An Phríomh-Oifig Staidrimh
Central Statistics Office

Population and Labour Force Projections

2016-2046

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BACKGROUND

Background

This report provides projections of both the total population (classified by age and sex) at five year intervals for the period 2016 to 2046, and of the total labour force (classified by age, sex and female marital status) for the years 2016, 2021 and 2026.

The projections are based on assumptions relating to future trends in fertility, mortality, migration and labour force participation. Two sets of assumptions were chosen for fertility, one for mortality and three for migration[1] up to the year 2046, giving six sets of results altogether. For the labour force projections a single set of assumptions relating to future labour force participation rates was chosen.

The assumptions used for the projections were agreed by an Expert Group (see membership in Appendix 1) which met during the period November 2012 to February 2013. The Central Statistics Office is grateful to the members of the Group for their input and advice during the discussions leading to the adoption of these assumptions. The most up-to-date information available was used in preparing the projections including the results of Census 2011, information on births up to 2011, life tables for 2009/2011 and the results for Q2 2011 of the Quarterly National Household Survey (QNHS).

Methodology

The model used in these projections is similar to that used in previous projections, namely the demographic component method, which projects the base population forward under the chosen assumptions governing births, deaths, migration and labour force participation. The base year used was 2011, using the Census of Population results. The methodology is explained further in Appendix 2.

A glossary of technical terms is given in Appendix 3 to assist readers who may not be familiar with the terminology used in the report.

Layout of the report

The report contains three sections:

- The first section contains a brief description of historical population trends and the factors influencing them.
- The projection assumptions chosen, for fertility, mortality, migration and labour force, and the rationale for selecting them are covered in the second section, as are the assumptions used in the previous set of projections which are reviewed against the out-turn for recent years.
- The main results are described in the third section focusing, in turn, on the young population, the population of working age and the old population.

The main results presented consist of ten tables:

- Tables 1 to 6 contain the projected population at five-year intervals between 2016 and 2046 under the six scenarios obtained from the different combinations of the fertility and migration assumptions.
- Table 7 gives the average annual numbers of projected births, deaths and net migrants for the corresponding inter-censal periods.
- Tables 8, 9 and 10 contain the projected labour force for 2016, 2021 and 2026 under the three migration assumptions.

More detailed results are available on the CSO website **www.cso.ie** (See Appendix 4).

[1] A fourth migration assumption of M0 is also presented as an appendix.

Appendix 5 contains a number of supporting tables which either informed the deliberations of the Expert Group or were derived from the results of the projection exercise along with a set of tables built around a zero migration assumption.

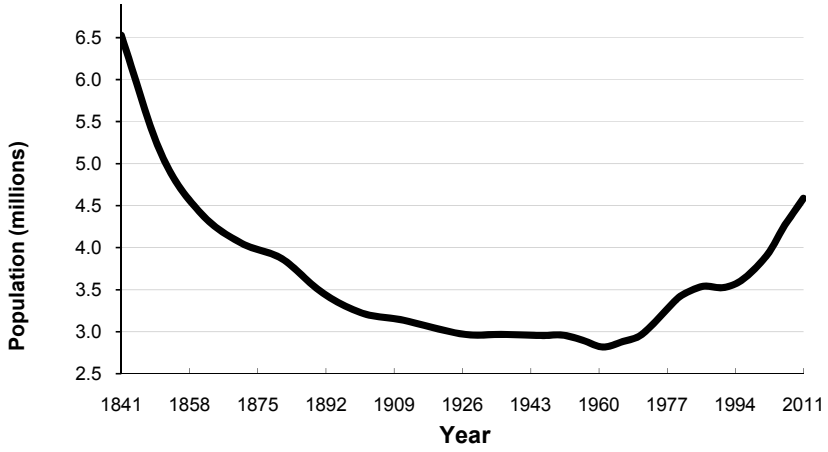
Appendix 6 provides a description of the method used to project mortality.

HISTORICAL POPULATION[2] TRENDS

The population 1841 to 2011

The area representing the Republic of Ireland registered a decline in population from just over 6.5 million in 1841 to 3.1 million in 1911 (see Table A1 in Appendix 5). The effects of the famine of 1846/1847 and the subsequent heavy population losses due to emigration in the latter half of the nineteenth century were the main contributing factors to this decline. A further fall of over 5 per cent occurred between 1911 and 1926 – the first year in which a census was held in the newly independent State. The continuing high level of emigration was again the main reason for this decline.

Figure 1 Population, 1841 to 2011



The situation since 1926

The overall population level, which remained quite stable at just under three million between 1926 and 1951, declined to reach a low point of 2.8 million in 1961. The 1960s, 1970s and the first half of the 1980s witnessed a decline in emigration and a relatively high level of natural increase culminating in a population total in excess of 3.5 million in 1986. After a slight fall between 1986 and 1991, due mainly to a resumption of net outward migration at the end of the 1980s, the upward trend in population resumed in the early 1990s. Both natural increase and significant net inward migration contributed to record population growth between 2002 and 2006 with the result that the 2006 population of 4.24 million was 50 per cent higher than the low point of 1961. Despite a return to net outward migration in the years leading up to Census 2011 the population continued to grow strongly due mainly to the high number of births of recent years.

Table A shows the components of population change, expressed in the form of annual averages, for each inter-censal period since 1926. The relevant components are:

- the natural increase, i.e. births less deaths; and
- net migration, i.e. inward less outward migration.

[2] The population figures quoted in this section relate to the de-facto concept i.e. those present in the State on Census night. The projected population is on the basis of the usual residence concept in line with changes introduced in the annual population estimates.

Table A Average annual births, deaths, natural increase and estimated net migration for each inter-censal period, 1926 to 2011

Period	Total births	Total deaths	Natural increase	Change in population	Estimated net migration
			Thousands		
1926 - 1936	58	42	16	0	-17
1936 - 1946	60	43	17	-1	-19
1946 - 1951	66	40	26	1	-24
1951 - 1956	63	36	27	-12	-39
1956 - 1961	61	34	26	-16	-42
1961 - 1966	63	33	29	13	-16
1966 - 1971	63	33	30	19	-11
1971 - 1979	69	33	35	49	14
1979 - 1981	73	33	40	38	-3
1981 - 1986	67	33	34	19	-14
1986 - 1991	56	32	24	-3	-27
1991 - 1996	50	31	18	20	2
1996 - 2002	54	31	23	49	26
2002 - 2006	61	28	33	81	48
2006 - 2011	73	28	45	70	25

Lowest population level in 1961

The stability of the population level in the 1926 to 1951 period resulted from gains due to the natural increase being counterbalanced by losses due to net outward migration. The high emigration during the 1950s was responsible for the historically low population level of 2.8 million recorded in 1961.

Population levels began to rise again during the 1960s mainly as a result of the decline in net outward migration. The reversal in net migration from outward to inward during the 1970s alongside an increase in births led to an overall population increase of just over 465,000 between 1971 and 1981.

Net outward migration resumed again during the early 1980s and, coupled with a decline in births, resulted in a moderation in the rate of overall population increase. The sharp increase in net outward migration in the second half of the 1980s, along with a continued fall in the number of births, contributed to a small population loss between 1986 and 1991.

In the early 1990s there was a further decline in the average annual natural increase due to the declining birth rate. However, as a consequence of increased economic activity and employment growth there was a change around once again in the pattern of migration, with a small net inflow recorded between 1991 and 1996. Thus the population increased at an average annual rate of over 20,000 in the period 1991 to 1996.

Recent migration

The 1996-2002 inter-censal period saw the average annual natural increase revert to the level attained during the late 1980s. When combined with high net inward migration this led to an average annual population increase on a par with that achieved during the 1970s.

The period 2002-2006 saw the average annual natural increase continue to grow, which, combined with historically high net inward migration, resulted in an unparalleled average annual population increase of over 80,000 or nearly 2 per cent per annum over the four year period.

Census 2011 results showed that the population continued to grow strongly over the period 2006–2011 with an annual average increase of 1.6 per cent over the period. Very high births, combined with falling deaths, was the main driver of population growth, while net migration fell from an annual average of 48,000 in the previous period to 25,000 this period.

ASSUMPTIONS

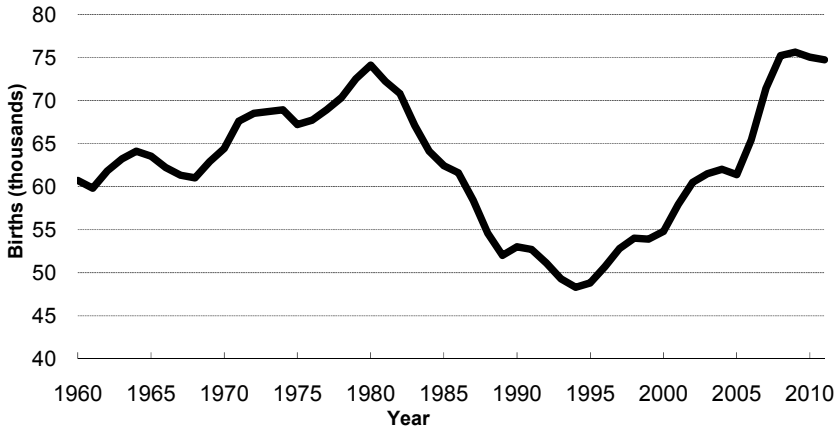
Fertility

Births 1960 to date

The number of births each year in Ireland has varied enormously over the past 50 or so years, with a trough of 48,255 in 1994 surrounded by peaks of 74,064 and 75,554 in 1980 and 2009.

Figure 2 illustrates the overall picture from 1960 to the present time. Between 1960 and 1980 the underlying trend in the annual number of births was steadily upwards, rising from 61,000 in 1960 to a peak of 74,000 in 1980. From 1980 to 1994 the number of births fell steeply to reach a low of 48,000 in 1994. Since then the underlying trend in the annual number of births has returned to an upward path with annual births consistently exceeding 70,000 in recent years.

Figure 2 Births, 1960 to 2011



Three sub-periods

The factors which impact on the number of births are the number of women of child bearing age (15-49 years) and the fertility levels of these women (see Table A2 in Appendix 5 and Table B opposite). In analysing the period 1960-2011 it is instructive to distinguish three distinct sub-periods: 1960-1980, 1980-1994 and 1994-2011.

In the first sub-period the number of women aged 15-49 increased by over 30 per cent. Of more significance was the increase of nearly 50 per cent in the number of women in the prime child bearing age groups, i.e. those aged 20-39 years. The increase of over 20 per cent in the number of births during this twenty-year period thus masked a significant decline in underlying fertility rates.

The number of women aged 20-39 years continued to grow between 1980 and 1994, albeit at a slower rate (12 per cent) than during the previous sub-period, and taken in conjunction with a decrease of 43 per cent in the total fertility rate (TFR) resulted in a decline of over a third in the number of births.

The most recent period (1994-2011) has seen a reversal in the downward trend in fertility rates with TFR rising from 1.85 to 2.04. This, combined with an increase of 37.4 per cent in the number of women aged 20-39 years, led to rise of 54.7 per cent in the number of births. In most recent years 2009 to 2011 births were consistently above the previous peak experienced in 1984; 2009 was the high point with 75,554 births.

Table B contains age-specific and total fertility rates at five yearly intervals from 1960 to 1990 and for each year from 1990 to 2011.

Table B Age-specific fertility rate and total fertility rate, 1960 to date

Year	Live births per 1,000 females at specified ages							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR
1960	8.8	103.9	209.6	213.1	156.3	56.0	4.2	3.76
1965	14.0	125.1	236.1	218.9	150.3	57.6	4.2	4.03
1970	16.3	145.5	228.7	201.9	131.9	45.3	3.7	3.87
1975	22.8	138.5	216.0	162.2	100.2	36.8	2.6	3.40
1980	23.0	125.3	202.3	165.7	97.3	29.6	2.3	3.23
1985	16.6	87.2	158.6	138.4	75.3	21.6	1.5	2.50
1990	16.7	63.3	137.6	126.2	63.1	15.4	1.1	2.12
1991	17.1	64.0	131.8	124.4	63.4	15.2	1.0	2.09
1992	16.9	58.9	123.9	122.3	61.3	14.4	0.8	1.99
1993	16.3	53.8	116.5	121.2	58.5	14.1	0.9	1.91
1994	15.0	50.7	112.5	119.8	58.6	12.8	0.7	1.85
1995	15.1	50.3	106.7	123.5	60.3	13.1	0.8	1.85
1996	16.7	52.2	105.3	127.1	63.9	11.8	0.6	1.89
1997	17.5	50.9	106.4	131.5	66.6	13.4	0.8	1.94
1998	19.2	52.5	103.1	131.5	69.3	13.4	0.6	1.95
1999	20.2	51.0	99.4	129.5	68.5	12.9	0.6	1.91
2000	19.5	51.6	95.1	129.3	71.3	13.6	0.5	1.90
2001	19.9	53.3	95.1	134.1	75.3	13.9	0.7	1.96
2002	19.4	52.8	93.7	134.5	80.0	14.5	0.6	1.98
2003	19.0	50.3	92.6	135.0	82.3	15.7	0.5	1.98
2004	17.1	49.1	88.4	134.2	83.9	16.2	0.5	1.95
2005	16.8	45.8	79.9	129.4	86.4	16.9	0.6	1.88
2006	16.4	49.5	82.1	130.4	90.8	18.1	0.8	1.94
2007	17.8	51.6	82.8	139.3	97.6	19.6	0.8	2.05
2008	17.2	55.2	86.3	140.1	100.6	19.9	1.2	2.10
2009	16.4	56.7	87.4	137.1	100.6	21.3	1.1	2.10
2010	15.3	57.0	89.0	136.2	99.5	22.0	1.1	2.10
2011	12.4	49.5	89.7	135.3	98.1	22.4	1.2	2.04

From 1980 to 1994 the fertility rate in Ireland fell dramatically and consistently from 3.23 to 1.85 – the lowest rate on record. Since then TFR has been on an upward trajectory in Ireland. In trying to understand this temporary, yet sharp, fall in total fertility it is helpful to examine the varying trends of the different age specific rates up to 1994.

Between 1980 and 1994 the age specific fertility rate (ASFR) for those aged 20-24 fell from 125.3 to 50.7, a fall of 59.5 per cent, while those aged 25-29 saw an almost equally dramatic fall from 202.3 to 112.5. Over the same period the fertility rate for older women, while falling in line with trends generally, showed a less dramatic decline, falling from 165.7 to 119.8 for those aged 30-34 and from 97.3 to 58.6 for the 35-39 age group.

Between 1994 and 2008 the rates for those aged 20-24 have hovered around 50 while those for the 25-29 age group continued to fall. On the other hand the fertility rates for those aged 30 and over have recovered substantially; the rate for the 30-34 age group increased from a low of 119.8 in 1994 to 140.1 in 2008 before falling back somewhat to 135.3 in 2011. The rate for the 35-39 year olds has followed a similar trajectory.

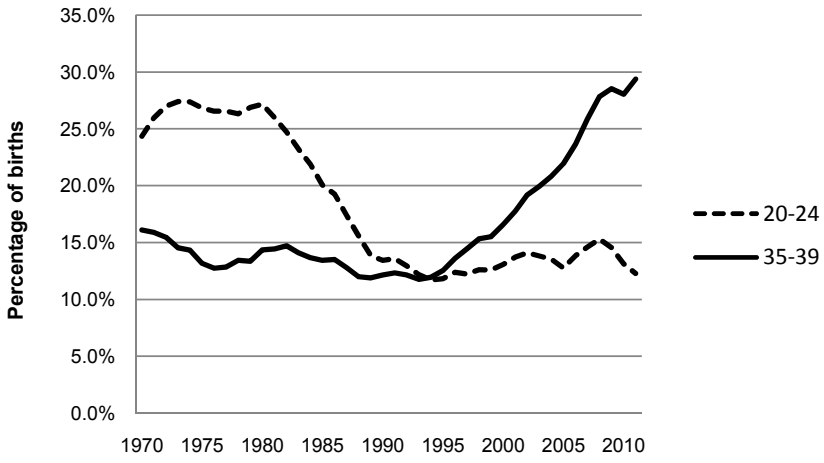
Tempo effect

It is now thought that what had been happening to fertility rates in Ireland throughout the 1980s and 1990s was what is known as the tempo effect. Tempo effect is the term used to describe systematic trends in the timing of childbirth whereby younger women in their twenties delay having children until their thirties or early forties. This results in a decline in the ASFR for this younger age group while the off-setting rise for older women only occurs some years later when this younger age group ages. The impact of tempo effects on Irish fertility rates was examined by Pete Lunn and Tony Fahey in their report on Household and Family Structures in Ireland (Lunn and Fahey 2008)[3]. While 'tempo effects' are complex and multi-faceted, the varying trends in the ASFR in Ireland over the past 30 years would point to evidence that some level of 'tempo effect' was at play in Ireland during the 1980s and 1990s.

Births by age of mother

This delay in child bearing for women from their twenties to their thirties is illustrated in Figure 3. In 1980 women aged 20-24 only accounted for 17 per cent of women of child bearing age (15-49) and yet accounted for 27 per cent of births, whereas those aged 35-39 represented 12 per cent of women in this group and 14 per cent of births. By 2010 this pattern had reversed with only 13 per cent of births to the younger age group (who represented 14 per cent of women by 2010), while older women aged 35-39 accounted for 28 per cent of births but only 15 per cent of the group. In 2011 almost 3 in 4 births (74 per cent) were to women in their thirties, almost double the percentage only 20 years previously (38 per cent).

Figure 3 Distribution of births by age of mother for 20-24 and 35-39 years olds.

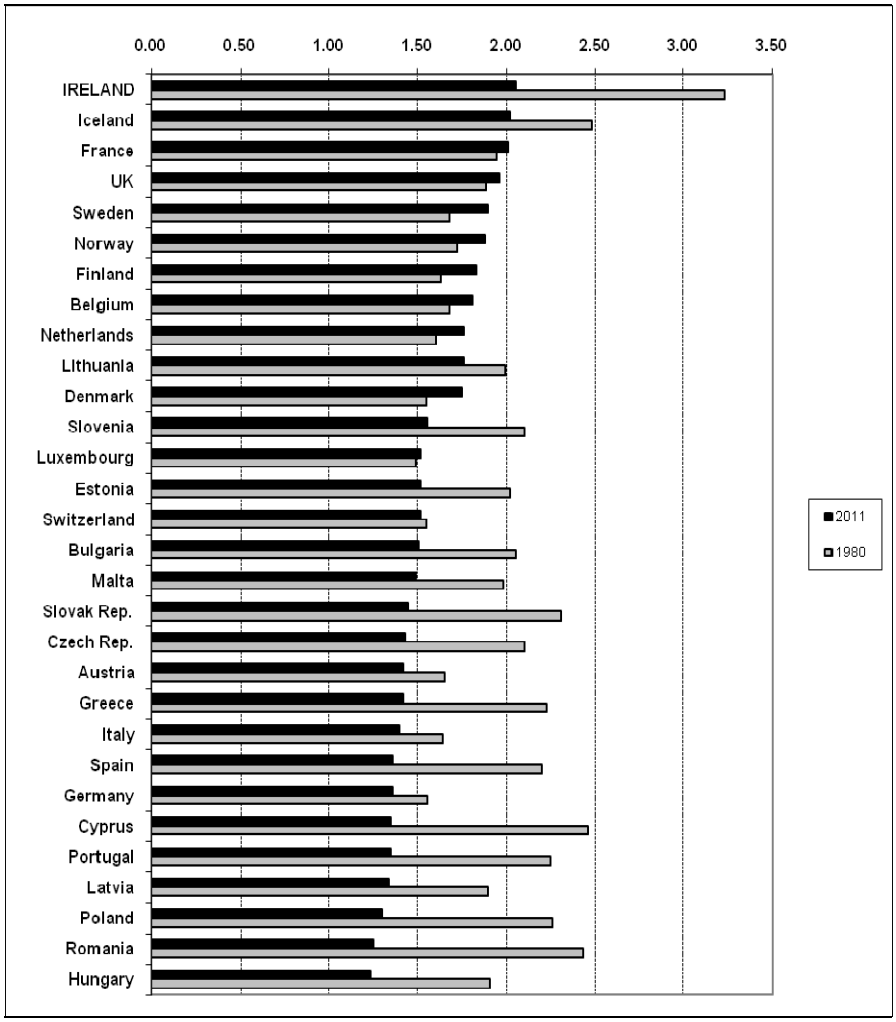


[3] Households and Family Structures in Ireland: A Detailed Statistical Analysis of Census 2006 (Pete Lunn and Tony Fahey, Family Support Agency, ESRI)

International trends of selected countries

Figure 4 gives the Total Fertility Rate (TFR) for the 27 EU countries, as well as for Iceland, Norway and Switzerland, in 1980 and 2011. From standing in 4th place in 2006 (behind Iceland, France and Norway) Ireland has the highest fertility rates in Europe in 2011. What is also noteworthy, however, is that 18 of the 30 countries listed in the table saw gains in fertility between 2006 and 2011.

