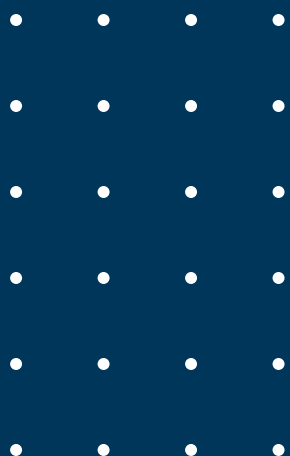


Demographic Aspects of Policy and Population Modelling





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Executive Summary

This NESC secretariat paper does two things: first it looks how well do Irish policies incorporate demography and second it looks at how good Ireland has been at population modelling.

Ireland's ability to successfully navigate several demographic shifts that are happening simultaneously will depend on proactive policymaking, investment in human capital, and the creation of an inclusive society that maximises the benefits of its evolving population. This raises the question of how effectively Irish policies have incorporated demographic considerations to date.

We examined over 160 government policies and find that:

- Earlier policies tend to focus more on the impact of an ageing population, whereas later policies give this issue less attention.
- The term 'rural' is underdefined, subject to change, and often based solely on population size, without consideration for connectivity.
- Mentions of migration are infrequent, though they appear more often in later policies.
- The broader implications of migration are left unexplored.
- Few policies address the diversity within migrant populations.
- When population projections are used, policies rarely acknowledge the uncertainty, volatility, and complexity of these projections.
- Additionally, when a population projection is referenced, it is typically based on two primary sources—ESRI or the CSO—often without explicit acknowledgment.
- Finally, the time horizon for many policy documents is short.

We then turn to examining the modelling of the population in Ireland. Population projections have consistently run behind the outturn of population mostly because of an under forecast of migration. There are several significant issues with our current approach to population modelling. We have been relying on outdated techniques that are neither robust nor appropriate for today's needs. Too often, these models are simplistic ('necessary and sufficient models'), which fail to incorporate relevant government policies. A key factor contributing to this is the lack of demographers in Ireland with the specialised expertise required for accurate demographic forecasting. The academic discipline of demography is underrepresented in Ireland, and there is no dedicated master's programme in this field.

Furthermore, within the modelling process, there has been a tendency towards relying on a small number of people (economists, geographers, statisticians, and policy makers), which has hindered innovation and critical analysis. This leads to a potential lack of diversity in thought and approach, and it limits the development of more sophisticated models and robust counter-factual scenarios.

This paper argues that we must recruit demographers, we must stress test policies for different demographic scenarios and we must plan for the high side of population estimates.

Chapter One: Irish Policy Development and Demography

1.1 Introduction

This chapter looks at how well recent Irish Government policies incorporated demographic changes, including projected population growth, and how demography influences the policy's intended outcomes. We reviewed almost 170 policies – however for many of these policies there is no suggestion that demography is relevant. Rather we sought to be comprehensive. There are several aspects to this:

- First is population growth included and how specific is the inclusion?
- Second are the components of the population growth mentioned, and the consequences of the different elements incorporated into the strategy. For some strategies, demographic change is irrelevant, for others, what drives the increased population growth is irrelevant – for instance more people will require clean water regardless of who is in the population. For other policy areas, it is important to consider what are the drivers of any population growth – for instance in health care it is important to know the age, health, ethnicity, and location of the population.
- Third for those strategies that do incorporate estimates of the growth of the population – how robust are these estimates?

1.2 Working method

Government policy can take many forms – regulation, strategies, frameworks, briefing notes, white papers and so on. There is no universally agreed definition of what a government policy is, nor any central policy repository from which to access them. The selection of policies for this review, therefore, is not exhaustive, but do represent a broad range of policy areas and approaches across various Government Departments.

The review also specifically excludes certain categories of policy, for example, strategies pertaining to the day-to-day operation of the Department, Departmental strategic plans and Department of Foreign Affairs strategies on other countries or regions outside of Ireland.

The focus of the review has been on national government and therefore largely excludes Local Government policies and those of State agencies and advisory bodies.

The following process was followed in the selection of policies for review:

- A search of gov.ie for 'policy' or 'strategy.'
- Searches of the websites of individual Government Departments.
- Identifying policies and strategies referenced within other policies and strategies.
- Requesting lists of policies from personnel in Government Departments.

- Identifying references to specific policies in the 2025 Programme for Government.
- The aim was to cover all extant policies so some policies date back to 2011. Also, some policies were timebound and their time has now been passed. If they have not been replaced and de facto are still in operation they are included here.

While acknowledging the limitations of the process in providing an exhaustive list of policies, Appendix One details the policies reviewed and gives an indication of the breadth and scale of the task.

In reviewing the policies selected, the following core question was applied:

How does the policy deal with projected population growth and other demographic changes such as the ageing, increased migration, or increased diversity?¹

The review of the identified policies leads to eight high-level observations made about how the strategies engage with demographic changes. These observations do not seek to criticise any policy or Government Department but rather provide an overview of the generality of engagement with demographic changes in government policy.

The eight observations are:

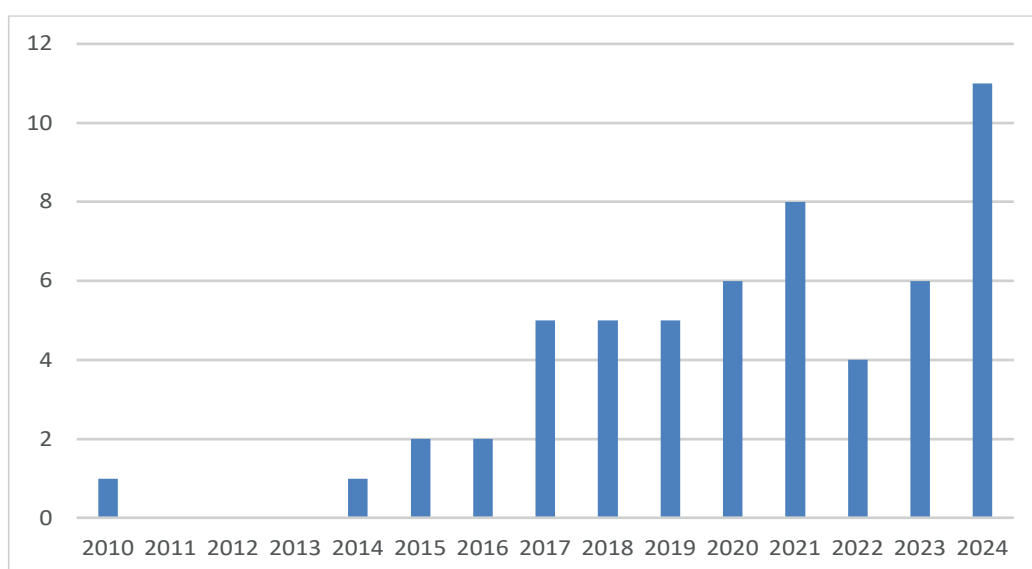
- Mentions of migration are infrequent but more likely in later policies.
- The implications of migration for the broader policy are left mostly unexplored.
- Few policies examine diversity within migrant populations.
- Where a population projection is used, the policy does not acknowledge the uncertainty, volatility, and complexity of the projection.
- Where a policy uses a population projection, it is likely to rely on two primary sources of projection—ESRI or the CSO—sometimes without explicit acknowledgment.
- Earlier policies emphasise the impact of an ageing population more than later ones.
- The term ‘rural’ is underdefined, subject to change, and is often based on only population size and not connectivity.
- The time horizon for many policy documents is relatively short.

We now explore each of these observations in greater detail.

¹ It is worth separating out two distinct effects of migration: first it means that there is likely to be a bigger population. A bigger population is not a given if deaths outweigh births in the population and migration is a response to a declining and ageing population (this unfortunately is referred to as ‘replacement’ migration). The second effect is likely to be increased diversity within the population. Again, increased diversity in the population is not a given as migration may be dominated by return migrants. However, migration is often the source of increased diversity within the population. These two effects have differential effects for public policy.

Observation 1: Mentions of migration are infrequent but more likely in later policies

Migration increases are more frequently mentioned in later policies than in earlier ones. Ireland was a country of net emigration for a very long time and the change from emigration to net immigration was relatively swift. This has possibly left an overhang in thinking about population increases. Also, the changes were not predicted (see later on the robustness of population estimates). Therefore, it is only in the later strategies that we see mentions of migration and migrants. Figure 1 shows the increase in mentions of migration over time – this is somewhat overstated as the modal year for documents in 2020 but this clearly highlights migration increasing salience.

Figure 1.1: Mentions of migration in policy document**Observation 2: The implications of migration for the broader policy are left mostly unexplored**

While many strategies reference migration and/or migrants, very few explore the implications of migration for the broader strategy. A notable exception, and good exemplar of engaging with the implications of migration, is the National Sports Policy 2018-2027 published in 2019. The policy does not attempt to forecast the size of the population but notes the size of the 2011 migrant origin population. The policy notes that sport can combat the social exclusion of migrants, but that migration is a 'challenge' for the policy because an 'ethnically and culturally diverse population' tends to have low participation rates in sport (p.25). Furthermore, the strategy acknowledges the need to use 'participation trends and demographic patterns ... to develop a clear understanding of the gaps in our sporting infrastructure' (p.44). This demonstrates a willingness to understand the challenge and the need to address the needs of migrants if the policy targets are to be met.

The National Sexual Health Strategy (2015-2020) recognised that knowledge and information about sexual health and crisis pregnancy prevention services was poor among migrants, and experiences of accessing sexual and reproductive health services limited, in comparison with other young women in the same age group.

Another document that explicitly considers migration is 'the Disability Capacity Review to 2032'. This is not a policy or strategy but is included as an example of how Government policy might engage with the impact of migration, in this case as a source of demand for specialist disability places. Published in 2021, it examined the need for additional care and support services to facilitate disabled people living independently in the community (and associated housing requirements) over the 2018 to 2032 period. The Review modelled a range of scenarios based on various demographic factors. It explored the CSO population projections (based on Census 2016 data) before developing its own projections.

These three documents were the only documents we found that explicitly engaged with the impact of migration on service provision.

Observation 3: Few policies examine diversity within migrant populations

Few strategies differentiate between different types of migrants. Migrants, if mentioned, are often found in a list amongst the other equality groups and as such are almost a procedural requirement. This points to a tendency to see migrants as a monolithic group all with similar needs without recognising that the various migration pathways mean migrants come from a variety of socio-economic backgrounds, have different levels of education, different health needs (for example, someone coming to Ireland to take up employment in a high-paying industry will likely have a different health profile to an applicant for international protection fleeing war or persecution) and so on.

Examples of policies that engage well with the issue of migration can be found in the area of education. The policies reviewed highlight the need for support of children who do not speak English, recognising the unique challenges faced by young learners who may require tailored language supports. These education policies acknowledge that language barriers can impact academic progress, social integration, and overall well-being, thereby emphasise the need for a more nuanced approach. However, the focus is often limited to language proficiency, overlooking other aspects of migrant children's diverse experiences, such as cultural adaptation, emotional support, and family background.

