

We now turn to the central projection scenarios with positive international migration, which are shown in Table 14. Here some important differences emerge because the number of births under the two fertility scenarios differ more markedly and indeed births peak in different years[18]. While the peak under the F1 scenario

[17] Indeed, the number of births under the M0F2 assumption peaks in 2007.
[18] Under F1 births peak in 2014 while under F2 they peak in 2009.

indicates that the annual number of births would be as much as 5,000 higher than recorded in 2006 the peak for F2 is just 1,000 higher than recorded in 2006. There is also more heterogeneity across counties with more counties recording increasing numbers of births over a longer period while some experience more substantial declines in the number of births.

Table 14 Projected Births Assuming Positive International Net-Migration (M2)

		F1	F1	F1		F2	F2	F2
	2002	2006	2011	2016	2021	2011	2016	2021
Carlow	851	847	914	914	877	861	807	774
Dublin	17,599	17,623	18,948	17,681	14,034	17,793	15,302	11,987
Kildare	3,277	3,405	3,680	3,775	3,751	3,505	3,372	3,304
Kilkenny	1,106	1,197	1,307	1,409	1,486	1,237	1,240	1,287
Laois	935	1,060	1,220	1,383	1,512	1,162	1,233	1,330
Longford	545	564	641	700	734	614	634	658
Louth	1,683	1,703	1,810	1,835	1,832	1,714	1,614	1,588
Meath	2,347	2,907	3,408	3,747	3,967	3,244	3,341	3,487
Offaly	1,020	1,102	1,229	1,314	1,369	1,169	1,171	1,203
Westmeath	1,206	1,361	1,472	1,521	1,529	1,405	1,364	1,354
Wexford	1,852	2,120	2,354	2,561	2,736	2,246	2,296	2,422
Wicklow	1,905	2,112	2,245	2,300	2,303	2,138	2,054	2,028
Clare	1,754	1,741	1,773	1,770	1,804	1,690	1,584	1,593
Cork	6,708	7,326	7,890	8,039	7,679	7,486	7,117	6,697
Kerry	1,746	1,789	1,850	1,859	1,836	1,751	1,634	1,590
Limerick	2,537	2,736	2,913	2,938	2,720	2,761	2,593	2,365
Tipperary	919	1,056	1,093	1,121	1,153	1,045	1,011	1,027
Tipperary	1,024	1,065	1,095	1,120	1,143	1,036	984	989
Waterford	1,674	1,755	1,828	1,818	1,752	1,744	1,629	1,550
Galway	3,174	3,404	3,871	4,131	4,015	3,657	3,626	3,474
Leitrim	355	396	463	525	570	441	469	502
Mayo	1,537	1,623	1,690	1,752	1,822	1,607	1,560	1,600
Roscommon	609	762	843	943	1,038	801	840	912
Sligo	757	843	896	912	895	850	808	782
Cavan	807	990	1,144	1,290	1,413	1,093	1,158	1,253
Donegal	1,911	2,067	2,180	2,255	2,332	2,070	2,000	2,039
Monaghan	665	683	737	760	757	695	661	647
Total	60,503	64,237	69,495	70,371	67,057	65,817	62,101	58,440

Source: Own Calculation. Note F1 refers to unchanged fertility from 2006 while F2 refers to declining fertility scenarios. M2 refers to a moderate net-immigration scenario based on the ESRI MTR low-growth scenario.

4.3 Population by broad age groups

A key determinant of health services need is the age structure of the population and in particular, the size of older age groups. It is therefore important to consider the change in the size of these cohorts over time. Although the model produces results for single year of age, this is difficult do display in tabular form, hence the results are

summarised by broad age groups, with more emphasis on older age groups through the use of smaller age intervals. Table 15 shows the projected number of persons in each age group for each of the four scenarios. The most striking feature of the projections is that under all scenarios the number of older people is set to rise substantially. Even if one assumed no improvements in age specific mortality rates the number of older people would be set to rise. The other important feature of note is that that number is almost entirely independent of the migration assumption since there is essentially no international migration among the older groups. Consequently, even high immigration leaves the totals of those aged over 65 almost unchanged over the projection horizon. Of course if this horizon were extended then international migration would impact on the number of older people.

Reflecting the projected trends in the number of births, the cohort aged under 5 is projected to increase from its 2006 level but then decrease, with the timing of that decrease dependent on the fertility assumption. Comparing the size of the younger age groups for the two migration scenarios reveals that international migration will add about 30,000 children aged under 4 and about 50,000 to children aged 5 to 14. However, the biggest impact is on intermediate age groups and particularly that of 15 to 49 year olds.

Table 15 Total Population by Age Groups, 2011 to 2021

Scenario and Year	0-4	5-14	15-49	50-64	65-74	75-84	85+	Total
				Thousands				
2006	302.3	562.2	2,253.4	654.1	262.5	157.4	48.0	4,239.8
M0F1								
2011	324.5	592.8	2,238.3	734.9	305.8	175.4	62.7	4,434.5
2016	320.1	630.0	2,214.4	805.1	373.3	201.6	80.9	4,625.3
2021	302.0	648.0	2,184.9	878.9	429.4	245.3	105.0	4,793.4
M0F2								
2011	314.4	592.8	2,238.3	734.9	305.8	175.4	62.7	4,424.4
2016	289.5	620.0	2,214.4	805.1	373.3	201.6	80.9	4,584.7
2021	263.3	607.4	2,184.9	878.9	429.4	245.3	105.0	4,714.1
M2F1								
2011	343.0	606.5	2392.6	744.8	308.3	176.4	63.0	4634.6
2016	355.4	662.5	2445.4	824.5	378.8	203.2	81.4	4951.3
2021	345.2	710.0	2463.0	911.3	438.1	248.1	105.9	5221.5
M2F2								
2011	332.4	606.5	2,392.6	744.8	308.3	176.4	63.0	4,623.9
2016	321.5	651.9	2,445.4	824.5	378.8	203.2	81.4	4,906.7
2021	300.9	665.4	2,463.0	911.3	438.1	248.1	105.9	5,132.6

Source: Own Calculation

4.4 Households

Having made assumptions regarding the trends in household size it is a straightforward matter to calculate the projected number of households, which again is done for all four scenarios. Given that household size is predicted to decline it will not come as a surprise to see the number of households increasing in all counties. Under the M2 scenario the number of households is projected to exceed two million by 2021, which represents an increase of almost 40% in a space of 15 years.