Figure 4 Total fertility rates for selected countries, 1980 and 2011



Source: *Eurostat Statistics in Focus*

Fertility assumptions

When deciding on the assumptions for future fertility rates in Ireland the Expert Group took account of not only recent trends, and in particular the upward movement in rates over the most recent inter-censal period, but also the impact of the tempo effect on fertility rates generally. The following points were noted by the Group:

- Some element of 'tempo effect' is at play in Ireland and accordingly fertility rates were likely to remain at their current levels in the short to medium term.
- The recent increase in overall fertility rates are likely to be maintained but that further growth is unlikely.
- The fertility rates of recently arrived immigrants (in particular Polish and Lithuanian women)[4] are in line with Irish rates rather than reflecting the rates prevailing in their own countries i.e. immigrant women in Ireland have tended to take on the fertility rates of their adoptive home.

[4] The total fertility rates of Polish and Lithuanian women in Ireland in 2011 were 2.10 and 2.16 respectively, while the corresponding rates in Poland and Lithuania were 1.30 and 1.76 respectively.

- While Irish fertility rates are high when compared with some other European countries, trends in Europe are shifting.

Given the above the Expert Group considered that the most likely out-turn for overall average fertility over the projection period, as measured by the TFR, would be in the range 2.1 to 1.8. Consequently two variants were chosen: a high variant (F1) and a low variant (F2):

- **F1:** TFR to remain at the 2010 level of 2.1 for the lifetime of the projections
- **F2:** TFR to decrease to 1.8 by 2026 and to remain constant thereafter

High fertility assumption

The high fertility assumption F1 assumes the total fertility rate will remain at the level observed in 2010 of 2.1 for the lifetime of the projections up to 2046. This assumption allows the impact on the projections of fertility remaining at the theoretical replacement level to be monitored.

Low fertility assumption

The low fertility assumption F2 assumes the total fertility rate will decrease from 2.1 to 1.8 by 2026, and then stabilise at this level until the end of the projection period in 2046. The Group considered that this assumption would allow Ireland to remain close to the top of the EU fertility table while still allowing a decrease to take place from the current level.

It is also assumed that the decline in fertility under F2 will be uniform across all age groups. While there has been wide variation in the way the fertility of women in different age groups has evolved in recent years, adjusting age specific rates within the agreed overall TFR has little impact on the total number of births. Furthermore, given that the principal purpose of the fertility assumptions are to generate projected annual number of births to feed the projection model, the distribution of these births according to the age of the mothers is considered to be of secondary importance. The assumed age-specific and derived total fertility rates under assumption F2 are given in Table C.

Table C Actual 2011 and assumed age-specific fertility rate and total fertility rate, 2016 to 2046 under fertility assumption F2

Year	Live births per 1,000 females at specified ages							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR
2011	12.4	49.5	89.7	135.3	98.1	22.4	1.2	2.04
2016	12.2	48.7	88.2	133.1	96.5	22	1.2	2.01
2021	11.5	46.1	83.5	126	91.3	20.9	1.1	1.90
2026-2046	10.9	43.6	79.0	119.2	86.4	19.7	1.1	1.80

Previous projections

Two fertility assumptions were used in the last set of projections (covering the period 2011 to 2041). The high variant assumed the TFR would remain at its 2006 level of 1.9 for the whole period, while the lower variant assumed a gradual decline from 1.9 to 1.65 over the lifetime of the model.

The higher scenario, F1, projected an annual average number of births of 67,300. In actual fact fertility rates, which had already begun to rise in 2006 continued to rise throughout 2007 to 2011, and the actual annual average births was 73,900 - some 6,600 more births each year.

Mortality

National trends

Developed economies have witnessed significant improvements in mortality since the start of the 20th century. In Ireland, male life expectancy has increased from 57.4 years in 1926 to 77.9 years in 2010, a gain of 20.5 years over the eighty-four year period, while females have seen a gain of 24.8 years (from 57.9 to 82.7). The gap between male and female life expectancy was only 0.5 years back in 1926. By 2010 that gap had grown to 4.7 years.

Table D Gains in life expectancy at various ages 1926 to 2010

Period	Males			Females		
	Birth	5 years	70 years	Birth	5 years	70 years
1926-1946	3.1	2.0	-0.8	4.5	3.3	-0.5
1946-1961	7.6	4.2	0.5	9.5	6.5	0.8
1961-1971	0.7	-0.2	0.0	1.6	1.0	0.5
1971-1981	1.3	0.6	0.0	2.1	1.5	0.7
1981-1986	0.9	0.7	0.1	1.1	0.9	0.4
1986-1991	1.3	1.2	0.7	1.2	1.1	0.9
1991-1996	0.7	0.6	0.2	0.8	0.6	0.3
1996-2002	2.1	2.1	1.3	1.7	1.7	1.1
2002-2006	1.7	1.5	1.1	1.3	1.2	1.0
2007-2010[5]	1.1	1.1	0.8	1.1	1.0	0.8
1926-2010	20.5	13.8	3.9	24.9	18.9	6.0

Note: See Table A3 in Appendix 5 for the more detailed underlying figures.

As can be seen from table D the biggest gains in both male and female life expectancy were recorded in the immediate post-war period, i.e. 1946-1961. These resulted from improvements in living conditions, as well as from advances in maternity services and medical treatment, such as immunisation which significantly improved survival rates. The reduction in mortality was most marked in the case of infant deaths.

The 1960s, on the other hand, marked a fall off in the rate of improvements and, in the case of older males, a marginal deterioration occurred in life expectancy over the decade. Two reasons are generally advanced for this. First, the rate of improvement in infant mortality began to taper off and consequently its influence on life expectancy at birth diminished. Secondly, an increase was experienced in the mortality of people of working age due to a rise in the incidence of deaths due to ischaemic heart disease and most forms of cancer.

The situation has improved again in recent years. Life expectancy at birth increased by 5.6 years for males between 1991 and 2010 while the increase for females over the same period was 4.9 years. The improvements have been most notable in the older age groups. Improved living conditions coupled with further developments in medical care are considered to be the main contributing factors.

International comparisons

Male life expectancy in Ireland ranks 16th highest of the 30 countries listed in Table E overleaf, while female life expectancy ranks 20th. This reflects a relative deterioration in Ireland's position since 2004 when male rates ranked 13th and female rates ranked 16th despite the large improvements in life expectancy during the period 1970 to 2010.

[5] The 2010 Life Tables referenced here were produced by the CSO as a special exercise for this projections publication. A set of Life Tables for 2010-2012 using Census 2011 data will be published during 2013.

Table E Life expectancy at various ages for selected European countries, 2011

Country	Males				Females			
	0	1	15	65	0	1	15	65
Austria	78.3	77.7	63.8	18.1	83.9	83.1	69.2	21.7
Belgium	77.8	77.1	63.3	17.8	83.2	82.4	68.5	21.5
Bulgaria	70.7	70.4	56.7	14.0	77.8	77.4	63.6	17.3
Cyprus	79.3	78.6	64.7	18.2	83.1	82.3	68.4	20.3
Czech Rep.	74.8	74.0	60.2	15.6	81.1	80.3	66.4	19.2
Denmark	77.8	77.0	63.2	17.3	81.9	81.2	67.3	20.1
Estonia	71.2	70.3	56.5	14.7	81.3	80.5	66.7	20.0
Finland	77.3	76.5	62.7	17.7	83.8	83.0	69.1	21.7
France	78.7	78.0	64.1	19.3	85.7	85.0	71.1	23.8
Germany	78.4	77.7	63.8	18.2	83.2	82.5	68.6	21.2
Greece	78.5	77.8	63.9	18.5	83.1	82.3	68.4	20.6
Hungary	71.2	70.6	56.7	14.3	78.7	78.1	64.3	18.3
Iceland	80.7	79.8	66.0	18.9	84.1	83.2	69.3	21.5
Ireland	**78.3**	**77.6**	**63.7**	**17.9**	**82.8**	**82.1**	**68.1**	**20.7**
Italy	80.1	79.4	65.5	18.8	85.3	84.5	70.6	22.6
Latvia	68.6	68.1	54.3	13.4	78.8	78.2	64.4	18.7
Lithuania	68.1	67.4	53.7	14.0	79.3	78.6	64.8	19.2
Luxembourg	78.5	77.9	64.0	17.8	83.6	82.8	68.9	21.6
Malta	78.6	78.1	64.2	17.6	82.9	82.5	68.7	20.9
Netherlands	79.4	78.7	64.8	18.1	83.1	82.4	68.5	21.2
Norway	79.1	78.4	64.5	18.2	83.6	82.7	68.8	21.4
Poland	72.6	72.0	58.1	15.4	81.1	80.4	66.6	19.9
Portugal	77.6	76.9	63.0	18.1	84.0	83.2	69.3	21.8
Romania	71	70.8	57.1	14.3	78.2	77.8	64.0	17.5
Slovak Rep.	72.3	71.7	57.9	14.5	79.8	79.2	65.3	18.4
Slovenia	76.8	76.1	62.2	16.9	83.3	82.5	68.6	21.1
Spain	79.4	78.6	64.7	18.7	85.4	84.6	70.7	22.8
Sweden	79.9	79.1	65.2	18.5	83.8	83.0	69.1	21.3
Switzerland	80.5	79.8	65.9	19.2	85.0	84.3	70.4	22.6
United Kingdom	79.1	78.5	64.6	18.6	83.1	82.3	68.5	21.2

Source: Eurostat

Table E shows that life expectancy for females is now 82 years or more in twenty of the thirty countries listed, while the life expectancy for males is 78 years or over in sixteen of the countries.

Mortality assumptions

There is general consensus internationally among demographers that improvements in life expectancy will continue for the foreseeable future. The main question to be addressed therefore is the rate of improvement.

For the 2006 set of projections, a break was made with the traditional methodology, whereby the log-linear trend in improvements in the age specific mortality rates observed in the past was extrapolated into the future. The original method had a number of drawbacks. First, the choice of the historic period of analysis was not entirely clear and secondly, the method gave rise to a discontinuity in the first year of the projection period. Accordingly it was decided to adopt an alternative methodology for extrapolating improvements; namely the so-called 'targeting' approach. This approach involved estimating short-term and long-term mortality trends separately and interpolating between the two over an appropriate period of time. The precise methodology used is described in Appendix 6 of this report.

In agreeing assumptions on mortality for this set of projections the Expert Group decided to adopt the same targeting approach, whereby both a short and a long term rate of improvement were employed. The long-term rate of improvement is assumed to be 1.5 per cent and is unchanged since the last report. The short-term rate declines linearly over a 25 year period to the long term rate. Rates of improvement are projected separately for males and females. The short-term rate of improvement (the annualised weighted average of the 4 years 2006 to 2010) is calculated at 3 per cent for males and 2.5 per cent for females, representing a softening of expected improvements since 2007 (from 5 per cent for males and 3.5 per cent for females). These rates are assumed to apply to all ages up to age 90.

Under these assumptions male life expectancy at the end of period in 2046 is projected to be 85.1, a gain of 7.2 years over the 30 year period, whereas for females there is a projected gain of 5.8 years to 88.5. As can be seen from the resulting gains, the projections assume that the recent narrowing of the gap in life expectancy between males and females will continue over the projection period.

Table A4 in Appendix 5 shows the evolution of life expectancies at various ages over the projection period under the assumptions used.

Mortality rates are assumed to decrease which will result in gains in life expectancy at birth from:

- 77.9 years in 2010 to 85.1 years in 2046 for males
- 82.7 years in 2010 to 88.5 years in 2046 for females

Previous projections

In the last set of projections life expectancy at birth was assumed to improve between 2005 and 2010 by 3 years to 79.7 for males and by 1.7 years to 83.2 for females. The actual improvement between 2006 and 2010 was 1.1 years for males and 1.1 years for females, significantly below the projected levels. These new assumptions, therefore, take account of these slower rates of improvement.

Migration

Historical trends

Of the three factors that determine population change, namely births, deaths and migration, from an Irish perspective this latter factor is by far the most influential, volatile and uncertain. Over the past 50 years Ireland has moved from periods of high net outward migration in the 1950s through to the early 1970s and again in the late 1980s, to periods of net inward migration in both the late 1970s and again from the late 1990s through most of the 2000s. This is illustrated in Figure 5 where the dominant influence which migration has exerted on the pattern of population change over the sixty year period can be clearly seen.

Figure 5 – Average annual inter-censal components of population changes 1951-2011

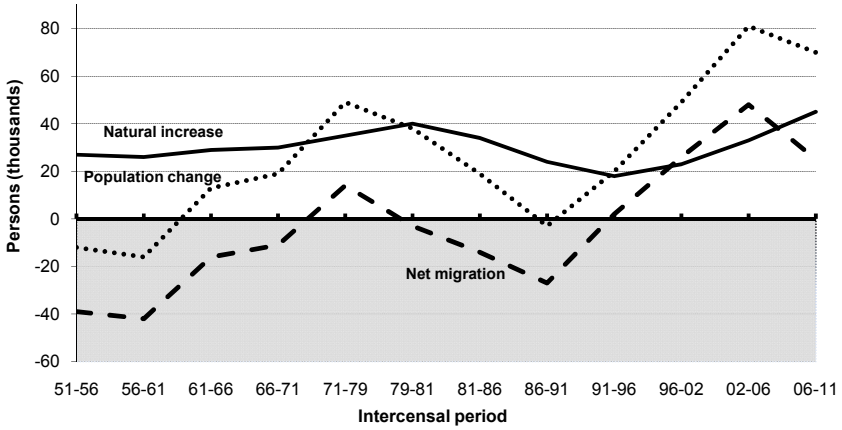


Table F shows the detailed annual migration flows for more recent years. The number of immigrants increased dramatically between 1997 and 2008 with the very sharp increases between 2005 and 2007 attributed to the accession of the ten new EU member states in May 2004. Emigration, on the other hand, has ranged from 25,000 to 30,000 between 1997 and 2005 before rising slowly between April 2006 and April 2008. This was followed by a sharp rise in 2009 following the economic downturn in 2008. Emigration has remained high in the years since 2009 meaning Ireland has returned to a situation of net outward migration.

Table F Estimated migration 1997 to 2012

Year ending April	Emigrants	Immigrants	Net Migration
		Thousands	
1997	25.3	44.5	19.2
1998	28.6	46.0	17.4
1999	31.5	48.9	17.3
2000	26.6	52.6	26.0
2001	26.2	59.0	32.8
2002	25.6	66.9	41.3
2003	29.3	60.0	30.7
2004	26.5	58.5	32.0
2005	29.4	84.6	55.1
2006	36.0	107.8	71.8
2007	46.3	151.1	104.8
2008	49.2	113.5	64.3
2009	72.0	73.7	1.6
2010	69.2	41.8	-27.5
2011	80.6	53.3	-27.4
2012	87.1	52.7	-34.4

Migration assumptions

Projecting migration involves making assumptions about the magnitude and direction of future migration flows. The volatility of past migration flows and their susceptibility to shifts in reaction to economic conditions makes projections around migration very difficult. It is clear that both labour market trends and economic conditions, not only in Ireland but in the wider global economy, have a significant influence on migration flows in and out of Ireland.

The Expert Group recognised that the high economic and labour force growth experienced by Ireland in the years leading up to 2008 has significantly changed the outlook in regard to migration. Notwithstanding the return to emigration in recent years, the 2011 Census showed that Ireland continues to attract immigrants and also presented evidence of family formation among the migrant community.

The following particular points were raised during the deliberations of the Expert Group:

- The strong influence that economic conditions in other countries exert on migration in and out of Ireland.
- The present economic conditions in Ireland and persistent high unemployment.
- The extent to which recent migrants have established themselves in Ireland and evidence of family reunification particularly among the Polish and Lithuanian community and the corresponding influence this can have on other migrants.
- There is still a 'pull' factor at play in Ireland caused by capacity in niche sectors of the labour market.
- The continuing availability of a large pool of migrant labour from all across Europe.

Given the difficulties associated in predicting future economic conditions, not alone in Ireland but in the wider global economy, the Expert Group considered it unwise to explicitly factor economic growth into the assumptions on migration, but rather to outline in a more general way three different scenarios of positive and negative net migration. Accordingly, under the most optimistic migration scenario M1, the Group assumed a return to positive net migration by 2016, rising slowly thereafter before settling at an annual rate of plus 30,000 by 2021. This net figure will manifest itself as an annual rate of 70,000 immigrants and 40,000 emigrants.

Under the less optimistic scenario of M2, migration is assumed to turn positive by 2018 before reaching an annual flow of plus 10,000 by 2021 (60,000 immigrants and 50,000 emigrants). Under a negative scenario, M3, migration is assumed to remain negative throughout the life time of the projections settling at -5,000 in 2021 and remaining at that level; this is shown as 50,000 immigrants and 55,000 emigrants.

M1: Net migration returning to positive by 2016 and rising steadily thereafter to plus 30,000 by 2021

- -19,100 annual average per annum in 2011/2016
- +18,200 annual average per annum in 2016/2021
- +30,000 per annum in 2021/2026
- +30,000 per annum in 2026/2046

M2: Net migration returning to positive by 2018 and rising thereafter to +10,000 by 2021

- -21,600 annual average per annum in 2011/2016
- +4,700 annual average per annum in 2016/2021
- +10,000 per annum in 2021/2026
- +10,000 per annum in 2026/2046

M3: Net migration remaining negative for the whole period

- -25,100 annual average per annum in 2011/2016
- -10,000 annual average per annum in 2016/2021
- -5,000 per annum in 2021/2026
- -5,000 per annum in 2026/2046

The gross flow components of these net migration assumptions are given in Table G.

Table G Assumed average annual migration flows, 2011 to 2046

Scenario	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046
				Thousands			
M1							
Immigration	56.3	67.0	70.0	70.0	70.0	70.0	70.0
Emigration	75.4	48.8	40.0	40.0	40.0	40.0	40.0
Net migration	-19.1	18.2	30.0	30.0	30.0	30.0	30.0
M2							
Immigration	54.6	59.3	60.0	60.0	60.0	60.0	60.0
Emigration	76.3	54.6	50.0	50.0	50.0	50.0	50.0
Net migration	-21.6	4.7	10.0	10.0	10.0	10.0	10.0
M3							
Immigration	51.1	50.1	50.0	50.0	50.0	50.0	50.0
Emigration	76.2	60.1	55.0	55.0	55.0	55.0	55.0
Net migration	-25.1	-10.0	-5.0	-5.0	-5.0	-5.0	-5.0

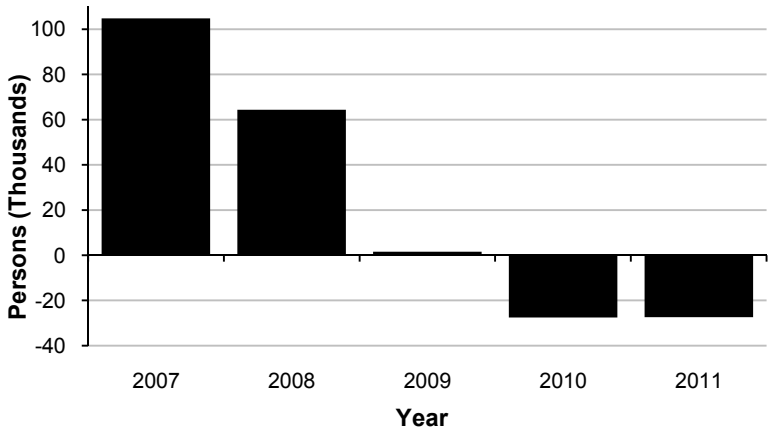
In addition to migration assumptions M1, M2 and M3 a zero net migration scenario M0 has been included in Appendix 5. This allows a full assessment of the impact of migration to be made and consists of gross flows of 50,000 each way.

Previous projections

The previous assumptions on migration were set at a time of unprecedented economic growth in Ireland and reflected the high level of optimism that existed at that time, not only in Ireland but right across the global economy. Under the most positive assumption, M1, net migration was set at plus 60,000 for the first 5 years, giving a gross inflow of 300,000 over the period, while M2 had a gross five-year inflow of 250,000.

In actual fact the period 2007-2011 is now best seen as two sub-periods, with very high inflows for the first two years followed by the sharp economic downturn and a return to net outward migration in the years 2009-2011. Combined, the net flow over the 5 years was plus 116,000 - considerably less than either the M1 or M2 assumptions allowed. Accordingly, the migration assumptions presented here are a sharp downward revision in projected migration up to 2021, though consistent in the longer term with the assumptions made previously.

Figure 6 Net Migration, 2007-2011



Labour Force

Methodology

Projected labour force estimates are calculated by applying average labour force participation rates to the different projected population cohorts. The labour force is comprised of persons who are either employed or unemployed and the definition used in this analysis is that prescribed by the International Labour Organisation (ILO) and used in the Quarterly National Household Survey (QNHS). As the labour force projections are restricted to the period up to and including 2026, fertility does not impact in any way on the size of this population sub-group and accordingly only the migration variants are relevant when examining labour force projections.

Participation rates are applied to the relevant sub-populations of five-year age groups for men and women. The age groups 15-19 and 20-24 are further split between those in the education system and those outside, while women aged 25 years and over are classified by marital status (i.e. married and single) with separate participation rates applied to both groups. While it might appear preferable to distinguish women on the basis of those with and without dependent children it was decided to continue to use marital status as an alternative while recognising that the single category contains a growing number of lone parents and partners in cohabiting couples.