Another exception is the policy *Zero Tolerance: Third National Strategy on Domestic, Sexual and Gender-Based Violence* (DSGBV) (2022) which names migrants as particularly vulnerable to DSGBV and notes the additional risks to certain cohorts due to intersectional discrimination. While this is a welcome step in supporting vulnerable migrants, it fails to recognise, for instance, migrants who are undocumented, here on a partner's visa, or who are asylum seekers and who often experience additional vulnerabilities in seeking help for DSGBV due to fear of deportation, language barriers, or cultural stigmas, yet these specific needs are not explicitly addressed. These may be very relevant for the successful operation of DSGBV policy.

Consequently, the prevailing view still tends to simplify migrant needs, potentially missing opportunities to provide more comprehensive and individualised support across various policy areas.

Observation 4: Where a population projection is used, the policy does not acknowledge the uncertainty, volatility, and complexity of the projection

Very few policy documents acknowledge the uncertainty, volatility and complexity involved in making future population predictions or discuss the sources of this volatility (see below).

The *Uisce Éireann: Draft Water Services Strategic Plan 2050* is the only document that addresses the potential for climate-induced migration, suggesting that Ireland's population could exceed six million by 2050. This highlights an underlying assumption across nearly all strategies in which population projections are referenced that current population projections are broadly accurate and that large-scale socio-political or environmental events will not significantly impact Ireland's demographic landscape. Care should be taken not to over-state climate induced migration rather that there is a need for further consideration of how unpredictable global factors, such as climate change and mass migration might be, and this should influence long-term planning.²

Observation 5: Where a policy uses a population projection, it is likely to rely on two primary sources of projection—the ESRI or the CSO—sometimes without explicit acknowledgment

For those strategies that include population growth projections, the primary data source is ESRI projections medium projection (in line with the National Development Plan), followed by estimates from the CSO medium projection. While the estimates provided are valuable, it is worth noting that they are derived from a relatively narrow range of sources. It is important to acknowledge that the experts involved in developing the ESRI's forecasts also participate in the CSO's expert group, and the CSO's forecast contributes to the development of the ESRI forecast. In a small country with a limited pool of demography experts, some overlap between expert groups is to be expected. However, this overlap raises concerns about the potential for a lack of diversity in perspectives. This is particularly important because both models use similar methods and assumptions.

Within the application of ESRI and CSO population models, policy documents have consistently adopted the medium projection. This has led to a systematic underestimation of actual population outcomes (see discussion below on the accuracy of population estimates in Ireland). As a result, planning has often aimed for sufficiency rather than resilience—providing just enough rather than building capacity for higher growth. While perfect foresight is impossible, it is more prudent in practice to allow for flexibility and contingency than to move repeatedly from one capacity crisis to the next.

Observation 6: Earlier policies emphasise the impact of an ageing population more than later ones

Earlier strategies emphasise the impact of an ageing population more than later ones. For example, in 2017 the Sláintecare report took a throughgoing approach to how the ageing of the population would affect health care delivery. But the 2023 Wellbeing Framework makes no mention of ageing.

The population continues to age, and Ireland's dependency ratios are gradually catching up with the EU. It is therefore important to keep the impact of an ageing population on the policy agenda. This exclusion is particularly surprising given that a recent Department of Finance

(2024) publication has highlighted that population ageing is still the most important factor for public policy.³ Therefore, the decline in references in strategies over time to population ageing is of concern.

Observation 7: The term ‘rural’ is underdefined, subject to change, and is often based on only population size and not connectivity

Many strategies are concerned with where in Ireland population growth takes place. Concerns with the declining population in rural areas became increasingly salient over the last 50 years and gave impetus to the development of several policies including the *National Spatial Strategy* (2002), the *National Planning Framework* (2018) and the *National Rural Development Policy* (2021). Each of these policies highlights the widely varying patterns of population change and the consequent challenge of providing for the needs of populations living in areas experiencing higher levels of change. Policies expressly dealing with rural populations seek to halt rural depopulation (and in case of Our Living Islands explicitly to reverse depopulation) and at the same time to have balanced regional growth, or compact growth.

The assumption often made is that rural depopulation is happening, is uniform and has serious consequences for the viability of the remaining population. As noted in the Council report, the actual story of population decline is much more nuanced and areas with good connectivity are increasing and areas with poorer connectivity are declining. However, as O’Driscoll et al (2022a) have asked: what is the objective of any such policy? Is it to reverse population decline by encouraging people to move to these locations or is it to sustain or improve the quality of life of the people living in these places? There are policies currently in place, such as *Project Ireland 2040* and *Our Rural Future* that seek to achieve both outcomes. By not having in place specific targets, there is a risk that available resources are spread too thinly or allocated to places that do not have the greatest needs.

Moreover, ‘rural’ is not uniformly defined. For instance, the Rural Safety Plan uses three definitions:

- i) Any area that is sparsely populated and isolated, such as the majority of the West Coast or inhabited off shore islands.
- ii) Any area that is sparsely populated with a strong urban influence, such as areas of North County Dublin.
- iii) Any large town that is not sparsely populated, such as Navan or Sligo Town, but is predominately rural in character, independent of any one of the five cities of the State, and which influences a sparsely populated or isolated area (p.5).

In contrast, some policies refer to everything outside the cities, for others it is everything outside towns with a particular population threshold (5,000, 1,500 or 400 people). These definitions prioritise population as the definition of rurality when remoteness or access may be more of a policy issue.

3 <https://assets.gov.ie/297016/3485f1c0-5e2c-4851-b534-100bbdb8920.pdf>

Observation 8: The time horizon for many policy documents is relatively short

It is a truism to say the time horizon over which the population is projected makes a difference to the prediction's accuracy – a prediction of the population in 2026 made today will be more accurate than a prediction of 2076. Yet longer term thinking is needed to shape forces that are relatively inflexible in the short and medium term. Health Service Capacity Review (2018) is to 2031, the National Strategy for Higher Education to 2030 (set in 2011). The majority of others follow the NPF and have an estimate to 2040 (16-10 years in the future) and a very small number of others go beyond that to 2050 Uisce Éireann: Draft Water Services Strategic Plan 2050; Ireland's Forest Strategy 2023-2030 (2023); Clean Air Strategy (2023); Water Services Policy Statement 2018 – 2025; Water Action Plan 2024: A River Basin Management Plan (2024) and Nature Based Management of Urban Rainwater and Urban Surface Water Discharges - A National Strategy (2024).

Raftery and Ševčíková (2023) highlight that multinational organisations often project far into the future; for example, the EU and UN projects the population to 2100. This is necessary to be able to assess the implications of population change for other long-term trends influenced by population, such as decarbonisation and food security. National governments, Raftery and Ševčíková argue, typically forecast about 40-50 years into the future; 40 to 50 years being sufficient for major national questions of infrastructure and personnel planning. In Appendix 1 it is clear that the time horizon for many of the Irish policy documents reviewed is not 40-50 years but rather 15-25 years. The initiative of the Department of Finance in therefore seeking to plan 40 years out is therefore to be welcomed (Department of Finance, 2025).

1.3 Conclusion

This Chapter has examined and reflected upon how Irish Government policies have engaged with demographic changes – most importantly population growth but also migration, ageing and internal population movements. Broadly, government strategies have been hesitant to fully engage with the implications of these demographic changes. One potential reason for this hesitation lies in the reliance on existing models of demographic change and the absence of expert demographers. The next Chapter has a deeper examination of these and other models.

However, other factors may also be influencing how policy is engaging with the issue of demographic change. Key demographic trends, such as societal ageing and increasing diversity, are already well-documented. Indeed, the Department of Finance has highlighted the importance of ageing in several documents, but these warnings do not seem to have filtered through to the policies. Even without precise forecasts, it is evident that policies must address these overarching trends. One important implication of population ageing is there will be greater need for people from overseas to fill gaps in the labour force. Many countries have recognised this eventuality and are acting on it, particularly with regard to attracting in highly skilled workers.

Conversely, the lack of a clear conceptualisation of rural Ireland presents a different challenge. Without a well-defined vision or understanding of what constitutes rural Ireland and the desired outcomes for rural Ireland, policy risks being poorly designed and failing to achieve its objectives. It is not the case that we do not have a definition that incorporates connectivity. The CSO usefully defines 'Highly rural/remote areas' which takes account of both population density

(less than 1,500) and links to more urban areas (weighing of workers who work in more urban areas) (CSO, 2019).

The definition of 'rural' is difficult and contestable but the lack of tight definition or a consistent definition that travels across government strategies creates challenges in assessing the true nature and extent and effects of rural de/repopulation. Without a precise and universally accepted definition, policy risks basing decisions on assumptions rather than accurate data, which may lead to ineffective or even counterproductive strategies. For instance, rural areas near urban centres have grown due to commuting opportunities, while more remote areas face different pressures, such as limited access to public services and employment. This uneven distribution challenges the concept of a 'one-size-fits-all' approach in strategies aiming to foster regional balance and compact growth. A clear, consistent definition of 'rural' that incorporates both population density and connectivity could facilitate a more targeted approach. This would help resource allocation, design interventions, and monitor long-term effects on community viability.

However, one of the most pressing concerns is the lack of concern with population growth, the narrowness of estimates – estimates which have proved too tentative in the past. The next chapter looks at this in more depth.

Chapter Two: Modelling the Size and Structure of the Irish Population by Mid-Century

Large demographic forces have shaped Ireland in the recent past – it is critical to know if these forces will continue to be able to plan effectively. This chapter looks at how population change is modelled. Responsibility for modelling these demographic changes in Ireland lies largely with CSO and ESRI – however we are cognisant that projecting population size and changes entails a great degree of uncertainty that may not be reflected in current models. Various techniques and sub-divisions have been developed to narrow this uncertainty. However, uncertainty remains, and this is especially true in the case of net migration. There is increasing recognition, across Europe, of the challenges presented by highly unpredictable migration trends and events (see Bijak, et al, 2023). This awareness underscores the need for improved preparedness, especially preparedness for unexpected events, inflection and turning points and to explore the potential consequences of various short- and long-term migration outcomes.

2.1 Population modelling

Governments worldwide rely on population forecasts for effective planning. The fundamental purpose of government is to provide services to citizens, which necessitates understanding future population sizes and their distribution by age, sex, and region. Population studies distinguish between projections and forecasts. Three elements are usually delineated to model the population: births, deaths and migration (discussed more in appendix 2).

Population projections explore hypothetical “what-if” scenarios, illustrating potential changes in population size and structure. Population forecasts, in contrast, are informed predictions of what the population is most likely to be at a specific future time.

Several generations of population modelling methods have evolved. First was extrapolation, this method assumes past growth rates will remain constant into the future, without accounting for births, deaths, or migration. While simple, it lacks nuance and is not used in Ireland, so it will not be discussed further.