Table 16 Projected Number of Households Assuming Zero Net-international Migration (M0)

		F1	F1	F1		F2	F2	F2
	2002	2006	2011	2016	2021	2011	2016	2021
				Thousands				
Carlow	14.9	17.2	18.7	20.5	22.4	18.7	20.4	22.1
Dublin	379.4	420.4	439.2	455.0	464.8	438.2	450.8	456.6
Kildare	50.5	61.0	69.5	79.9	91.2	69.3	79.1	89.7
Kilkenny	25.6	29.7	33.2	37.5	42.3	33.2	37.2	41.6
Laois	18.6	22.6	27.1	32.7	39.3	27.1	32.4	38.6
Longford	10.4	12.1	13.4	15.0	16.9	13.4	14.9	16.6
Louth	33.5	38.7	42.9	48.2	53.9	42.8	47.7	53.0
Meath	41.7	53.9	65.1	79.2	95.2	64.9	78.5	93.6
Offaly	20.1	23.8	26.8	30.4	34.6	26.7	30.2	34.0
Westmeath	23.4	27.1	29.9	33.0	36.4	29.8	32.7	35.8
Wexford	38.0	45.6	52.2	60.4	69.7	52.1	59.9	68.6
Wicklow	36.6	42.9	48.2	54.7	61.9	48.1	54.2	60.9
Clare	33.9	38.2	42.5	46.7	51.2	42.4	46.3	50.4
Cork	148.0	167.2	180.9	196.7	213.0	180.5	195.0	209.5
Kerry	43.3	48.1	52.2	55.0	57.9	52.1	54.6	57.0
Limerick	57.3	64.2	69.3	74.8	80.5	69.1	74.1	79.1
Tipperary	20.2	23.0	25.2	27.6	30.4	25.1	27.4	29.9
Tipperary	26.4	29.4	31.5	34.1	37.0	31.4	33.9	36.4
Waterford	33.9	38.6	42.4	46.4	50.7	42.3	46.0	49.9
Galway	66.3	78.7	87.5	96.6	106.5	87.2	95.7	104.6
Leitrim	9.1	10.6	11.8	13.2	14.8	11.8	13.1	14.6
Mayo	39.4	43.4	46.4	49.4	52.7	46.3	49.0	52.0
Roscommon	18.1	20.7	22.9	25.5	28.5	22.9	25.3	28.1
Sligo	19.6	21.5	23.4	25.0	26.8	23.3	24.8	26.3
Cavan	18.3	21.9	25.0	28.8	33.1	24.9	28.6	32.6
Donegal	44.7	50.4	54.3	59.1	64.4	54.2	58.6	63.4
Monaghan	16.8	18.7	19.4	20.6	21.9	19.4	20.4	21.5
Total	1288.0	1469.5	1600.8	1746.4	1897.8	1597.1	1731.0	1866.4

Source: Own Calculation

Table 17 Projected Number of Households Assuming Positive Net-international Migration (M2)

		F1	F1	F1		F2	F2	F2
	2002	2006	2011	2016	2021	2011	2016	2021
				Thousands				
Carlow	14.9	17.2	19.6	22.0	24.4	19.5	21.8	24.0
Dublin	379.4	420.4	465.1	499.2	525.8	464.1	494.4	516.1
Kildare	50.5	61.0	72.4	85.0	98.3	72.2	84.2	96.6
Kilkenny	25.6	29.7	34.1	38.9	44.2	34.0	38.6	43.5
Laois	18.6	22.6	27.5	33.4	40.2	27.4	33.1	39.5
Longford	10.4	12.1	14.1	16.2	18.4	14.0	16.0	18.1
Louth	33.5	38.7	44.3	50.5	57.2	44.2	50.0	56.2
Meath	41.7	53.9	68.3	84.7	102.8	68.1	83.9	101.1
Offaly	20.1	23.8	28.0	32.6	37.6	28.0	32.3	37.0
Westmeath	23.4	27.1	31.5	35.7	40.0	31.4	35.4	39.4
Wexford	38.0	45.6	54.2	63.8	74.4	54.1	63.3	73.3
Wicklow	36.6	42.9	49.9	57.6	65.9	49.8	57.1	64.8
Clare	33.9	38.2	43.6	48.5	53.7	43.5	48.2	52.9
Cork	148.0	167.2	188.1	209.0	229.9	187.6	207.1	226.0
Kerry	43.3	48.1	54.3	58.5	62.6	54.2	58.1	61.6
Limerick	57.3	64.2	71.7	78.9	86.1	71.5	78.2	84.6
Tipperary	20.2	23.0	25.9	28.9	32.1	25.8	28.7	31.6
Tipperary	26.4	29.4	32.2	35.4	38.7	32.2	35.1	38.1
Waterford	33.9	38.6	43.8	48.9	54.1	43.7	48.5	53.3
Galway	66.3	78.7	93.1	106.3	120.0	92.9	105.3	117.8
Leitrim	9.1	10.6	12.5	14.4	16.4	12.5	14.3	16.2
Mayo	39.4	43.4	48.2	52.4	56.7	48.1	52.0	55.8
Roscommon	18.1	20.7	23.8	26.9	30.4	23.7	26.7	29.9
Sligo	19.6	21.5	24.1	26.3	28.5	24.0	26.0	28.0
Cavan	18.3	21.9	26.0	30.6	35.6	26.0	30.3	35.0
Donegal	44.7	50.4	56.6	62.9	69.7	56.5	62.4	68.6
Monaghan	16.8	18.7	20.4	22.2	23.9	20.3	22.0	23.5
Total	1288.0	1469.5	1673.1	1869.7	2067.7	1669.3	1852.9	2032.5

Source: Own Calculation

5. Comparison with CSO Regional Projections

It is instructive to compare these new population projections with those published in 2005 and produced on the basis of the 2002 Census of Population by the CSO. Indeed the CSO projections have recently been used by PA Consultanting in their Acute Hospital Bed Review. PA Consulting used the CSO M1 F2 projections. As we have now entered what the MTR called the 'low growth scenario' M1 is unrealistic over the medium run. Consequently the preferred projection here is M2F2, which will be used for comparison purposes. In order to facilitate the comparison with the CSO projections our county level projections are aggregated to the eight NUTS 3 planning regions.