Marriage rate assumptions

The projected female population aged 25 years and over is first divided into two categories – married and single. Table H shows the percentage of females who were married in each age group as measured by the 2002, 2006 and 2011 Censuses of Population along with the rates assumed for 2016, 2021 and 2026.

Table H Females married classified by age group (%), 2002 to 2026

Age group	Actual			Assumed		
	2002	2006	2011	2016	2021	2026
25-29 years	26.8	23.7	23.5	21.0	20.0	20.0
30-34 "	60.6	55.0	51.1	52.0	50.0	50.0
35-39 "	78.4	73.4	68.5	71.0	70.0	70.0
40-44 "	85.4	82.2	77.8	78.0	76.0	76.0
45-49 "	88.2	86.3	83.5	84.0	83.0	83.0
50-54 "	90.0	88.6	87.0	88.0	88.0	88.0
55-59 "	90.6	89.9	88.8	90.0	89.0	89.0
60-64 "	89.9	90.2	90.2	90.0	89.0	89.0
65 and over	84.6	85.4	87.5	87.0	87.0	87.0

The table shows declining rates of marriage up to 2011 for all age groups with the exception of those aged 65 and over. This downward trend is projected to continue for those aged 25-29 and 30-34, while rates for the 35-39 are projected to recover somewhat. For females aged 50 and over the proportions are assumed to remain about the same.

Participation in education

While only 77 per cent of 15-19 year males were in education in 2006, this had increased to 88 per cent by 2011. The older age group of 20-24 year olds showed a similar rise from 22 per cent to 33 per cent. The corresponding rates for younger females showed a smaller rise of just 2 percentage points. Projecting these rates forward, the 2011 high rates of male participation in education are assumed to fall back slightly to 82 per cent by 2021 whereas female rates are assumed to remain constant in line with a greater participation in third level education among females generally. The data is presented in table I.

Table I Education participation rates, 2002 to 2026 (%)

	Actual			Assumed		
	2002	2006	2011	2016	2021	2026
Males						
15-19 years	77	77	88	85	82	82
20-24 "	26	22	33	30	28	28
Females						
15-19 years	86	87	89	89	89	89
20-24 "	31	31	33	33	33	33

Labour force participation rate assumptions

The labour force participation of students is largely a reflection of the extent to which they are involved in part-time work while in full-time education. The rates for 15-19 year olds were 12 and 14 per cent for males and females respectively in 2006 but by 2011 these had fallen back to 9 and 10 per cent respectively. These rates are projected to recover slightly by 2016 and remain constant at this new lower rate until 2026. The rates for 20-24 year olds are projected to improve slightly for males and reduce slightly for females.

The participation rates of non-students aged 15-24 fell dramatically between 2006 and 2011 from 91 to 72 per cent for males and from 81 to 66 for females. The rate for males is projected to slowly recover over the next 15 years to 90 per cent for males and 85 per cent for females. The data is presented in Table J.

Table J Labour Force participation rates, 2002 to 2026 (%)

Category and sex	Age group	Actual			Assumed		
		2002	2006	2011	2016	2021	2026
Students							
Males							
	15-19 years	11	12	9	10	10	10
	20-24 "	22	28	28	30	30	30
Females							
	15-19 "	13	14	10	12	12	12
	20-24 "	20	30	34	32	32	32
Non-students							
Males							
	15-19 years	91	91	72	80	85	90
	20-24 "	95	95	88	90	95	95
Females							
	15-19 "	80	81	66	75	80	85
	20-24 "	86	86	80	80	85	85

For other males, labour force participation rates fell after 2008 though not as dramatically as those for the younger age groups. Those aged between 25-44 years generally saw a fall of about 2 percentage points. While rates are assumed to recover to their 2006 levels over the lifetime of the projections it is assumed there is little scope for further improvement. Rates for older males are assumed to increase somewhat – particularly for those aged 60 and over, reflecting a greater propensity to remain in the labour force among older people.

It is assumed the major gains in the labour force participation rates of married females in the recent past will level off and accordingly the scope for additional gains is considered somewhat limited - apart from the youngest group of 25-29 year olds. For single females the fall in rates seen in 2011 is considered temporary and a recovery in labour force participation is projected across all age groups.

The actual labour force participation rates for 2002, 2006 and 2011 as well as the assumed labour force participation rates for 2016, 2021 and 2026 are given in Table A5 of Appendix 5 for males, married females and other females, respectively.

Males:
- LFPR of males to recover to 2006 rates
- Increases in LFPR of males aged 60 and over reflecting a greater propensity to remain in the labour force, particularly those aged 60+

Married females:
- Softening of recent gains in LFPR of married females

Other females:
- Recovery in LFPR of other females by 2016 and minor gains thereafter

Summary of Assumptions

Fertility

- **F1:** TFR to remain at the 2010 level of 2.1 for the lifetime of the projections
- **F2:** TFR to decrease to 1.8 by 2026 and to remain constant thereafter

Mortality

Mortality rates are assumed to decrease which will result in gains in life expectancy at birth from:

- 77.9 years in 2010 to 85.1 years in 2046 for males
- 82.7 years in 2010 to 88.5 years in 2046 for females

Migration

M1: Net migration returning to positive by 2016 and rising steadily thereafter to plus 30,000 by 2021

- -19,100 annual average per annum in 2011/2016
- +18,200 annual average per annum in 2016/2021
- +30,000 per annum in 2021/2026
- +30,000 per annum in 2026/2046

M2: Net migration returning to positive by 2018 and rising slowly thereafter to plus 10,000 by 2021

- -21,600 annual average per annum in 2011/2016
- +4,700 annual average per annum in 2016/2021
- +10,000 per annum in 2021/2026
- +10,000 per annum in 2026/2046

M3: Net migration remaining negative for the whole period

- -25,100 annual average per annum in 2011/2016
- -10,000 annual average per annum in 2016/2021
- -5,000 per annum in 2021/2026
- -5,000 per annum in 2026/2046

Labour force

Males:

- LFPR of males to recover to 2006 rates
- Increases in LFPR of males aged 60 an over reflecting a greater propensity to remain in the labour force, particularly those aged 60+

Married females:

- Softening of recent gains in LFPR of married females

Other females:

- Recovery in LFPR of other females by 2016 and minor gains thereafter

RESULTS

Introduction

Different sub-periods

These projections cover the period 2016-2046. Two distinct time periods are distinguished in the presentation of the results, namely: the periods 2016-2026 and 2026-2046, respectively. Six population variants are given for both periods, namely M1F1, M1F2, M2F1, M2F2, M3F1 and M3F2, along with two sets of tables for the M0 assumption (M0F1, M0F2) provided in Appendix 5. A single mortality assumption underlies all these projections. In addition three labour force projections are presented for the period 2016-2026; fertility rates do not have any direct impact on the level of the workforce over such a relatively short period of time.

The results are set out in Tables 1 to 10 following this commentary.

- Tables 1 to 6 give the projected population classified by five-year age group and sex at five-year intervals from 2011 to 2046.
- The projected numbers of births, deaths and net migration under the six combinations of assumptions are set out for five-year periods from 2011 to 2046 in Table 7. This table also contains comparable historical inter-censal data from 1926 onwards in order to facilitate comparisons with past trends.
- In Tables 8, 9 and 10 the projected labour force is classified by five-year age group, sex and female marital status for the years 2016, 2021 and 2026.
- Appendix 5 contains a complete set of tables for the M0 assumption.

The period 2016 to 2026

Total projected population

The usually resident population according to Census 2011 was 4.57 million. Table K summarises the total projected population arising under the six combinations of fertility and migration.

Table K Projected population, 2016 to 2026

Year	High Fertility (F1)			Low Fertility (F2)		
	M1	M2	M3	M1	M2	M3
	Thousands					
2016	4,704	4,691	4,674	4,699	4,686	4,669
2021	4,987	4,901	4,803	4,961	4,875	4,778
2026	5,309	5,103	4,910	5,245	5,042	4,852

Under the highest variant (M1F1) the population is projected to grow by 734,000 between 2011 and 2026 - an average annual rate of population increase of 1.0 per cent, which compares with 1.6 per cent observed during the most recent inter-censal period of 2006-2011. Under the lowest variant of negative net migration and low fertility (M3F2) overall population growth is projected to increase to 277,000 over the fifteen year period to 2026 – equivalent to 0.4 per cent annual average increase.

.. migration the key factor..

The difference between the highest migration and fertility assumption (M1F1) and the lowest (M3F2) is 457,000. Between 393,000 and 399,000 of this increase can be attributed to migration, depending on which fertility assumption is used, while only between 58,000 to 64,000 can be attributed to fertility - depending on which migration assumption is used. This clearly shows the impact which migration has on projected population growth. Looking at the gap between the high and medium migration assumptions (M1 and M2), there is a difference of between 203,000 and 206,000 (keeping fertility steady) while the difference between the two fertility assumptions (keeping migration constant) is between 61,000 and 64,000.

Table L shows the population by broad age group under the various combinations of assumptions for five-year intervals from 2016 to 2026. It also distinguishes the derived young and old dependency ratios as well as the population of school-going age. Births are presented in Table 7 on page 44.

Births up...then down

Following falls in the 1990s, the number of births in Ireland is again at record highs, with numbers exceeding 74,000 every year since 2008. Ireland had the highest fertility rates in Europe in 2011. However, projected births are dependent not only on fertility rates but also on the number of women of child-bearing age – particularly those in their 30s (the peak child bearing years). Under all assumptions, annual average births are projected to remain above 72,000 for the first five years before starting to fall back (at varying rates depending on the assumption used) between 2016 and 2026. This slowing in the rise in the overall number of births up to 2026 (which picks up again ten years later) is a consequence of lower projected number of women of child bearing years around this time and is a result of lower births thirty years previously (in the early 1990s).

Table L Population projections, 2016 - 2026

Scenario	Population of school going age		Population				Annual Average % change in total population in 5-year period	Dependancy ratios		
	"Primary" 5-12	"Secondary" 13-18	0-14	15-64	65+	Total		Young	Old	Total
	Thousands							Percentage		
Actual										
2011	502.3	342.4	976.7	3,066.6	531.6	4,574.9	0.0	31.9	17.3	49.2
M1F1										
2016	556.5	368.6	1,052.4	3027.1	624.5	4,704.1	0.56	34.8	20.6	55.4
2021	602.6	405.4	1,089.8	3162.9	734.2	4,986.8	1.17	34.5	23.2	57.7
2026	583.2	459.2	1,076.7	3371.5	860.7	5,308.9	1.26	31.9	25.5	57.5
M1F2										
2016	556.5	368.6	1,047.8	3027.1	624.5	4,699.4	0.54	34.6	20.6	55.2
2021	597.9	405.4	1,063.5	3162.9	734.2	4,960.6	1.09	33.6	23.2	56.8
2026	556.9	459.2	1,012.7	3371.5	860.7	5,244.9	1.12	30.0	25.5	55.6
M2F1										
2016	555.9	368.0	1,051.3	3015.7	624.2	4,691.2	0.50	34.9	20.7	55.6
2021	599.1	402.5	1,079.0	3090.2	731.9	4,901.0	0.88	34.9	23.7	58.6
2026	571.2	453.6	1,041.0	3207.5	854.9	5,103.3	0.81	32.5	26.7	59.1
M2F2										
2016	555.9	368.0	1,046.6	3015.7	624.2	4,686.5	0.48	34.7	20.7	55.4
2021	594.5	402.5	1,053.1	3090.2	731.9	4,875.1	0.79	34.1	23.7	57.8
2026	545.3	453.6	979.8	3207.5	854.9	5,042.1	0.68	30.5	26.7	57.2
M3F1										
2016	555.0	367.2	1,049.4	3000.5	623.8	4,673.7	0.43	35.0	20.8	55.8
2021	594.8	399.5	1,065.3	3008.8	729.3	4,803.4	0.55	35.4	24.2	59.6
2026	557.5	448.2	1,003.2	3057.5	849.6	4,910.3	0.44	32.8	27.8	60.6
M3F2										
2016	555.0	367.2	1,044.7	3000.5	623.8	4,669.0	0.41	34.8	20.8	55.6
2021	590.1	399.5	1,039.9	3008.8	729.3	4,778.0	0.46	34.6	24.2	58.8
2026	532.1	448.2	945.0	3057.5	849.6	4,852.1	0.31	30.9	27.8	58.7

The young population

The number of persons aged 0-14 years reached a peak of 1,044,000 in 1981. The main reasons were the steady build up of births in the 1970s coupled with inward migration during the same period as complete families returned to Ireland. Following a steady fall in the number of children in this age group between 1981 and 2002 the numbers rose in 2006 to 865,000. The 2011 Census showed a further sharp rise in this group to 976,600 mainly as a result of the resurgence in the number of births since 2006.

Those aged 0-14 years in 2011 will have been completely replaced by the year 2026, either through natural increase (primarily births) or net migration. As proportionally more children immigrate into Ireland than emigrate, there is a persistent net inflow of children even during phases of net outward migration.

Under M1F1 the young population is projected to increase by 113,000 up to 2021 before falling back slightly in 2026. The total difference in the projected number of 0-14 year olds between M1F1 and M2F2 is 97,000 of which between 33,000 and 36,000 can be attributed to migration (depending on which fertility assumption is used) and between 61,000 and 64,000 can be attributed to fertility (depending on which migration assumption is used).

Large rise in primary school children

Data are presented separately for primary and secondary school children. Taking the "primary" school population as being broadly represented by those aged 5-12 years, the numbers in this category are projected to increase progressively under all combinations of assumptions in the period 2011-2021, before falling back in 2026. Under the most positive assumption of M1F1 primary school children will increase by 100,000 by 2021 which represents an annual average increase of 10,000 each year. Under the most negative scenario of net outward migration and falling fertility (M3F2) the projected increase up to 2021 is only 12,000 lower at 88,000.

The numbers of children of "secondary" school age (i.e. persons aged 13-18 years[6]) are projected to increase by between 106,000 and 117,000, depending on the assumption used, representing increases in the range 31 to 34 per cent. The largest increases will be seen between 2021 and 2026 as the projected crop of primary school children graduate to secondary level.

The population of working age

Fertility assumptions have no impact on the population aged 15-64 in the first 15 years up 2026 and so reference need only be made to different migration assumptions of M1, M2 and M3. With over 90 per cent of net migration estimated to affect the 15-64 age group, the difference between the three migration assumptions impacts strongly on this age group up to 2026.

The rapid growth in the population in this group between 1996 and 2006, with an annual average increase of 2.1 per cent, was followed by a less dramatic average increase over the 2006-2011 inter-censal period of 1.1 per cent per annum. Over this latter period net inward migration among this group was 91,000 and accounted for 57 per cent of the total increase of 161,000 in this group, with demographic shifts, and to a less extent natural change, accounting for the remainder.

Under the strongest migration assumption of M1 this population group is projected to increase by just under 305,000 between 2011 and 2026 with the majority of this increase in the later part of the period. Under M2 the increase over the same period will be less than half this (141,000) while under the scenario of net outward migration (M3) there is a projected fall in the population of working age of -9,000 over the period.

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[6] Users should note these figures reflect the actual number of persons in this age group and not the numbers enrolled in secondary schools as participation rates for those aged 16,17 and 18 can vary over time, and are not taken into account.

The Expert Group's assumptions concerning labour force participation rates translate these populations into their relevant labour force and non-labour force components. The results are given in Tables 8, 9 and 10.

Increasing labour force

Under migration assumption M1, which assumes net inward migration returning to positive by 2016 and increasing steadily to plus 30,000 per annum by 2021, the labour force is projected to increase by just under 300,000 over the 15 years, representing an annual average increase of 20,000; this can be divided into very slow early growth (negligible growth up to 2016), more steady growth of 26,000 per annum in the five years up to 2021 and stronger growth of 33,000 per annum for the final five years of the period. Overall, the projected annual average increase of 0.9 per cent per annum over the fifteen years is unevenly divided between the male and female components; the male component is projected to increase by 1 per cent and compares with slower growth of 0.7 per cent for females. This is as a consequence of assumed stronger recovery in male labour force participation rates (see table A5) than for females, whose rates fell less during the economic downturn.

Under the M2 scenario of migration reaching plus 10,000 per annum by 2021, the labour force is projected to increase at a slower average annual rate of 11,000 per annum, or 0.5 per cent, while under the negative migration assumption the labour force is projected to contract up to 2016 by 14,500 before growing slowly by 5,900 per annum over the following ten years, resulting in an annual average increase over the entire 15 years of just 0.1 per cent.

Table M compares labour force growth rates for the period 2002-2011 with those projected for 2011-2026. The projected average annual growth is less than that achieved during 2002 to 2011 for all scenarios. This is due to two main factors. First, the lower growth rate of the projected working age population will depress labour force growth rates. Secondly, the major gains of recent years in labour force participation rates among married females are assumed to moderate considerably.

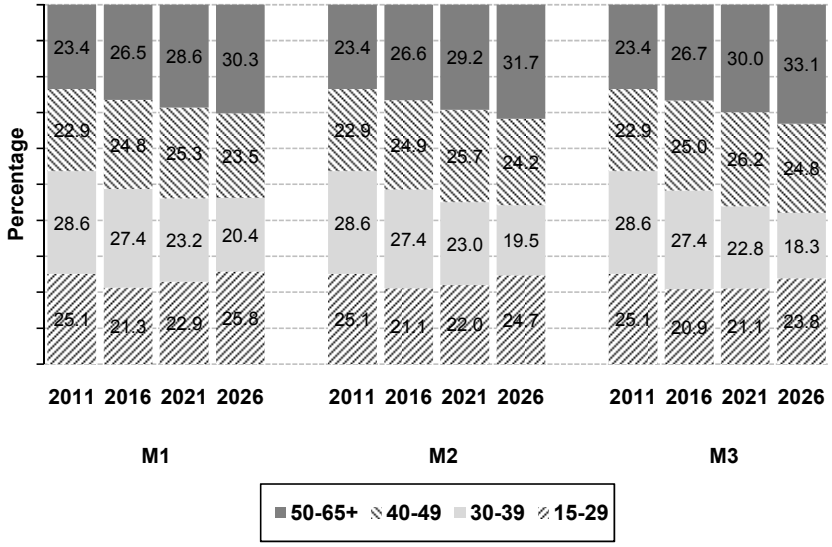
Table M Actual and projected average annual growth rates of the labour force (%)

Period	Males	Married females	Other females	Total Females	Persons
2002/2011	1.3	3.1	2.2	2.7	1.9
2011/2026 (M1)	1.0	0.8	0.6	0.7	0.9
2011/2026 (M2)	0.6	0.6	0.1	0.4	0.5
2011/2026 (M3)	0.2	0.3	-0.4	0.0	0.1

Increase in older people in labour force

From a demographic point of view, the total labour force can be divided into four age demographic groups – namely those aged 15-29, 30-39, 40-49 and 50 and over. In 2011 the youngest age group made up 25.1 per cent of the labour force under the M1 scenario but this share is projected to fall to 21.3 per cent by 2016, before recovering by 2026 to 25.8 per cent. The older age group is more interesting; in 2011 they made up 23.4 per cent of the labour force, but this is projected to slowly increase over the period to reach 30.3 per cent by 2026 through a combination of increased participation and demographic shifts. The increased importance of older people in the labour force is even more striking under M2 and M3.

Figure 7 Share of actual and projected labour force for persons aged 15 years and over by broad age groups, 2011-2026



Demographic effect dominates

By holding labour force participation rates constant at their 2011 level it is possible to apportion the overall projected increase in the labour force between its *demographic* and *participation rate* effects. Table N sets out the results under all three migration assumptions.

Table N Components of labour force change, 2011 to 2026

Scenario	Males	Females			Persons
		Married	Other	Total	
		Thousands			
M1					
Demographic	103.5	58.5	11.3	69.8	173.4
Participation rate	83.9	9.9	31.2	41.1	125.0
Total	187.4	68.4	42.5	110.9	298.4
M2					
Demographic	31.8	38.3	-24.0	14.3	46.2
Participation rate	80.5	9.9	29.5	39.4	120.0
Total	112.4	48.2	5.5	53.7	166.1
M3					
Demographic	-33.7	18.2	-55.2	-36.9	-70.6
Participation rate	77.6	10.0	27.9	37.9	115.5
Total	43.9	28.3	-27.3	1.0	44.9

Among males, increases in participation are a key component of projected labour force growth, particularly for migration assumptions M2 and M3. For married females increased participation is assumed to have levelled off and so demographic change is the more important, while for other females increased participation is also the dominant component of labour force growth for this demographic under M2 and M3.

The Period 2026 to 2046

Total projected population

The population projections for the years 2026, 2031, 2036, 2041 and 2046 classified by five-year age groups and sex are given in Tables 1 to 6. The more distant the projection period from the reference year of the base population the more unreliable the assumptions are likely to be. Therefore, the projections for the period beyond 2026 are of a more conjectural nature than those for the period up to and including 2026. However, they do convey a good indication of the likely changes in the population both in terms of structure and magnitude. Table O shows the projected population under all six scenarios.

