A primer on the dynamic simulation of income model (DYNASIM3)
A Primer on The Dynamic Simulation of Income Model (DYNASIM3)

DYNASIM3 is a dynamic microsimulation model designed to analyze the long-run distributional consequences of retirement and aging issues. Starting with a representative sample of individuals and families, the model "ages" the data year by year, simulating such demographic events as births, deaths, marriages and divorces, and such economic events as labor force participation, earnings, hours of work, disability onset, and retirement. The model simulates Social Security coverage and benefits, as well as pension coverage and participation, and benefit payments and pension assets. It also simulates home and financial assets, health status, living arrangements, and income from non-spouse family members (co-residents). In addition, it calculates SSI eligibility, participation, and benefits.\(^1\)

DYNASIM has a long history at the Urban Institute. It was originally developed here in the 1970s. A revised version of the model, DYNASIM2, was built in the early 1980s specifically to analyze retirement income issues (for an overview of the model's earlier development, see Zedlewski 1990). DYNASIM3 represents a major update of the model. It includes a more recent starting sample and recent information on demographics and family economics. DYNASIM3 also includes new household saving and private pension coverage modules, and Social Security and Supplemental Security Income (SSI) calculators.\(^2\)

The DYNASIM3 model has been used recently to simulate how potential changes to Social Security will affect the future retirement benefits of at-risk populations, such as elderly widows and widowers, and certain divorcees and spouses (Favreault and Sammartino 2002; Favreault, Sammartino, and Steuerle 2002). The Institute has also used it to explore annuitization effects under a Social Security system with personal accounts (Uccello et al. 2003), potential retirement consequences of rapid work effort growth among low-wage, single mothers in the late 1990s (Johnson, Favreault, and Goldwyn 2003), and the implications of recent earnings inequality patterns for future retirement income (Smith 2003). Ongoing work examines personal account proposals and how they would intersect with current patterns of wealth accumulation and retirement preparedness (Butrica and Uccello forthcoming).

The remainder of this paper briefly summarizes the input data and key characteristics of the DYNASIM3 model to give an overall sense of the model's content. We outline the data used in the various estimation procedures and generally describe the structure of each module. We also include some baseline projections produced by a recent version of the model to provide a fuller sense of the model's capacity. More detailed documentation of DYNASIM3 is available upon request from the authors, and in the recent application papers mentioned above, available on the Institute's web site.

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1 This version of DYNASIM was developed through a grant from the Mellon Foundation and a generous Urban Institute investment.

2 Many of these new modules were adapted from those designed by the Urban Institute for the Social Security Administration's Model of Income in the Near Term (see Toder et al. 2002).

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www.urban.org. model, income, simulation, dynamic, primer. International journal of microsimulation (2007) 1(1) 35-53 dynamic microsimulation of health care demand, health care finance and the economic impact of health www.spielauer.ca. health, demand, finance, economic, impact. Modeling & Simulation of Dynamic Systems â€“ a Tutorial James H. Taylor Department of Electrical & Computer Engineering University of New B... Â Note that there are implicit â€œzero-order holdsâ€ operating on the elements of uk. It is usually not a good practice to develop an ode model that includes both very fast 4.2) with the following ordinary differential equation set: x E^{hc}(t) = fc(xc, zc, uk, uk). In fact, rather. 20), we may replace the form in (1) with the following constrained ode set: x E^{hc}(t) = fc(xc) and t is time.