The second method is the Cohort Component Method. This method begins with a distribution of the population by age and sex for a specific base year. This is a system of demographic accounting in which the population is advanced forward in time through the application of time-specific survivorship ratios by age and sex and the derivation of births from time-specific fertility rates of women by age; migration by age and sex can also be incorporated. Cohorts are usually arranged in 5-year groups, such as ages 0–4, 5–9, 10–14, and so on, which facilitates projecting a population forward in time in 5-year intervals. While often deterministic, expert judgment is employed to assess whether trends in births, deaths, and migration will persist, reverse, or stabilise. The cohort-component method of forecasting population has been the dominant method since the 1940s (Raftery and Ševčíková, 2023). Raftery and Ševčíková (2023) also highlight that uncertainty has usually been communicated in these methods, not by statistical

measures such as standard errors and confidence intervals, but by subjectively determined scenarios. These are hard to interpret, and they lack statistical or probabilistic validity. These types of time-series based models often work best over very short time horizons.

The third method is economic modelling, this involves structural modelling with exogenous variables (Booth, 2006). This method tries to explain how economic factors influence the demographic factors and incorporates such things as wage differences influencing people's decision to migrate. We do not have a population economic method model in Ireland however the ESRI produces an estimate for the size of the labour force that uses economic modelling.

The fourth method is probabilistic forecasts. Risk is an important consideration in decision making, and probability forecasts can quantify such risks. In the Bayesian approach, inferences and forecasts are probabilistic in nature, and probability forecasts can be generated in many other ways too. Since 2015, the United Nations has issued probabilistic population forecasts for all countries using a Bayesian methodology.

The final method or sets of methods we refer to as the radical uncertainty models method- which are in development, attempts to take on board radical uncertainty about some of the drivers of population into modelling. It looks at the reasons, for instance, why people migrate and therefore how they might respond to policy changes. The aim of this research is to develop models to simulate how policy changes will affect the population (in particular migration). These models can use statistical models to limit the number of variables, use synthetic microsimulation, AI, or use innovative sources of data such as google searches. These methods are nearly always multivariate, so their uncertainty increases (p.69 Bijak et al). Some of these models aim to give early warnings of changes in population.

Table 2.1: Typology of population model methods

Model	Cohort method	Cohort component method	Economic method	Probabilistic method	Extrapolative plus principal component	Radical uncertain models method
Source for Ireland	CSO, Eurostat	ESRI	ESRI	UN	Dept of Finance	None
Population	Y	Y	N (labour force)	Y	Y	Y
Forecast or projections	Forecast	Forecast	Forecast	Projection	Projection	Projection
End date	2057	2040	Unclear	2100	2065	Varies
Easy to understand and convey	Y	Y	N	N	N	N
Early warning system	N	N	N	N	Possible	Possible
Expert opinions	Y	Y	Y	N	N	Optional
Uncertainty	Modelled by 6 options	Modelled by 6 options	Modelled by 6 options	Modelled by 60+ options	Modelled by 6 options	Radical
Additional assumptions	N	Y (must accord with economic theory)	Y (must accord with economic theory)	N	Y (category specific)	Optional
Components additive or multiplicative	+	+	+	*	+	Either
Upper and lower bounds	Ad hoc	Ad hoc	Ad hoc	Y	Y	Y

In addition, the IFAC (2019) modelled future migration using a gravity model. This was a one off and only included migration so is not examined further.

In Ireland, population changes have been historically forecasted by two organisations, the CSO and the ESRI. The CSO uses a Cohort Component Method and the ESRI uses a similar technique but incorporates consistency with economic modelling. Hence the ESRI adds additional information to its model—such as wage differences compared to the CSO. However, it also adds additional assumptions, such as estimates must be compatible with economic theory. International bodies who forecast the Irish population are the European Commission (Cohort Component Method) and the UN (Probabilistic Method).

2.2 A note on net migration

Until the D/Finance recent modelling of migration, all migration models used in Ireland were based on net migration—those entering the country minus those leaving. However, net migration itself is not a process but rather an arithmetic outcome. The factors influencing why people leave or arrive are driven by entirely different processes. Several hundred variables have been identified as key drivers of migration. Moreover, the policy implications differ significantly depending on the composition of migration flows. For example, if 1.1 million people enter while 1 million leave, or if 200,000 enter while 100,000 leave, both scenarios result in the same net migration figure of 100,000. However, the impact on policy—such as housing demand, school places, language support services, and other infrastructure needs—varies greatly between the two. For instance, emigrants may leave from a family home, whereas immigrants must secure accommodation upon arrival. These underlying dynamics are obscured when focusing solely on net migration figures.

2.2.1 The Central Statistics Office (CSO)

The Central Statistics Office produces Population and Labour Force Projections based on variables such as birth rates, death rates, migration trends, and economic conditions. These projections are typically issued every five years, based on Census population data, and provide scenarios for population changes over 25–30 years.

The CSO makes 6 projections about the future population – based on two predictors of fertility (higher and lower fertility) and three assumptions of migration (low, medium and high). The scenarios are developed by the expert group set up to examine the population (see text box). The CSO has developed a range of projections regarding potential changes in Ireland's population, across all scenarios, migration is the primary driver of population change, while natural increase (births minus deaths) plays a comparatively minor role.

The expert group developing the 2023–2057 projections met three times (15th Feb 2024, 5th April 2024 and 24th May 2024) and consisted of 44 members. The group meets and an agreed set of assumptions is developed. Of note, many of the people who sit on the expert panel are policy makers and not demographers. It would be prudent to guard against an element of policy wishful thinking creeping into the projections.

See Box 2.1 for the assumptions for the 2023–2057 projections. The publication date was July 2024, and the data was based on the 2022 census.⁴

4 <https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2023-2057/backgroundnotes/>

Box 2.1: Summary of assumptions agreed by Expert Group for Population and Labour Force Projections 2023-2057

The assumptions agreed by the Expert Group to project the population forward from 2022 to 2057 and to project the labour force forward from 2022 to 2037 are summarised below:

Fertility Assumptions Agreed

Total fertility rate to decrease from 1.55 to 1.3 by 2037 and to remain constant thereafter to 2057.

Mortality Assumptions Agreed

Mortality rates for males and females are both assumed to improve at 2.5% per annum in the short-term to 2047.

The long-term rate of improvement is assumed to be 1.5% per annum (unchanged since the last report). The short-term rate declines linearly over a 25-year period to the long-term rate.

These rates are assumed to apply to all ages up to age 90.

These assumptions will result in gains in life expectancy from:

- 80.2 years in 2022 to 86.2 years in 2057 for males.
- 83.9 years in 2022 to 89.1 years in 2057 for females.

Migration Assumptions Agreed

Three migration scenarios were taken into consideration by the expert group:

- M1: Net migration starting at +75,000 in 2022 and decreasing incrementally to +45,000 per annum by 2027 and remaining at this level to 2057.
- M2: Net migration starting at +75,000 in 2022 and decreasing incrementally to +30,000 per annum by 2032 and remaining at this level to 2057.
- M3: Net migration starting at +75,000 in 2022 and decreasing incrementally to +10,000 per annum by 2032 and remaining at this level to 2057.

Labour Force Assumptions Agreed

Persons aged 15 - 24:

- Gentle increases in labour force participation anticipated for younger males and females (students and non-students).
- Convergence between males and female labour force participation rates.
- 3rd Level attendance – Student rates expected to remain broadly in line with 2022 levels to 2037.

Persons aged 25 – 74+:

- Female participation in the labour force is no longer disaggregated by marital status.
- Increased labour force participation across most 5-year age groups to 2037 for both males and females.
- The largest percentage increases in labour force participation are projected within the older age cohorts.

Source: CSO <https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2023-2057/introductionandsummaryofassumptions/> Accessed 24/10/2024

Of note, the three migration assumptions start at net migration of 75,000 a year in 2022 but vary in how net migration falls over the coming decades.⁵ In M1 migration gradually decreases to 45,000 per annum by 2027 and remains stable between 2027 and 2057 at were lagging the CSOs Population and Migration Estimates for 2024 produced in April 2024 (<https://www.cso.ie/en/releasesandpublications/ep/p-pme/populationandmigrationestimatesapril2024/>). In April, the CSO estimated that the population usually resident in Ireland was 5,380,000. The projections of 2024 published in July were:

- M1 5,370,388
- M2 5,355,388
- M3 5,350,384

Therefore the 2024 projections were between 10,000 and 30,000 behind the number of people the CSO consider are actually in the country in 2024. These are relatively trivial differences and would not matter if the population projections did not have a cumulative nature. The projections are at least one year behind in the case of M1 and 3 years adrift in the case of M3.

2.2.2 Economic and Social Research Institute (ESRI)

The other major national source of continuous population models is the ESRI. The ESRI conducts demographic research and produces reports that forecast population trends. The ESRI uses a cohort component method similar to the CSO's but in parallel it runs detailed economic models to analyse how factors like migration, and labour markets affect future population changes. The migration estimate in the population model must be coherent with the economic model.

As seen in appendix 1, the ESRI's work is often used by the government to inform social and economic policy. The ESRI population projections are a Cohort Component Method but with inbuilt consistency that the estimate for migration must conform to the COSMO model.

Similar to the CSO the ESRI model then adopts a high and low set of assumptions:

- Baseline scenario: net immigration of +35k p.a. to 2030 (higher in the next two years) and +20k p.a. thereafter.
- High International Migration: net immigration is +10k p.a. higher in each year than in the baseline scenario.
- Low International Migration: net immigration is 10k p.a. lower in each year than in the baseline scenario.

There are several things of note in this model:

- This model explicitly incorporates consistency with a model of the labour force.
- Migration is modelled as a function of the attractiveness of Ireland as a labour market destination relative to other countries⁶ – this is further outlined in a description of the COSMO model (Bergin et al, 2017) as 'In COSMO, emigration is determined by the

5 Of note this is higher than the Estimated Net Migration as of April 2022, but lower than the April 2023 estimate (77,700) (source: CSO table PEA03).