Table O Projected population, 2026 to 2046

Year	High Fertility (F1)			Low Fertility (F2)		
	M1	M2	M3	M1	M2	M3
	Thousands					
2026	5,309	5,103	4,910	5,245	5,042	4,852
2031	5,637	5,293	4,992	5,522	5,187	4,894
2036	5,988	5,492	5,073	5,817	5,337	4,932
2041	6,358	5,701	5,159	6,122	5,491	4,971
2046	6,729	5,907	5,240	6,421	5,635	4,997

Under the strongest scenario - maintaining the total fertility at 2.1 over the entire period to 2046 coupled with net inward migration of 30,000 from 2021 onwards (M1F1) - the population is projected to grow by 2.2 million over the 35 years to 6.7 million. Under the more moderate migration assumption of plus 10,000 by 2021 coupled with falling fertility (M2F2), the population is projected to be 5.6 million, while under the most negative scenario (M3F2) the population would fail to increase above 5 million. The difference in population between the highest and lowest outcomes by 2046 is 1.7 million.

Table P (overleaf) contains the population classified by broad age groups, the derived young and old dependency ratios and the population of school-going and working age, under the various combinations of assumptions at five-year intervals from 2031 to 2046.

Young population

The young population post 2026 is effectively determined by births occurring after 2011. Average annual numbers of births will decline temporarily towards 2026 under all scenarios before recovering again in the following years rising to an annual average of 77,000 by 2046 under M1F1 and 56,000 under M3F2.

The effect of these trends on the young population can be seen in Table P. Under all assumptions the population aged 0-14 years, having peaked in 2021 and fallen marginally over the following 10 years up to 2031, is projected to rise again by 2036. Under M1F1 it is projected to reach 1,339,000 by 2046 resulting in an increase of 362,000 over the 2011 equivalent figure. Under the falling fertility scenario of F2, the rise would be less than half this, increasing by 168,000 to 1,144,700. Under the most negative assumption migration and falling fertility (M3F2) the young population would fall over the 35 year period by 146,000 to 831,000.
.

Table P Population projections, 2031 - 2046

Scenario	Population of school going age		Population				Annual average % change in total population in 5-year period	Dependency ratios		
	"Primary" 5-12	"Secondary" 13-18	0-14	15-64	65+	Total		Young	Old	Total
	Thousands							Percentage		
Actual										
2011	502.3	342.4	976.7	3,066.6	531.6	4,574.9	0.0	31.9	17.3	49.2
M1F1										
2031	560.9	459.5	1,067.1	3,568.7	1,000.9	5,636.7	4.3	29.9	28.0	57.9
2036	580.6	433.6	1,124.0	3,718.0	1,146.2	5,988.1	1.2	30.2	30.8	61.1
2041	641.0	433.7	1,229.6	3,830.0	1,298.0	6,357.6	1.2	32.1	33.9	66.0
2046	708.8	469.7	1,338.6	3,939.8	1,451.0	6,729.3	1.1	34.0	36.8	70.8
M1F2										
2031	508.2	448.1	957.3	3,564.0	1,000.9	5,522.2	3.8	26.9	28.1	54.9
2036	505.5	401.9	978.9	3,691.7	1,146.2	5,816.7	1.0	26.5	31.0	57.6
2041	553.1	382.7	1,057.8	3,766.1	1,298.0	6,121.8	1.0	28.1	34.5	62.6
2046	609.3	407.1	1,144.7	3,825.5	1,451.0	6,421.2	1.0	29.9	37.9	67.9
M2F1										
2031	528.4	449.9	990.3	3,312.2	991.0	5,293.4	3.0	29.9	29.9	59.8
2036	519.2	412.7	997.3	3,364.0	1,131.1	5,492.5	0.7	29.6	33.6	63.3
2041	552.6	392.3	1,058.8	3,366.1	1,276.3	5,701.2	0.7	31.5	37.9	69.4
2046	602.0	406.4	1,136.3	3,351.7	1,419.3	5,907.3	0.7	33.9	42.3	76.2
M2F2										
2031	478.5	438.6	889.0	3,307.5	991.0	5,187.4	2.5	26.9	30.0	56.8
2036	451.6	382.0	868.1	3,338.2	1,131.1	5,337.4	0.6	26.0	33.9	59.9
2041	476.3	345.4	909.8	3,305.0	1,276.3	5,491.0	0.6	27.5	38.6	66.1
2046	516.7	351.4	969.9	3,246.0	1,419.3	5,635.2	0.5	29.9	43.7	73.6
M3F1										0.0
2031	495.0	440.5	916.7	3,092.6	982.4	4,991.7	1.8	29.6	31.8	61.4
2036	463.0	391.1	885.8	3,068.7	1,118.4	5,072.8	0.3	28.9	36.4	65.3
2041	478.3	353.4	917.8	2,983.5	1,257.9	5,159.1	0.3	30.8	42.2	72.9
2046	516.9	351.8	975.3	2,872.2	1,392.2	5,239.6	0.3	34.0	48.5	82.4
M3F2										
2031	448.0	429.2	823.4	3,087.9	982.4	4,893.7	1.4	26.7	31.8	58.5
2036	402.3	361.6	770.5	3,043.4	1,118.4	4,932.3	0.2	25.3	36.7	62.1
2041	411.7	310.5	787.5	2,925.3	1,257.9	4,970.8	0.2	26.9	43.0	69.9
2046	442.9	303.5	830.8	2,774.4	1,392.2	4,997.4	0.1	29.9	50.2	80.1

The older population

The older population (i.e. those aged 65 years and over) is projected to increase very significantly from its 2011 level of 532,000 to over 1.4 million by 2046 under the two positive migration assumptions and to just under 1.4 million under the negative migration scenario. The very old population (i.e. those aged 80 years of age and over) is set to rise even more dramatically, increasing from 128,000 in 2011 to between 484,000 and 470,000 in 2046 depending on the scenario chosen (see Tables 1-6).

The average annual number of deaths is projected to increase steadily from the 2011 figure of 29,000 to an annual average of 48,000 in the period 2041-2046. For the same period, the natural increase in the population (i.e. the excess of births over deaths) is projected to return to 2006-2011 levels of 44,000 under M1F1 but to fall under all other assumptions; under the most pessimistic scenario (M3F2) the natural increase, though still projected to be positive, will fall to just 10,000 per annum in the period 2041-2046.

The young population (976,600) was considerably higher than the old population (531,600) in 2011 but this will reverse by 2031 (2036 in the case of M1F1). It is projected that there will be more older persons than younger persons under all scenarios by 2036. The excess will widen further by 2046 at which stage it is projected that there will be between 112,000 and 561,000 more older people than younger people depending on the scenario used.

Population structure

The changing population structure is best illustrated by comparing the breakdown of the population by five-year age groups and sex in 2011 and 2046 as depicted by their respective population pyramids. Figures 8 and 9 contain the relevant population pyramids for 2011 and 2046, for M1F1 and M3F2, respectively – the two extremes of the projections. Both graphs illustrate the major expansion projected to take place in the number of persons aged 50 years and over. In the M1F1 scenario all age groups are projected to increase – the result of steady net inward migration and the maintenance of a fertility rate at replacement level of 2.1. Under M3F2 the projected decline in fertility to 1.8 children per woman coupled with negative migration shows a shrinking population in all age groups apart from the over 60s.

Figure 8 Population pyramids for 2011 and 2046 (M1F1)

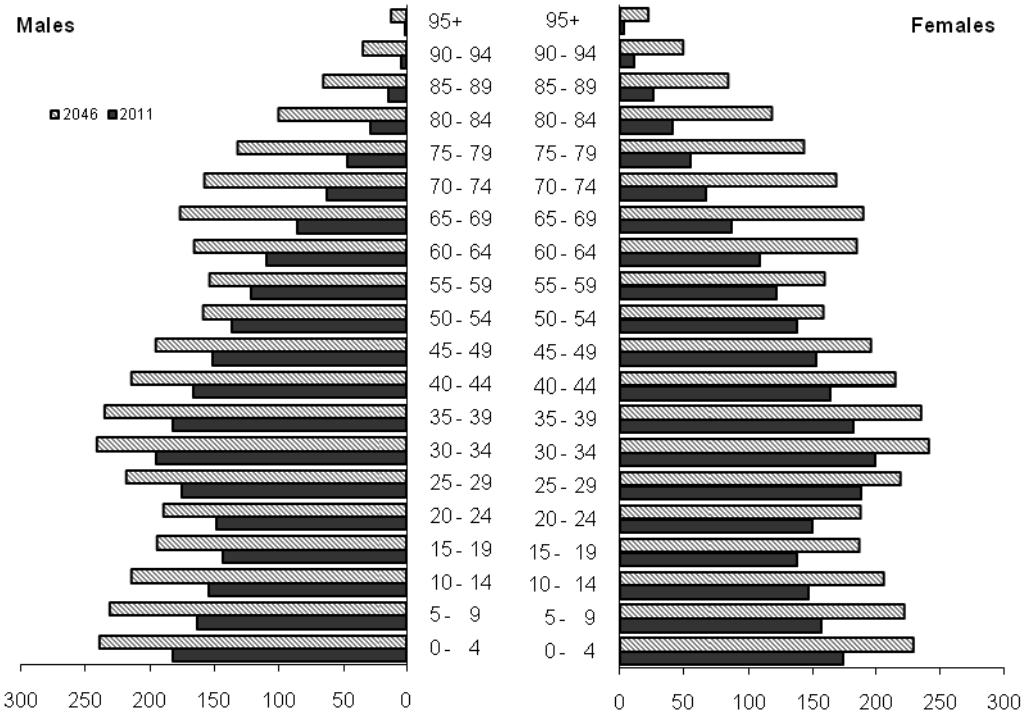
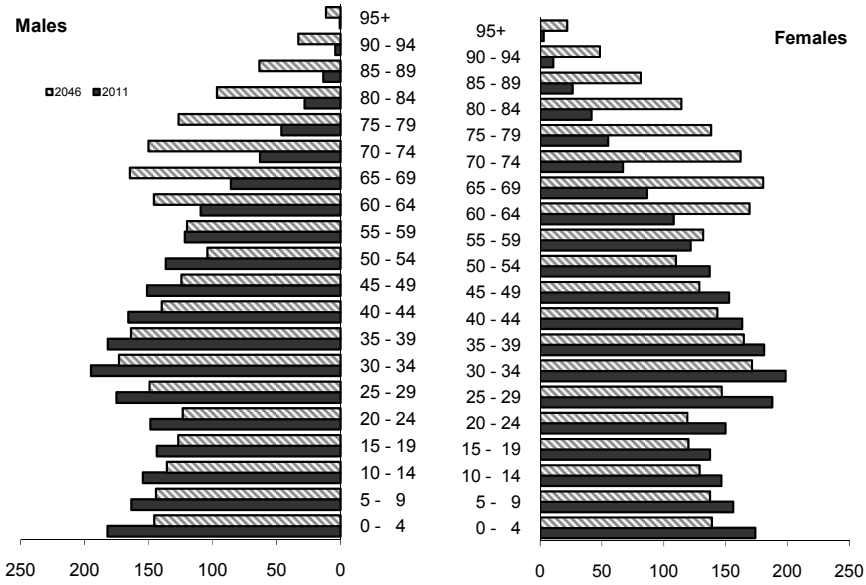


Figure 9 Population pyramids for 2011 and 2046 (M3F2)



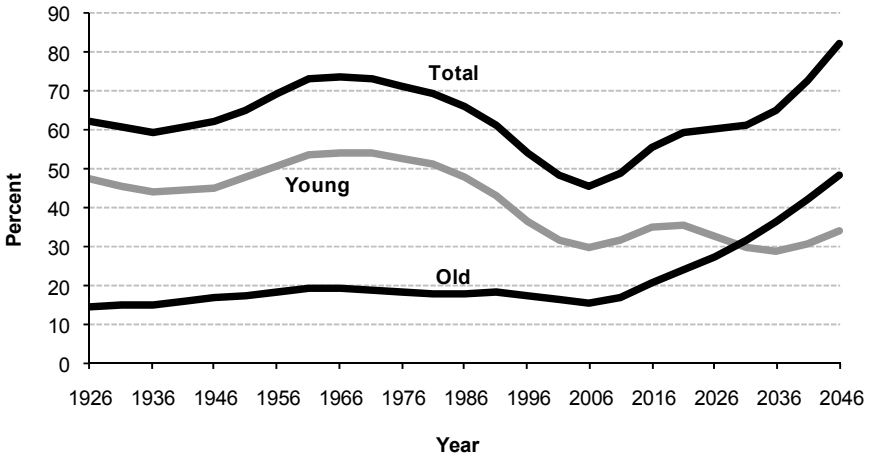
Dependency ratios

Dependency ratios are presented in Table P for the young, the old and total population.

The young dependency ratio is projected to rise in the early part of the projections period up to 2021 before falling back in the mid part of the period to 2036, but rising again thereafter under all assumptions, (M1F1 is the exception where it starts increasing from 2031 as opposed to 2036). The old dependency ratio is projected to increase steadily from 2011 onwards, rising by about 3 points every five years with the increase even more dramatic under M2 and M3 between 2036 and 2046. By 2046 the old dependency ratio will be more than double that of 2011 under all combinations of assumptions; under the most negative scenarios of negative migration it is projected to reach 48.5 and 50.2 per cent depending on the associated fertility assumption.

The two ratios combined give the total dependency ratio. Having fallen steadily between 1966 and 2006 it has risen over the most recent inter-censal period to reach just under 50 per cent (49.2). It is projected to continue to rise under all scenarios to reach values of between 71 per cent (M1F2) and 82.4 per cent (M3F1) by 2046. A representative picture is given in Figure 10, which contains the young, old and total dependency ratios for the period 1926-2011 and the projected rates up to 2046 under the M3F1 scenario.

Figure 10 Actual and projected (M3F1) dependency ratios



TABLES

Table 1 Actual and projected population classified by sex and age group, 2011 - 2046 (M1F1)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	369.2	344.9	336.7	358.3	401.8	442.3	467.2
5 - 9 "	319.6	360.9	378.0	355.0	346.9	368.4	411.9	452.5
10 - 14 "	301.0	322.3	366.9	385.0	362.0	353.9	375.4	418.9
15 - 19 "	281.0	296.0	325.0	371.0	389.2	366.1	358.1	379.6
20 - 24 "	298.6	241.2	301.2	342.8	388.7	406.9	383.9	375.9
25 - 29 "	362.9	284.1	276.8	353.6	395.1	441.1	459.3	436.4
30 - 34 "	393.4	344.8	295.6	298.3	375.0	416.5	462.4	480.7
35 - 39 "	363.1	376.8	346.2	303.3	306.1	382.6	424.1	470.0
40 - 44 "	329.3	353.8	377.2	350.2	307.6	310.4	386.8	428.3
45 - 49 "	304.1	325.7	355.0	380.2	353.5	311.3	314.2	390.4
50 - 54 "	273.7	301.1	325.8	356.1	381.4	355.1	313.4	316.5
55 - 59 "	243.4	268.0	297.8	323.4	353.7	379.2	353.5	312.5
60 - 64 "	217.1	235.4	262.2	292.7	318.4	348.7	374.2	349.4
65 - 69 "	172.1	205.8	226.4	253.9	284.2	309.9	340.0	365.7
70 - 74 "	130.1	157.8	192.3	213.6	240.9	270.8	296.3	326.1
75 - 79 "	101.4	112.3	139.9	172.9	194.1	220.6	249.6	274.7
80 - 84 "	69.8	78.7	90.4	115.6	145.2	165.4	190.3	217.6
85 years and over	58.2	69.9	85.2	104.6	136.6	179.5	221.8	266.9
Total	4,574.9	4,704.1	4,986.8	5,308.9	5,636.7	5,988.1	6,357.6	6,729.3
Males								
0 - 4 years	182.0	189.0	176.5	172.3	183.4	205.6	226.4	239.1
5 - 9 "	163.5	184.7	193.6	181.7	177.5	188.5	210.8	231.6
10 - 14 "	154.5	165.0	187.7	197.1	185.2	181.0	192.1	214.3
15 - 19 "	143.7	152.2	166.5	189.9	199.3	187.4	183.3	194.3
20 - 24 "	148.6	122.0	152.2	172.6	196.0	205.4	193.5	189.4
25 - 29 "	175.1	140.0	138.4	176.8	197.2	220.6	230.0	218.2
30 - 34 "	194.9	164.3	145.6	149.5	187.9	208.3	231.6	241.1
35 - 39 "	181.9	184.6	164.6	149.6	153.6	191.9	212.3	235.6
40 - 44 "	165.9	175.7	184.5	166.7	151.9	155.9	194.1	214.4
45 - 49 "	151.3	163.2	175.9	185.7	168.2	153.6	157.7	195.7
50 - 54 "	136.7	149.5	163.2	176.5	186.5	169.3	154.9	159.0
55 - 59 "	121.8	133.2	147.5	161.8	175.2	185.2	168.4	154.3
60 - 64 "	109.2	116.7	129.4	144.2	158.5	171.9	182.0	165.7
65 - 69 "	85.6	102.0	111.0	124.1	138.8	153.1	166.4	176.7
70 - 74 "	62.9	76.8	93.6	103.2	116.3	130.7	144.8	158.1
75 - 79 "	46.3	52.5	66.3	82.3	91.9	104.5	118.4	132.2
80 - 84 "	28.3	33.8	40.1	52.5	66.6	75.7	87.4	100.4
85 years and over	18.4	23.2	30.7	40.1	54.9	74.1	92.2	111.6
Total	2,270.5	2,328.4	2,467.4	2,626.8	2,788.7	2,962.6	3,146.2	3,331.7
Females								
0 - 4 years	174.1	180.2	168.4	164.4	174.9	196.1	216.0	228.1
5 - 9 "	156.2	176.2	184.5	173.3	169.4	179.9	201.1	220.9
10 - 14 "	146.6	157.3	179.1	187.9	176.8	172.8	183.3	204.5
15 - 19 "	137.4	143.8	158.5	181.1	189.8	178.7	174.8	185.3
20 - 24 "	149.9	119.2	149.0	170.2	192.7	201.5	190.4	186.5
25 - 29 "	187.8	144.2	138.5	176.8	198.0	220.5	229.3	218.2
30 - 34 "	198.5	180.5	150.0	148.8	187.1	208.2	230.8	239.6
35 - 39 "	181.2	192.2	181.5	153.7	152.4	190.7	211.8	234.4
40 - 44 "	163.4	178.1	192.8	183.4	155.7	154.5	192.8	213.9
45 - 49 "	152.9	162.5	179.1	194.5	185.3	157.7	156.6	194.7
50 - 54 "	137.1	151.6	162.6	179.5	194.9	185.9	158.6	157.5
55 - 59 "	121.6	134.8	150.3	161.7	178.6	194.0	185.2	158.2
60 - 64 "	107.9	118.7	132.8	148.6	160.0	176.8	192.2	183.7
65 - 69 "	86.5	103.8	115.4	129.7	145.4	156.8	173.6	189.0
70 - 74 "	67.2	81.0	98.6	110.4	124.6	140.1	151.5	168.1
75 - 79 "	55.0	59.8	73.7	90.6	102.2	116.0	131.1	142.5
80 - 84 "	41.5	44.9	50.2	63.1	78.6	89.7	102.8	117.2
85 years and over	39.8	46.7	54.6	64.5	81.7	105.4	129.6	155.3
Total	2,304.4	2,375.6	2,519.5	2,682.1	2,848.0	3,025.5	3,211.5	3,397.6