A number of differences emerge at the aggregate level (see Table 18). Firstly the CSO projected a lower total population by 2021 compared to the ones presented here (difference of 63,000). This is primarily due to higher international migration between 2002 and 2006, which accounts for the difference between the CSO projection for 2006 and the actual outturn. Secondly here we project a very different profile across the regions. Most notably Dublin is expected to grow only very slowly. Recent growth of the population in Dublin has almost entirely been driven by international migration. As this is expected to diminish substantially and it is assumed that the internal migration patterns remain constant, Dublin will not grow substantially[19]. In contrast regions such as the Border, Midlands and Mid-East regions are projected to increase their population share. This is largely driven by internal migration but also by fertility patterns. The CSO considered a number of alternative internal migration scenarios, but chose what they called a 'medium' scenario, which was based on the average over the period 1991-2002. The projections presented here are closer to the 'recent' CSO scenario, which considered the internal migration patterns between for 2001/02. The analysis showed that this pattern started in the late 1990's and has persisted to 2006. The CSO 'medium' scenario assumes a shift back to the more traditional internal migration patterns, while our projections assume persistence of current patterns.

There are also some differences between the two sets of projections regarding cohorts of different ages even though the distribution is not too dissimilar (see Table 19)[20]. Primarily these differences manifest themselves in absolute numbers of persons in each age group. In particular the CSO projects a higher number of 0-14 year olds and a lower number of over 65's. This is explained by the differences in international migration assumptions and improved life expectancy used in our projections[21].

[19] While the recent decline in house prices might be expected to result in a return to the traditional internal migration patterns (towards large cities and particularly Dublin), given the problems in the housing market which are likely to reduce the number of internal migrants, and thus it is unlikely that internal migration patterns will return to the pre-1996 pattern.
[20] The correlation coefficients are in excess of 0.96.
[21] The CSO M1 assumption projects a strong inflow of mainly young persons who will either bring child dependents with them or have children.

Table 18 Comparison of Projections Presented here (ESRI) and CSO population projections

	Actual		CSO M1F2				ESRI M2F2		
	2002	**2006**	**2006**	**2011**	**2016**	**2021**	**2011**	**2016**	**2021**
Border	433	468	457	488	519	546	513	548	580
Midlands	225	252	243	262	280	296	285	315	343
West	380	414	406	441	480	513	454	485	511
Dublin	1,123	1,187	1,186	1,281	1,374	1,440	1,254	1,281	1,279
Mid-East	413	475	459	515	572	623	553	620	682
Mid-West	340	361	355	375	395	410	387	407	423
South-East	424	461	451	482	512	537	507	544	579
South-West	580	621	609	644	679	705	671	707	736
State	3,917	4,240	4,166	4,488	4,811	5,070	4624	4907	5133

Population Shares

	Actual		**CSO M1F2**				**ESRI M2F2**		
	2002	**2006**	**2006**	**2011**	**2016**	**2021**	**2011**	**2016**	**2021**
Border	11.0%	11.0%	11.0%	10.9%	10.8%	10.8%	11.1%	11.2%	11.3%
Midlands	5.8%	5.9%	5.8%	5.8%	5.8%	5.8%	6.2%	6.4%	6.7%
West	9.7%	9.8%	9.7%	9.8%	10.0%	10.1%	9.8%	9.9%	10.0%
Dublin	28.7%	28.0%	28.5%	28.5%	28.6%	28.4%	27.1%	26.1%	24.9%
Mid-East	10.5%	11.2%	11.0%	11.5%	11.9%	12.3%	12.0%	12.6%	13.3%
Mid-West	8.7%	8.5%	8.5%	8.4%	8.2%	8.1%	8.4%	8.3%	8.2%
South-East	10.8%	10.9%	10.8%	10.7%	10.6%	10.6%	11.0%	11.1%	11.3%
South-West	14.8%	14.6%	14.6%	14.3%	14.1%	13.9%	14.5%	14.4%	14.3%
State	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: CSO Regional Population Projections and ESRI projections are aggregated from ESRI county level projections.

Table 19 Comparison of Age Structures for of Projections Presented here (ESRI) and the CSO, 2021

	0-14	15-24	15-44	45-64	65+	Total
		CSO				
Border	109	64	152	136	84	546
Midlands	61	36	81	75	43	296
West	109	57	147	123	76	513
Dublin	276	172	440	355	197	1440
Mid-East	134	77	177	157	78	623
Mid-West	84	49	109	102	65	410
South-East	106	65	145	137	84	537
South-West	136	82	191	182	114	705
State	1016	603	1442	1267	741	5070
		ESRI				
Border	106	76	163	141	93	580
Midlands	70	44	100	81	47	343
West	93	61	150	124	83	511
Dublin	233	135	362	345	203	1279
Mid-East	141	88	204	168	82	682
Mid-West	80	51	117	105	70	423
South-East	110	73	163	142	92	579
South-West	135	88	207	185	121	736
State	966	615	1467	1292	792	5133

6. Summary and Conclusions

This report has outlined some of the main demographic trends. It has shown that the strong growth in the population is due not just to immigration, which has become an increasing factor but primarily due to the high number of births and to a lesser extent to an improvement in life expectancy. Clearly these two aspects of natural increase play a particular role in the provision of health services.

Given recent trends, the report outlined a set of assumptions that are required for the implementation of a cohort component population projection model. As the results are sensitive to the assumptions chosen a number of scenarios were used. These scenarios also provide a means to establish the main driving forces behind the projections. In particular, the zero net-international migration scenarios highlight the impact of changes in fertility and mortality rates on the growth of the population. However these scenarios are not realistic and thus should therefore not be used for planning purposes. Instead two scenarios with positive international immigration have been put forward in this report to provide more realistic projections. In this respect one should treat the F2 scenario as the central forecast as the evidence regarding long-

run trends in fertility in Ireland and the EU suggests that fertility rates will decline further. Fertility rates across Europe have converged over a longer period, and Ireland still maintains an above average fertility rate.