6 In early models this was the UK but at some point, switched to 'rest of the world'.

relative attractiveness of alternative labour markets. For example, if the returns to working in Ireland dis-improve relative to the UK, measured in terms of real after-tax earnings, there will be a tendency for outflows of migrants to start up or accelerate. Immigration is partly exogenous in the model but does react to changes in domestic economic conditions' p.10. Unfortunately, these assumptions are not borne out by research which shows that migration is not just economic but is multifaceted and that moreover the poorest people do not typically migrate because they do not have the resources to do so (De Haas et al, 2020).⁷

- It cannot take on board return migration.
- Migration is not differentiated between different sources; rather everyone is assumed to be moving to and from Ireland for work purposes. This ignores moving for political or safety reasons. Even if the initial migrant moved for economic reasons often this sets up chain migration – first by family reunification then migrants travelling to places they have contacts.
- The model assumes that the higher and lower bounds are +10,000 or -10,000 from the central forecast per year. Similar to the CSO these are subjectively determined scenarios, which are hard to interpret. No explanation of these bounds is given but they are both very narrow and move in step with the central scenario. It might be more reasonable to have wider bands, based on different assumptions or failing that, a percentage boundary (+-x%) as there is no reason to believe that migration of 10,000 has the same variability as migration of 100,000.
- The calculation for future population growth converges to a more modest path. In Bergin et al, (2017) it is explained that in COSMO 'The long-run properties of the model, as derived from optimisation, exert their influence through the error correction structure. This anchors the model and ensures that although there are short-run dynamics the variables do eventually converge to their long-run path as specified by theory' p.4. The term error-correction relates to the fact that this period's deviation from a long-run equilibrium, the error, influences its short-run dynamics and the ECM pulls the model back onto the long run equilibrium path. Therefore, the model explicitly assumes some underlying equilibrium. The actual 'mechanism' that pulls the system back onto its long run equilibrium path can be rather ad hoc 'The short-run dynamics are not purely data driven as consistency with economic theory is given more importance.' Footnote 6 page 4.⁸

7 There have been many empirical studies of migration drivers and several meta-analyses of the drivers of migration – most recently Nishimura and Czaika (2023) they identify nine driver dimensions: 1. demographic, 2. economic, 3. environmental, 4. human development, 5. individual resources, 6. politico-institutional, 7. security, 8. socio-cultural, 9. supranational. These were operationalised by 1,021 variables. The migration determinants literature suffers from methodological problems and is based on obsolete and theoretically uninformed push-pull and gravity models, and is biased by omitting crucial sending-country, non-economic and policy factors. However, even with these limitations aside, different migrants move at different times for varied reasons – the motivations of the Filipino nurses moving to Ireland are different from the motivations of Irish doctors moving to Australia. However, both movements are now embedded within cultures of migration and constrained by legal frameworks. And while we have broad understanding of how a range of factors work (e.g. labour migrants typically seek higher wages) these are far from being universal laws (Czaika et al 2024).

8 This is further explained 'in the long run labour converges to a path where labour productivity equals the real wage, however in the short-run dynamics are influenced by output growth, technological progress, real wage growth and a lagged dependent variable. The mechanism by which convergence of the actual and long-run factor levels is achieved is termed the wage-price system. This system has an error correction structure and is a complete system that delivers the equilibrium levels of the factor inputs. In the labour factor market the nominal wage will adjust to align the first order condition. This process also occurs for the other factors on the production side. When a 'production gap' exists between the real price and productivity of an input this will feedback through the nominal price to guide capacity utilisation to that required by the first order condition.' pp7-8.

A 2016 ESRI paper further discusses this shift from migration to population:

'The cohort component methodology is used to generate population projections. This method projects the population by gender and single year of age for each year according to the components of population change (fertility, mortality, and net migration). The baseline scenario incorporates a continued improvement in mortality rates that slowly converges to a standard rate of improvement, an unchanged (from 2015) total fertility rate of 1.94 and a projection for net inward migration of around 13,000 per annum over the longer term.

'Migration flows are particularly sensitive to economic conditions, both domestically and in the source countries for immigrants or the destination countries for emigrants. The issue of the volatility of these flows is more pertinent for Ireland than for many other European countries. **The approach taken in developing the scenarios is to first determine migration within COSMO and then to impose that result in the demographic model and use it to determine an initial labour force.** A short iteration between the two models can be used to reach a solution that incorporates some of the additional insights available from the demographic model (Bergin et al 2016 pp.7-8, emphasis added).

Therefore, even though the ESRI model models demographic growth as opposed to the pure cohort-component method of the CSO it suffers from several of the same problems: The high and low scenarios are subjectively determined and hard to comprehend. They rely on the opinions of experts in this case ESRI economists who are not demographers. In addition, the ESRI model imposes several additional obligations that do not apply to the CSOs model:

- The model is a population model, but it must conform to a workforce model
- The model is forced to comply with economic theory
- The model is forced to reach a steady state path through an error correction mechanism.

2.2.3 European Commission

Eurostat initially prepared population projections so that the EU could assess and address the impact of the EU population's ageing on public finances in the EU. Later, the use of Eurostat's population projections grew to cover other uses. Eurostat's work on population projections started in 2000 based on a mandate from the Economic and Financial Affairs Council (ECOFIN) and the estimates were initially made every 3 years, but from 2022 there has been an annual update.

The most recent long-term projections are the 2022-based population projections (EUROPOP2023) whose time horizon runs from 2022 to 2100. They provide information about how the population size and structure at national levels would change for EU countries if the assumptions on fertility, mortality and migration remained true over the whole projection period.

An assumption in the EUROSTAT model is that socio-economic differences between EU Member States would diminish over time and thus there will be a convergence of demographic values.

The population projections produced by Eurostat are deterministic projections, and a specific set of assumptions for fertility, mortality and migration fully determines the projected population (Eurostat n.d.).

Box 2.2: EUROSTAT Projected population: estimation steps

The final projected population is estimated ... in the following way: The starting point is the population on 1 January 2022 broken down by sex and single year age. The mortality rates are used to derive the number of deaths by sex and age. The number of non-EU and EU immigrants by age and sex are computed. For 2022 and 2023, the number of refugees under TP by age and sex are added. The number of emigrants by age and sex is computed and subtracted from the population (this includes refugees under TP for the years 2024 to 3033 [2033]). The population at the end of the year by age and sex is computed, and the size of the population in working ages at the beginning and end of the year is estimated and the immigration due to shrinkage is derived. Based on that figure, the number of additional immigrants from non-EU countries by sex and age is computed, and the population at the end of the year by sex and age is re-calculated. Now, the average population in the year by sex and age is derived; on the basis of that, the number of live births by age of the mother and broken down by sex are computed. In the year 2022, total number of live births, total number of deaths, immigration and emigration are calibrated using the nowcast figures.

Source: <https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=596339>

The EUROPOP2023 projections also assume that 33% of Ukraine BOTP refugees will remain permanently in the host country, while 67% will return to Ukraine. The return period is modelled over 10 years from 2024, such that the number of returns per year decreases linearly, until one third of the initial sum of inflows from 2022 and 2023 remain. This assumption of a linear decline in the number of Ukrainian BOTP partly explains the inflection in population growth for Ireland in the EUROPOP2023 population numbers.⁹

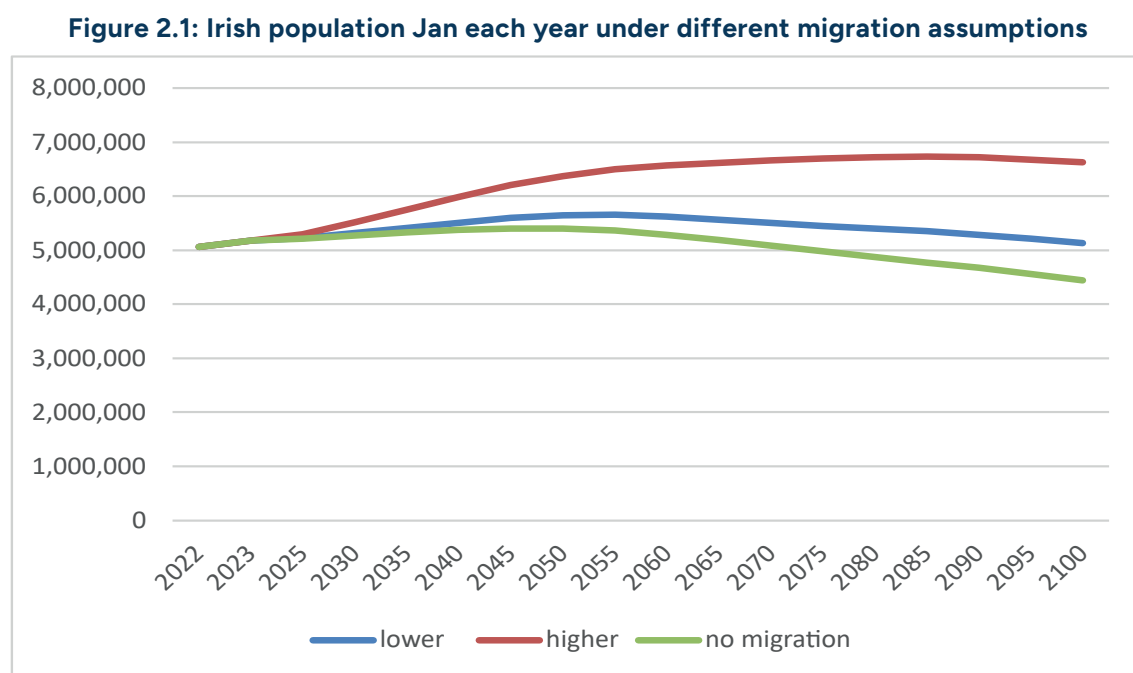
2.2.4 Alternative scenarios

In addition to the baseline assumptions, Eurostat also formulates five alternative scenarios. For the EUROPOP2023 round, these scenarios are:

- lower fertility, the assumption is that the total fertility rate is 20% lower than that of the baseline in each year covering the projection horizon (2023 - 2100)
- lower mortality, the life expectancy at birth is two years higher than in the baseline scenario
- zero net migration
- lower non-EU immigration - 33% less immigration from non-EU countries in each individual year
- higher non-EU immigration - 33% more immigration from non-EU countries in each year covering the projection horizon.

Therefore, the Eurostat model is a cohort-component method similar to that of the CSO but with percentage differences in the scenarios rather than fixed numbers. The model is still relying on expert judgements on demographic trends and adds an additional condition – that these trends converge on a European average.

Figure 2.1 plots the Eurostat estimates for Ireland under three scenarios to 2100.



2.2.5 The UN model for Ireland

Since the 1940s, national governments have primarily used a deterministic approach to population forecasting, based on the Cohort-Component Method of Population Projection (CCMPP). The UN followed this method until 2008, when it adopted a probabilistic approach. Raftery and Ševčíková (2023) criticize CCMPP for relying on users to subjectively estimate future fertility and mortality rates, often based on expert judgment, which research suggests is not ideal for accurate forecasting.

Probabilistic forecasting, addresses these limitations by providing measures of accuracy, distinguishing real trends from random fluctuations, and informing risk-based decision-making. The UN simulations produce a range of possible outcomes, creating a predictive distribution for future population trends. Figure 2.2 is the 2024 UN prediction for Ireland.

The UN estimates that Ireland's population is likely to be 5.8m in 2040 but that 95% prediction interval is between an increase to 7.4m or decrease to 4.7m. Moreover, this modelling allows us to see what is driving the broad uncertainty (Figure 2.3).