Table 2 Actual and projected population classified by sex and age group, 2011 - 2046 (M1F2)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	364.5	323.3	299.0	307.9	344.8	377.9	394.8
5 - 9 "	319.6	360.9	373.4	333.4	309.1	318.0	354.9	388.0
10 - 14 "	301.0	322.3	366.9	380.3	340.4	316.1	325.0	361.9
15 - 19 "	281.0	296.0	325.0	371.0	384.5	344.6	320.3	329.2
20 - 24 "	298.6	241.2	301.2	342.8	388.7	402.2	362.4	338.2
25 - 29 "	362.9	284.1	276.8	353.6	395.1	441.1	454.6	414.9
30 - 34 "	393.4	344.8	295.6	298.3	375.0	416.5	462.4	476.0
35 - 39 "	363.1	376.8	346.2	303.3	306.1	382.6	424.1	470.0
40 - 44 "	329.3	353.8	377.2	350.2	307.6	310.4	386.8	428.3
45 - 49 "	304.1	325.7	355.0	380.2	353.5	311.3	314.2	390.4
50 - 54 "	273.7	301.1	325.8	356.1	381.4	355.1	313.4	316.5
55 - 59 "	243.4	268.0	297.8	323.4	353.7	379.2	353.5	312.5
60 - 64 "	217.1	235.4	262.2	292.7	318.4	348.7	374.2	349.4
65 - 69 "	172.1	205.8	226.4	253.9	284.2	309.9	340.0	365.7
70 - 74 "	130.1	157.8	192.3	213.6	240.9	270.8	296.3	326.1
75 - 79 "	101.4	112.3	139.9	172.9	194.1	220.6	249.6	274.7
80 - 84 "	69.8	78.7	90.4	115.6	145.2	165.4	190.3	217.6
85 years and over	58.2	69.9	85.2	104.6	136.6	179.5	221.8	266.9
Total	4,574.9	4,699.4	4,960.6	5,244.9	5,522.2	5,816.7	6,121.8	6,421.2
Males								
0 - 4 years	182.0	186.6	165.4	153.0	157.5	176.4	193.4	202.0
5 - 9 "	163.5	184.7	191.2	170.6	158.2	162.7	181.6	198.6
10 - 14 "	154.5	165.0	187.7	194.7	174.1	161.7	166.3	185.2
15 - 19 "	143.7	152.2	166.5	189.9	196.9	176.4	164.0	168.6
20 - 24 "	148.6	122.0	152.2	172.6	196.0	203.0	182.5	170.2
25 - 29 "	175.1	140.0	138.4	176.8	197.2	220.6	227.6	207.2
30 - 34 "	194.9	164.3	145.6	149.5	187.9	208.3	231.6	238.7
35 - 39 "	181.9	184.6	164.6	149.6	153.6	191.9	212.3	235.6
40 - 44 "	165.9	175.7	184.5	166.7	151.9	155.9	194.1	214.4
45 - 49 "	151.3	163.2	175.9	185.7	168.2	153.6	157.7	195.7
50 - 54 "	136.7	149.5	163.2	176.5	186.5	169.3	154.9	159.0
55 - 59 "	121.8	133.2	147.5	161.8	175.2	185.2	168.4	154.3
60 - 64 "	109.2	116.7	129.4	144.2	158.5	171.9	182.0	165.7
65 - 69 "	85.6	102.0	111.0	124.1	138.8	153.1	166.4	176.7
70 - 74 "	62.9	76.8	93.6	103.2	116.3	130.7	144.8	158.1
75 - 79 "	46.3	52.5	66.3	82.3	91.9	104.5	118.4	132.2
80 - 84 "	28.3	33.8	40.1	52.5	66.6	75.7	87.4	100.4
85 years and over	18.4	23.2	30.7	40.1	54.9	74.1	92.2	111.6
Total	2,270.5	2,326.0	2,453.9	2,594.0	2,730.1	2,874.9	3,025.5	3,174.0
Females								
0 - 4 years	174.1	177.9	157.8	146.0	150.3	168.3	184.5	192.7
5 - 9 "	156.2	176.2	182.2	162.8	150.9	155.3	173.3	189.4
10 - 14 "	146.6	157.3	179.1	185.6	166.2	154.4	158.7	176.7
15 - 19 "	137.4	143.8	158.5	181.1	187.6	168.2	156.3	160.7
20 - 24 "	149.9	119.2	149.0	170.2	192.7	199.2	179.9	168.0
25 - 29 "	187.8	144.2	138.5	176.8	198.0	220.5	227.0	207.7
30 - 34 "	198.5	180.5	150.0	148.8	187.1	208.2	230.8	237.3
35 - 39 "	181.2	192.2	181.5	153.7	152.4	190.7	211.8	234.4
40 - 44 "	163.4	178.1	192.8	183.4	155.7	154.5	192.8	213.9
45 - 49 "	152.9	162.5	179.1	194.5	185.3	157.7	156.6	194.7
50 - 54 "	137.1	151.6	162.6	179.5	194.9	185.9	158.6	157.5
55 - 59 "	121.6	134.8	150.3	161.7	178.6	194.0	185.2	158.2
60 - 64 "	107.9	118.7	132.8	148.6	160.0	176.8	192.2	183.7
65 - 69 "	86.5	103.8	115.4	129.7	145.4	156.8	173.6	189.0
70 - 74 "	67.2	81.0	98.6	110.4	124.6	140.1	151.5	168.1
75 - 79 "	55.0	59.8	73.7	90.6	102.2	116.0	131.1	142.5
80 - 84 "	41.5	44.9	50.2	63.1	78.6	89.7	102.8	117.2
85 years and over	39.8	46.7	54.6	64.5	81.7	105.4	129.6	155.3
Total	2,304.4	2,373.4	2,506.7	2,650.9	2,792.1	2,941.8	3,096.3	3,247.2

Table 3 Actual and projected population classified by sex and age group, 2011 - 2046 (M2F1)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	368.7	338.2	314.7	317.4	345.2	376.2	394.9
5 - 9 "	319.6	360.6	375.7	345.7	322.2	325.0	352.8	383.7
10 - 14 "	301.0	322.0	365.1	380.6	350.7	327.1	329.9	357.7
15 - 19 "	281.0	295.2	321.2	364.8	380.4	350.5	327.0	329.8
20 - 24 "	298.6	237.6	283.7	315.5	359.1	374.6	344.8	321.4
25 - 29 "	362.9	281.1	255.3	309.0	340.7	384.3	399.9	370.2
30 - 34 "	393.4	343.2	282.6	261.5	315.1	346.9	390.4	406.0
35 - 39 "	363.1	375.9	338.9	281.4	260.4	314.0	345.7	389.2
40 - 44 "	329.3	353.3	373.2	338.1	281.0	260.1	313.6	345.3
45 - 49 "	304.1	325.4	352.8	373.7	338.9	282.2	261.6	314.9
50 - 54 "	273.7	300.9	324.3	352.2	373.2	339.0	282.9	262.5
55 - 59 "	243.4	267.9	296.8	320.7	348.7	369.8	336.3	281.0
60 - 64 "	217.1	235.3	261.3	290.6	314.7	342.7	363.9	331.4
65 - 69 "	172.1	205.7	225.6	252.0	281.2	305.3	333.2	354.6
70 - 74 "	130.1	157.7	191.6	212.1	238.3	267.1	291.1	318.7
75 - 79 "	101.4	112.2	139.5	171.8	192.1	217.7	245.6	269.3
80 - 84 "	69.8	78.6	90.1	115.0	143.9	163.4	187.4	213.8
85 years and over	58.2	69.9	85.0	104.1	135.5	177.7	219.0	262.9
Total	4,574.9	4,691.2	4,901.0	5,103.3	5,293.4	5,492.5	5,701.2	5,907.3
Males								
0 - 4 years	182.0	188.8	173.1	161.1	162.5	176.7	192.6	202.1
5 - 9 "	163.5	184.5	192.4	177.0	165.0	166.4	180.7	196.5
10 - 14 "	154.5	164.9	186.9	195.0	179.6	167.6	169.0	183.2
15 - 19 "	143.7	151.8	164.7	186.9	195.0	179.7	167.7	169.1
20 - 24 "	148.6	120.3	143.9	159.6	181.8	190.0	174.7	162.7
25 - 29 "	175.1	138.4	127.7	155.0	170.7	192.9	201.1	185.9
30 - 34 "	194.9	163.4	138.5	130.4	157.7	173.4	195.6	203.8
35 - 39 "	181.9	184.1	160.4	137.4	129.3	156.6	172.3	194.4
40 - 44 "	165.9	175.5	182.0	159.6	136.7	128.8	156.0	171.6
45 - 49 "	151.3	163.0	174.7	181.8	159.6	137.0	129.2	156.3
50 - 54 "	136.7	149.3	162.4	174.3	181.6	159.7	137.4	129.7
55 - 59 "	121.8	133.1	146.9	160.2	172.2	179.6	158.2	136.3
60 - 64 "	109.2	116.7	128.9	142.9	156.3	168.4	175.9	155.2
65 - 69 "	85.6	101.9	110.6	123.1	137.1	150.4	162.5	170.2
70 - 74 "	62.9	76.7	93.3	102.3	114.8	128.6	141.8	153.8
75 - 79 "	46.3	52.4	66.0	81.6	90.8	102.9	116.2	129.1
80 - 84 "	28.3	33.8	40.0	52.2	65.9	74.6	85.9	98.3
85 years and over	18.4	23.2	30.6	39.9	54.4	73.2	90.8	109.6
Total	2,270.5	2,321.7	2,422.9	2,520.3	2,611.1	2,706.5	2,807.4	2,907.9
Females								
0 - 4 years	174.1	179.9	165.1	153.6	154.9	168.5	183.6	192.7
5 - 9 "	156.2	176.1	183.2	168.7	157.2	158.5	172.1	187.2
10 - 14 "	146.6	157.1	178.2	185.6	171.1	159.6	160.9	174.5
15 - 19 "	137.4	143.4	156.6	177.9	185.3	170.8	159.3	160.7
20 - 24 "	149.9	117.3	139.8	155.9	177.2	184.7	170.1	158.7
25 - 29 "	187.8	142.7	127.6	153.9	170.0	191.4	198.8	184.3
30 - 34 "	198.5	179.8	144.1	131.1	157.4	173.5	194.8	202.3
35 - 39 "	181.2	191.8	178.5	144.1	131.1	157.4	173.5	194.8
40 - 44 "	163.4	177.8	191.2	178.5	144.3	131.3	157.6	173.7
45 - 49 "	152.9	162.4	178.2	191.8	179.3	145.2	132.4	158.6
50 - 54 "	137.1	151.5	162.0	177.9	191.6	179.3	145.5	132.8
55 - 59 "	121.6	134.7	149.9	160.5	176.5	190.2	178.1	144.7
60 - 64 "	107.9	118.6	132.4	147.7	158.4	174.3	188.0	176.2
65 - 69 "	86.5	103.8	115.1	128.9	144.1	154.9	170.7	184.4
70 - 74 "	67.2	81.0	98.4	109.7	123.5	138.5	149.3	164.9
75 - 79 "	55.0	59.8	73.5	90.1	101.3	114.8	129.4	140.2
80 - 84 "	41.5	44.9	50.1	62.8	78.0	88.7	101.5	115.5
85 years and over	39.8	46.7	54.4	64.2	81.1	104.5	128.2	153.3
Total	2,304.4	2,369.4	2,478.1	2,583.0	2,682.3	2,785.9	2,893.8	2,999.4

Table 4 Actual and projected population classified by sex and age group, 2011 - 2046 (M2F2)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	364.0	317.0	279.3	272.6	296.1	321.0	332.7
5 - 9 "	319.6	360.6	371.0	324.5	286.9	280.2	303.7	328.5
10 - 14 "	301.0	322.0	365.1	375.9	329.5	291.8	285.2	308.6
15 - 19 "	281.0	295.2	321.2	364.8	375.7	329.3	291.7	285.1
20 - 24 "	298.6	237.6	283.7	315.5	359.1	370.0	323.7	286.2
25 - 29 "	362.9	281.1	255.3	309.0	340.7	384.3	395.2	349.0
30 - 34 "	393.4	343.2	282.6	261.5	315.1	346.9	390.4	401.4
35 - 39 "	363.1	375.9	338.9	281.4	260.4	314.0	345.7	389.2
40 - 44 "	329.3	353.3	373.2	338.1	281.0	260.1	313.6	345.3
45 - 49 "	304.1	325.4	352.8	373.7	338.9	282.2	261.6	314.9
50 - 54 "	273.7	300.9	324.3	352.2	373.2	339.0	282.9	262.5
55 - 59 "	243.4	267.9	296.8	320.7	348.7	369.8	336.3	281.0
60 - 64 "	217.1	235.3	261.3	290.6	314.7	342.7	363.9	331.4
65 - 69 "	172.1	205.7	225.6	252.0	281.2	305.3	333.2	354.6
70 - 74 "	130.1	157.7	191.6	212.1	238.3	267.1	291.1	318.7
75 - 79 "	101.4	112.2	139.5	171.8	192.1	217.7	245.6	269.3
80 - 84 "	69.8	78.6	90.1	115.0	143.9	163.4	187.4	213.8
85 years and over	58.2	69.9	85.0	104.1	135.5	177.7	219.0	262.9
Total	4,574.9	4,686.5	4,875.1	5,042.1	5,187.4	5,337.4	5,491.0	5,635.2
Males								
0 - 4 years	182.0	186.4	162.3	143.0	139.6	151.6	164.3	170.3
5 - 9 "	163.5	184.5	190.1	166.2	146.9	143.5	155.5	168.3
10 - 14 "	154.5	164.9	186.9	192.6	168.8	149.5	146.1	158.1
15 - 19 "	143.7	151.8	164.7	186.9	192.7	168.8	149.6	146.2
20 - 24 "	148.6	120.3	143.9	159.6	181.8	187.6	163.9	144.7
25 - 29 "	175.1	138.4	127.7	155.0	170.7	192.9	198.7	175.1
30 - 34 "	194.9	163.4	138.5	130.4	157.7	173.4	195.6	201.4
35 - 39 "	181.9	184.1	160.4	137.4	129.3	156.6	172.3	194.4
40 - 44 "	165.9	175.5	182.0	159.6	136.7	128.8	156.0	171.6
45 - 49 "	151.3	163.0	174.7	181.8	159.6	137.0	129.2	156.3
50 - 54 "	136.7	149.3	162.4	174.3	181.6	159.7	137.4	129.7
55 - 59 "	121.8	133.1	146.9	160.2	172.2	179.6	158.2	136.3
60 - 64 "	109.2	116.7	128.9	142.9	156.3	168.4	175.9	155.2
65 - 69 "	85.6	101.9	110.6	123.1	137.1	150.4	162.5	170.2
70 - 74 "	62.9	76.7	93.3	102.3	114.8	128.6	141.8	153.8
75 - 79 "	46.3	52.4	66.0	81.6	90.8	102.9	116.2	129.1
80 - 84 "	28.3	33.8	40.0	52.2	65.9	74.6	85.9	98.3
85 years and over	18.4	23.2	30.6	39.9	54.4	73.2	90.8	109.6
Total	2,270.5	2,319.4	2,409.7	2,489.0	2,556.9	2,627.2	2,699.8	2,768.6
Females								
0 - 4 years	174.1	177.6	154.7	136.3	133.1	144.5	156.7	162.4
5 - 9 "	156.2	176.1	181.0	158.3	140.0	136.7	148.1	160.3
10 - 14 "	146.6	157.1	178.2	183.3	160.7	142.3	139.1	150.5
15 - 19 "	137.4	143.4	156.6	177.9	183.0	160.4	142.1	138.8
20 - 24 "	149.9	117.3	139.8	155.9	177.2	182.4	159.8	141.5
25 - 29 "	187.8	142.7	127.6	153.9	170.0	191.4	196.5	174.0
30 - 34 "	198.5	179.8	144.1	131.1	157.4	173.5	194.8	200.0
35 - 39 "	181.2	191.8	178.5	144.1	131.1	157.4	173.5	194.8
40 - 44 "	163.4	177.8	191.2	178.5	144.3	131.3	157.6	173.7
45 - 49 "	152.9	162.4	178.2	191.8	179.3	145.2	132.4	158.6
50 - 54 "	137.1	151.5	162.0	177.9	191.6	179.3	145.5	132.8
55 - 59 "	121.6	134.7	149.9	160.5	176.5	190.2	178.1	144.7
60 - 64 "	107.9	118.6	132.4	147.7	158.4	174.3	188.0	176.2
65 - 69 "	86.5	103.8	115.1	128.9	144.1	154.9	170.7	184.4
70 - 74 "	67.2	81.0	98.4	109.7	123.5	138.5	149.3	164.9
75 - 79 "	55.0	59.8	73.5	90.1	101.3	114.8	129.4	140.2
80 - 84 "	41.5	44.9	50.1	62.8	78.0	88.7	101.5	115.5
85 years and over	39.8	46.7	54.4	64.2	81.1	104.5	128.2	153.3
Total	2,304.4	2,367.1	2,465.5	2,553.1	2,630.5	2,710.2	2,791.2	2,866.5

Table 5 Actual and projected population classified by sex and age group, 2011 - 2046 (M3F1)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	367.8	329.8	292.2	280.9	298.7	324.2	338.5
5 - 9 "	319.6	360.0	372.7	335.0	297.5	286.3	304.0	329.5
10 - 14 "	301.0	321.6	362.8	375.9	338.2	300.8	289.5	307.3
15 - 19 "	281.0	294.1	317.6	359.4	372.5	334.9	297.5	286.2
20 - 24 "	298.6	233.0	265.7	295.1	336.8	350.0	312.4	275.1
25 - 29 "	362.9	276.5	230.5	270.0	299.4	341.1	354.3	316.9
30 - 34 "	393.4	341.1	267.0	225.3	264.8	294.2	335.8	349.0
35 - 39 "	363.1	374.7	330.6	259.5	217.9	257.4	286.7	328.4
40 - 44 "	329.3	352.7	368.6	326.2	255.5	214.1	253.6	282.9
45 - 49 "	304.1	325.0	350.3	367.1	325.1	254.9	213.8	253.1
50 - 54 "	273.7	300.6	322.6	348.4	365.3	323.9	254.4	213.8
55 - 59 "	243.4	267.6	295.5	318.1	343.9	361.1	320.4	251.9
60 - 64 "	217.1	235.1	260.3	288.5	311.3	337.1	354.5	315.0
65 - 69 "	172.1	205.5	224.7	250.3	278.4	301.2	327.1	344.7
70 - 74 "	130.1	157.6	190.9	210.6	236.1	263.9	286.6	312.3
75 - 79 "	101.4	112.2	139.1	170.7	190.4	215.3	242.3	264.8
80 - 84 "	69.8	78.6	89.8	114.3	142.8	161.7	185.1	210.7
85 years and over	58.2	69.9	84.8	103.6	134.7	176.2	216.8	259.7
Total	4,574.9	4,673.7	4,803.4	4,910.3	4,991.7	5,072.8	5,159.1	5,239.6
Males								
0 - 4 years	182.0	188.3	168.8	149.6	143.9	153.0	166.0	173.3
5 - 9 "	163.5	184.2	191.0	171.7	152.5	146.7	155.8	168.9
10 - 14 "	154.5	164.7	185.8	192.7	173.4	154.2	148.5	157.6
15 - 19 "	143.7	151.3	162.9	184.3	191.2	171.9	152.8	147.0
20 - 24 "	148.6	118.2	135.4	149.9	171.3	178.3	159.1	140.0
25 - 29 "	175.1	136.1	115.6	136.2	150.7	172.1	179.1	159.9
30 - 34 "	194.9	162.2	130.1	112.0	132.6	147.1	168.4	175.5
35 - 39 "	181.9	183.4	155.6	125.2	107.3	127.8	142.3	163.6
40 - 44 "	165.9	175.1	179.2	152.6	122.5	104.6	125.2	139.6
45 - 49 "	151.3	162.8	173.2	177.9	151.6	121.7	104.0	124.5
50 - 54 "	136.7	149.2	161.4	172.1	176.9	151.0	121.5	104.0
55 - 59 "	121.8	133.0	146.1	158.6	169.4	174.4	149.0	120.0
60 - 64 "	109.2	116.6	128.4	141.8	154.4	165.2	170.4	145.7
65 - 69 "	85.6	101.8	110.1	122.2	135.5	148.1	159.0	164.5
70 - 74 "	62.9	76.7	92.8	101.5	113.6	126.8	139.3	150.2
75 - 79 "	46.3	52.4	65.8	81.1	89.8	101.6	114.4	126.6
80 - 84 "	28.3	33.8	39.9	51.8	65.3	73.7	84.7	96.6
85 years and over	18.4	23.2	30.5	39.7	54.0	72.5	89.7	108.0
Total	2,270.5	2,312.8	2,372.6	2,421.0	2,456.0	2,491.0	2,529.1	2,565.5
Females								
0 - 4 years	174.1	179.5	160.9	142.6	137.1	145.8	158.2	165.2
5 - 9 "	156.2	175.8	181.7	163.4	145.1	139.6	148.2	160.7
10 - 14 "	146.6	156.9	177.0	183.2	164.8	146.5	141.0	149.7
15 - 19 "	137.4	142.9	154.8	175.2	181.3	163.0	144.7	139.2
20 - 24 "	149.9	114.8	130.3	145.1	165.5	171.7	153.4	135.1
25 - 29 "	187.8	140.5	114.9	133.8	148.7	169.1	175.2	157.0
30 - 34 "	198.5	178.9	136.9	113.3	132.2	147.0	167.4	173.6
35 - 39 "	181.2	191.4	175.0	134.2	110.6	129.5	144.4	164.7
40 - 44 "	163.4	177.6	189.4	173.6	133.0	109.5	128.4	143.2
45 - 49 "	152.9	162.2	177.1	189.2	173.6	133.2	109.8	128.7
50 - 54 "	137.1	151.4	161.2	176.3	188.4	173.0	132.9	109.8
55 - 59 "	121.6	134.7	149.4	159.4	174.4	186.6	171.4	131.9
60 - 64 "	107.9	118.5	131.9	146.8	156.9	171.9	184.1	169.3
65 - 69 "	86.5	103.7	114.6	128.1	142.9	153.1	168.0	180.2
70 - 74 "	67.2	81.0	98.0	109.1	122.5	137.1	147.3	162.1
75 - 79 "	55.0	59.8	73.3	89.7	100.6	113.7	128.0	138.2
80 - 84 "	41.5	44.8	49.9	62.5	77.5	88.0	100.5	114.1
85 years and over	39.8	46.6	54.3	63.9	80.6	103.7	127.1	151.6
Total	2,304.4	2,360.8	2,430.7	2,489.3	2,535.7	2,581.9	2,630.0	2,674.1

