

Economics 125 – Demographic Analysis and Forecasting, Winter 2009

Time, Location	Center Hall, Room 214; T/TH 3:30 pm – 4:50 pm
Instructor	Jeff Tayman: email jtayman@ucsd.edu
Office Location/Hours	Econ. Annex #103 T/TH 2:15 pm – 3:15 pm (Map at end of syllabus)
Class Web Site	webct.ucsd.edu Heea Jung, Sequoyah Hall, Room 227; M 12:00 pm – 2:00 pm email: hej001@ucsd.edu
Teaching Assistants	Yi Zhang, Econ. Bldg., Room 119; W 3:00 pm – 5:00 pm email: y9zhang@ucsd.edu

Course Objectives: This course is designed to teach you the foundations of demographic analysis and forecasting. You will learn: (1) the terminology, methods, and practical guidance needed to create, evaluate, interpret, and use forecasts; (2) fundamental demographic concepts including population size, composition, and distribution; (3) the measurement, and interpretation of trends and patterns in fertility, mortality, and migration; (4) key relationships between economic and demographic process; and (5) the implications of demographic changes for the social security system.

Academic Integrity: Any violation of academic integrity standards set by the UCSD Policy on Integrity of Scholarship (<http://www-senate.ucsd.edu/manual/Appendices/app2.htm>) will be reported to the Academic Integrity Office and may result in disciplinary action. Those found in violation of these standards will receive zero points on the assignment/exam/paper and/or receive a failing grade for the entire course.

Required Reading: Stanley K. Smith, Jeff Tayman, & David A. Swanson (2001). *State and Local Population Projections: Methodology and Analysis*. New York, Kluwer Academic/Plenum Publishers.

Articles/Internet links on Electronic Reserve and the course Web page.

Assessment: I encourage you to collaborate with your classmates on the assignments, research paper, and preparing for exams. You can turn in your own work, but have the option of submitting assignments/paper as a group no larger than 4 people. Each member of the group will receive the same score and all names of the group must be on the submission when it is turned in. **Assignments are due at the start of class; assignments submitted later than 10 minutes after class starts or by email will receive a score of zero.**

Problem Sets— There are eight problem sets. All assignments should be done with an electronic spreadsheet. (Microsoft Excel is available in the computer lab). The following link is an on-line Excel tutorial <http://www.usd.edu/trio/tut/excel/index.html>

Research Paper— You are required to write a paper; details on page 6-7 of the syllabus.

Exams— There is one mid-term exam and a final exam. The final exam is not cumulative. **If you miss the Mid-term because of a compelling and fully documented medical excuse or family emergency, your Final will count for 45% of your grade instead of 30%. Missing the midterm for any other reason will result in zero points. There will be no alternate date/time for the final exam.**

Pop Quizzes— There are five pop quizzes given randomly, with no make up provision.

Grading— You can earn a maximum of 335 points as follows: Assignments (70 points, 21%), first exam (50 points, 15%), final exam (100 points, 30%), pop quizzes (35 points, 10%) and research paper (80 points, 24%).

You will receive no lower than: an (A-) with 302 points; a (B-) with 268 points; a (C-) with 235 points; and a (D) with 201 points. Depending on the distribution of class scores, the above breakpoints may be lowered.