Figure 2.2: UN estimates for the Irish population to 2100

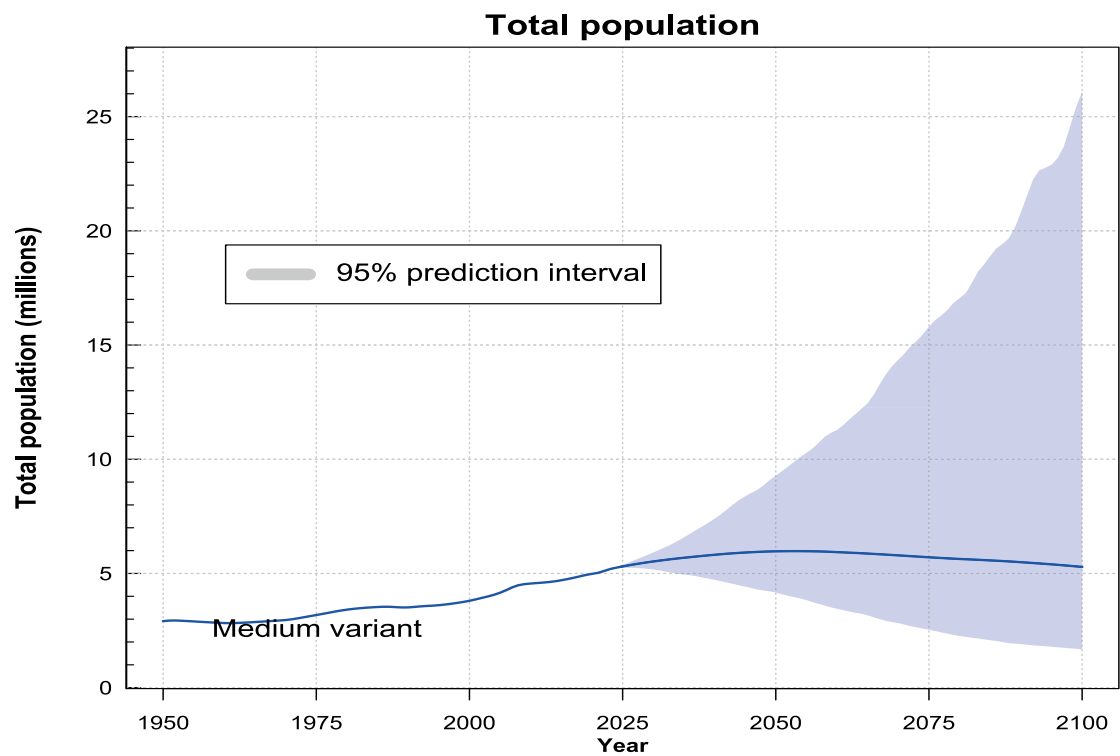
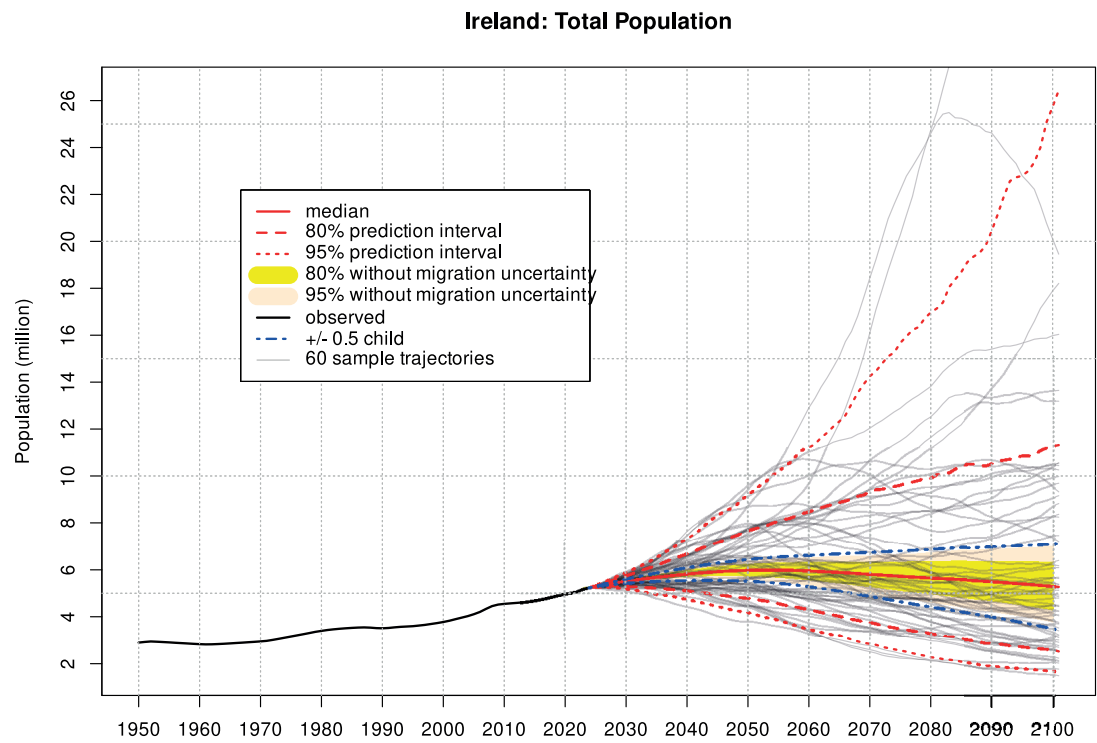


Figure 2.3: UN estimates for the Irish population to 2100 with drivers of change outlined



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United Nations, DESA, Population Division. *World Population Prospects 2024*. <http://population.un.org/wpp/>

This method avoids some of the problems with previous models – it is not based on expert opinions; it does not assume (or force) a return to a steady state, and it has true prediction intervals – not ad hoc estimates. It also allows users to see what is driving the numbers – so the yellow patch above is the estimates without migration uncertainty – everything wider than those lines are driven by migration uncertainty. However, the very breadth of estimates can be off-putting and how useful is it to really know that we are 95% certain that the 2040 population will lie between 4.7m and 7.4m, beyond building in redundancy in policy? Here is where the role of knowledge translators becomes into play (Grimshaw, 2012). It is unrealistic to expect policy makers to understand and communicate the complexity of such estimates – however, knowledge translators between academics and policy makers could interpret and situate the estimates for policy makers.

2.3 Department of Finance’s model description

Recently as part of Future Forty the Department of Finance has modelled population changes in what is described as a ‘bottom up’ method. Pertinently immigration and migration are modelled separately, and immigration is broken down by the different work visas, humanitarian and student visas. Forecasting immigration and emigration separately requires modelling of two complex and independent processes, each influenced by different economic, political, and social factors. Net migration aggregates these factors into a single number, simplifying projections while still capturing the overall impact on population change.

The Department of Finance calculates a long-term trend for each of its 22 distinct migration categories by determining the percentage increase or decrease based on historical entry and exit rates specific to each category. In Future Forty, immigration is estimated by applying historical averages and, for certain cohorts, the proportion of the total population, to the various migrant categories. Emigration, meanwhile, is estimated as a function of past immigration and emigration levels, as well as the average length of stay of migrants within each category. There are five distinct categories related to employment permits, while family reunification is divided into 12 categories. Additionally, there are four free movement categories, with the final category encompassing international protection. The data used to construct the model is sourced from the Central Statistics Office (CSO), the Department of Enterprise, Trade and Employment, and the Department of Justice.

A risk with modelling the factors independently is that the variables are not truly independent and therefore if one variable is off it is likely that all variables are similarly off. For instance, the immigration of nurses is modelled separately from the immigration of general operatives. However, both will be affected by the cost of living in Ireland, and the shortage of housing and the economic opportunities elsewhere while the former may not be affected by an Irish economic recession and the latter will.

2.4 Radical uncertain models method

Rather than a single method, these approaches represent an effort by migration scholars and population demographers to develop more effective tools for policymakers. For example, the QuantMig project, funded under Horizon 2020, has been instrumental in refining methodologies

for early warning systems for short-term operational responses, forecasting for medium-term planning, and scenario-building for long-term strategic decision-making (Wilkin and Melachrinou, 2024).

The European Union's Horizon 2020 programme has funded several initiatives to enhance our understanding of migration dynamics, incorporating complexity and uncertainty into population modelling and developing new analytical tools to generate robust quantitative migration scenarios. These projects include members of Population Europe, a network of Europe's leading demographic research centres. However, as of the time of writing, there is no Irish member listed among its partners (Population Europe).

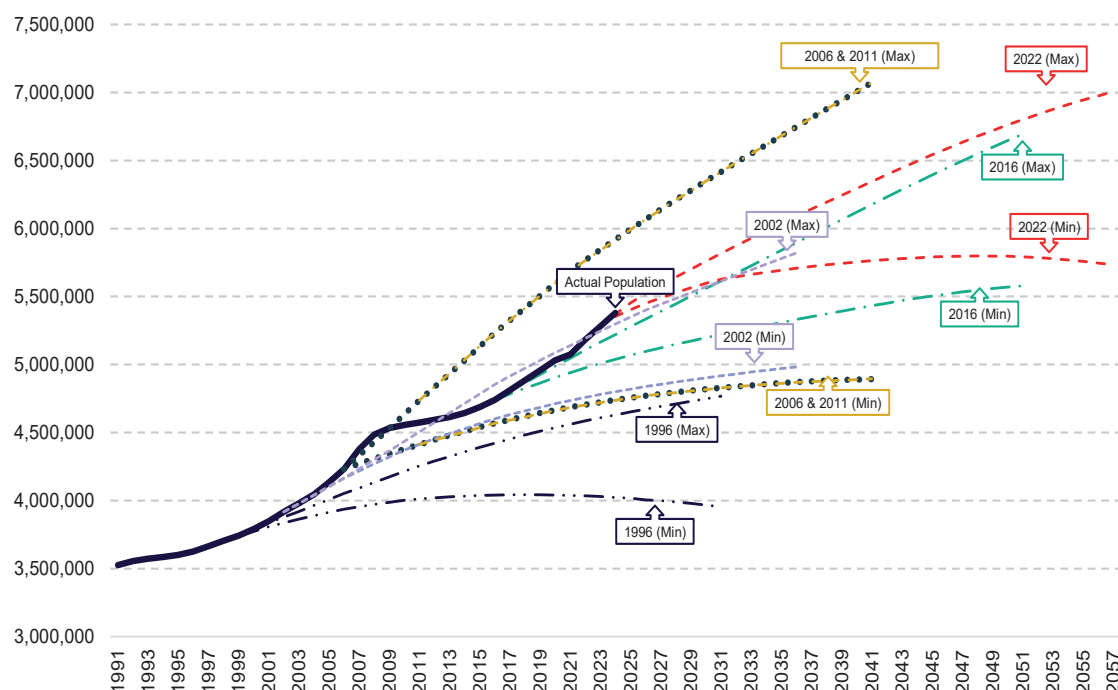
Many of these approaches are still in the early stages of development, with various experimental methods being explored—such as the use of AI to predict migration patterns. The application of big data to forecast and manage migratory flows has been under study since at least 2015, with growing levels of accuracy and success (Beduschi, 2021). In Sweden, the PREDICT system employs algorithmic models to anticipate inflows, transit flows, and outflows, facilitating more effective forward planning across all aspects of migration management.

2.5 Accuracy of population forecasting

The accuracy of population forecasting in Ireland, as in other countries, has varied over time depending on factors such as economic conditions, migration trends, and policy changes. While Ireland's main forecasters, the CSO and the ESRI, generally produce robust forecasts, unforeseen events—especially related to migration and economic fluctuations—have affected the precision of these estimates.

