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Cross-Sectional Surveys: Inferring total eventual time in current state using only elapsed time-to-date

Richard C. Larson

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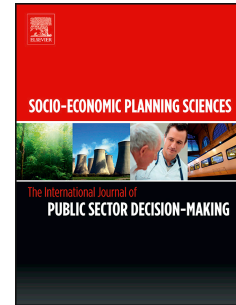
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Cross-Sectional Surveys:**Inferring Total Eventual Time in Current State Using Only Elapsed Time-to-Date**

Richard C. Larson

August 23, 2016

Abstract

*We focus on snapshot surveying of sub-populations whose members are in a temporary state and where one of the questions asked is the elapsed time already spent in that state. From these answers we develop probabilistic and statistical procedures to estimate the distribution of **total time** that will eventually be spent in that state by any random individual who enters the state. The method relies on a selection bias often found in temporal sampling, sometimes called “random incidence” or “longevity bias.” We develop results for several types of sampling, including random and fixed times of surveying, random and fixed times of entering the state, and sampling only those who have already spent some minimal specified time in the targeted state. An example with post-doc data is included to demonstrate the steps.*

Key words: Cross-sectional survey, snapshot survey, career duration, random sampling, post-doc careers

Often in survey research we wish to poll at one point in time a random selection of individuals who are in some temporary state. Such polls are often called “cross-sectional surveys” or “snapshot surveys.” While the inspiration of this paper is the surveying of post-doctoral fellows (“post-docs”), such random surveys are seen in myriad domains, especially in services sectors, both public and private. The public sector has many needs for this type of research, investigating for instance durations of criminal careers, queue waits for medical treatment of U.S. veterans, waits for placement in public housing, career lengths of public school teachers, just to name a few. In the private sector, we may be surveying automobile owners and homeowners, - for durations of ownerships, individuals with mortgages, patients receiving chemotherapy, etc. Representative literature is found in marketing (Rindfleisch et. al 2008), health care (Barnett et. al. 2012), education (Kaia, 2006; Tuncalp, et. al. 2014), banking (Voleti & Bharadwaj 2015), transportation (Oum 1979), and criminal justice (Blumstein & Cohen 1987).

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