ProFamy: A SOFTWARE AND DATABASE FOR HOUSEHOLD FORECASTING[1]

The classic headship-rate method for demographic projections of households is not linked to demographic rates, projects a few household types without size, and does not deal with household members other than heads. By comparison, the ProFamy method uses demographic rates as input and projects much more detailed household types, sizes, and living arrangements for all members of the population. Projections from 1990 and 2000 using ProFamy and observed U.S. demographic rates in the 1990s show the discrepancies between the projections and 2000 census observations are reasonably small, which validates the new method.

Good Potential for Applications of Household Projections at State and Small Area Levels Using ProFamy Software and Database

Most potential users of ProFamy software for business and social planning may be interested in household forecasting at state or small area levels; it may not be appropriate to conduct household projection by race groups at state and small area levels due to sub-sample size constraints of the available data. Thus, we provide the input and output of the U.S. household projection without race classification as part of the ProFamy package, while we present the main results and discussions of the U.S. household projection by race at national level in our Report No. 3 included in the package. As part of the ProFamy package, we present and discuss in the database and Report No. 2 the race-specific standard schedules of the age-parity-marital status-specific occurrence/exposure (o/e) rates of fertility and the sex-age-specific o/e rates of marital/union status transitions in 1990-96 based on the U.S. pooled surveys data, as well as the race-sex-age-specific net rates of leaving the parental home based on 1990 and 2000 censuses data. The detailed information about the data resources and procedures for estimating the race-specific standard schedules are presented in our Report No. 2. As discussed in that report, we are confident that the race-specific standard schedules included in the database of the ProFamy package may be used as the model standard schedules for U.S. household projections at the national, state and small areas levels. For household projection at state and small areas levels, we recommend to use the weighted average of the national race-sex-age-specific standard schedules with proportions of White & non-Hispanic, Black & non-Hispanic, Hispanic, Asian & Others non-Hispanic populations in the state or small area as weights. The reset of the data preparation work for household projections of a state or small area are rather straightforward. Thus, we believe that there is a good potential for applications of household forecasting at state and small area levels using

[1] The ProFamy software, the Reports No. 1, No.2, and No. 3, as well as the database, which are stored in a CD, are preliminary outcome of the ongoing research project on demographic tool and database for household forecasting supported by a NIH/NIA SBIR Phase I grant. We also thank the Population Division of the U.S. Census Bureau, NIA, NICHD, Center for Demographic Studies of Duke University, Max Planck Institute for Demographic Research, and Sabre System Inc. for supporting the prior related applied and basic scientific research in the past several years.

ProFamy software and database.

Report No. 1: Software

Zeng Yi and Zhenglian Wang (2004). "ProFamy (Trial version 1.0) – A Software for Household Forecasting"

Abstract: The current version of the program is written in Microsoft Visual C++ for the interface (including input and tabulation/graphic output) and in Fortran for computing; it runs under Windows and DOS. Using an Intel Pentium 4, it takes about half a minute to complete the calculations of household forecasts for 50-60 years. Chapter G1 presents a tutorial for a new user to get general ideas of how to use the software. Chapters G2, G3, and G4 describe in more details on how to set up the projection model based on data availability and user's needs, how to prepare the input data, and how to run the computing program, and how to view/manage the output, respectively.

Report No. 2: A Database of Demographic Standard Schedules

Zeng Yi, Zhenglian Wang, and Danan Gu, and Philip Morgan (2004). Standard Schedules for Household Projections -- A Database (preliminary version) of U.S. Race-Sex-Age-Specific Occurrence/Exposure Rates of Marriage/Union Formation & Dissolution, Marital and Non-Marital Fertility, and Race-Sex-Age-Specific Net Rates of Leaving Parental Home in the 1990s.

Abstract: We have presented in the database (in Excel file format) as part of the ProFamy package the race-sex-age-specific o/e rates of marital/union status transitions and race-age-parity-marital status-specific fertility o/e rates in the 1990s, based on a large data set which pools several relevant variables (age, sex, race, events history information on dates of marital/union status changes and births) from the national surveys of CPS (1990, 1995), SIPP (1996), NSFH (1992-94), and NSFG (1995). The total sample size of this pooled surveys data set is 191,525 individuals (37,731 men and 153,794 women). We also present in the database the race-sex-age-specific net rates of leaving the parental home estimated based on 1990 and 2000 censuses data.

The Total Fertility Rates and age-specific fertility frequencies for all marital statuses, all parities and all races combined in the 1990s based on the pooled data set are remarkably close to the corresponding estimates based on the vital statistics. The life table summary measures of marital status transitions for all races combined based on pooled surveys data in 1990-96 and those corresponding estimates by Schoen and Standish (2001) using their upward adjusted age-specific marriage and divorce rates based on vital statistics are pretty consistent. Furthermore, we have made appropriate adjustments for the pooled survey estimates of the detailed o/e rates of marital/union status transitions to be consistent with the aggregate estimates (without race and cohabitation classifications) based on the vital statistics. ***We are, therefore, confident that the race-age-parity-marital status-specific o/e rates of fertility and the race-sex-age-specific o/e rates of marital/union status transitions in 1990-96 based on***

the pooled surveys data may be used as the standard schedules for U.S. household projections at national, state and small areas levels. For household projection at state and small areas levels, we recommend to use the weighted average of the national race-sex-age-specific standard schedules with proportions of White & non-Hispanic, Black & non-Hispanic, Hispanic, Asian & Others non-Hispanic populations in the state or small area as weights.

Report No. 3: Method and Application

Zeng Yi, Kenneth C. Land, Zhenglian Wang, and Danan Gu (2004). U.S. Family Household Dynamics and Momentum -- Extension of Method and Application.

Abstract: Using data from national surveys and vital statistics, census micro files, and the ProFamy method, we prepare projections of U.S. households from 2000 to 2050. Medium projections, smaller and larger family scenarios with corresponding combinations of assumptions of marriage/union formation & dissolution, fertility, mortality, and international migration are performed to analyze future trends of U.S. households and their possible higher and lower bounds, as well as the enormous racial differentials. To our knowledge, the household projections reported in this article are the first to have empirically found evidence of family household momentum and to have provided informative low and high bounds of various indices of projected future households and living arrangements distributions based on possible changes in demographic parameters.