Course Schedule, Econ-125, Winter 2009

Date	Topics	Assignment
Jan. 6	Course Overview Introduction and Uses of Forecasts	Chapter 1
Jan. 8	Fundamentals of Population Analysis	Chapter 2 SANDAG <i>INFO</i> (2006)
Jan. 13	Mortality	Chapter 4; Rogers (1995)
Jan. 15	Fertility	Chapter 5 Jacoby (2008); Demeny (1993); Easterlin (1978) Assignment 1 due
Jan. 20	Finish Fertility and Migration	Chapter 6, pp. 97-118
Jan. 22	Migration	Chapter 6, pp. 119-135 Assignment 2 due
Jan. 27	Finish Migration & Exam Review	
Jan. 29	Exam	
Feb. 3	Demographic Change and Social Security	Siegel (2002); SSA (2005); Lee, et al (2003); Calmes (2005); Gladwell (2006); Weaver (2008); Myers (2007) Assignment 3 due
Feb. 5	Cohort-Component Method	Chapter 3; Chapter 7, pp. 137-151; Isserman (1993)
Feb. 10	Cohort-Component Method	Chapter 7, pp. 151-160
Feb. 12	Trend Extrapolation	Chapter 8, pp. 161-175 Assignment 4 due
Feb. 17	Trend Extrapolation	Chapter 8, pp. 176-183
Feb. 19	Economic-Demographic Models	Chapter 9, pp. 185-198; Hunt (1993) Assignment 5 due
Feb. 24	Economic-Demographic Models	Chapter 9, pp. 198-214 Paper Due
Feb. 26	Special Adjustments to Forecasts	Chapter 11, pp. 239-258 Assignment 6 due
Mar. 3	Special Adjustments to Forecasts	Chapter 11, pp. 258-277
Mar. 5	Forecast Errors	Chapter 13, pp 301-326; Swanson and Tayman (1995) Assignment 7 due
Mar. 10	Forecast Errors	Chapter 13, pp. 326-341
Mar. 12	Evaluating Projections Final Exam Review	Chapter 12 Assignment 8 due
Mar. 17	Final Exam	3:00 – 6:00 p.m.

Assignments, Econ-125, Winter 2009

Assignment 1 (4 pts)

1. Draw a line graph showing the percentage distribution by age for the 2008 male and female populations in San Diego County (1 pt). (Hint: a distribution is the share of each age or age/sex group to the **total** population)
2. Draw a line graph showing the percentage distribution by age for the 2007 population in Utah and Maine (1 pt)
3. Describe the major differences between male and female age composition in San Diego. (1 pt)
4. Describe the major differences between the age composition in Utah and Maine. (1 pt)

Assignment 2 (6 pts)

1. Project to the year 2010 San Diego County age specific birth rates (ASBR) and total fertility rate using the synthetic method based on projections for California. (2 pts)
2. Project to the year 2010 San Diego County female survival rates using the targeting method and assuming a 10% convergence to U.S. survival rates in that year. (2 pts)
3. Describe the changes in San Diego County ASBR from 2005 to 2010. (2 pts)

Assignment 3 (12 pts)

1. For San Diego County females, calculate total net migration between 2000 and 2005. (1 pt)
2. For San Diego County females, calculate net migration by age between 2000 and 2005. (4 pts)
3. For San Diego County females, calculate gross in- and out- migration rates by age between 2000 and 2005. (2 pts)
4. For San Diego County females, calculate age-specific cohort change ratios (CCR) between 2000 and 2005. (2 pts)
5. Explain the demographic factors causing the change in the female population between 2000 and 2005. (2 pts)
6. Based on the 2000 to 2005 CCR, what is the main drawback of using the CCR to measure survival probabilities? (1 pt)

Assignment 4 (12 pts)

1. Create a 2010 population projection by age for San Diego County females using the cohort-component method (CCM). (7 pts)
2. Compute the components of the female population change from 2005 to 2010 and the share of growth due to migration. (1 pt)
3. Create a 2010 population projection by age for San Diego County females using the Hamilton-Perry (HP) method. (2 pts)
4. Describe the difference in the 2010 total female population between the HP and CCM methods? What accounts for the difference in the two projection methods? (2 pts)

Assignment 5 (11 pts)

1. Using 1980 to 2000 as the base period, create population projections for the year 2008 for each geographic subregion in San Diego County using five extrapolation methods: 1) Linear Trend (LINE); 2) Exponential Trend (EXPO); 3) Shift-Share (SHIFT); 4) Share of Growth (SHARE); and 5) Constant Share (CONSTANT). (Use a bottom-up approach for creating the population projection for San Diego County for LINE and EXPO). (4 pts)
2. Describe why the 2008 projections vary across methods. (7 pts)