Table 6 Actual and projected population classified by sex and age group, 2011 - 2046 (M3F2)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	363.2	309.1	259.4	241.2	256.1	276.3	284.5
5 - 9 "	319.6	360.0	368.1	314.4	264.7	246.5	261.4	281.7
10 - 14 "	301.0	321.6	362.8	371.3	317.6	267.9	249.8	264.7
15 - 19 "	281.0	294.1	317.6	359.4	367.9	314.2	264.6	246.5
20 - 24 "	298.6	233.0	265.7	295.1	336.8	345.3	291.8	242.3
25 - 29 "	362.9	276.5	230.5	270.0	299.4	341.1	349.7	296.2
30 - 34 "	393.4	341.1	267.0	225.3	264.8	294.2	335.8	344.4
35 - 39 "	363.1	374.7	330.6	259.5	217.9	257.4	286.7	328.4
40 - 44 "	329.3	352.7	368.6	326.2	255.5	214.1	253.6	282.9
45 - 49 "	304.1	325.0	350.3	367.1	325.1	254.9	213.8	253.1
50 - 54 "	273.7	300.6	322.6	348.4	365.3	323.9	254.4	213.8
55 - 59 "	243.4	267.6	295.5	318.1	343.9	361.1	320.4	251.9
60 - 64 "	217.1	235.1	260.3	288.5	311.3	337.1	354.5	315.0
65 - 69 "	172.1	205.5	224.7	250.3	278.4	301.2	327.1	344.7
70 - 74 "	130.1	157.6	190.9	210.6	236.1	263.9	286.6	312.3
75 - 79 "	101.4	112.2	139.1	170.7	190.4	215.3	242.3	264.8
80 - 84 "	69.8	78.6	89.8	114.3	142.8	161.7	185.1	210.7
85 years and over	58.2	69.9	84.8	103.6	134.7	176.2	216.8	259.7
Total	4,574.9	4,669.0	4,778.0	4,852.1	4,893.7	4,932.3	4,970.8	4,997.4
Males								
0 - 4 years	182.0	186.0	158.2	132.8	123.5	131.1	141.5	145.7
5 - 9 "	163.5	184.2	188.6	161.1	135.7	126.4	134.0	144.4
10 - 14 "	154.5	164.7	185.8	190.4	162.8	137.4	128.2	135.8
15 - 19 "	143.7	151.3	162.9	184.3	188.8	161.3	136.0	126.7
20 - 24 "	148.6	118.2	135.4	149.9	171.3	175.9	148.5	123.2
25 - 29 "	175.1	136.1	115.6	136.2	150.7	172.1	176.7	149.4
30 - 34 "	194.9	162.2	130.1	112.0	132.6	147.1	168.4	173.1
35 - 39 "	181.9	183.4	155.6	125.2	107.3	127.8	142.3	163.6
40 - 44 "	165.9	175.1	179.2	152.6	122.5	104.6	125.2	139.6
45 - 49 "	151.3	162.8	173.2	177.9	151.6	121.7	104.0	124.5
50 - 54 "	136.7	149.2	161.4	172.1	176.9	151.0	121.5	104.0
55 - 59 "	121.8	133.0	146.1	158.6	169.4	174.4	149.0	120.0
60 - 64 "	109.2	116.6	128.4	141.8	154.4	165.2	170.4	145.7
65 - 69 "	85.6	101.8	110.1	122.2	135.5	148.1	159.0	164.5
70 - 74 "	62.9	76.7	92.8	101.5	113.6	126.8	139.3	150.2
75 - 79 "	46.3	52.4	65.8	81.1	89.8	101.6	114.4	126.6
80 - 84 "	28.3	33.8	39.9	51.8	65.3	73.7	84.7	96.6
85 years and over	18.4	23.2	30.5	39.7	54.0	72.5	89.7	108.0
Total	2,270.5	2,310.4	2,359.6	2,391.2	2,405.9	2,419.0	2,432.7	2,441.6
Females								
0 - 4 years	174.1	177.2	150.8	126.6	117.7	125.0	134.8	138.8
5 - 9 "	156.2	175.8	179.4	153.3	129.0	120.2	127.4	137.3
10 - 14 "	146.6	156.9	177.0	180.9	154.7	130.5	121.6	128.9
15 - 19 "	137.4	142.9	154.8	175.2	179.0	152.9	128.7	119.8
20 - 24 "	149.9	114.8	130.3	145.1	165.5	169.4	143.3	119.1
25 - 29 "	187.8	140.5	114.9	133.8	148.7	169.1	173.0	146.9
30 - 34 "	198.5	178.9	136.9	113.3	132.2	147.0	167.4	171.3
35 - 39 "	181.2	191.4	175.0	134.2	110.6	129.5	144.4	164.7
40 - 44 "	163.4	177.6	189.4	173.6	133.0	109.5	128.4	143.2
45 - 49 "	152.9	162.2	177.1	189.2	173.6	133.2	109.8	128.7
50 - 54 "	137.1	151.4	161.2	176.3	188.4	173.0	132.9	109.8
55 - 59 "	121.6	134.7	149.4	159.4	174.4	186.6	171.4	131.9
60 - 64 "	107.9	118.5	131.9	146.8	156.9	171.9	184.1	169.3
65 - 69 "	86.5	103.7	114.6	128.1	142.9	153.1	168.0	180.2
70 - 74 "	67.2	81.0	98.0	109.1	122.5	137.1	147.3	162.1
75 - 79 "	55.0	59.8	73.3	89.7	100.6	113.7	128.0	138.2
80 - 84 "	41.5	44.8	49.9	62.5	77.5	88.0	100.5	114.1
85 years and over	39.8	46.6	54.3	63.9	80.6	103.7	127.1	151.6
Total	2,304.4	2,358.6	2,418.4	2,460.9	2,487.9	2,513.2	2,538.0	2,555.8

Table 7 Average annual births, deaths, natural increase and estimated net migration for each intercensal period, 1926 - 2046

Period	Total births	Total deaths	Natural increase	Change in population	Estimated net migration
			Thousands		
Actual					
1926 - 1936	58	42	16	0	-17
1936 - 1946	60	43	17	-1	-19
1946 - 1951	66	40	26	1	-24
1951 - 1956	63	36	27	-12	-39
1956 - 1961	61	34	26	-16	-42
1961 - 1966	63	33	29	13	-16
1966 - 1971	63	33	30	19	-11
1971 - 1979	69	33	35	49	14
1979 - 1981	73	33	40	38	-3
1981 - 1986	67	33	34	19	-14
1986 - 1991	56	32	24	-3	-27
1991 - 1996	50	31	18	20	2
1996 - 2002	54	31	23	49	26
2002 - 2006	61	28	33	81	48
2006 - 2011	73	28	45	70	25
Projected					
M1F1					
2011-2016	73	29	45	26	-19
2016-2021	68	30	38	57	18
2021-2026	66	32	34	64	30
2026-2031	71	35	36	66	30
2031-2036	79	39	40	70	30
2036-2041	88	44	44	74	30
2041-2046	93	48	44	74	30
M1F2					
2011-2016	73	29	44	25	-19
2016-2021	64	30	34	52	18
2021-2026	59	32	27	57	30
2026-2031	61	35	25	55	30
2031-2036	68	39	29	59	30
2036-2041	75	44	31	61	30
2041-2046	78	48	30	60	30
M2F1					
2011-2016	73	29	45	23	-22
2016-2021	67	30	37	42	5
2021-2026	62	32	30	40	10
2026-2031	63	35	28	38	10
2031-2036	68	39	30	40	10
2036-2041	75	43	32	42	10
2041-2046	78	47	31	41	10
M2F2					
2011-2016	73	29	44	22	-22
2016-2021	63	30	33	38	5
2021-2026	55	32	23	33	10
2026-2031	54	35	19	29	10
2031-2036	59	39	20	30	10
2036-2041	64	43	21	31	10
2041-2046	66	47	19	29	10
M3F1					
2011-2016	73	29	45	20	-25
2016-2021	66	30	36	26	-10
2021-2026	58	32	26	21	-5
2026-2031	56	34	21	16	-5
2031-2036	59	38	21	16	-5
2036-2041	64	42	22	17	-5
2041-2046	67	46	21	16	-5
M3F2					
2011-2016	72	29	44	19	-25
2016-2021	61	30	32	22	-10
2021-2026	51	32	20	15	-5
2026-2031	48	34	13	8	-5
2031-2036	51	38	13	8	-5
2036-2041	55	42	13	8	-5
2041-2046	56	46	10	5	-5

Table 8 Actual and projected labour force classified by sex and age group, 2011 - 2026 (M1)

Year and sex	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 +	Total
	Thousands											
2011												
Persons	46.0	198.6	302.2	328.2	295.3	258.1	240.0	205.4	158.3	97.8	48.9	2,178.6
Males	23.8	101.4	153.7	175.6	167.2	151.8	134.0	115.3	90.3	60.8	33.3	1,207.2
Females[7]	22.2	97.2	148.5	152.6	128.1	106.2	105.9	90.1	68.0	37.0	15.6	971.4
- married	0.0	0.0	30.5	76.9	84.8	81.0	87.8	78.1	59.9	33.2	14.2	546.4
- other	22.2	97.2	117.9	75.7	43.3	25.2	18.1	12.0	8.1	3.8	1.4	425.0
2016												
Persons	58.4	164.3	242.3	291.7	306.6	281.3	260.6	226.3	175.0	111.0	66.3	2,183.9
Males	31.2	87.9	126.0	151.1	171.7	163.4	148.5	128.5	101.2	70.0	46.1	1,225.8
Females	27.2	76.5	116.3	140.6	134.9	117.9	112.1	97.8	73.7	40.9	20.2	958.1
- married	0.0	0.0	21.8	70.4	91.4	88.9	92.8	85.4	65.5	36.3	17.6	570.1
- other	27.2	76.5	94.5	70.2	43.5	29.0	19.2	12.4	8.2	4.6	2.6	388.0
2021												
Persons	70.0	217.5	241.7	254.6	282.7	300.9	284.0	245.2	197.7	126.3	92.9	2,313.5
Males	39.1	116.9	127.3	136.9	154.8	171.6	160.1	140.4	115.0	80.3	61.5	1,303.7
Females	30.9	100.6	114.4	117.8	128.0	129.4	123.9	104.8	82.7	46.0	31.4	1,009.8
- married	0.0	0.0	20.2	55.5	83.9	93.8	101.1	91.6	72.3	40.2	27.3	585.7
- other	30.9	100.6	94.2	62.3	44.1	35.6	22.8	13.3	10.4	5.8	4.1	424.1
2026												
Persons	82.6	247.4	309.0	257.4	249.0	278.2	303.6	267.6	215.1	140.9	126.3	2,477.0
Males	46.3	132.6	162.6	140.6	140.7	155.1	169.0	151.8	126.2	89.4	80.5	1,394.7
Females	36.3	114.9	146.4	116.8	108.3	123.1	134.6	115.8	88.9	51.5	45.8	1,082.3
- married	0.0	0.0	26.2	55.0	71.0	89.2	109.8	101.1	77.7	45.0	39.9	614.8
- other	36.3	114.9	120.2	61.7	37.3	33.9	24.8	14.6	11.2	6.5	6.0	467.5

[7] Females aged 15 – 24 are not distinguished by marital status

Table 9 Actual and projected labour force classified by sex and age group, 2011 - 2026 (M2)

Year and sex	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 +	Total
	Thousands											
2011												
Persons	46.0	198.6	302.2	328.2	295.3	258.1	240.0	205.4	158.3	97.8	48.9	2,178.6
Males	23.8	101.4	153.7	175.6	167.2	151.8	134.0	115.3	90.3	60.8	33.3	1,207.2
Females[7]	22.2	97.2	148.5	152.6	128.1	106.2	105.9	90.1	68.0	37.0	15.6	971.4
- married	0.0	0.0	30.5	76.9	84.8	81.0	87.8	78.1	59.9	33.2	14.2	546.4
- other	22.2	97.2	117.9	75.7	43.3	25.2	18.1	12.0	8.1	3.8	1.4	425.0
2016												
Persons	58.3	161.9	239.7	290.4	305.8	280.9	260.4	226.2	174.9	110.9	66.3	2,175.5
Males	31.1	86.6	124.5	150.3	171.2	163.2	148.4	128.4	101.2	70.0	46.1	1,221.0
Females	27.1	75.2	115.1	140.0	134.6	117.7	112.0	97.7	73.7	40.9	20.2	954.5
- married	0.0	0.0	21.6	70.1	91.3	88.8	92.8	85.3	65.5	36.3	17.5	569.2
- other	27.1	75.2	93.6	69.9	43.4	29.0	19.2	12.4	8.2	4.6	2.6	385.3
2021												
Persons	69.2	204.9	222.8	243.3	276.6	297.6	282.2	244.1	197.0	125.8	92.6	2,256.2
Males	38.7	110.5	117.5	130.2	150.8	169.3	158.9	139.6	114.6	79.9	61.3	1,271.3
Females	30.5	94.4	105.4	113.1	125.8	128.3	123.3	104.4	82.4	45.9	31.3	984.9
- married	0.0	0.0	18.6	53.3	82.5	93.0	100.6	91.2	72.0	40.1	27.2	578.5
- other	30.5	94.4	86.8	59.8	43.4	35.3	22.7	13.2	10.4	5.8	4.1	406.4
2026												
Persons	81.2	227.8	270.1	225.5	230.7	268.2	298.2	264.6	213.2	139.8	125.4	2,344.7
Males	45.6	122.6	142.6	122.6	129.1	148.4	165.5	149.9	124.9	88.6	79.8	1,319.6
Females	35.6	105.2	127.5	102.9	101.6	119.8	132.7	114.7	88.3	51.2	45.6	1,025.1
- married	0.0	0.0	22.8	48.5	66.6	86.8	108.3	100.2	77.2	44.7	39.7	594.6
- other	35.6	105.2	104.7	54.4	35.0	33.0	24.5	14.5	11.1	6.5	5.9	430.5

[7] Females aged 15 – 24 are not distinguished by marital status

Table 10 Actual and projected labour force classified by sex and age group, 2011 - 2026 (M3)

Year and sex	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 +	Total
	Thousands											
2011												
Persons	46.0	198.6	302.2	328.2	295.3	258.1	240.0	205.4	158.3	97.8	48.9	2,178.6
Males	23.8	101.4	153.7	175.6	167.2	151.8	134.0	115.3	90.3	60.8	33.3	1,207.2
Females[7]	22.2	97.2	148.5	152.6	128.1	106.2	105.9	90.1	68.0	37.0	15.6	971.4
- married	0.0	0.0	30.5	76.9	84.8	81.0	87.8	78.1	59.9	33.2	14.2	546.4
- other	22.2	97.2	117.9	75.7	43.3	25.2	18.1	12.0	8.1	3.8	1.4	425.0
2016												
Persons	58.1	158.8	235.8	288.6	304.9	280.4	260.0	225.9	174.7	110.8	66.2	2,164.1
Males	31.0	85.1	122.5	149.3	170.5	162.8	148.1	128.3	101.1	69.9	46.1	1,214.7
Females	27.0	73.7	113.3	139.3	134.3	117.6	111.9	97.6	73.7	40.9	20.2	949.4
- married	0.0	0.0	21.2	69.8	91.0	88.6	92.7	85.3	65.4	36.3	17.5	567.9
- other	27.0	73.7	92.1	69.6	43.3	28.9	19.2	12.4	8.2	4.6	2.6	381.6
2021												
Persons	68.4	192.0	201.2	229.8	269.6	293.8	280.1	242.8	196.1	125.3	92.2	2,191.4
Males	38.3	104.0	106.3	122.3	146.3	166.7	157.6	138.8	114.0	79.6	61.0	1,234.9
Females	30.1	87.9	94.9	107.5	123.3	127.1	122.5	104.0	82.1	45.7	31.2	956.5
- married	0.0	0.0	16.8	50.7	80.8	92.1	99.9	90.8	71.8	39.9	27.2	570.0
- other	30.1	87.9	78.1	56.8	42.5	35.0	22.6	13.2	10.4	5.8	4.1	386.5
2026												
Persons	80.0	213.1	236.1	194.2	212.3	258.4	292.8	261.7	211.4	138.8	124.6	2,223.5
Males	45.0	115.2	125.3	105.3	117.7	141.9	161.9	148.0	123.7	87.9	79.3	1,251.2
Females	35.1	98.0	110.8	88.9	94.6	116.5	130.9	113.7	87.7	50.9	45.3	972.3
- married	0.0	0.0	19.8	41.9	62.0	84.4	106.8	99.3	76.6	44.4	39.4	574.7
- other	35.1	98.0	91.0	47.0	32.6	32.1	24.1	14.4	11.0	6.5	5.9	397.7

[7] Females aged 15 – 24 are not distinguished by marital status

APPENDICES

Appendix 1

Membership of Expert Group

Steve MacFeely Chairperson	Central Statistics Office
Deirdre Cullen	Central Statistics Office
Declan Smyth	Central Statistics Office
Helen Cahill	Central Statistics Office
Kevin McCormack	Central Statistics Office
Richie McMahon	Central Statistics Office
Sandra Tobin	Central Statistics Office
Brian Ring	Central Statistics Office
Kieran Walsh	Central Statistics Office
Denise O'Brien Secretary	Central Statistics Office
Gillian Golden	Department of Education and Science
Diarmuid Reidy	Department of Education and Science
Bruce McCormack	Department of Environment and Local Government
Helen McGrath	Department of Environment and Local Government
Shane Enright	Department of Finance
Niall Ferrick	Department of Finance
Gavin Sweeney	Department of Finance
Kevin Keady	Department of Health and Children
Jessica Lawless	Department of Public Expenditure and Reform
Kevin Meaney	Department of Public Expenditure and Reform
Paul Morrin	Department of Social Protection
Cillian Doyle	Department of the Taoiseach
Emily Whelton	Department of the Taoiseach
Damien Courtney	Cork Institute of Technology
Brian Hughes	Dublin Institute of Technology
Edgar Morgenroth	Economic and Social Research Institute
Adele Bergin	Economic and Social Research Institute
Jim Walsh	National University of Ireland, Maynooth
William Hynes	University College Dublin
Mary Hall	University College Dublin
Shane Whelan	University College Dublin

Appendix 2

Description of population and labour force projection model

2016 - 2046

Projections of the population have been compiled on an annual basis up to 2046. The model used is the demographic component method which projects the base 2011 population forward under the chosen assumptions governing births, deaths and net migration. This is illustrated graphically in Figure A.

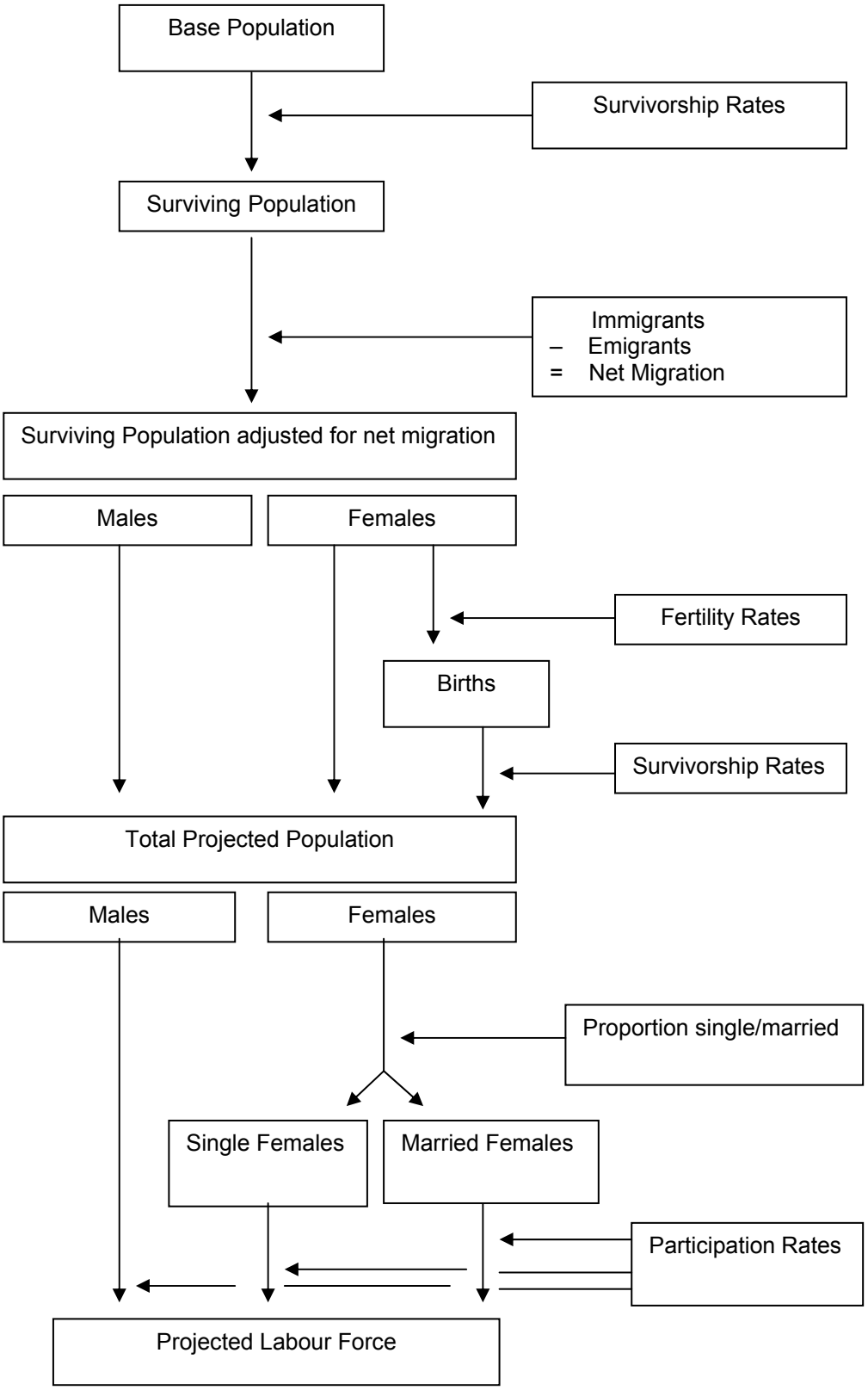
The 2011 Census of Population data are first disaggregated by age and sex. The death and gross migration rates which these groups are assumed to experience in the following year are then applied. The assumed fertility rates are applied to the female population aged 15-49. The population projected in this way then becomes the base population for the following year. The whole procedure is repeated.