For example, forecasts made by the CSO in the early 2010s correctly anticipated population growth but slightly underestimated the scale of migration-driven increases (figure 2.4). The CSO's 2016 population forecast predicted that Ireland's population would reach about 4.85 million by 2021, and this estimate informed the National Development Plan. However, the 2021 Census showed a population of 5.1 million, reflecting higher-than-expected immigration and economic recovery, which attracted more people to the country than forecasted.

Figure 2.4 shows that the actual population growth – the solid purple line – has run ahead of estimates undertaken every five years with the exception of 2006 estimate between 2010 and the present. The result of the population forecasts for Ireland underestimating actual population outturn has resulted in population projections to 2040 increasing by almost a million in 8 years.

Figure 2.4: Comparison of actual and estimated population growth in Ireland

Source: D/Finance 2025

While all population projections across Europe have been poor and the projections made by the ESRI and CSO are logical, reliance on a few narrow sources for these estimates raises several concerns:

- **Cognitive Engagement with Data:** Presenting only one numerical estimate, even with a higher and lower bound, can lead to cognitive disengagement. Stakeholders are more likely to engage in meaningful analysis when presented with multiple projections, as this fosters a deeper exploration of the underlying assumptions and methodologies that may lead to divergent outcomes.
- **Convergence Mechanisms:** The ESRI employs an error correction model (ECM) that inherently assumes the existence of a long-term equilibrium. This reliance on a singular equilibrium framework may oversimplify complex demographic dynamics and limit the exploration of alternative scenarios that could arise under varying conditions. For instance, the climate emergency or another pandemic. The CSO does not use an ECM – but does assume a long run low stable number for migration. Eurostat assumes that there is European convergence on demographic trends. A legitimate question is are these convergence mechanisms and points valid?
- **Post-Hoc Rationalization:** With only a limited number of models in use, that tend to echo each other, deviations from projected estimates are often attributed to external events, such as the COVID-19 pandemic or geopolitical tensions like the conflict in Ukraine. In contrast, employing multiple models compels analysts to investigate the intrinsic qualities of each model, prompting a more thorough evaluation of their strengths and weaknesses rather than attributing discrepancies solely to external factors.

- **Radical uncertainty:** Migration has increasingly emerged as a critical issue in public discourse; however, its complexity—stemming from various distinct and often overlapping factors—tends to be somewhat downplayed. All the models discussed above – even the UN model – rely on path dependence. However, migration processes are highly uncertain, volatile and complex. Indeed, it is not a single phenomenon, but rather different people move for different reasons at different times. Individuals migrate for diverse reasons: some come to Ireland seeking employment, some indeed were recruited abroad for their skills, others pursue educational opportunities, they may work when they are here and some might overstay their education visa, others are returning to Ireland as either it is their country of origin or it was somewhere they previously migrated to, and yet others are fleeing persecution. To formulate a thoughtful and cohesive response to migration, it is essential to break down this multifaceted phenomenon into its underlying components. Family reunification is relatively stable and predictable; forced and irregular migration is far from predictable (Bijak and Czaika, 2020).
- **Synchrony in their errors** - when demographic models, including net migration forecasts, are wrong, they often exhibit synchrony in their errors across different regions or countries. This happens because migration drivers—such as economic conditions, conflicts, climate change, and policy shifts—are often global or regional in nature rather than isolated to a single country. Events like economic recessions, pandemics, or wars can cause simultaneous errors in multiple models. For example, the COVID-19 pandemic drastically reduced migration worldwide, rendering many forecasts inaccurate in the same direction (overestimating migration). In part this is because many models extrapolation from past patterns. When a major disruption occurs (e.g., Brexit, the Ukraine war), models that relied too much on past stability fail together. This leads to synchronised forecasting errors.

2.6 Modelling internal populations movements

Bergin and Egan (2024) estimate the population in each of the regions in order to calculate a housing demand by region to 2040. The regional population model is a cohort-component model and follows the ESRI population model described above. In addition to the three elements used in the national model (fertility, mortality and net international migration) the model adds in internal migration – movements between counties.

The three alternative sets of assumptions for international migration are:

- “Baseline scenario: net immigration of +35k p.a. to 2030 (higher in the next two years) and +20k p.a. thereafter. This is based on projections from the ESRI’s macroeconometric model COSMO and is consistent with expected economic conditions domestically and internationally.
- High International Migration: net immigration is +10k p.a. higher in each year than in the baseline scenario.
- Low International Migration: net immigration is 10k p.a. lower in each year than in the baseline scenario.” Pp. 16-17

The internal migration is taken from the census as the census asks respondents for their current residence and their residence in the previous year, so the number of people who move from one county to another can be estimated for a census year.

First, flows of people among counties is then estimated in a regression model with explanatory variables including “differences in labour market conditions between counties, house prices in the origin county, and distance and whether counties are adjacent to each other, which are proxies for the cost of moving” p.17.

The model indicates if its costly to move (counties are not adjacent) people are more likely to stay but if house prices increase, they are more likely to move.

Second, Bergin and Egan (2024) project these regression findings into the future step, and find that “If current economic trends continue, we project a pattern of internal migration that is similar to that observed in 2016 and 2022” p.17.

That is, Bergin and Egan (2024) use current data to estimate the factors that drive internal migration and then conclude if the factors that drive internal migration are the same in the future as they are now then migration patterns will be the same in the future as they are now. “In terms of regional population growth, the overall patterns are consistent with what has been observed over the past 25 years” p.33. These conditions are both necessary and sufficient conditions, if these conditions occur, they will cause the migration.

The paper adds average household size and the obsolescence of housing to calculate the regional demand for housing. The paper uses three scenarios for international migration plus two for obsolescence and two headship rates giving 12 scenarios.

There have been previous iterations of this model (cf Bergin and Garcia Rodriguez 2020 and Morgenroth 2018) which have calculated regional populations projections – these have not proved a reliable guide to population movements.

As noted, the model is necessary and sufficient, this means that there is no allowance for either happenstance or choice. In particular, the model has no loopback mechanism so does not account for government policy on regional development or housing. A decision to build a new town would have no bearing on the estimates. Rather the demand for housing is driven by the projected population which is based on the previous population. Policy is being based on this model, but it takes no account of policy.

Another innovation in looking to internal population movements is the work of O'Driscoll et al 2022b who look at Electoral Districts (EDs) over several censuses from 1986 and examine which EDs are growing or declining. They then model the reasons for decline. This is not forecasting but will allow a better understanding of what is driving population movements within Ireland at a much smaller scale than county level.

2.7 Conclusion

Predicting population trends is inherently uncertain and complex, often resulting in underestimation of populations in the longer term. However, certain elements within this process are more stable and predictable—such as births and deaths—while others, particularly migration, are far less so. Migration is fundamentally complex and uncertain, and no improvement in data or methodologies will fully eliminate this uncertainty. That said, better data on internal flows, migration, and particularly emigration would be highly beneficial.

There is no single model that applies universally. Within migration, however, some flows are more stable than others—family reunification being among the most predictable, while irregular migration remains the most uncertain (Bijak, 2024). Yet, the difficulty of modelling should not serve as a justification for disregarding it. Ireland requires a solid foundation for forward planning, which is why the Department of Finance’s modelling of both immigration and emigration is particularly welcome. Nevertheless, an over-reliance on any model and its estimates is inherently risky. Rather than assuming precise accuracy, policies should be stress-tested to assess the levels of population change—and its sub-components—that would render them ineffective. Furthermore, there is no reason to assume that the threshold at which population growth compromises a policy’s effectiveness is the same across all policies. The level of population growth that challenges water supply, for instance, is unlikely to be identical to the level that impacts the provision of primary school places.

The Department of Finance initiative needs to be the start of the development of demography as a discipline in Ireland. We lack demographers and links into the innovative research ongoing in Europe. As a result, we lack civil servants skilled in the understandings of demography able to alert the system to cutting edge demographic research “knowledge translators” (Grimshaw, 2012). This has resulted in a lack of stress testing of policies for their demographic assumptions.

In conclusion, the development and adoption of a more diverse set of population models would enhance analytical robustness, encourage critical engagement with demographic data, support policy adaptation, and provide a more nuanced understanding of the factors shaping population trends. This broader modelling approach would ultimately lead to more effective policymaking in response to demographic shifts.

Chapter Three: Conclusion

The paper provides an analysis of the extent to which Irish Government policies have engaged with demographic trends, including population growth, migration, ageing, and internal population movements. The findings indicate a degree of caution in fully addressing these demographic developments, reflecting, in part, reliance on existing modelling frameworks and the limited availability of specialist demographic expertise within the policymaking process. While key demographic trends, such as an ageing population and increasing societal diversity, are well-documented, there remains scope to further embed their implications within policy development, particularly in relation to workforce planning and the role of inward migration in addressing sectoral labour market requirements.

A further consideration is the absence of a clear and consistently applied definition of rural Ireland, which presents challenges for policy formulation and implementation. In the absence of an agreed definition, there is a risk that policy interventions may be based on assumptions rather than robust evidence, potentially reducing their overall effectiveness. Given the diversity of rural contexts, a differentiated approach is required, as a uniform policy framework may not adequately reflect the distinct challenges facing different rural communities. A more precise and operationally relevant definition of rural Ireland—incorporating factors such as population density and connectivity—could support improved resource allocation, targeted programme design, and enhanced long-term monitoring.

The complexity of demographic forecasting, particularly in relation to migration, presents additional challenges for policy planning. Migration population projections are inherently uncertain, and there is a tendency towards underestimation, particularly over the medium to long term. Notwithstanding these challenges, demographic modelling remains an essential tool for forward planning. The work undertaken by the Department of Finance in modelling immigration and emigration flows represents a positive development; however, over-reliance on any single modelling approach carries inherent risks. It is therefore recommended that policies be subject to scenario stress testing to assess their resilience under varying population growth scenarios, recognising that the impact of demographic change will differ across policy domains.

Policies that rely on population forecasts universally use the central scenario. As population growth has consistently exceeded these projections, planning has often been too cautious and too late. A more prudent approach would be to plan using the higher range of population projections and scale down if necessary, rather than repeatedly responding to shortfalls and crises caused by underestimating the growth in the population.

Furthermore, there is a requirement to strengthen demographic expertise within Ireland and particularly the public sector to ensure that policymaking is informed by the latest research and international best practice. Enhancing institutional linkages with European demographic research networks and investing in specialist analytical capacity within government departments would improve the state's ability to anticipate and respond effectively to demographic change. The adoption of a broader range of demographic models would enhance analytical robustness, support evidence-based policy adaptation, and contribute to more sustainable and responsive policymaking.