The model results show two important trends. Firstly, the size of the older cohorts will increase very substantially over the forecast horizon to 2021 and indeed will increase beyond that date. The second finding is that while the number of births will increase slightly and thus the cohort of young children will increase in the short run, it is projected that the number of births will decline over the latter period of the forecasting period. The continued population increase along with changes in household formation patterns will increase the total number of households and thus increase the number of single households.

As was indicated in the introduction, the projections outlined here were finalised in November 2007 based upon the information available up to that time. These projections formed the key input into the analysis of the impact of demographic change on health services need. In the meantime Ireland has experienced significant changes in the overall economic environment. At the time of producing the projections it was seen as appropriate to utilise migration projections that were derived from a low-growth scenario. Recent events however, suggest that at least in the short-run there will be significant net-emigration. The Autumn 2008 ESRI Quarterly Economic Commentary (Barrett et al., 2008) predicted net-emigration of 25,000 for the year ending in April 2009. While the Commentary does not forecast migration beyond 2009, it is reasonable to assume that migration will return to the predicted medium-term level in time. Using this assumption, along with the latest migration estimates from the CSO it is possible to consider the impact of the recent changed environment and compare the projections taking the new information into account with those produced in November 2007 which is shown in Figure 13. The figure shows clearly that the changed scenario has a significant impact on the size of the total population but that given the assumption of resumed net-immigration by 2014 the population continues to grow strongly. Furthermore, as was highlighted above, migration has little impact on the older age cohorts and particularly those aged over 80 years. It is thus still reasonable to use the 2007 projections for policy analysis. Given that migration does have an impact on the number of births, the figures presented here should be used with some caution.

Figure 13 Comparison of 2007 Projections with Projections based on newer information

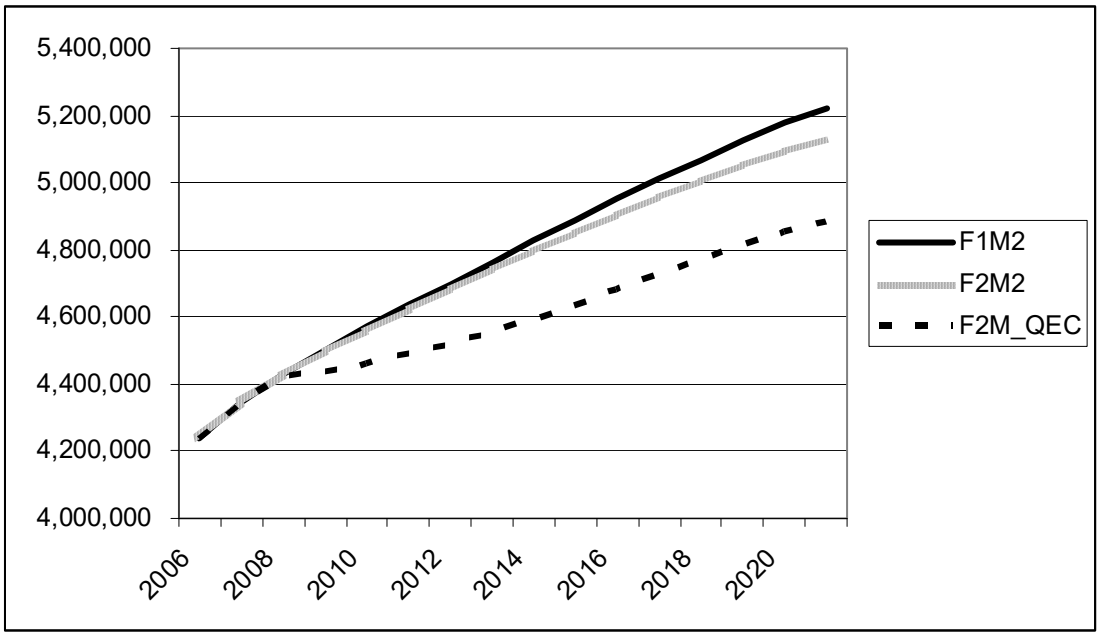


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Table A1. Population, Males and Females by Broad Age Category for each HSE Region, M2F2 (1000's)

	2006	2011	2016	2021	2006	2011	2016	2021
	Males			Dublin North-East			Females	
0-4	34.4	38.9	37.6	34.4	32.6	36.6	35.7	32.5
5-14	61.6	69.3	77.0	79.5	58.2	65.4	72.5	75.1
15-49	257.5	279.4	289.3	293.4	254.1	271.1	277.6	279.4
50-64	67.5	78.6	89.7	103.7	68.0	79.5	90.5	103.1
65-74	25.2	30.9	39.1	46.3	28.1	32.9	40.9	48.2
75-84	12.6	15.4	18.9	24.4	19.1	20.9	23.4	28.2
85+	2.7	4.0	5.9	8.6	6.7	8.7	10.9	13.6
Total	461.6	516.4	557.5	590.2	466.7	515.1	551.5	580.1
				Dublin Mid-Leister				
0-4	45.1	50.9	48.0	43.2	43.2	48.1	45.8	41.0
5-14	81.2	88.4	96.8	98.9	76.6	83.9	92.0	93.7
15-49	338.2	354.9	357.5	354.0	334.0	344.8	343.0	337.4
50-64	88.8	101.7	113.3	127.1	89.7	103.0	114.7	127.0
65-74	32.5	39.2	49.0	57.2	36.1	41.8	51.1	59.7
75-84	16.0	19.1	23.2	29.6	24.0	25.8	28.8	34.3
85+	3.4	5.0	7.1	10.3	8.3	10.5	13.0	16.0
Total	605.2	659.2	695.0	720.2	611.9	658.0	688.4	709.1
				Southern				
0-4	37.3	40.2	39.4	37.9	38.9	42.4	41.1	39.7
5-14	71.7	75.5	79.6	81.1	75.0	79.4	83.9	85.3
15-49	272.8	289.7	297.7	303.2	283.2	303.4	313.4	319.3
50-64	85.7	96.5	106.6	116.0	88.9	99.7	109.5	119.4
65-74	37.1	42.6	51.1	57.6	35.5	42.0	51.0	58.3
75-84	25.1	27.2	30.3	35.8	18.0	21.5	26.0	32.4
85+	8.7	11.3	14.0	17.4	4.1	5.8	8.3	11.9
Total	538.4	583.1	618.5	648.9	543.6	594.2	633.2	666.4
				Western				
0-4	34.6	36.6	36.1	35.2	36.1	38.7	37.7	36.9
5-14	67.3	70.5	73.1	73.9	70.7	74.0	77.1	77.9
15-49	251.6	267.5	275.1	279.4	262.1	281.8	291.9	296.9
50-64	80.6	91.3	98.9	106.0	84.9	94.6	101.3	109.0
65-74	33.8	39.0	47.7	55.0	34.1	39.9	48.9	55.7
75-84	24.4	25.3	27.6	32.7	18.2	21.1	25.0	30.8
85+	9.4	11.6	13.7	16.4	4.6	6.1	8.4	11.8
Total	501.7	541.7	572.2	598.5	510.7	556.3	590.3	619.1