One hundred different single year age groups are distinguished (0-1 to 99+) for both males and females. After the base population is aged a year the appropriate survivorship ratios (see Appendix 3) are applied to it. Next the assumed migration effects are included. The assumed outward and inward flows are broken down by age and sex on the basis of the distributions estimated for the inter-censal period 2002-2011. This yields the surviving population adjusted for net migration but without an estimate of the number of children born in the year. The age specific fertility rates for the projection year are applied to the projected female population to estimate the projected births. These births are then divided into males and females on the basis of the ratios experienced for recent years. The appropriate survivorship ratios are then applied to male and female births before these are added in to yield the total projected population.

The assumed labour force participation rates are applied to the projected population aged 15 years and over to give the projected labour force.

Figure A

Diagram of population and labour force projection model



Appendix 3

Glossary of technical terms

Age specific fertility rate: The age specific fertility rate for a particular age group is the number of live births to women in that age group per 1,000 females in the same age group.

Labour force participation rate: The number of persons at work or unemployed (either looking for first regular job or having lost or given up previous job) in a particular age group expressed as a percentage of all persons in that age group.

Life expectancy: The average number of additional years a person would live if current mortality trends were to continue. The expectation of life at birth represents the mean length of life of individuals who are subjected since birth to current mortality trends. Life expectancy is usually compiled on the basis of a life table showing the probability of dying at each age for a given population according to the age specific death rates prevailing in a given period.

Net migration: The net effect of immigration and emigration. A positive entry denotes that inward migration exceeds outward migration and vice-versa.

Old dependency ratio: The population aged 65 years and over expressed as a percentage of the population aged 15-64 years.

Survivorship ratio: The survivorship ratio at age x, S_x, is calculated as

$$S_x=L_x/L_{x-1}$$

where L_x is the population aged between x and x+1 assuming that 100,000 births occur each year according to the Life Tables.

Total dependency ratio: The sum of the young and old dependency ratios.

Total fertility rate (TFR): The TFR represents the theoretical average number of children who would be born alive to a woman during her lifetime if she were to pass through her child bearing years (ages 15-49) conforming to the age specific fertility rates of a given year. The rate refers to a theoretical female cohort.

The TFR is compiled by summing the age specific fertility rates for the relevant five-year age groups, dividing by 1,000 and multiplying by 5. The small number of births for which the age of the mother is not stated is distributed in proportion to the stated categories.

Young dependency ratio: The population aged 0-14 years expressed as a percentage of the population aged 15-64 years.

Appendix 4

Availability of data

Detailed results of the projections are available in Excel and comma delimited formats on the Census area of the CSO website (see http://www.cso.ie/en/releasesandpublications/population/). The detailed data files contain projections of the population for each year from 2011 to 2046 classified by sex and single year of age. Births, deaths and net migration are analysed by sex only. The detailed projections are provided for the six combinations of fertility and migration assumptions distinguished in the publication (i.e. M1F1, M1F2, M2F1, M2F2, M3F1 and M3F2). There are two further combinations in relation to the M0 assumptions.

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Appendix 5

SUPPORTING TABLES

Table A1 Population classified by sex at each census since 1841

Census year	Persons	Males	Females
	Thousands		
1841	6,529	3,222	3,306
1851	5,112	2,494	2,617
1861	4,402	2,169	2,233
1871	4,053	1,992	2,061
1881	3,870	1,912	1,958
1891	3,469	1,729	1,740
1901	3,222	1,610	1,612
1911	3,140	1,590	1,550
1926	2,972	1,507	1,465
1936	2,968	1,520	1,448
1946	2,955	1,495	1,460
1951	2,961	1,507	1,454
1956	2,898	1,463	1,435
1961	2,818	1,417	1,402
1966	2,884	1,449	1,435
1971	2,978	1,496	1,482
1979	3,368	1,693	1,675
1981	3,443	1,729	1,714
1986	3,541	1,770	1,771
1991	3,526	1,753	1,772
1996	3,626	1,800	1,826
2002	3,917	1,946	1,971
2006	4,240	2,121	2,119
2011	4,588	2,273	2,315

Table A2 Females in selected age groups at each census since 1926

Census year	Females aged 20-39 years	Females aged 15-49 years
	Thousands	
1926	404	709
1936	408	694
1946	413	704
1951	389	670
1961	313	598
1966	316	607
1971	339	627
1979	442	750
1981	466	780
1986	505	839
1991	501	869
1996	537	934
2002	618	1,032
2006	684	1,112
2011	719	1,176

Table A3 Life expectancy at various ages, 1925 – 2011

Period		Age in years									
		0	5	10	30	40	50	60	70	80	90
		Males									
1	1925-1927	57.4	59.5	55.2	38.4	30.4	22.7	15.8	10.0	5.8	3.3
2	1935-1937	58.2	60.1	55.8	38.5	30.3	22.4	15.5	10.0	6.0	3.1
3	1940-1942	59.0	60.7	56.3	38.9	30.6	22.5	15.4	9.6	5.7	3.6
4	1945-1947	60.5	61.5	56.9	39.2	30.6	22.4	15.1	9.2	5.3	3.2
5	1950-1952	64.5	63.6	58.8	40.3	31.3	22.8	15.4	9.2	5.0	2.7
6	1960-1962	68.1	65.7	60.8	41.7	32.4	23.5	15.8	9.7	5.1	2.5
7	1965-1967	68.6	65.7	60.8	41.7	32.2	23.4	15.6	9.7	5.2	2.6
8	1970-1972	68.8	65.5	60.6	41.5	32.1	23.3	15.6	9.7	5.4	2.8
9	1978-1980	69.5	65.7	60.8	41.7	32.2	23.3	15.7	9.5	5.3	2.9
10	1980-1982	70.1	66.1	61.3	42.1	32.6	23.6	15.9	9.7	5.4	2.9
11	1985-1987	71.0	66.8	61.9	42.7	33.1	24.0	16.0	9.7	5.3	2.8
12	1990-1992	72.3	68.0	63.1	43.9	34.4	25.2	17.0	10.4	5.8	3.0
13	1995-1997	73.0	68.6	63.6	44.5	35.1	25.8	17.5	10.6	5.9	3.0
14	2001-2003	75.1	70.7	65.7	46.5	37.0	27.8	19.2	11.9	6.5	3.3
15	2005-2007	76.8	72.2	67.2	48.0	38.5	29.2	20.6	13.0	7.1	3.6
*	2009-2011	77.9	73.3	68.3	49.0	39.5	30.3	21.5	13.8	7.5	3.7
		Females									
1	1925-1927	57.9	59.2	54.9	38.6	30.8	23.2	16.4	10.7	6.5	3.7
2	1935-1937	59.6	60.4	56.1	39.2	31.2	23.3	16.2	10.6	6.5	3.4
3	1940-1942	61.0	61.4	56.9	39.9	31.6	23.5	16.3	10.4	6.4	4.2
4	1945-1947	62.4	62.5	57.9	40.5	32.1	23.9	16.4	10.2	6.0	3.8
5	1950-1952	67.1	65.4	60.6	42.2	33.3	24.7	16.8	10.2	5.6	3.2
6	1960-1962	71.9	69.0	64.1	44.7	35.3	26.3	18.1	11.0	5.9	3.0
7	1965-1967	72.9	69.6	64.8	45.2	35.7	26.6	18.4	11.2	6.1	3.1
8	1970-1972	73.5	70.0	65.1	45.6	36.0	27.0	18.7	11.5	6.2	3.2
9	1978-1980	75.0	71.0	66.1	46.5	36.8	27.6	19.2	11.9	6.4	3.4
10	1980-1982	75.6	71.5	66.6	47.0	37.3	28.0	19.5	12.2	6.7	3.5
11	1985-1987	76.7	72.4	67.5	47.8	38.1	28.7	20.1	12.6	6.8	3.3
12	1990-1992	77.9	73.5	68.6	48.9	39.2	29.8	21.1	13.5	7.4	3.6
13	1995-1997	78.5	74.1	69.1	49.5	39.8	30.3	21.5	13.7	7.5	3.7
14	2001-2003	80.3	75.7	70.8	51.1	41.4	31.9	22.9	14.8	8.2	4.1
15	2005-2007	81.6	76.9	72.0	52.3	42.5	33.1	24.0	15.8	8.8	4.3
*	2009-2011	82.7	78.0	73.0	53.2	43.5	34.0	24.9	16.6	9.5	4.7

* The 2010 Life Tables referenced here were produced by the CSO as a special exercise for this projections publication. A set of Life Tables for 2010-2012 using Census 2011 data will be published during 2013

Table A4 Projected life expectancy at various ages, 2015 – 2047

Period		Age in years									
		0	5	10	30	40	50	60	70	80	90
		Males									
17	2015-2017	79.7	75.0	70.1	50.7	41.1	31.7	22.8	14.9	8.4	4.1
18	2020-2022	81.0	76.3	71.3	51.8	42.2	32.8	23.8	15.7	9.0	4.5
19	2025-2027	82.1	77.3	72.4	52.8	43.2	33.7	24.7	16.5	9.5	4.7
20	2030-2032	83.0	78.2	73.2	53.7	44.0	34.5	25.4	17.1	10.0	5.0
21	2035-2037	83.7	79.0	74.0	54.4	44.7	35.2	26.0	17.6	10.4	5.1
22	2040-2042	84.4	79.7	74.7	55.1	45.4	35.8	26.6	18.1	10.8	5.3
23	2045-2047	85.1	80.3	75.3	55.7	46.0	36.4	27.2	18.6	11.1	5.5
		Females									
17	2015-2017	84.0	79.3	74.3	54.5	44.7	35.2	26.0	17.5	10.2	5.1
18	2020-2022	85.0	80.2	75.3	55.4	45.6	36.1	26.8	18.2	10.7	5.4
19	2025-2027	85.9	81.1	76.1	56.3	46.5	36.8	27.6	18.9	11.2	5.6
20	2030-2032	86.6	81.8	76.8	57.0	47.2	37.5	28.2	19.4	11.7	5.8
21	2035-2037	87.3	82.4	77.5	57.6	47.8	38.1	28.7	19.9	12.0	6.0
22	2040-2042	87.9	83.0	78.1	58.2	48.3	38.7	29.3	20.4	12.4	6.2
23	2045-2047	88.5	83.6	78.6	58.8	48.9	39.2	29.8	20.8	12.7	6.4

Table A5 Labour force participation rates, 2002 - 2026 (%)

Age group	Actual *			Assumed		
	2002	2006	2011	2016	2021	2026
	Males					
25 - 29	91.5	92.7	87.8	90.0	92.0	92.0
30 - 34	93.8	93.8	90.1	92.0	94.0	94.0
35 - 39	93.8	93.9	91.9	93.0	94.0	94.0
40 - 44	92.1	93.8	91.5	93.0	93.0	93.0
45 - 49	89.8	91.9	88.6	91.0	91.0	91.0
50 - 54	85.4	85.8	84.4	86.0	86.0	86.0
55 - 59	75.2	76.4	74.1	76.0	78.0	78.0
60 - 64	55.7	58.3	55.7	60.0	62.0	62.0
65 and over	15.1	14.5	13.8	16.0	18.0	20.0
	Married Females					
25 - 29	65.7	70.1	69.2	72.0	73.0	74.0
30 - 34	65.7	71.2	75.8	75.0	74.0	74.0
35 - 39	61.3	63.8	68.3	67.0	66.0	66.0
40 - 44	64.0	64.8	63.7	64.0	64.0	64.0
45 - 49	61.6	65.2	68.8	68.0	68.0	68.0
50 - 54	50.5	61.4	65.5	64.0	64.0	64.0
55 - 59	37.2	47.3	55.5	54.0	54.0	54.0
60 - 64	21.5	30.4	34.1	34.0	34.0	34.0
65 and over	2.9	4.1	5.6	6.0	8.0	10.0
	Other Females					
25 - 29	86.6	84.4	82.1	83.0	85.0	85.0
30 - 34	84.8	80.9	78.0	81.0	83.0	83.0
35 - 39	80.8	78.1	75.9	78.0	81.0	81.0
40 - 44	79.6	75.3	69.6	74.0	77.0	77.0
45 - 49	73.4	72.0	71.9	74.0	75.0	75.0
50 - 54	66.3	67.5	67.3	68.0	68.0	68.0
55 - 59	47.1	61.5	59.5	61.0	63.0	63.0
60 - 64	37.7	40.0	35.6	39.0	40.0	40.0
65 and over	4.1	4.9	3.8	6.0	8.0	10.0

* Source: Quarterly National Household Surveys 2002, 2006, 2011

Table A6 Actual and projected labour force, 1996 – 2026

Year	Males	Females			Persons
		Married	Other	Total	
	Thousands				
Actual*					
1996	925.1	322.1	260.2	582.3	1,507.4
2002	1,076.6	414.5	349.8	764.3	1,840.9
2006	1,223.2	475.0	419.8	894.8	2,118.0
2011	1,207.2	546.4	425.0	971.4	2,178.6
M1					
2016	1,225.8	570.1	388.0	958.1	2,183.9
2021	1,303.7	585.7	424.1	1,009.8	2,313.5
2026	1,394.7	614.8	467.5	1,082.3	2,477.0
M2					
2016	1,221.0	569.2	385.3	954.5	2,175.5
2021	1,271.3	578.5	406.4	984.9	2,256.2
2026	1,319.6	594.6	430.5	1,025.1	2,344.7
M3					
2016	1,214.7	567.9	381.6	949.4	2,164.1
2021	1,234.9	570.0	386.5	956.5	2,191.4
2026	1,251.2	574.7	397.7	972.3	2,223.5
M0					
2016	1,239.1	572.6	394.6	967.2	2,206.3
2021	1,283.4	582.2	409.9	992.1	2,275.4
2026	1,311.4	594.8	420.8	1,015.6	2,327.0

* Source: Labour Force Surveys 1996; Quarterly National Household Surveys 2002, 2006, 2011

Table A7 Labour force participation Rates (ILO) of females aged 15 years or over distinguishing mothers by number of dependant children 2005 to 2011

%

	Age group								
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+	Total
2005									
Mothers (wives or partners with children or lone mothers)	14.7	49.3	56.5	63.0	61.3	63.9	64.6	38.4	54.9
No dependant children	*	*	*	*	*	68.5	66.4	33.9	39.8
One dependent child	15.9	54.9	70.7	77.6	74.0	67.9	64.7	40.8	61.1
Two dependent children	*	30.7	45.3	62.8	64.8	69.1	65.3	52.8	61.7
Three or more dependent children	*	*	26.1	38.9	49.6	55.8	61.5	52.8	50.2
Wives (or partners) without children	*	86.2	93.7	94.8	89.3	83.3	65.9	23.5	49.8
Other females (i.e. children in family units or other females not in family units)	24.5	73.5	89.7	90.6	84.8	81.5	77.7	16.5	49.2
All Females	24.6	71.0	79.5	74.7	66.7	66.9	66.2	27.0	51.9
2007									
Mothers (wives or partners with children or lone mothers)	26.2	47.3	61.4	65.1	64.3	64.3	68.8	41.1	57.6
No dependant children	*	*	*	*	*	74.0	69.5	36.9	42.5
One dependent child	26.2	54.2	73.3	77.7	78.3	74.2	70.3	43.5	64.8
Two dependent children	*	26.1	49.9	63.8	63.6	65.8	70.9	56.8	62.6
Three or more dependent children	*	*	35.6	45.6	55.6	54.3	62.4	51.5	53.0
Wives (or partners) without children	*	88.8	92.0	93.5	90.1	83.7	71.2	26.3	52.0
Other females (i.e. children in family units or other females not in family units)	26.9	75.0	91.4	87.8	86.1	85.8	75.6	18.7	52.5
All Females	27.3	72.5	82.1	74.9	69.4	68.2	69.8	29.5	54.7
2009									
Mothers (wives or partners with children or lone mothers)	29.4	41.5	58.6	65.0	65.2	64.9	66.5	44.6	58.3
No dependant children	*	*	*	*	*	81.3	68.2	40.1	45.0
One dependent child	30.4	47.3	69.2	78.6	75.0	71.1	68.6	47.4	64.5
Two dependent children	*	25.0	50.3	63.0	68.4	66.7	66.0	57.1	62.7
Three or more dependent children	*	*	25.5	42.7	53.0	56.8	62.8	50.4	52.3
Wives (or partners) without children	*	89.3	95.8	93.8	88.9	86.5	73.3	26.4	52.5
Other females (i.e. children in family units or other females not in family units)	20.5	74.2	89.3	90.6	83.4	78.0	79.6	18.3	49.3
All Females	21.0	71.0	80.0	75.4	69.8	68.0	68.8	30.4	54.0
2011									
Mothers (wives or partners with children or lone mothers)	9.2	45.7	61.6	67.8	66.7	62.2	67.8	45.9	59.3
No dependant children	*	*	*	*	*	73.7	71.1	39.5	44.1
One dependent child	*	52.0	74.1	82.4	79.1	72.5	69.2	48.5	66.2
Two dependent children	*	30.8	51.2	69.7	68.2	63.4	68.1	62.3	64.6
Three or more dependent children	*	*	35.6	40.1	55.2	53.4	63.9	52.1	51.9
Wives (or partners) without children	*	91.1	93.9	94.8	90.5	85.8	74.8	28.1	51.1
Other females (i.e. children in family units or other females not in family units)	15.9	66.2	88.0	88.9	84.3	76.7	77.0	19.2	45.6
All Females	15.9	64.6	79.1	76.9	70.9	65.4	69.6	32.0	53.2

* Population estimates of less than 1,000 are deemed too small for publication purposes due to reliability concerns. Sampling or other survey errors are greater in respect of smaller values or estimates of change.

The following set of tables are built around zero migration assumption, M0. This has been fed into the model as 50,000 immigrants and 50,000 emigrants at an overall level, though there are differences at single year of age and sex. The tables are included to enable users to examine the impact of zero net migration on population change over the next 35 years.

Note: For consistency the migration flows for 2012 and 2013 were kept in line with those used for the other migration scenarios (M1, M2 and M3) thus resulting in an overall negative figure for the period 2011-2016.

