## Box B: Demographic Change and Public Finances

The Council is planning a special publication on the long-term sustainability of the public finances (30-40 years ahead) for next year. Demographics are a key driver of the public finances, which can directly impact relevant spending areas such as pensions, education and health. However, projections around these are challenging given the amount of uncertainty involved, as this box aims to outline.

To illustrate how errors on demographic projections can accumulate, we compare past projections from the CSO against actual census outcomes.[1] The CSO usually provides scenarios for different fertility and migration assumptions. In this analysis, we only consider the scenario that has been the most accurate up to 2016 for each projection.[2]

Looking at the CSO projections, we can see that a shorter projection window does not necessarily give more precise results. Figure B.1 compares actual population outturns from 1996–2018 with projections based on the 2006 and 1996 censuses. For 2016—the most recent census year—the 20-year-ahead projections underestimated the population by almost 317,000, while the ten-year-ahead projection of 2006 overestimated it by 354,000.

Figure B.1: Comparison of Actual and Projected Population
Population in thousands
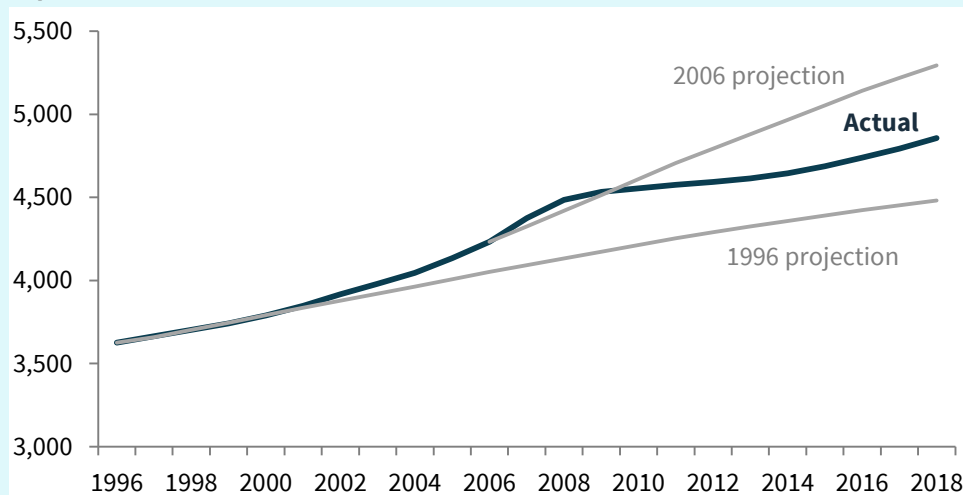
Sources: CSO annual population estimates and CSO population projections 1996/2006 census based.
Note: The scenarios displayed are M1F1 for 1996 and M2F1 for 2006. Data after 2016 is preliminary.

Net migration tends to be the key source of error for population projections. This is evident for the five-year-ahead projections for 2006 and 2011 (Figure B.2, Panel A). Panel B shows that actual net migration varied greatly during the last 20 years. Importantly, it largely mirrored the economic cycle, whereas each set of projections tended to be quite linear and informed by recent migration. This is also reflected in the relatively large projection errors for middle age

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[1] It is important to note that the population projections produced by the CSO are not attempts at forecasting the future, rather presentations of how the population could evolve under different scenarios. The scenarios are agreed by an expert group in conjunction with the CSO. Assumptions are informed by historical and recent migration, mortality and fertility trends, and also by the prevailing economic and social conditions at the time of the projection.

[2] For example, 1996 census projections list three total fertility scenarios: fertility rates (1) rise to 2 children per woman by 2001 and remain there, (2) decrease to 1.75 by 2011 and remain there and (3) decrease markedly to 1.5 by 2011 and remain there. Actual rates were around 1.9 for 1996–2006, before rising to 2.0 for 2007–2011 and then falling to just over 1.8 until 2016. From what we know today, the 1996 "high" fertility assumption (F1) was the most accurate assumption for 2016.