Source: Own Calculations

Table A2. Population, Males and Females by Broad Age Category for each County, M2F2 (1000's)

	2006	2011	2016	2021		2006	2011	2016	2021
	Males				Carlow	Females			
0-4	1.9	2.2	2.1	2.0		1.9	2.1	2.1	1.9
5-14	3.5	3.8	4.2	4.5		3.2	3.7	4.1	4.2
15-49	13.8	15.1	15.6	15.9		13.0	13.7	14.0	14.4
50-64	3.9	4.4	5.0	5.5		3.7	4.3	4.8	5.3
65-74	1.5	1.8	2.2	2.6		1.5	1.8	2.2	2.5
75-84	0.8	0.9	1.1	1.4		1.0	1.1	1.2	1.5
85+	0.2	0.2	0.4	0.5		0.3	0.4	0.5	0.7
Total	25.6	28.5	30.6	32.4		24.7	27.1	29.0	30.5
					Dublin				
0-4	40.1	46.0	41.8	33.7		38.4	43.7	39.7	32.0
5-14	71.8	76.6	84.8	85.9		67.4	72.8	80.8	81.5
15-49	336.4	341.6	329.8	310.9		339.1	336.3	318.2	295.3
50-64	83.2	94.4	103.8	116.0		88.3	100.3	110.1	120.2
65-74	32.2	37.9	46.2	53.3		38.0	42.6	50.8	58.7
75-84	15.7	19.0	23.2	28.8		25.1	27.5	30.4	35.1
85+	3.2	4.7	7.1	10.2		8.4	10.8	13.7	17.1
Total	582.6	620.1	636.8	638.9		604.6	633.9	643.8	639.9
					Kildare				
0-4	8.2	9.1	8.9	8.6		7.8	8.6	8.5	8.2
5-14	13.9	16.3	18.1	18.6		13.1	15.4	17.0	17.6
15-49	53.1	59.1	63.4	66.4		51.4	56.4	60.0	62.9
50-64	13.3	16.1	18.8	22.5		12.8	15.6	18.4	21.4
65-74	3.7	5.3	7.4	9.2		3.8	5.2	7.2	9.2
75-84	1.6	2.0	2.7	4.1		2.3	2.5	3.2	4.4
85+	0.4	0.5	0.8	1.1		0.9	1.1	1.3	1.7
Total	94.2	108.4	120.1	130.5		92.1	104.8	115.7	125.5
					Kilkenny				
0-4	3.2	3.2	3.2	3.3		3.1	3.0	3.1	3.1
5-14	6.4	6.7	6.8	6.8		6.1	6.4	6.5	6.4
15-49	22.8	25.1	26.8	28.2		21.7	23.9	25.5	27.0
50-64	7.3	8.4	9.2	10.1		6.9	7.9	8.9	9.7
65-74	2.7	3.3	4.2	4.8		2.8	3.3	4.1	4.7
75-84	1.5	1.7	2.0	2.6		2.0	2.1	2.3	2.8
85+	0.4	0.5	0.7	0.9		0.7	0.9	1.1	1.4
Total	44.3	48.9	52.9	56.8		43.3	47.6	51.4	55.1

Table A2 continued

	2006	2011	2016	2021		2006	2011	2016	2021
		Males			Laois		Females		
0-4	2.8	3.1	3.3	3.5		2.7	2.9	3.1	3.3
5-14	4.9	5.9	6.5	7.0		4.7	5.6	6.2	6.6
15-49	18.3	20.7	23.0	25.2		16.7	19.5	22.2	24.9
50-64	5.1	6.3	7.4	8.6		4.7	5.7	6.8	7.9
65-74	1.9	2.3	2.9	3.7		2.0	2.3	2.8	3.4
75-84	1.1	1.3	1.4	1.8		1.4	1.5	1.6	2.0
85+	0.2	0.3	0.5	0.7		0.4	0.6	0.8	1.0
Total	34.4	39.8	45.1	50.4		32.7	38.1	43.5	49.0
					Longford				
0-4	1.3	1.6	1.6	1.7		1.3	1.5	1.5	1.6
5-14	2.5	2.8	3.1	3.4		2.4	2.5	2.9	3.1
15-49	8.7	9.8	10.6	11.3		8.0	9.0	9.7	10.3
50-64	3.1	3.5	3.7	3.8		2.8	3.1	3.3	3.6
65-74	1.2	1.4	1.8	2.1		1.1	1.3	1.7	1.9
75-84	0.6	0.7	0.9	1.1		0.9	0.9	0.9	1.1
85+	0.1	0.2	0.3	0.4		0.3	0.4	0.5	0.6
Total	17.6	19.9	21.9	23.8		16.8	18.9	20.6	22.3
					Louth				
0-4	4.6	4.5	4.3	4.1		4.3	4.3	4.1	3.9
5-14	8.0	9.1	9.4	9.1		7.8	8.7	8.9	8.7
15-49	29.5	32.1	33.7	35.1		29.1	31.4	33.2	34.5
50-64	8.3	9.5	10.9	12.5		8.1	9.3	10.5	12.1
65-74	3.2	3.9	4.7	5.5		3.3	4.0	4.9	5.5
75-84	1.5	1.8	2.3	3.0		2.4	2.4	2.7	3.4
85+	0.3	0.5	0.7	1.0		0.9	1.1	1.3	1.6
Total	55.3	61.3	66.0	70.3		55.9	61.3	65.8	69.7
					Meath				
0-4	7.4	8.6	8.9	9.2		6.9	7.9	8.4	8.7
5-14	12.3	15.4	17.9	19.3		11.6	14.3	16.5	18.0
15-49	45.4	55.4	63.4	70.2		43.5	52.6	60.2	66.9
50-64	11.7	14.3	17.5	21.8		11.1	13.6	16.6	20.5
65-74	3.7	5.1	6.9	8.4		3.8	5.0	6.8	8.3
75-84	1.8	2.2	2.9	4.1		2.5	2.8	3.3	4.4
85+	0.4	0.6	0.8	1.3		0.9	1.2	1.4	1.9
Total	82.7	101.5	118.3	134.3		80.2	97.4	113.2	128.5

