



Future changes in age and household patterns: Some implications for public finances



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ABSTRACT

Using stochastic forecasting techniques, this paper assesses the consequences for public finances of changes in age and household structures in Denmark over the period 2008–2037. Focusing on components of welfare provisions and tax payments with noticeable differences across age and household status, we show that, based on a point forecast, the fiscal impact of changes in household structures amounts to an annual negative effect of 0.5% of GDP, and the effect of changes in age structures is forecast to worsen the public budget by 3.7% of GDP per year. While being subject to a considerable amount of uncertainty, the prospect of such a dramatic weakening of public finances is likely to trigger demands for welfare reforms characterized by a more individualized system of public transfer and tax payments, in addition to the measures that have already been taken to address the fiscal effects of population ageing.

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1. Introduction

Household structures are changing throughout Western economies (see, e.g., OECD, 2011). This development is characterized by couples postponing childbearing, increased shares of divorced and other single mothers and fathers, more people living alone in old age, etc. The observed emergence of new family patterns is happening concurrently with population ageing, driven by falling fertility rates and increasing longevity, as well as with larger volumes of migration. Such demographic changes may have substantial economic consequences.

The magnitude of past and projected changes in the age structure of the population has been documented in several studies (see, e.g., EU Commission, 2011). There is

also a large body of literature addressing the fiscal (and wider economic) effects of population ageing (see, e.g., Davig, Leeper, & Walker, 2010; Kotlikoff, 2006; and Weale, 2008). This literature has pointed to a fiscal “overhang” posed by the uncovered expected financial liabilities associated with public pension schemes, health costs, etc. A recent paper (IMF, 2009) has put this problem into dramatic form by showing that the financial stress caused by the great financial crash of 2007–10 was probably only about 10% of that likely to be caused by future age-related spending in economies with a shrinking labour force.

In this paper, we focus on the sensitivity of public finances to changes in the household structure. From a Scandinavian perspective, the link between demographic transitions and welfare expenditures may be of particular relevance. Indeed, many of the central features of the Scandinavian welfare model are related to households and families: public spending on child care and education, means-tested cash payments, early retirement benefits, publicly provided health and eldercare services, old-age

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pensions, and so on (see, e.g., Esping-Andersen, 1990). Moreover, certain tax revenues might be sensitive to changes in family structures.

As a case study, we use Denmark, which is an archetypical Scandinavian welfare state (Andersen, Jensen, & Pedersen, 2008). The first part is a demographic analysis, aimed at quantifying the changes in household structures in Denmark. To form a benchmark, we briefly examine the extent to which people have actually “jumped” between different household positions over a 25-year period (1982–2007). Following the approach set out by Alho and Keilman (2010), we then combine a probabilistic population forecast with a model for random shares, with the random shares model assigning the population randomly to different household positions by age and gender in any future year.

The second part of the paper offers an empirical assessment of the implications of changes in household structures for some selected components of welfare expenditures and public revenues. Our focus is on components with noticeable differences in unit costs between individuals living alone and couples, and for couples living together as married or cohabiting (OECD, 2010). Specifically, we construct a counter-factual scenario, showing what the (different categories of) welfare costs and tax revenues would be if the household structure prevailing in 2007 were to remain unchanged throughout the years 2008–2037. We also assess the budgetary implications of the fact that the projections are subject to much uncertainty.

The methodological approach of the paper is interdisciplinary, drawing heavily on demographics, stochastic forecasting techniques, social policy and (public) economics. In fact, the contribution of the paper can be seen as an extension of existing studies, with a focus on the significance of changes in age structures for public finance. The gap this paper seeks to fill relates to the fiscal implications of another dimension of demographic changes, namely changes in household structures. How strong are those demographic effects, do they tend to aggravate or counteract each other, and what can be said about the uncertainty surrounding forecasts of their future significance? To the best of our knowledge, no such study has yet been undertaken on a systematic basis.

From here, the paper proceeds as follows. In Section 2, we identify different types of households, and observed and projected changes are reported. Section 3 outlines a method for calculating the budgetary effects of changes in age and household structures. In Section 4, we use this method to quantify the empirical significance of those changes for the period 2008–2037, and Section 5 addresses the uncertainty associated with the forecasts. Section 6 concludes and suggests some policy implications for the future financing of the welfare state.

2. Demographic developments: 1982–2037

This section provides the demographic background to the fiscal studies performed in subsequent sections. Two distinct data sources are used. First, registers from Statistics Denmark contain information about the entire Danish

population every year, including demographic data such as age, gender, marriage status, family linkages and immigration status. Second, a probabilistic forecast of the Danish population broken down by age, gender, and household status is produced, following the methodology set out by Alho and Keilman (2010). The main idea is to combine a probabilistic population forecast with a model for random shares, where the latter assigns the population in any future year randomly to different household positions (by age and gender). A probabilistic forecast for household shares requires a multivariate distribution for shares of all household positions in the future (by age and gender), expected values (point predictions), probability distributions around the expected values, co-variances between the shares, and serial correlation. The steps to be implemented are, first, specify a multivariate probability distribution for shares; second, estimate its parameters (expected values, variances, co-variances, serial correlation); third, compute expected values for the shares; and, finally, simulate shares for future years, and apply these to a stochastic population forecast. This forecast results in 3000 paths for the population size in each of the household types and in five-year age groups from ages 0–4 to 95+. The medians of these 3000 values will be denoted as the point forecasts for the population. In what follows, we present the values for 2017, 2027 and 2037.

In 1982, the Danish population was 5.12 m. With modest population growth, driven primarily by net migration, the total population had increased to 5.45 m in 2007. The projection in the present paper has a point forecast for the total population in 2037 of 5.98 m, which is very close to Statistics Denmark's (2012) official projection (6.02 m). Thus, the total increase from 1982 to 2037 amounts to an annual growth rate of less than 0.3%. However, like most developed countries, Denmark is subject to population ageing over the projection period. Thus, the number of individuals aged 70+ is projected to more than double between 1982 and 2037, whereas the number of individuals aged 15–64 is projected to increase by a mere 0.14 m. This clearly leaves Denmark with significant challenges for financing an increasing amount of public expenditures to the elderly, mainly for health care and pensions.¹

We next explore how differences in the age and gender composition of the population can be supplemented by demographic projections where the population is also divided into different household categories. Following the practice of Alho and Keilman (2010), the population may be divided into seven household types, with each individual being assigned to one and only one of the following groups: (A1) Married in a couple with or without children; (A2) Cohabiting with or without children; (A3) Lone parent; (A4) Children; (A5) Persons living alone; (A6) Others in private households, including adults living with other adults but not forming a couple (roommates and similar); and (A7) Living in institutions, which primarily includes

¹ Since the focus of this study is on the importance of changing household structures (relative to changing age structures), we do not provide a detailed comparison of our results to other ageing studies in Denmark. Instead, the reader is referred to, for example, the 2012 Ageing Report of the European Commission (European Commission, 2012).

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