Appendix One: Summary Information on Demography in Irish Government Strategies

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Overarching Frameworks					
National Development Plan 2021-2030	Y	N	Y	ESRI	6.1m
National Planning Framework	Y	N	Y	ESRI	5.7m
The Climate Action Plan 2024	Y	Y	N	?	
Sustainable Development Goals (2020) and SDG National Implementation Plan 2022-2024	N	Y	Y		
Ireland's National Energy and Climate Plan 2021-2030 (2020)	Growth mentioned	Y	Y	ESRI	
Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'	N	N	N		
Well-Being Framework (2023 onwards)	N	N	N		
Sláintecare (2017)	Growth mentioned	Y	Y		
Global Ireland 2025	Growth mentioned	Y	Y		
Economic and Workforce Development					
Future Jobs Ireland	Growth mentioned	Y	Y		
Pathways to Work 2021-2025 (the Pfor G announced it would publish a new strategy)	N	N	N		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Outcome of the Review of the Employment Permits Occupations Lists December 2023	N	Y	Y		
Making Remote Work: National Remote Work Strategy (2021)	N	N	N		
The SME and Entrepreneurship Growth Plan (2021)	N	Y	Y		
Enterprise 2025 Renewed (2018)	Y	Y	N		plus 1m (over 2018)
People, Place and Policy: Growing Tourism to 2025	N	N	N		
Economic Recovery Plan (2021)	Y	Y	Y	ESRI	5.6-6m
Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022)	N	N	N		
Ireland for Finance strategy: The strategy for the development of Ireland's international financial services sector to 2025 (2019)	Y	Y	Y		plus .9
Trading for Impact: National Social Enterprise Policy for Ireland 2024-2027 (2024)	N	N	N		
Work to Change Strategy: Social Enterprise and Employment Strategy (2021-2023)	N	N	N		
Comprehensive Employment Strategy for People with Disabilities 2019-2021 (2015)	N	N	N		
Skills and Education					
National Skills Strategy 2025 (NSS 2025) published in 2016	N	Y	Y		
National Strategy for Higher Education to 2030 (2011)	Y	N	N		Only increased students to 2027 before falling

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
National Access Plan: A Strategic Action Plan for Equity of Access, Participation and Success in Higher Education 2022-2028	N	Y	Y		
Ireland's Literacy, Numeracy and Digital Literacy Strategy 2024-2033: Every Learner from Birth to Young Adulthood and 5-year implementation plan	N	N	N		
'Adult Literacy for Life' – a 10-year adult literacy strategy	N	Y	N		
The Digital Strategy for Schools to 2027 (2022)	N	N	N		
STEM Education Policy Statement 2017-2026 (2017)	N	N	N		
Irish Aid Global Citizenship Education Strategy 2021-2025	N	Y	N		
Second National Strategy on Education for Sustainable Development – ESD to 2030	Growth mentioned	Y	N		
Innovation, Research, and Technology					
Impact 2030: Ireland's Research and Innovation Strategy	Y	Y	Y		plus 1m
National Smart Specialisation Strategy for Innovation 2022-2027 (2022)	Depopulation	Y	Y		
Ireland's Industry 4.0 Strategy 2020-2025 (2019)					
AI – Here for Good a National Artificial Intelligence Strategy for Ireland (2021)	N	N	N		
Innovation 2020 (2015)	N	N	Y		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Global Citizens 2030 – Ireland's Talent and Innovation Strategy: Enhancing Ireland's global influence through excellence and inclusion in talent and innovation (2024)	N	Y	N		
National Space Strategy for Enterprise 2019-2025 (2019)	N	N	N		
Social Inclusion and Community Support					
From Poverty to Potential: A Programme Plan for Child Well-being 2023-2025 (2023)	N	Y	N		
The Roadmap for Social Inclusion 2020-2025 (2020)	N	Y	N		
National Traveller and Roma Inclusion Strategy II 2024-2028	N	Y	N		
LGBTI+ Inclusion Strategy 2019-2021 and LGBTI+ National Youth Strategy 2018-2020	N	Y	Y		
Zero Tolerance: Third National Strategy on Domestic, Sexual and Gender-Based Violence (2022)	N	Y	Y		
National Strategy for Women and Girls – 2017-2020 (2017)	N	Y	N		
Energy Poverty Action Plan (2022)	N	N	N		
National Carers' Strategy (2012)	N	N	Y		
Sustainable, Inclusive and Empowered Communities: A Five-Year Strategy to Support the Community and Voluntary Sector in Ireland 2019-2024	Y	Y	Y		
National Volunteering Strategy (2021-2025) (2020)	N	Y	Y		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
National Strategy on Children and Young People's Participation in Decision-Making 2015-2020	N	Y	Y		
National Disability Inclusion Strategy 2017-2021 (2017)	N	N	Y		
Autism Innovation Strategy	N	N	N		
The National Pensions Framework (2010)	N	N	N		
Rural Safety Plan (2022)	N	N	Y		
Health and Well-being					
Healthy Ireland Framework 2019-2025 (2019)	Y	N	Y		
National Drugs Strategy, Reducing Harm, Supporting Recovery: A Health-led Response to Drug and Alcohol Use in Ireland 2017-2025	N	Y	Y		
Disability Capacity Review to 2032: A Review of Social Care Demand and Capacity Requirements to 2032 (2021)	Y	Y	N		
National Strategic Plan to Improve the Health of People Experiencing Homelessness in Ireland (2024-2027)	N	Y	N		
Sharing the Vision: A Mental Health Policy for Everyone (2020)	N	N	N		
Strategy for the Office of the Chief Nursing Officer 2024-2026 (2024)	N	N	N		
National Cancer Strategy 2017-2026	Y	N	Y		
National Dementia Strategy	Y	N	Y	CSO (2013)	

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
National Rare Disease Plan for Ireland 2014-2018	N	Y	N		
Creating A Better Future Together: National Maternity Strategy 2016-2026 (2016)	Y	Y	Y	CSO M2F2 projection until 2031	
Health Service Capacity Review (2018)	Y	Y	Y	CSO M2F2 projection until 2031	5.3m by 2031
Changing Cardiovascular Health National Cardiovascular Health Policy 2010-2019 (a new one is announced in the Pfor G)	Y	Y	Y	CSO 2038	Over 65 to be 23% of population
A Healthy Weight for Ireland: Obesity Policy and Action Plan (2016-2025)	N	N	Y		
National Strategy for Accelerating Genetic and Genomic Medicine	N	N	N		
National Sexual Health Strategy (2015-2020) (new one announced in the Pfor G)	Y	Y	Y		
The Model of Care for Eating Disorders (being reviewed)	N	Y	Y		
The National Adult Palliative Care Policy	N (uses incidence)	N	Y		
Palliative Care For Children With Life-Limiting Conditions In Ireland – A National Policy	N	N	N		
Sports, Culture, and Arts					
National Sports Policy 2018-2027 (2019)	Y	Y	Y		
National Physical Activity Plan for Ireland (2016)	N	N	Y		
National Swimming Strategy 2024-2027 (2024)	N	Y	N		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
High Performance Strategy 2021-2032 (Sport Ireland)	N	N	N		
Culture 2025 (2020)	N	N	N		
Making Great Art Work 2016-2025	N	N	N		
Creative Ireland Programme 2017-2022 (extended to 2027)	N	N	N		
Heritage Ireland 2030 (2020)	N	Y	N		
Straitéis 20 Bliain don Ghaeilge 2010-2030	?	?	?		
Major International Sports Events Policy and Strategy Framework July 2024	N	N	N		
Housing					
Housing for All (National Housing Plan) (2021)	Y	N	N	ESRI	
Strategy for the Rental Sector (2016)	Y	N	N		
Youth Homelessness Strategy (2022)	N	N	N		
Housing Options for Our Ageing Population: Policy Statement (2019)	Y	Y	N	CSO	in 2051 population 5.6m and 6.7m people
National Student Accommodation Strategy (2020)	Student growth	N	N		
Time to Move on from Congregated Settings (2011)	N	N	N		
National Housing Strategy for People with a Disability: 2022-2027 (2022)	N	N	N		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Report of the Housing Commission (2024)	Y	Y	Y		CSO (but says they are an underestimate)
Places for People – the National Policy on Architecture (2022)	Y	N	Y	?	5.7m
Ireland's Long-Term Renovation Strategy (2020)	N	N	N		
Town Centre First (2022)	Y		Y		
Youth, Children, and Families					
First 5 Strategy and other Childcare and Early Years Policies	Y	N	Y		
'Young Ireland: National Policy Framework for Children and Young People 2023-2028' (2023)	N	Y	Y		
Opportunities for Youth: National Strategy for Youth Work and Related Services 2024 - 2028 (2024)	N	Y	Y		
Digital Strategy for Schools to 2027 (2021)	N	N	N		
Justice and Criminal Reform					
Youth Justice Strategy 2021-2027 (2021)	N	Y	N		
Criminal Justice Sectoral Strategy 2022-2024 (2022)	N	N	N		
Probation Service Strategy Statement and Action Plan 2021-2023 (2021)	N	N	N		
Supporting a Victim's Journey: A plan to help victims and vulnerable witnesses in sexual violence cases (O'Malley Report) (2021)	N	N	N		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Promoting and supporting the provision of Restorative Justice at all stages of the criminal justice system Policy Paper (2023)	N	N	N		
Family Justice Strategy 2022-2025 (2022)	N	N	N		
Civil Defence – Towards 2030	N	N	N		
Migration and Integration					
Migrant Integration Strategy 2017-2020 (2017)	N	Y	N		
The EUs Asylum, Migration and Integration Fund (2021-2027)	n/a	n/a	n/a		
Traveller and Roma Education Strategy (2024-2030) (2024)	N	Y	N		
National action plan to prevent and combat human trafficking 2023-2027 (2023)	N	Y	N		
Global Ireland Ireland's Diaspora Strategy 2020-2025	N	Y	N		
Transport					
National Sustainable Mobility Policy (2022)	Y	Y	Y		5.7
EV Infrastructure Strategy 2022-2025 (2023)	N	N	N		
Ireland's Road Haulage Strategy 2022-2031	Y	N	Y		
Renewable Transport Fuels Policy 2023-2025	N	N	N		
National Ports Policy 2013	Y	N	Y	CSO	
Moving Together: A Strategic Approach to Improving the Efficiency of Ireland's Transport System (2024)	Y	Y	Y		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Rail Freight 2040 Strategy	Y	N	N		5.7
Irish Maritime Directorate Strategy 2021-2025 (2021)	N	N	N		
Maritime Safety Strategy: Make time for maritime safety (2015)	N	N	N		
Our Journey Towards Vision Zero Ireland's Government Road Safety Strategy 2021-2030 (2021)	N	N	N		
National Sustainable Aviation Fuel Policy Roadmap	N	N	N		
National Aviation Policy (2015)	N	N	N		
Infrastructure and Environment					
Harnessing Digital – The Digital Ireland Framework (2022)	N	N	Y		
Laboratory Strategy 2024-2034 (2024)	N	N	N		
Connecting Government 2030: A Digital and ICT Strategy for Ireland's Public Service (2022)	N	N	Y		
Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022)	N	N	N		
National Adaptation Framework (2024).	N	N	Y		
National Cyber Security Strategy 2019-2024 (2019)	N	N	Y		
Our Rural Future – Rural Development Policy 2021-2025 (2021)	Y	N	Y		plus 1m
Ireland's 4th National Biodiversity Action Plan 2023- 2030	N	N	N		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Common Agricultural Policy Strategic Plan 2023-2027 (2023)	N	N	Y		
Ireland's Forest Strategy 2023-2030 (2023)	Y	N	Y	CSO	plus, 1m by 2050
Clean Air Strategy (2023)	N	N	N		
Water Services Policy Statement 2018-2025	Y	N	N		plus 1m
Uisce Éireann: Draft Water Services Strategic Plan 2050	Y	Y	Y		6m by 2050
Water Action Plan 2024: A River Basin Management Plan (2024)	Y	N	N	CSO	6m by 2051 & 1m+ by 2040
Nature Based Management of Urban Rainwater and Urban Surface Water Discharges – A National Strategy (2024)	Y	N	N		6m by 2050
Nitrates Action Programme (2021)	N	N	N		
Waste Action Plan for a Circular Economy (2019)	N	N	N		
Embracing Ireland's Outdoors – National Outdoor Recreation Strategy 2023-2027 (2022)	N	N	Y		
National Landscape Strategy	N	N	N		
National Air Pollution Control Programme (NAPCP)	Y	N	N	ESRI	5.7m
National Climate Mitigation Plan (2017)	Y	Y	Y		
Food Vision 2030 – A World Leader in Sustainable Food Systems (2021)	Y	Y	N		only world pop
The National Organic Farming & Food Strategy	N	N	N		
National Strategy Horticulture 2023 to 2027 (2023)	N	Y	N		