Table A2 continued

	2006	2011	2016	2021	2006	2011	2016	2021
	Males			Offaly	Females			
0-4	2.8	3.0	3.1	3.1	2.7	2.9	2.9	2.9
5-14	5.4	5.8	6.1	6.4	5.1	5.6	5.9	6.0
15-49	18.8	21.1	22.7	24.0	17.7	19.9	21.5	22.8
50-64	5.4	6.4	7.3	8.2	5.3	6.1	6.9	7.8
65-74	2.1	2.5	3.1	3.7	2.2	2.6	3.2	3.7
75-84	1.2	1.4	1.6	2.0	1.5	1.6	1.8	2.2
85+	0.3	0.4	0.5	0.8	0.5	0.7	0.8	1.0
Total	35.9	40.6	44.5	48.0	34.9	39.3	43.0	46.5
				Westmeath				
0-4	3.1	3.7	3.6	3.5	2.9	3.4	3.4	3.3
5-14	6.0	6.4	7.0	7.4	5.7	6.0	6.6	7.0
15-49	21.0	23.3	24.6	25.3	20.4	22.4	23.4	24.0
50-64	6.0	7.0	8.0	9.0	5.7	6.7	7.7	8.7
65-74	2.3	2.7	3.4	4.0	2.4	2.7	3.3	4.0
75-84	1.2	1.4	1.7	2.1	1.7	1.8	1.9	2.3
85+	0.3	0.4	0.5	0.8	0.6	0.8	1.0	1.1
Total	39.8	44.9	48.7	52.1	39.5	43.9	47.4	50.4
				Wexford				
0-4	5.2	5.9	6.0	6.3	4.8	5.5	5.7	5.9
5-14	9.7	10.8	11.9	12.6	9.5	10.3	11.1	11.9
15-49	33.5	38.1	41.5	44.3	32.7	37.2	40.5	43.2
50-64	10.7	12.2	13.9	16.0	10.4	11.9	13.8	15.7
65-74	4.5	5.4	6.5	7.3	4.5	5.5	6.5	7.3
75-84	2.1	2.7	3.4	4.3	2.7	3.2	3.8	4.7
85+	0.4	0.6	1.0	1.5	1.0	1.3	1.6	2.1
Total	66.1	75.9	84.3	92.4	65.7	74.8	83.0	90.8
				Wicklow				
0-4	4.7	5.6	5.4	5.3	4.9	5.3	5.2	5.0
5-14	8.5	10.0	10.9	11.4	9.1	9.4	10.5	10.8
15-49	33.3	36.3	38.0	39.6	33.3	35.9	37.2	38.4
50-64	9.9	11.5	12.9	14.5	10.1	11.5	13.2	14.9
65-74	3.7	4.5	5.9	6.7	3.6	4.7	5.9	6.8
75-84	2.4	2.0	2.6	3.5	1.6	2.6	3.1	4.0
85+	0.9	0.5	0.7	1.1	0.4	1.1	1.3	1.7
Total	63.3	70.4	76.6	82.1	62.9	70.4	76.3	81.6

Table A2 continued

	2006	2011	2016	2021		2006	2011	2016	2021
		Males			Clare		Females		
0-4	4.1	4.4	4.1	4.1		4.1	4.2	4.0	3.9
5-14	8.0	8.4	8.8	8.7		7.8	8.3	8.5	8.4
15-49	28.5	30.4	31.4	31.9		27.0	28.5	29.6	30.3
50-64	9.5	10.7	11.6	12.8		9.1	10.2	11.1	12.2
65-74	3.6	4.4	5.5	6.2		3.6	4.3	5.4	6.2
75-84	1.8	2.1	2.6	3.4		2.5	2.6	2.9	3.6
85+	0.5	0.6	0.9	1.2		1.0	1.2	1.4	1.7
Total	56.0	61.0	64.8	68.3		54.9	59.3	62.9	66.2
					Cork				
0-4	17.2	19.3	18.6	17.4		16.4	18.3	17.9	16.8
5-14	32.4	34.5	37.2	38.3		31.0	32.9	35.3	36.5
15-49	129.3	137.3	140.3	141.4		125.2	131.8	134.0	135.0
50-64	37.9	42.9	47.7	52.4		37.1	41.8	46.3	50.7
65-74	14.9	17.5	21.4	24.8		16.1	18.2	21.8	24.7
75-84	7.4	9.0	10.8	13.5		10.8	11.8	13.0	15.2
85+	1.7	2.4	3.4	4.9		3.8	4.9	6.0	7.5
Total	240.8	262.9	279.4	292.7		240.5	259.6	274.4	286.4
					Kerry				
0-4	4.5	4.6	4.3	4.1		4.3	4.4	4.1	3.9
5-14	9.3	9.5	9.3	8.9		9.1	9.1	8.8	8.5
15-49	34.9	36.7	37.3	37.1		33.0	34.2	34.4	34.2
50-64	13.0	14.1	14.6	15.1		12.2	13.4	14.2	14.6
65-74	5.3	6.3	7.6	8.4		5.4	6.2	7.3	8.1
75-84	2.8	3.3	3.8	4.8		3.8	4.0	4.4	5.2
85+	0.7	0.9	1.3	1.8		1.3	1.7	2.1	2.5
Total	70.6	75.3	78.2	80.3		69.2	72.9	75.3	77.0
					Limerick				
0-4	6.3	7.1	6.7	6.2		6.0	6.7	6.5	6.0
5-14	12.1	12.6	13.4	13.8		11.6	11.9	12.7	13.2
15-49	50.5	52.0	52.1	51.4		48.3	48.9	48.3	47.3
50-64	14.8	16.5	17.5	18.6		14.3	15.9	17.0	18.0
65-74	5.7	6.7	8.3	9.6		5.9	6.9	8.4	9.5
75-84	2.8	3.3	4.1	5.1		4.0	4.3	4.8	5.7
85+	0.6	0.9	1.3	1.8		1.4	1.8	2.2	2.7
Total	92.7	99.1	103.4	106.5		91.4	96.4	99.9	102.4