Assignments, Econ-125, Winter 2009 (Continued)

Assignment 6 (7 pts)

1. Estimate an equation to project net domestic migration based on employment change lagged 2-years, using time series data from 1980-81 to 2006-07. (2 pts)
2. Using that equation project net domestic migration for the 2007-08 and 2008-09 periods. (2 pts)
3. Interpret the slope of the equation. (1 pt)
4. How might this equation be improved? (2 pts)

Assignment 7 (6 pts)

1. Create an independent net migration projection using the 2010 total population projection from the HP method and the birth and death projections from the CCM. (2 pts)
2. Control the 2005-2010 female gross migration projection by age from the CCM to the independent net migration projection. (3 pts)
3. Why did you select the controlling method? (1 pts)

Assignment 8 (12 pts)

1. Using the population projections by geographic subregion for 2008, calculate algebraic and absolute percentage errors for each geographic subregion and trend extrapolation method. (2 pts)
2. Calculate the following summary measures for each trend extrapolation method: MALPE, %Pos, MAPE, MEDAPE, and PRE (for the MAPE and MALPE using a naïve forecast). (3 pts)
3. Evaluate the precision, bias, utility, and shape of the error distribution of the trend extrapolation methods. Which method(s) do the best? (7 pts)

Articles/Internet Links on Electronic Reserve/Class Web Site, Econ-125, Winter 2009

Fundamentals of Population Analysis	http://www.sandag.org/uploads/publicationid/publicationid_1232_5564.pdf (SANDAG, 2006) San Diego region demographic and economic characteristics
Mortality	R. Rogers. 1995. Sociodemographic characteristics of long-lived and healthy individuals. <i>Population and Development Review</i> , 21:33-58.
Fertility	J. Jacoby. 2008. A world without children & The coming population bust. The Boston Globe. (On class website) P. Demeny. 2003. Population policy dilemmas in Europe at the dawn of the twenty-first century. <i>Population and Development Review</i> , 29:1-28 R. Easterlin. 1978. What will 1984 be like? Socioeconomic implications of recent twists in age structure. <i>Demography</i> , 15: 397-432.
Cohort-Component Method	A. Isserman. 1993. The right people, the right rates: Making population estimates and forecasts with an interregional cohort-component model. <i>Journal of the American Planning Association</i> , 59: 45-64.
Economic-Demographic Models	G. Hunt. 1993. Equilibrium and disequilibrium in migration modeling. <i>Regional Studies</i> , 27: 341-49.
Forecast Error	D. Swanson and J. Tayman. 1995. Between a rock and a hard place: the evaluation of demographic forecasts. <i>Population Research and Policy Review</i> , 14:233-249
Research Paper	J. Calmes. 2005. How social security might change. The Wall Street Journal. http://online.wsj.com/public/article_print/SB110703449985340148.html M. Gladwell. 2006. The Risk Pool. The New Yorker. http://www.gladwell.com/2006/2006_08_28_a_risk.html R. Lee, M. Andersen, and S. Tuljapurkar. 2003. Stochastic forecasts of the social security trust fund. http://repositories.cdlib.org/iber/ceda/papers/2003-0005CL/ D. Myers. 2007. Testimony before the House Committee on the Judiciary Ellis Island New York and New Jersey. (On class website) J. Siegel. 2002. Demographic aspects of selected public policy issues, pp 595-605 in <i>Applied Demography: Applications to Business Government, Law, and Public Policy</i> . Academic Press, San Diego, CA (On class Website) Social Security Administration (SSA). 2008. OASDI Trustees Report (Sections I, II, and V.A, V.B, and VI.E). http://www.ssa.gov/OACT/TR/TR08/trTOC.html R. Weaver. 2008. Bridging the Social Security Divide: Lessons from Abroad. Brookings Policy Brief # 166 http://www.brookings.edu/papers/2008/06_social_security_weaver.aspx

Research Paper, Econ-125, Winter 2009

This research paper gives you the “real world” opportunity to analyze and evaluate population projections and the impact that fertility, mortality, and migration assumptions can have on the future size of a population and its demographic make-up. The topic of your paper is *U.S. Demographics to the Year 2050 and the Outlook for Social Security*. I expect you will find this to be a challenging and hopefully rewarding exercise. Good luck.