Table A8 Assumed average annual migration flows, 2011 to 2046

Scenario	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046
	Thousands						
M0							
Immigration	50.9	50.0	50.0	50.0	50.0	50.0	50.0
Emigration	63.8	50.0	50.0	50.0	50.0	50.0	50.0
Net migration	-12.9	0.0	0.0	0.0	0.0	0.0	0.0

Table A9 Population projections, 2016-2046

Scenario	Population of school going age		Population				Annual average % change in total population in 5-year period	Dependency ratios		
	"Primary" 5-12	"Secondary" 13-18	0-14	15-64	65+	Total		Young	Old	Total
	Thousands							Percentage		
Actual										
2011	501.4	322.4	979.6	3,073.3	535.4	4,588.3	0.0	31.9	17.3	49.2
M0F1										
2016	556.4	369.2	1,053.7	3,057.0	625.9	4,736.5	0.6	34.5	20.5	54.9
2021	599.0	401.6	1,084.7	3,111.5	733.3	4,929.5	0.8	34.9	23.6	58.4
2026	575.3	450.7	1,044.4	3,183.3	855.0	5,082.6	0.6	32.8	26.9	59.7
2031	528.4	449.2	980.6	3,243.1	989.2	5,212.9	0.5	30.2	30.5	60.7
2036	503.7	413.4	958.8	3,254.6	1,127.1	5,340.6	0.5	29.5	34.6	64.1
2041	518.2	383.6	989.7	3,210.1	1,270.7	5,470.5	0.5	30.8	39.6	70.4
2046	552.9	383.7	1,044.6	3,138.1	1,412.9	5,595.7	0.5	33.3	45.0	78.3
M0F2										
2016	556.4	369.2	1,048.9	3,057.0	625.9	4,731.8	0.6	34.3	20.5	54.8
2021	594.3	401.6	1,058.3	3,111.5	733.3	4,903.1	0.7	34.0	23.6	57.6
2026	549.0	450.7	982.6	3,183.3	855.0	5,020.8	0.5	30.9	26.9	57.7
2031	478.1	437.7	880.2	3,238.3	989.2	5,107.8	-1.4	27.2	30.5	57.7
2036	437.6	382.2	834.0	3,228.3	1,127.1	5,189.4	0.3	25.8	34.9	60.7
2041	446.1	337.1	849.3	3,148.5	1,270.7	5,268.5	0.3	27.0	40.4	67.3
2046	473.8	331.1	890.1	3,033.2	1,412.9	5,336.2	0.3	29.3	46.6	75.9

Table A10 Actual and projected average annual growth rates of the labour force (%)

Period	Males	Married females	Other females	Total Females	Persons
2002/20211	1.3	3.1	2.2	2.7	1.9
2011/2026 (M0)	0.6	0.6	-0.1	0.3	0.4

Table A11 Components of labour force change, 2011 to 2026

Scenario	Males	Females			Persons
		Married	Other	Total	
	Thousands				
M0					
Demographic	24.2	38.6	-33.2	5.3	29.5
Participation rate	79.9	9.8	29.1	38.9	118.9
Total	104.2	48.4	-4.2	44.2	148.4

Table A12 Actual and projected population classified by sex and age group, 2011 - 2046 (M0F1)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	370.5	344.3	314.8	306.7	322.5	345.7	361.6
5 - 9 "	319.6	360.8	376.1	350.0	320.5	312.3	328.1	351.3
10 - 14 "	301.0	322.4	364.3	379.6	353.5	324.0	315.9	331.7
15 - 19 "	281.0	298.0	320.2	362.1	377.4	351.3	321.9	313.8
20 - 24 "	298.6	251.5	282.1	304.2	346.2	361.5	335.5	306.1
25 - 29 "	362.9	290.3	262.1	292.6	314.8	356.7	372.1	346.1
30 - 34 "	393.4	350.0	288.7	260.7	291.2	313.4	355.3	370.6
35 - 39 "	363.1	380.1	344.5	283.6	255.6	286.1	308.3	350.2
40 - 44 "	329.3	355.5	376.7	341.4	280.8	253.1	283.5	305.7
45 - 49 "	304.1	326.2	354.3	375.7	340.8	280.7	253.1	283.6
50 - 54 "	273.7	301.4	324.4	352.7	374.2	339.9	280.3	253.1
55 - 59 "	243.4	268.4	296.9	320.1	348.5	370.1	336.5	277.8
60 - 64 "	217.1	235.7	261.6	290.2	313.6	341.9	363.7	331.0
65 - 69 "	172.1	206.1	225.8	251.7	280.3	303.7	331.9	353.9
70 - 74 "	130.1	158.2	191.9	211.9	237.7	265.9	289.2	317.2
75 - 79 "	101.4	112.6	139.9	171.9	191.8	216.9	244.3	267.4
80 - 84 "	69.8	78.9	90.4	115.1	143.9	162.9	186.6	212.5
85 years and over	58.2	70.1	85.3	104.4	135.7	177.7	218.6	261.9
Total	4,574.9	4,736.5	4,929.5	5,082.6	5,212.9	5,340.6	5,470.5	5,595.7
Males								
0 - 4 years	182.0	189.7	176.3	161.2	157.0	165.1	177.0	185.1
5 - 9 "	163.5	184.6	192.6	179.3	164.2	160.0	168.1	180.0
10 - 14 "	154.5	165.0	186.4	194.5	181.1	166.1	161.9	170.0
15 - 19 "	143.7	153.2	164.1	185.5	193.6	180.2	165.2	161.0
20 - 24 "	148.6	127.3	143.5	154.4	175.8	183.9	170.6	155.6
25 - 29 "	175.1	143.2	131.2	147.4	158.3	179.7	187.8	174.6
30 - 34 "	194.9	167.3	141.7	129.7	145.9	156.8	178.2	186.4
35 - 39 "	181.9	186.6	163.6	138.2	126.4	142.5	153.5	174.8
40 - 44 "	165.9	176.9	184.1	161.4	136.2	124.5	140.6	151.5
45 - 49 "	151.3	163.5	175.7	183.1	160.7	135.7	124.1	140.2
50 - 54 "	136.7	149.6	162.5	174.8	182.3	160.2	135.5	124.1
55 - 59 "	121.8	133.4	146.9	159.9	172.3	179.9	158.3	134.1
60 - 64 "	109.2	116.9	129.1	142.7	155.8	168.2	176.0	155.0
65 - 69 "	85.6	102.2	110.7	123.0	136.6	149.6	162.0	170.0
70 - 74 "	62.9	77.0	93.5	102.3	114.5	128.0	140.9	153.2
75 - 79 "	46.3	52.6	66.3	81.7	90.6	102.6	115.5	128.2
80 - 84 "	28.3	33.9	40.2	52.3	65.9	74.4	85.5	97.7
85 years and over	18.4	23.3	30.7	40.0	54.6	73.3	90.7	109.2
Total	2,270.5	2,346.1	2,439.1	2,511.4	2,571.7	2,630.7	2,691.4	2,750.6
Females								
0 - 4 years	174.1	180.8	168.1	153.6	149.7	157.4	168.7	176.5
5 - 9 "	156.2	176.2	183.5	170.7	156.3	152.3	160.0	171.4
10 - 14 "	146.6	157.4	177.9	185.1	172.4	158.0	154.0	161.7
15 - 19 "	137.4	144.8	156.1	176.6	183.9	171.1	156.7	152.8
20 - 24 "	149.9	124.3	138.6	149.9	170.4	177.6	164.9	150.5
25 - 29 "	187.8	147.1	130.9	145.2	156.5	177.0	184.3	171.6
30 - 34 "	198.5	182.7	147.1	130.9	145.3	156.5	177.0	184.3
35 - 39 "	181.2	193.5	180.9	145.4	129.3	143.6	154.8	175.3
40 - 44 "	163.4	178.6	192.5	180.0	144.6	128.6	142.9	154.2
45 - 49 "	152.9	162.7	178.6	192.5	180.1	145.0	129.1	143.3
50 - 54 "	137.1	151.7	162.0	177.9	191.9	179.7	144.8	129.0
55 - 59 "	121.6	134.9	149.9	160.3	176.2	190.2	178.2	143.7
60 - 64 "	107.9	118.8	132.4	147.4	157.8	173.7	187.7	176.1
65 - 69 "	86.5	103.9	115.1	128.7	143.7	154.1	169.9	183.9
70 - 74 "	67.2	81.2	98.4	109.6	123.1	137.9	148.4	164.0
75 - 79 "	55.0	60.0	73.6	90.1	101.1	114.4	128.8	139.3
80 - 84 "	41.5	45.0	50.2	62.8	77.9	88.5	101.1	114.9
85 years and over	39.8	46.8	54.6	64.3	81.1	104.4	127.9	152.7
Total	2,304.4	2,390.4	2,490.4	2,571.2	2,641.2	2,709.9	2,779.2	2,845.0

Table A13 Actual and projected population classified by sex and age group, 2011 - 2046 (M0F2)

Sex and age group	Persons in April of each year							
	2011	2016	2021	2026	2031	2036	2041	2046
	Thousands							
Persons								
0 - 4 years	356.0	365.8	322.7	279.4	263.3	276.4	294.6	304.0
5 - 9 "	319.6	360.8	371.4	328.3	285.0	269.0	282.2	300.3
10 - 14 "	301.0	322.4	364.3	374.9	331.9	288.6	272.5	285.7
15 - 19 "	281.0	298.0	320.2	362.1	372.7	329.7	286.5	270.5
20 - 24 "	298.6	251.5	282.1	304.2	346.2	356.8	313.9	270.8
25 - 29 "	362.9	290.3	262.1	292.6	314.8	356.7	367.4	324.6
30 - 34 "	393.4	350.0	288.7	260.7	291.2	313.4	355.3	365.9
35 - 39 "	363.1	380.1	344.5	283.6	255.6	286.1	308.3	350.2
40 - 44 "	329.3	355.5	376.7	341.4	280.8	253.1	283.5	305.7
45 - 49 "	304.1	326.2	354.3	375.7	340.8	280.7	253.1	283.6
50 - 54 "	273.7	301.4	324.4	352.7	374.2	339.9	280.3	253.1
55 - 59 "	243.4	268.4	296.9	320.1	348.5	370.1	336.5	277.8
60 - 64 "	217.1	235.7	261.6	290.2	313.6	341.9	363.7	331.0
65 - 69 "	172.1	206.1	225.8	251.7	280.3	303.7	331.9	353.9
70 - 74 "	130.1	158.2	191.9	211.9	237.7	265.9	289.2	317.2
75 - 79 "	101.4	112.6	139.9	171.9	191.8	216.9	244.3	267.4
80 - 84 "	69.8	78.9	90.4	115.1	143.9	162.9	186.6	212.5
85 years and over	58.2	70.1	85.3	104.4	135.7	177.7	218.6	261.9
Total	4,574.9	4,731.8	4,903.1	5,020.8	5,107.8	5,189.4	5,268.5	5,336.2
Males								
0 - 4 years	182.0	187.2	165.2	143.0	134.8	141.5	150.9	155.6
5 - 9 "	163.5	184.6	190.2	168.2	146.0	137.8	144.6	153.9
10 - 14 "	154.5	165.0	186.4	192.1	170.1	147.9	139.7	146.5
15 - 19 "	143.7	153.2	164.1	185.5	191.1	169.2	147.1	138.9
20 - 24 "	148.6	127.3	143.5	154.4	175.8	181.5	159.6	137.5
25 - 29 "	175.1	143.2	131.2	147.4	158.3	179.7	185.4	163.6
30 - 34 "	194.9	167.3	141.7	129.7	145.9	156.8	178.2	183.9
35 - 39 "	181.9	186.6	163.6	138.2	126.4	142.5	153.5	174.8
40 - 44 "	165.9	176.9	184.1	161.4	136.2	124.5	140.6	151.5
45 - 49 "	151.3	163.5	175.7	183.1	160.7	135.7	124.1	140.2
50 - 54 "	136.7	149.6	162.5	174.8	182.3	160.2	135.5	124.1
55 - 59 "	121.8	133.4	146.9	159.9	172.3	179.9	158.3	134.1
60 - 64 "	109.2	116.9	129.1	142.7	155.8	168.2	176.0	155.0
65 - 69 "	85.6	102.2	110.7	123.0	136.6	149.6	162.0	170.0
70 - 74 "	62.9	77.0	93.5	102.3	114.5	128.0	140.9	153.2
75 - 79 "	46.3	52.6	66.3	81.7	90.6	102.6	115.5	128.2
80 - 84 "	28.3	33.9	40.2	52.3	65.9	74.4	85.5	97.7
85 years and over	18.4	23.3	30.7	40.0	54.6	73.3	90.7	109.2
Total	2,270.5	2,343.7	2,425.6	2,479.8	2,517.9	2,553.3	2,588.0	2,617.8
Females								
0 - 4 years	174.1	178.5	157.5	136.3	128.5	134.9	143.8	148.4
5 - 9 "	156.2	176.2	181.2	160.1	139.0	131.1	137.6	146.5
10 - 14 "	146.6	157.4	177.9	182.8	161.8	140.7	132.8	139.2
15 - 19 "	137.4	144.8	156.1	176.6	181.6	160.6	139.4	131.6
20 - 24 "	149.9	124.3	138.6	149.9	170.4	175.3	154.4	133.3
25 - 29 "	187.8	147.1	130.9	145.2	156.5	177.0	182.0	161.0
30 - 34 "	198.5	182.7	147.1	130.9	145.3	156.5	177.0	182.0
35 - 39 "	181.2	193.5	180.9	145.4	129.3	143.6	154.8	175.3
40 - 44 "	163.4	178.6	192.5	180.0	144.6	128.6	142.9	154.2
45 - 49 "	152.9	162.7	178.6	192.5	180.1	145.0	129.1	143.3
50 - 54 "	137.1	151.7	162.0	177.9	191.9	179.7	144.8	129.0
55 - 59 "	121.6	134.9	149.9	160.3	176.2	190.2	178.2	143.7
60 - 64 "	107.9	118.8	132.4	147.4	157.8	173.7	187.7	176.1
65 - 69 "	86.5	103.9	115.1	128.7	143.7	154.1	169.9	183.9
70 - 74 "	67.2	81.2	98.4	109.6	123.1	137.9	148.4	164.0
75 - 79 "	55.0	60.0	73.6	90.1	101.1	114.4	128.8	139.3
80 - 84 "	41.5	45.0	50.2	62.8	77.9	88.5	101.1	114.9
85 years and over	39.8	46.8	54.6	64.3	81.1	104.4	127.9	152.7
Total	2,304.4	2,388.1	2,477.5	2,541.0	2,589.9	2,636.1	2,680.5	2,718.3

Table A14 Average annual births, deaths, natural increase and estimated net migration for each intercensal period, 1926 - 2046

Period	Total births	Total deaths	Natural increase	Change in population	Estimated net migration
	Thousands				
Actual					
1926 - 1936	58	42	16	0	-17
1936 - 1946	60	43	17	-1	-19
1946 - 1951	66	40	26	1	-24
1951 - 1956	63	36	27	-12	-39
1956 - 1961	61	34	26	-16	-42
1961 - 1966	63	33	29	13	-16
1966 - 1971	63	33	30	19	-11
1971 - 1979	69	33	35	49	14
1979 - 1981	73	33	40	38	-3
1981 - 1986	67	33	34	19	-14
1986 - 1991	56	32	24	-3	-27
1991 - 1996	50	31	18	20	2
1996 - 2002	54	31	23	49	26
2002 - 2006	61	28	33	81	48
2006 - 2011	73	28	45	70	25
M0F1					
2011-2016	74	29	45	32	-13
2016-2021	68	30	39	39	0
2021-2026	63	32	31	31	0
2026-2031	61	35	26	26	0
2031-2036	64	39	26	26	0
2036-2041	69	43	26	26	0
2041-2046	72	47	25	25	0
M0F2					
2011-2016	73	29	44	31	-13
2016-2021	64	30	34	34	0
2021-2026	55	32	24	24	0
2026-2031	52	35	17	17	0
2031-2036	55	38	16	16	0
2036-2041	58	43	16	16	0
2041-2046	60	47	14	14	0

Table A15 Actual and projected labour force classified by sex and age group, 2011 - 2026 (M0)

Year and sex	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 +	Total
	Thousands											
2011												
Persons	46.0	198.6	302.2	328.2	295.3	258.1	240.0	205.4	158.3	97.8	48.9	2,178.6
Males	23.8	101.4	153.7	175.6	167.2	151.8	134.0	115.3	90.3	60.8	33.3	1,207.2
Females[7]	22.2	97.2	148.5	152.6	128.1	106.2	105.9	90.1	68.0	37.0	15.6	971.4
-married	0.0	0.0	30.5	76.9	84.8	81.0	87.8	78.1	59.9	33.2	14.2	546.4
-other	22.2	97.2	117.9	75.7	43.3	25.2	18.1	12.0	8.1	3.8	1.4	425.0
2016												
Persons	58.8	171.4	247.6	296.2	309.3	282.7	261.0	226.5	175.2	111.2	66.5	2,206.3
Males	31.4	91.6	128.9	153.9	173.5	164.5	148.8	128.7	101.4	70.2	46.3	1,239.1
Females	27.4	79.7	118.7	142.3	135.8	118.2	112.2	97.8	73.8	41.0	20.2	967.2
-married	0.0	0.0	22.2	71.3	92.0	89.2	92.9	85.5	65.6	36.3	17.6	572.6
-other	27.4	79.7	96.5	71.0	43.8	29.1	19.3	12.4	8.2	4.6	2.6	394.6
2021												
Persons	69.0	203.7	228.8	248.6	281.4	300.5	283.5	244.2	197.1	126.0	92.8	2,275.4
Males	38.6	110.2	120.7	133.2	153.8	171.3	159.9	139.7	114.6	80.1	61.5	1,283.4
Females	30.4	93.6	108.1	115.5	127.5	129.2	123.6	104.4	82.5	45.9	31.4	992.1
-married	0.0	0.0	19.1	54.4	83.6	93.6	100.8	91.2	72.1	40.1	27.3	582.2
-other	30.4	93.6	89.0	61.0	44.0	35.6	22.8	13.2	10.4	5.8	4.1	409.9
2026												
Persons	80.6	219.7	255.8	224.7	232.4	270.9	299.9	265.0	212.8	139.6	125.4	2,327.0
Males	45.3	118.6	135.6	121.9	129.9	150.1	166.7	150.3	124.7	88.5	79.9	1,311.4
Females	35.4	101.2	120.3	102.8	102.5	120.8	133.2	114.7	88.1	51.1	45.6	1,015.6
-married	0.0	0.0	21.5	48.4	67.2	87.6	108.7	100.2	77.0	44.6	39.6	594.8
-other	35.4	101.2	98.8	54.3	35.3	33.3	24.5	14.5	11.1	6.5	5.9	420.8

[7] Females aged 15 – 24 are not distinguished by marital status

Appendix 6

Method of projecting mortality[8]

Mortality rates were projected by estimating the current rate of improvement for each sex and assuming that this rate of improvement will decline over a twenty-five year period to a long-term average improvement rate not dissimilar to the rates observed in the long-term past. Analysis showed that the current rate of decline of mortality for males averaged around 3 per cent per annum and around 2.5 per cent per annum for females across most ages. It was assumed that there would be no mortality improvements at ages from 100 years and upwards.

The Expert Group judged it reasonable to apply the same rate of mortality decline for the long-term future estimates for male and female mortality rates and, following reflection, a long term rate of 1.5 per cent per annum was settled upon as not unreasonable for all ages up to age 90 years from 2036 onwards. For each year between 2010 and 2036, the mortality declines for that year were calculated by linear interpolation.

Estimating the current rate of improvement in mortality

- A graduated life table was prepared for 2009-2011 following the same methodology as that employed for previous Irish Life Tables. Comparing these recent mortality rates with those of the last published Irish Life Table (ILT 15 centered on the year 2006) gave the average rate of improvement per annum over the four year period 2006 to 2010 at each age for each sex. (Similar rates of improvement were observed also over the three years to 2010.)
- Projections using the recent age-specific rates of decline in mortality or replacing them with the average rate of 3 per cent per annum for males and 2.5 per cent per annum for females up to age 90 years produced almost identical life expectancies at age 0 years and at age 65 years for each future year. It was decided to adopt the average rate for each sex as the initial rate of improvement to ensure that projected age-specific mortality rates are consistent (so, for example, that projected mortality rates in each future year increase with increasing age at the older ages).
- A zero per cent improvement (i.e. no improvement) was assumed for ages of 100 years and over. For ages 91 years to 99 years, the current rate of improvement was estimated by linear interpolation between the assumed rate of improvement at age 90 years (3% for males and 2.5% for females) and the zero per cent rate of improvement at age 100 years.

Projecting mortality improvements from 2036 onwards

- The average rate of improvement over the 76-year period 1926-2002 was 1.43 per cent per annum for males and 2.1 per cent per annum for females (when calculated as a simple average of the rates of improvement at each age from age 0 years to age 100 years over that period). There is a pronounced age structure effect to the improvements, with the rate of improvement generally lowering with increasing age. However, over more recent periods, the age pattern is less pronounced with later ages now showing large improvements. Also, in more recent decades, males are recording larger proportionate falls in mortality rates than females.
- It is difficult to settle on an annual rate of mortality improvement assumed to hold from 2036 onwards. Following discussion, the Expert Group decided that an annual decline of 1.5 per cent was reasonable to apply to both sexes up to age 90 years, as it is not very dissimilar to the average rate of mortality decline over the long term past. For ages of 100 years and over, no mortality improvements from calendar year 2036 were assumed. For age 91 years to age 99 years, the rate of improvement was estimated by linear interpolation.

Projecting mortality improvements between 2010 and 2036

- As explained above, the projection methodology estimated the current average rate of mortality decline for the four year period 2006 to 2010 for each sex at each age. This turned out to be approximately 3 per cent per annum for males, and approximately 2.5 per cent per annum for females, up to age 90 years.

[8] The Expert Group are indebted to Ms Mary Hall, FSAI, and Dr Shane Whelan, FSAI, of UCD School of Mathematical Sciences for their input into the mortality part of the projection work. The methodology employed is described in greater detail in *Projecting Population Mortality for Ireland*, Journal of the Statistical and Social Inquiry Society of Ireland, Vol. XXXVII, 135-163.

For any calendar year after 2036, the reduction in mortality over that year is assumed to be 1.5 per cent for each sex and at each age up to age 90 years. For all years between 2010 and 2036, the mortality declines for that year at each age is a simple linear interpolation between the decline in 2010 and that assumed in 2036. For ages of 100 years and over, no improvements were assumed either now or in the future while for ages between 90 years and 100 years, the rates of mortality decline were estimated by linear interpolation.