Table A2 continued

	2006	2011	2016	2021	2006	2011	2016	2021
	Males			Tipperary N.R.	Females			
0-4	2.4	2.7	2.6	2.6	2.3	2.6	2.5	2.5
5-14	4.8	5.0	5.3	5.5	4.6	4.8	5.0	5.2
15-49	17.0	17.9	18.4	18.8	15.6	16.6	17.2	17.5
50-64	5.6	6.3	7.0	7.4	5.4	5.9	6.5	6.9
65-74	2.3	2.6	3.2	3.6	2.3	2.6	3.2	3.6
75-84	1.3	1.5	1.6	2.0	1.7	1.8	1.9	2.2
85+	0.3	0.4	0.6	0.8	0.5	0.8	0.9	1.2
Total	33.6	36.4	38.6	40.7	32.5	35.1	37.2	39.1
				Tipperary S.R.				
0-4	2.9	2.7	2.6	2.5	2.8	2.6	2.5	2.4
5-14	6.1	6.1	5.8	5.4	5.7	5.8	5.5	5.1
15-49	21.2	22.2	22.7	23.1	19.9	20.8	21.2	21.4
50-64	7.2	8.0	8.7	9.0	6.8	7.7	8.2	8.8
65-74	2.9	3.4	4.0	4.7	2.9	3.3	4.0	4.6
75-84	1.6	1.8	2.1	2.6	2.1	2.2	2.4	2.8
85+	0.4	0.5	0.7	1.0	0.7	1.0	1.2	1.4
Total	42.3	44.7	46.6	48.3	41.0	43.2	45.0	46.5
				Waterford				
0-4	4.0	4.5	4.2	4.0	3.8	4.3	4.1	3.8
5-14	7.5	8.0	8.6	8.8	7.1	7.5	8.2	8.4
15-49	27.7	28.9	29.2	29.2	27.2	28.1	28.1	28.0
50-64	8.9	9.7	10.5	11.3	8.6	9.5	10.4	11.2
65-74	3.7	4.3	5.1	5.7	3.9	4.4	5.1	5.6
75-84	1.8	2.2	2.7	3.3	2.6	2.8	3.2	3.7
85+	0.4	0.6	0.8	1.2	0.8	1.2	1.4	1.8
Total	53.9	58.1	61.1	63.5	54.0	57.8	60.5	62.6
				Galway				
0-4	8.3	9.4	9.4	9.1	7.9	8.8	9.0	8.7
5-14	15.4	16.7	18.3	19.2	14.4	15.7	17.2	18.1
15-49	63.3	70.2	73.5	75.3	62.1	67.8	70.4	71.9
50-64	17.7	20.1	22.2	24.6	17.0	19.7	21.9	24.3
65-74	7.1	8.2	10.0	11.7	6.9	8.0	9.9	11.7
75-84	3.7	4.3	5.2	6.4	4.9	5.1	5.6	6.7
85+	1.0	1.3	1.7	2.4	2.0	2.3	2.8	3.3
Total	116.5	130.3	140.4	148.7	115.2	127.5	136.8	144.7

Table A2 continued

	2006	2011	2016	2021	2006	2011	2016	2021
		Males		Leitrim		Females		
0-4	1.0	1.2	1.2	1.3	1.0	1.1	1.2	1.2
5-14	2.0	2.2	2.4	2.6	1.9	2.1	2.2	2.4
15-49	7.2	8.3	9.0	9.7	6.6	7.6	8.4	9.1
50-64	2.7	3.1	3.3	3.6	2.4	2.9	3.1	3.3
65-74	1.2	1.3	1.6	1.9	1.0	1.2	1.5	1.8
75-84	0.7	0.8	0.9	1.1	0.8	0.8	0.9	1.0
85+	0.2	0.2	0.3	0.4	0.3	0.4	0.5	0.5
Total	14.9	17.1	18.8	20.5	14.0	16.0	17.7	19.3
				Mayo				
0-4	4.2	4.2	4.1	4.1	4.1	4.0	3.9	3.8
5-14	8.7	8.8	8.6	8.4	8.4	8.4	8.2	8.0
15-49	30.1	31.8	32.6	32.9	28.4	29.7	30.2	30.4
50-64	11.5	12.7	12.9	13.3	10.6	11.9	12.7	13.0
65-74	4.8	5.4	6.7	7.6	4.7	5.2	6.2	7.2
75-84	2.7	3.1	3.5	4.2	3.6	3.6	3.8	4.3
85+	0.7	0.9	1.2	1.7	1.5	1.8	2.0	2.3
Total	62.6	66.8	69.7	72.2	61.2	64.6	67.0	69.1
				Roscommon				
0-4	2.0	2.1	2.2	2.3	1.9	2.0	2.1	2.2
5-14	4.1	4.3	4.5	4.6	4.0	4.1	4.2	4.3
15-49	14.7	16.5	17.8	18.9	13.1	14.7	15.9	17.0
50-64	5.4	6.1	6.6	7.1	5.0	5.6	6.1	6.4
65-74	2.3	2.6	3.1	3.6	2.2	2.4	3.0	3.5
75-84	1.4	1.6	1.7	2.0	1.8	1.8	1.8	2.1
85+	0.4	0.5	0.6	0.9	0.7	0.8	1.0	1.2
Total	30.2	33.6	36.6	39.5	28.6	31.5	34.0	36.6
				Sligo				
0-4	2.0	2.2	2.1	2.0	1.9	2.1	2.0	1.9
5-14	4.2	4.1	4.2	4.3	3.8	3.9	4.1	4.1
15-49	15.1	15.6	15.8	15.7	15.1	15.5	15.3	15.2
50-64	5.3	5.9	6.1	6.3	5.2	6.0	6.3	6.4
65-74	2.2	2.4	3.1	3.5	2.2	2.5	3.0	3.6
75-84	1.2	1.4	1.6	1.9	1.7	1.7	1.8	2.1
85+	0.3	0.4	0.6	0.8	0.7	0.8	0.9	1.1
Total	30.3	32.1	33.4	34.4	30.6	32.4	33.5	34.4

