

Demography: Methods of Population Analysis

Sociology 476 - 35598

Spring 2018

Prof. Stewart

Course Description

Formal demography is characterized by a focus on the enduring collectivity of population and careful study of the processes responsible for changes in population size and composition. Of particular interest to the demographer, are the processes of fertility, mortality and migration. In addition to these three basic areas of research, demographers are also interested in a number of related issues within the broad social science and health research spectrum including marriage, retirement, segregation, disability and land use. At the heart of all of these empirical analyses of populations and related issues is a particular way of looking at the world and related set of methodological techniques.

This course aims to introduce students to the principal methodological tools used by demographers for studying changes in population size and composition. The course covers basic measures of mortality, fertility and migration; life table construction; multiple decrement life tables; stable populations; population projections; age patterns of vital events; and event history analysis. Students will learn to apply these and other demographic methods through a series of weekly problem sets.

The class meets on Wednesdays between 2:00 p.m. and 4:50 p.m. in Parkes Hall, Room 222. My office is located on the third floor of 1810 Chicago Ave in Room 322. I will be available on Mondays between 1:00 p.m. and 2:30 p.m. via Skype, or by appointment. **I prefer that you make an appointment before my office hours. If we meet in my office, please DO NOT wear perfume or cologne.** *I will have to ask you to reschedule our meeting if you wear perfume or cologne to an office meeting.* My office phone number is 847-491-7044. My email address is q-stewart@northwestern.edu. I will be available for talking via email during my office hours.

Prerequisites

There are no graduate-level prerequisites for this course. Although familiarity with Calculus is highly preferable, it is not essential as long as students have a solid background in Algebra and can understand some basic concepts of Calculus such as an integral (the area under a curve or a function) and the derivative (the rate of change in a variable). I will not expect you to do Calculus in this course, but there are several demographic relationships that are best

expressed with some reference to calculus. For those students who feel rusty in Algebra and are totally unfamiliar with Calculus, I recommend that you review math in the beginning of the term.

Course Requirements

Course requirements include: **Regular reading assignments, class attendance, problem sets, and exams.** There will be several **problem sets** to evaluate your comprehension of the respective methods. The problem sets are designed to help students to learn to apply demographic methods covered in this course. The completion of these problem sets in a timely fashion is key to comprehending the material covered in this course. Learning requires that you apply the methods to real data. It is also important to try to get an understanding of the logic behind the methods, which will help in learning the material and in future applications. Relative to many courses the readings for this course are relatively light in the number of pages. The key here is learning the methods. Students should spend time reading the text and working through the examples provided. The problem sets will constitute 30% of the grade for the course. The problem sets will be handed out one class prior to the class meeting they are due.

There will be a **short midterm examination (May 2nd, 2018)**. The midterm is open book and constitutes 30% of the final grade. The **final exam (June 13th, 2018, 3:00-5:00pm)** will be an open book exam and constitutes 40% of the grade for the course.

Attendance for this course is required. This class meets once a week and any absences will substantially affect your ability to receive your desired level of competency and grade for the course.

Your final grade will be calculated from the respective problem sets, and exams based on the percentages above. Furthermore, there is **no** extra credit for this course. I encourage you to work hard to avoid encountering any dissatisfaction with the grading process. The tabular breakdown of your final grade is below:

Requirement	Due Date	Percentage
Problem Sets	weekly	30%
Short Midterm	05/02/18	30%
Final Exam	06/13/18	40%

Note regarding Syllabus Changes - I reserve the right to make changes to the schedule of readings and/or lectures during the course of the semester. I will announce any such changes in class. You are responsible for noting the changes and preparing for class appropriately.

Note regarding Cheating - Any student that presents the work of another student as his/her own or who is caught copying the work of another student during a problem set/exam or allowing another student to copy from him/her will receive a grade of F on that problem set or exam, to be counted as zero in computing the final grade. No exceptions will be made.

Textbooks

(Available at the Norris Bookstore):

Preston, S. H., P. Heuveline and M. Guillot. 2001. *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers.

Readings

(Available on Canvas)

Preston, Samuel H. 1993. "The Contours of Demography: Estimates and Projections." *Demography* 30(4):593-606.

Preston, Samuel H., Christine Himes, and Mitchell Eggers. 1989. "Demographic Conditions Responsible for Population Aging." *Demography* 26(4):691-704.

Stewart, Quincy Thomas. 2011. "The Cause-Deleted Index: Estimating Cause of Death Contributions to Mortality," *Mathematical Population Studies* 18: 234-257.

White, Kevin M. and Samuel H. Preston. 1996. "How many Americans are alive because of twentieth-century improvements in mortality." *Population and Development Review* 22(3): 415-429.

Schedule

04/04 Basic Concepts and Measures

Reading: Preston *et al.*, 2001; Chapter 1.

Reading: Preston, Samuel H. 1993. "The Contours of Demography: Estimates and Projections," *Demography* 30(4):593-606.

04/11 Age Specific Rates, Standardization and Decomposition

Reading: Preston *et al.*, 2001; Chapter 2

White, Kevin M. and Samuel H. Preston. 1996. "How many Americans are alive because of twentieth-century improvements in mortality." *Population and Development Review* 22(3): 415-429.