groups (25-44) as well as for young ages (0-4) of the 2016 population (Figure B.3). The total number of births typically depends on fertility rates as well as on the number of women in middle age groups. As such, they may be indirectly affected by migration. Projections of deaths, on the other hand, have been the most consistent over all recent timeframes. IFAC is working on modelling migration explicitly in order to refine population projections.
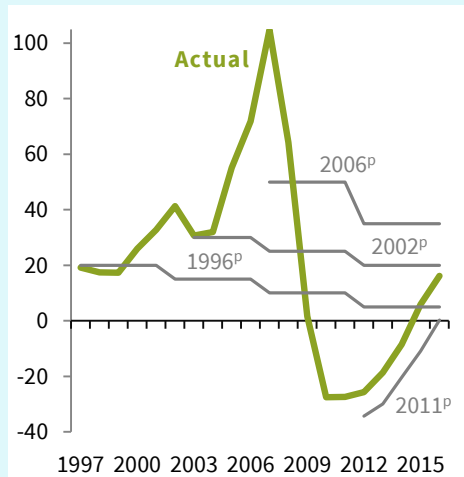
Figure B.2: A Closer Look at Errors on Projections
Population flows and population in thousands

A. Projection errors decomposed
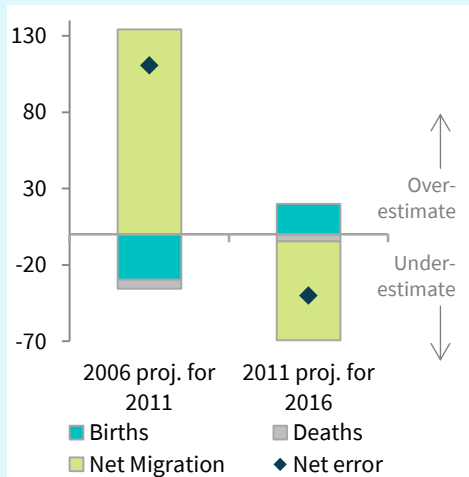
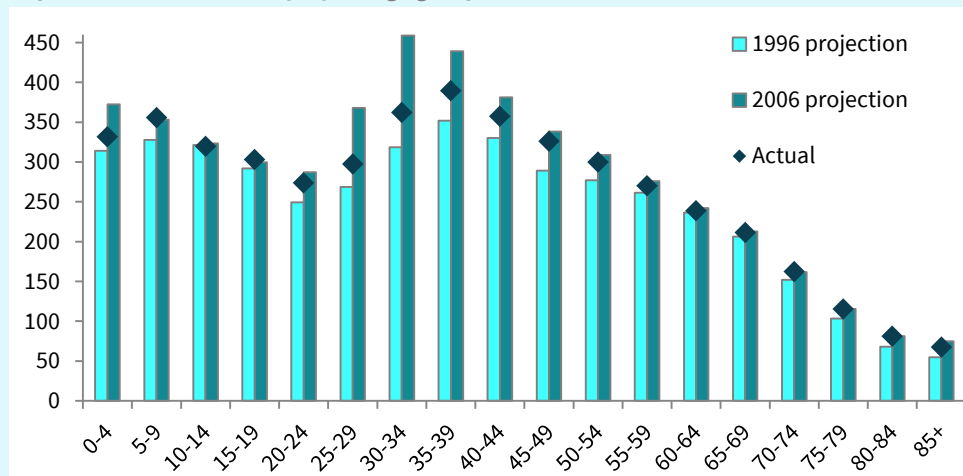**B. Actual and projected migration**

Sources: CSO population estimates and 2016 census results; CSO population projections based on 1996, 2002, 2006 and 2011 censuses.
Note: Scenarios are M1F1 (1996); average of M1/M2, F1/F2 (2002); M2F1 (2006); M1F2 (2011). "p" = projection.

Figure B.3: Actual vs Projected Population 2016 by Age Group
Population in thousands by 5 year age groups

Sources: CSO 2016 census and CSO population projections based on censuses 1996/2006.
Note: The scenarios displayed are M1F1 for 1996 and M2F1 for 2006.

Fertility, migration and deaths can impact the public finances differently, depending on, for example, net impacts on the labour force, contributions, and transfers. They may also have economic implications, including on housing. Further research could explore migrants' fertility, schooling demand, retirement intentions, and long term care requirements.