Table A2 continued

	2006	2011	2016	2021	2006	2011	2016	2021
	Males			Cavan	Females			
0-4	2.5	2.9	3.1	3.3	2.3	2.7	2.9	3.1
5-14	4.8	5.4	6.0	6.5	4.7	5.1	5.5	6.1
15-49	16.5	19.1	21.2	22.9	15.2	17.8	20.0	21.8
50-64	5.4	6.3	7.0	7.9	4.7	5.6	6.4	7.3
65-74	2.1	2.5	3.2	3.8	2.0	2.2	2.9	3.5
75-84	1.3	1.5	1.6	2.0	1.6	1.6	1.7	1.9
85+	0.3	0.4	0.6	0.8	0.7	0.8	0.9	1.1
Total	32.9	38.1	42.7	47.2	31.1	35.9	40.3	44.7
				Donegal				
0-4	5.8	5.4	5.2	5.2	5.4	5.1	5.0	4.9
5-14	11.4	11.9	11.6	10.9	10.8	11.3	10.9	10.4
15-49	35.8	39.2	41.2	42.3	35.4	38.2	39.8	40.6
50-64	12.4	13.3	14.1	15.3	11.8	13.1	14.2	15.6
65-74	5.1	6.2	7.3	8.0	5.0	5.9	7.1	8.0
75-84	2.7	3.1	3.8	4.8	3.5	3.6	4.1	4.9
85+	0.7	1.0	1.3	1.7	1.4	1.7	2.0	2.4
Total	74.0	80.0	84.4	88.3	73.3	79.0	83.2	86.8
				Monaghan				
0-4	2.0	1.8	1.7	1.7	1.9	1.7	1.7	1.6
5-14	4.1	4.2	3.9	3.6	3.8	3.8	3.6	3.4
15-49	14.8	15.8	16.3	16.5	13.7	14.6	14.9	15.0
50-64	4.7	5.2	5.6	5.9	4.2	4.9	5.4	5.7
65-74	1.7	2.0	2.6	3.1	1.9	2.0	2.5	2.9
75-84	1.0	1.1	1.3	1.6	1.4	1.4	1.5	1.7
85+	0.2	0.3	0.5	0.6	0.5	0.7	0.8	0.9
Total	28.6	30.6	31.9	32.9	27.4	29.2	30.3	31.2
				State				
0-4	154.6	170.8	164.5	154.3	147.7	161.5	157.0	146.6
5-14	288.5	311.2	334.8	341.6	273.7	295.3	317.1	323.8
15-49	1141.0	1219.5	1252.1	1263.6	1112.4	1173.1	1193.4	1199.4
50-64	330.1	374.6	413.8	459.2	324.1	370.3	410.7	452.1
65-74	127.4	151.9	188.0	217.5	135.1	156.3	190.8	220.6
75-84	64.8	77.1	93.1	117.2	92.5	99.2	110.1	130.9
85+	14.8	20.9	29.8	42.6	33.2	42.1	51.6	63.3
Total	2121.2	2326.1	2476.0	2595.9	2118.7	2297.8	2430.7	2536.7

Table A3 Projected Number of Persons aged 65 and over living alone in Private Households (1000s) using the M2F2 assumption

	2006	2011	2016	2021	2006	2011	2016	2021
	Male				Female			
Carlow	0.5	0.6	0.7	0.9	0.8	1.0	1.2	1.4
Dublin	9.0	10.6	13.2	15.9	22.7	25.6	29.9	34.8
Kildare	1.0	1.4	1.9	2.5	1.9	2.4	3.3	4.3
Kilkenny	0.9	1.1	1.3	1.6	1.5	1.8	2.2	2.6
Laois	0.7	0.8	1.0	1.2	1.1	1.4	1.6	2.0
Longford	0.5	0.6	0.8	1.0	0.7	0.9	1.1	1.3
Louth	1.0	1.2	1.5	1.9	2.1	2.3	2.7	3.1
Meath	1.0	1.4	1.9	2.4	2.0	2.5	3.2	4.1
Offaly	0.7	0.9	1.1	1.3	1.2	1.5	1.8	2.1
Westmeath	0.8	1.0	1.2	1.5	1.5	1.7	2.0	2.4
Wexford	1.4	1.7	2.1	2.5	2.5	3.0	3.6	4.3
Wicklow	0.9	1.3	1.6	2.0	2.0	2.4	2.9	3.5
Clare	1.3	1.6	2.0	2.4	2.1	2.4	3.0	3.6
Cork	4.8	5.6	6.9	8.4	9.5	10.7	12.6	14.7
Kerry	1.9	2.2	2.7	3.2	2.9	3.4	4.1	4.8
Limerick	1.9	2.3	2.8	3.5	3.5	4.0	4.8	5.7
Tipperary N.R.	0.8	0.9	1.1	1.3	1.4	1.6	1.9	2.3
Tipperary S.R.	1.1	1.3	1.6	1.9	1.8	2.0	2.3	2.7
Waterford	1.2	1.4	1.7	2.0	2.2	2.5	2.8	3.2
Galway	2.5	2.9	3.5	4.3	3.7	4.4	5.4	6.7
Leitrim	0.6	0.7	0.8	1.0	0.7	0.8	1.0	1.2
Mayo	2.0	2.3	2.8	3.2	2.9	3.4	4.1	4.9
Roscommon	1.0	1.2	1.4	1.7	1.4	1.6	1.8	2.2
Sligo	0.9	1.0	1.2	1.4	1.4	1.6	2.0	2.4
Cavan	1.0	1.2	1.4	1.8	1.4	1.6	1.9	2.3
Donegal	2.0	2.4	2.9	3.4	3.1	3.5	4.3	5.0
Monaghan	0.7	0.8	1.0	1.2	1.2	1.4	1.6	1.9
Total	41.9	50.1	62.2	75.4	79.2	91.3	109.1	129.6

Source: Own calculations