A Lipro Household Projection Model for Flanders: Data Issues, Consistency and Household Formation Scenario Setting

The purpose of the paper is to discuss some methodological issues of a Household Projection Model for Flanders (2006-2031) based on the Lipro Projection Method presented by Imhoff and Keilman (1991)[1]. Our projection is part of a larger on-going research project Flemosi (Flemish Model for Simulation) that aims at building a simulation model for ex ante evaluation of Flanders socio-economic policies. In this context, classical projections that focus on population structure by age and sex only, are not satisfactory since policy, income and expenditures are also linked to household structure, education and even to individual characteristics such as health status, demanding more detailed population projections.

We will discuss (1) data issues, (2) the problem of consistency and (3) the influence of scenario setting involving household formation dynamics on population trends. We will clarify the advantages and constraints of the Lipro projection method for our Household Projection Model for Flanders through tangible empirical examples.

(1) *Lipro-projections have high data demands.*

Besides age and sex, our population structure takes into account the 12 "Lipro Household Positions"(Imhoff and Keilman, 1991): children of married and unmarried couples, children in lone parent households, married and unmarried couples with or without children, single households, lone parents, non-related family members, members of collective households and an "other category". Data for this exercise are not readily and only partially available.

Based on its household and individual information, the 2006 Micro Census data was broken down by by age, sex and household structure. These data will be used as the initial population structure to be projected.

[1] Van Imhoff, E. and N.W. Keilman (1991) - *LIPRO* 2.0: *An Application of a Dynamic Demographic Projection Model to Household Structure in the Netherlands,* Amsterdam, Swets and Zeitlinger B.V.

The 2006 Micro Census Data were individually linked to the Belgian 2001 Population Census – also broken down by age, sex and household structure. This way we will establish an initial rate matrix for internal transitions between household positions. Complementing the Census information with reports on fertility and mortality will allow us to construct plausible fertility, mortality and migration figures by Lipro-position.

Several additional data issues encumber the rate calculation. First, data from the 2001 census refer to October 1st instead of January 1st. Consequently, events do not cover the whole 5-year period necessary for the projection. Second, the 2006 Micro Census data do not include individuals living in collective households. Thirdly, the National Register data on mortality only covers events up to the end of 2004 – omitting thus one year of observation needed. In the paper we will show how to solve these issues of incomplete data.

(2) *The possibility to impose consistency constraints to the projections*.

Consistency can be defined as a situation in which the number of events from each state is submitted to constraints. For example, if a woman enters the state "married", than also a man has to make such a transition. Consistency constraints without doubt enhance the reliability of Lipro results since projections are submitted to theoretical conditions that correct incongruous population trends. However, not all conditions can be modelled, and too strict conditions also might well trigger tendencies that match our erroneous preconceptions of (future) reality. We will show how results of our projection differ with and without consistency constraints through the example of single households and children from married versus unmarried couples. We will also compare our projections to other household projections (Flemish Government, 2011)[2] and discuss the possible role of consistency in the differences between them.

(3) *The possibility to evaluate the impact of internal transition rates on fertility, mortality and population dynamics.*

[2] Studiedienst Vlaamse regering (2011), SVR-projecties van de bevolking en de huishoudens voor Vlaamse steden en gemeenten, 2009–2030

Classical population projections allow generating hypothesis about general fertility, mortality and migration trends. Initially, we will adopt hypothesis about their evolution close to those proposed by the Flemish government. However, fertility, mortality and also emigration are also related to household position. Therefore, ceteris paribus, changes in the population's household structure will affect general fertility and mortality level. We will formulate scenarios about future household formation dynamics and evaluate their impact on fertility and the population.