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Plant Health & Biosecurity Strategy 2020-2025	N	N	N		
Bovine TB Eradication Strategy 2021-2030 (2021)	N	N	N		
The All-Ireland Pollinator Plan for 2021-2025 (2021)	Y	N	Y		
Compliance and Anti-Fraud Strategy 2024-2028 (2024)	N	N	N		
National Biomethane Strategy (2024)	N	N	N		
Powering Prosperity – Ireland's Offshore Wind Industrial Strategy (2024)	Y	N	N		
National Peatlands Strategy	N	N	Y		
Bord na Móna's Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) (2020) include???	N	N	N		
Coillte's Forest Estate Strategic Land Use Plan 2023-2050 (2022)	Y	N	N		
Report of the Deer Management Strategy Group	N	N	N		
Quantum 2030 – A National Quantum Technologies Strategy for Ireland (2023)	N	N	N		
Coastal Change Management Strategy Report	Y	N	Y		
National Hydrogen Strategy	Y	N	N		
Long-term Strategy on Greenhouse Gas Emissions Reductions	Y	N	N		5.7

	Use pop projections	Migration	Demography	Source of pop estimate	Pop estimate 2040
Strategy for the Future Development of National and Regional Greenways	N	N	Y		
National Payment Strategy	N	N	N		
Private Wires (2024)	N	N	N		
Public Sector Delivery					
Public Sector Energy Efficiency Strategy (2017)	N	N	N		
Public Service Data Strategy 2019-2023	N	N	N		
Better Public Services: A transformation strategy to deliver for the public and build trust	Y	N	N		
Ireland's Consular Strategy	N	N	N		
Buying Greener: Green Public Procurement Strategy and Action Plan 2024-2027 (2024)	Y	N	N		
Civil Service Blended Working Policy Framework	N	N	N		

Appendix Two: Elements of Population Modelling and its Uncertainty

It is important to recognise this uncertainty and to acknowledge that any projections, with respect to the future size of the population, are based on a set of, more or less realistic, assumptions. For this reason, it is critical that any demographic assumptions and projections be regularly reviewed to take account of new and emerging data. It is also important to incorporate such ambiguity and accept wide and uncertain population ranges as the principal quantitative guide to future outcomes.

Bijak and Czaika, (2020) argue that uncertainties are of two kinds:

- epistemic – related to imperfect knowledge, which can potentially be obtained through more research, rendering these aspects at least potentially knowable,
- aleatory – unknowable and unpredictable shocks and their impacts. An example of these would be a tsunami, a sudden conflict, or pandemic.

They quote reviews of the track record of population and in particular migration projections as ‘not too strong’ (p5). For instance, they quote Keilman and Pham (2004) assessment of forecasts produced by statistical offices in 14 European countries, which found that migration has been consistently underestimated in historical forecasts. Indeed, they argue that if forecasts are correct, it is a ‘fluke’ (p5).

The reasons for inaccurate forecasts include the occurrence of shock events, unpredictable changes to migration drivers, as well as large variation in the way migration responded to these changes.

In referring to migration, Bijak and Czaika, (2020) argue that four key elements are needed to perfectly predict migration, however these equally apply to population prediction. The four elements are:

- i) Perfect theory and understanding of the complex interplay of multiple drivers.
- ii) Perfect data on the multiple drivers of demographic change in the past, the present and in the future. This would need to hold across space as well.
- iii) Perfectly specified models analysing the data.
- iv) Perfect knowledge of the future development of multiple drivers.

The absence of any one of these undermines the idea that perfect prediction is attainable. However, all countries need some sense of which way the population is trending and early warnings of spikes in population changes. Bijak and Czaika (2020) argue that even with over a hundred years of study of migration, migration scholars are still not able to accurately predict the numbers of migrants, even they query if producing a probability distribution of possible future outcomes is possible.

Several factors are likely to influence the size and structure of the Irish population by 2050. These include demographic trends such as fertility rates, life expectancy, and migration patterns, as well as economic, social, and environmental factors.

Fertility Rates

As shown in the chapter on demographic changes - Ireland's fertility rate has been steadily declining over the past few decades, following global trends in developed countries. Fertility is declining because of societal shifts like delayed marriage, preferences for smaller families, preferences to be child-free, increased female workforce participation, and accessible contraception. Government policies such as access to affordable housing and in particular family-support policies, such as childcare and parental leave, may stabilise the long-term decline in fertility rates. Migrants, even with similar fertility rates, may boost the population as they tend to be younger and more likely to be entering their childbearing years. However, the decline in the fertility rate seems relatively predictable.

Migration Trends

At first glance, migration appears to be a straightforward concept: it reflects the number of people entering and leaving a country over a specified period. Migration can be expressed in gross terms—the total number of individuals entering—or in net terms, which accounts for this figure minus the number of people leaving the country. However, it is complicated for Ireland by several factors; free movement between the UK and Ireland, free movement within the EU and return emigrants or their children; seasonal workers who may come just for a harvest and very mobile workers who fly in and out continually for short periods (for instance Portuguese dentists and Romanian nurses were referenced as workers who just come to work and then fly home).¹⁰ Added to this we have people working remotely for Irish based companies who have never set foot in Ireland and workers living here but working remotely in another jurisdiction.

The most used definition is one that has been given by the UN, namely that it happens when a migrant moves from one country to another and stays there for at least 12 months. Usually, net migration is estimated because estimating immigration and emigration separately is more difficult, it involved understanding motivations, drivers and opportunities for potential and actual migrants. However, the net migration number (residual) is easier to estimate as it is just the change in population once births and deaths have been accounted for.

Partly because of these definition difficulties, migration is one of the biggest uncertainties in forecasting Ireland's future population. If we just concentrate on people who live here, Ireland has seen significant immigration over the last decade. Two things are at play here – movements into Ireland because it is an economically attractive place to be and movements because it is seen as a safe place to be. If Ireland remains economically attractive and continues to need labour for high-demand sectors (such as technology, healthcare, and construction), high levels of immigration could sustain population growth. Likewise, migration from people moving from less safe countries to safer countries could increase the population. However, it is likely that this will be influenced by broader socio-political choices.

Conversely, emigration trends could also affect population size. Ireland has a history of large-scale emigration, especially during times of economic stress. While this trend has slowed due

¹⁰ <https://www.cso.ie/en/releasesandpublications/FP/FP-IPEADS/irishpopulationestimatesfromadministrativedatasources2021/> looks for population size through admin data – they test to see if a person is in one or more admin sources – Portuguese dentists would register one hit and so be excluded.

to improved economic conditions, emigration levels could rise if the economy suffers in the future or if global conditions make other countries more attractive. Attractive here could be economically, socially or environmentally. The future size of the Irish population will be heavily influenced by government policies on immigration. If Ireland maintains or expands policies that attract skilled migrants, population growth could be sustained. Conversely, even with a limited history of success (De Haas et al, 2020) stricter immigration controls could limit population growth.

Longevity

Life expectancies in Ireland have consistently increased since the collection of statistics began. Even with an inflection point around the covid pandemic (Daly et al, 2024) – Irish people are living longer than ever, as public and social policies have improved health and living conditions. It may be assumed that if people live longer, there will be more population. However, Naqvi and Whelan (2019), highlight that the decrease in mortality rates has slowed and actually has reversed for the very oldest age groups. That is the expectations of increasing lifespans cannot be taken as read.

Projections of how long people will live are extrapolative: past trends are identified and forecast (Naqvi and Whelan, 2019). An underlying assumption is that the trends identified in the past will hold. An assumption challenged by the excess mortality witnessed during the Covid19 pandemic (Steel, et al. 2025). Another issue is the time period from which the projection is cast forward – Naqvi and Whelan (2019) highlight that it makes an important difference if the time period is 2010-2015 or 2012-2015 because of the economic cycle and demand for labour– never mind starting from 1900 or 1926.

This means there are decisions to either be made or modelled:

‘The extrapolative approach employed by the CSO and other national statistical agencies, though based on relationships found in mortality rates in the past, still requires the input of experts. The forecast mortality rates depend crucially on the time period in the past that is used to determine the short-term rate of improvement input to the model...’ (Naqvi and Whelan, 2019, p18).

Naqvi and Whelan (2019) outline various statistical techniques to overcome reliance on expert judgements and they discuss the performance of these various techniques and models. Each technique results in a different outcome for life expectancy – while at an individual level, or even age cohort, these predicted differences are small when calculated over the $\frac{3}{4}$ of million inhabitants aged over 65 they can imply a substantial difference in the numbers of people receiving pensions, getting eldercare etc.

Another issue which gets less attention is the inequality in life expectancy between age groups – while all age groups are experiencing increased longevity it is the better off (defined in various ways) that are seeing the most improvements. This will have divergent consequences for different sectors.

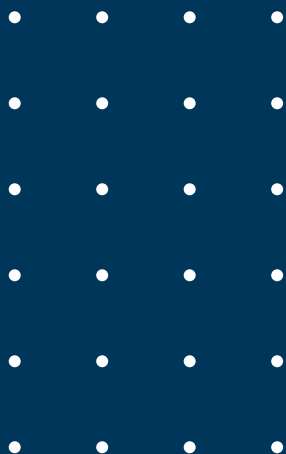
None of the three components of population change are entirely certain, we do not know the numbers of babies that will be born exactly in future years, we do not know the exact age at which people die, and we have a poor grasp of how many people will travel to Ireland in the next decade. As shown earlier, in the recent past migration has dominated as a driver of population change and it is likely that this will continue. However, the other elements are also important, not least because they contribute to changes in the age distribution.

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