You should not base your paper on data from a published source that has already analyzed it. I want you to analyze and draw your own conclusions from original data, which are national population projections prepared by the U.S. Census Bureau. They are contained in an Excel spreadsheet (US_Pop2000-2050.xls) on the class Web site. The Projections Tab contains population by selected age groups for the launch year 2000, four horizon years (2010-2050 in 10-year time increments), and four alternatives (low, middle, highest, and no immigration series) The Assumptions Tab shows the fertility, mortality and migration assumptions for each alternative. Articles on electronic reserve, the Internet, and the class website are available as resources.

Your paper should address these questions (points are shown in parenthesis):

- What aspects of the age distribution most influence the social security system? How can these aspects be measured? What are the strengths and weaknesses of these measures? (12 pts)
- Based on these measures, how does the age distribution vary under the different projection alternatives and why? Which alternatives are the most and least favorable to the social security system and why? (20 points)
- Based on these measures, how does the age distribution vary throughout the 50-year forecast horizon? What are the reasons for these trends? (8 pts)
- How would the demographic outlook for social security change if the retirement age was increased to 70 years in the year 2020 and held at that age until the year 2050? (8 points)
- If you had to pick one of the four projection alternatives as most likely to occur (i.e., as your forecast), which one would you pick and why (i.e. justify/support your total fertility rate, life expectancy, and immigration assumptions)? An option you can consider is creating your own assumptions by combining elements from the alternate scenarios. (16 points)
- If you were the president, what strategies would you take to address the social security system problem? Why would you select these over the other strategies being considered? (8 points)

Overall Quality: organization; including an Introduction and Conclusion; spelling and grammar; professional looking graphs/tables; proper citations and bibliography; well articulated, concise, supported, and documented arguments (8 pts)

Do's And Don't's For Your Research Paper

DO

- A hands-on analysis of population projections.
- Include an Introduction to provide background information and motivation for the topic (answer the “why we should care” question) and Conclusion summarizing the importance of your findings and suggestions for additional study.
- Proofread your papers carefully. Make sure the paper is well-organized (do an outline before writing word one), has proper grammar and spelling, and effectively communicates your ideas.
- Think about the reader when making tables and graphs. Are they easy to read? Is there a better, cleaner way to display the same information? Does the information help support or clarify the analysis and conclusions? Learning to do this well is an invaluable skill that will help you throughout your career.
- Label and number tables and graphs properly (see SANDAG publication for examples); Include a proper source at the bottom, telling where the data came from; All tables and figures should be cited in the text (e.g. As shown in Figure 1).
- Cite all data and references completely (for Websites, this means the complete URL, the date, the organization publishing it). Consult a style manual if you are not sure how to cite a source.
- Give your analysis the “common-sense” test. It is very possible to make computing mistakes that yield improbable results.

DON'T

- Exceed more than five double-spaced typewritten pages, excluding references, figures, and tables.
- Rely exclusively on data analyzed by others. (You can cite information from external sources, but you must do your own analysis of the projection data).
- Write a boring paper.
- Include extraneous information (verbiage, tables, and charts) that are not helpful in answering the questions, defending a position, or supporting a claim
- Wait until the last minute to start your paper.
- Plagiarize. I encourage you to collaborate with your classmates on this project, but the paper must be your own or part of an organized group of no more than **4** people. I take plagiarism very seriously; it is a violation of academic integrity standards.

Professor Tayman Office Location- Economic Annex #103