Some additional references:

1. National Center for Health Statistics. 1998. "Age Standardization of Death Rates: Implementation of the Year 2000 Standard." *National Vital Statistics Reports* 47(3).
2. Das Gupta, Prithwis. 1993. *Standardization and Decomposition of Rates: A User's Manual*. U.S. Bureau of the Census. Current Population Reports. Series P23-186. Washington, DC: U.S. Government Printing Office.
3. _____. 1989. "Methods of decomposing the difference between two rates with applications to race-sex inequality in earnings," *Mathematical Population Studies* 2(1): 15-36.

4. Kitagawa, Evelyn M. 1955. "Components of a difference between two rates," *Journal of the American Statistical Association* 50(272): 1168-1194.

04/18 **The Life-Table; Single-Decrement Processes**

Reading: Preston *et al.*, 2001; Chapter 3, Sections 3.1-3.6

04/25 **Population Association of America Meetings: No Class Meeting**

Assigned Problems—Practice Exam?

05/02 **SHORT EXAM—20%**

The Life-Table; Single-Decrement Processes continued

Reading: Preston *et al.*, 2001; Chapter 3, Sections 3.7-3.11, Appendix

Some additional references:

1. Chiang, C.L. 1984. *The Life Table and Its Applications*. Florida: R.E. Krieger.
2. Arriaga, Eduardo E. 1984. "Measuring and Explaining the Change in Life Expectancies." *Demography* 21(1): 83-96.
3. Pollard, J.H. 1988. "On the Decomposition of Changes in Expectation of Life and Differentials in Life Expectancy." *Demography* 25(2):265-76.
4. Kannisto, Vaino et al. 1994. "Reductions in Mortality at Advanced Ages: Several Decades of Evidence from 27 Countries," *Population and Development Review* 20(4): 793-810.
5. Preston, Samuel H., Irma T. Elo and Quincy Stewart. 1999. "Effects of Age Misreporting on Mortality Estimates at Older Ages," *Population Studies* 53: 165-177.

05/09 **Multiple-Decrement Life Tables**

Reading: Preston *et al.*, 2001; Chapter 4

Stewart, Quincy Thomas. 2011. "The Cause-Deleted Index: Estimating Cause of Death Contributions to Mortality," *Mathematical Population Studies* 18: 234-257.

An additional reference:

Preston, Samuel, Keyfitz Nathan, and Robert Schoen. 1972. *Causes of Death: Life Tables for National Populations*. New York: Seminar Press.

05/16 **Fertility Measures and Fertility Models**

Reading: Preston *et al.*, 2001; Chapter 5 and 11 (Section 11.4.2)

Some additional references:

1. Morgan, S. Philip. 1996. "Characteristic Features of Modern American Fertility." *Population and Development Review* 22 (Supplement): 19-63.
2. Bongaarts, John. 1983. "The Proximate Determinants of Natural Marital Fertility," in R.A. Bulatao and R.D. Lee, *Determinants of Fertility in Developing Countries*. Vol. 2. New York: Academic Press, pp. 61-102.

05/23 **Population Projections and Forecasting**

Reading: Preston *et al.*, 2001; Chapter 6

05/30 **The Stable Population Model and Age Distributions (Subject to Change)**

Reading: Preston *et al.*, 2001; Chapter 7.1-7.5

06/06 **The Stable Population Model and Age Distributions (Subject to Change)**

Reading: Preston *et al.*, 2001; Chapter 7.6-7.8

Preston, Samuel H., Christine Himes, and Mitchell Eggers. 1989. "Demographic Conditions Responsible for Population Aging," *Demography* 26(4):691-704.

FINAL EXAMINATION - 06/13, 3:00-5:00pm, Parkes 222

Possible Extra Topics

A. **Migration and Spatial Distribution**

Readings:

Massey, Douglas S. and Nancy A. Denton. 1988. "The Dimensions of Residential Segregation." *Social Forces* 67:281-315.

Massey, Douglas S., Michael J. White and Voon-Chin Phua. 1996. "The Dimensions of Segregation Revisited." *Sociological Methods and Research* 25: 172-206.

White, Michael J. 1983. "The Measurement of Spatial Segregation," *The American Journal of Sociology*, 88(5): 1008-1018.

B. **Modeling Age Patterns of Vital Events (Subject to Change)**

Reading: Preston *et al.*, 2001; Chapter 9

Stewart, Quincy Thomas. 2004. "Brass's Relational Model: A Statistical Analysis," *Mathematical Population Studies* 11: 1-22.

Additional references:

1. Coale, Ansley J., Paul Demeny, and Barbara Vaughn. 1983. *Regional Model Life Tables and Stable Populations*. New York: Academic Press

2. Lee, R. D. and L.R. Carter. 1992. A Modeling and Forecasting U.S. Mortality. @ *Journal of the American Statistical Association* 87(419):659-671.

C. **Introduction to Event History Analysis**

Reading: Allison, Paul. *SAS System for Survival Analysis*; Chapters 2 and 5.

Additional references:

1. Cox, D.R. and D. Oakes. 1985. *Analysis of Survival Data*. London: Chapman & Hall.

2. Yamaguchi, K. 1991. *Event History Analysis*. London: Sage Publications.