Economics 125 – Demographic Analysis and Forecasting, Spring 2009

Time, Location	Center Hall, Room 214; T/TH 5:00 pm – 6:20 pm
Instructor	Jeff Tayman: email jtayman@ucsd.edu
Office Location/Hours	Economics Annex #103; T/TH 3:45 pm – 4:45 pm Map of office location at end of syllabus
Class Web Site	webct.ucsd.edu
Teaching Assistants	Jedrze Zieleniak, Econ. Bldg., Room 113; M 1:00 pm – 3:00 pm email: jzieleniak@ucsd.edu 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: All suspicions of academic misconduct will be reported to the Academic Integrity Office according to university policy. Students found to have violated the Policy on Integrity of Scholarship will face administrative sanctions imposed by their college Dean of Student Affairs and academic sanctions imposed by me. Administrative sanctions can range from disciplinary probation to suspension and dismissal from the university; those are not at my discretion. Academic sanctions can range from an F on the assignment to an F in the class. The appropriate sanctions are determined by the egregiousness of the Policy violation. Students who become aware of their peers either facilitating academic misconduct or committing it should report their suspicions to me for investigation.

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. A few copies of the text are available in the library reserves.

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

Course Assessment, Econ-125, Spring 2009

I encourage you to collaborate with your classmates on the problem sets, research paper, and preparing for exams. You can turn in your own work, but have the option of submitting problem sets/research paper as a group no larger than **6** people. Each member of the group will receive the same score and all names of the group must be typed on the submission when it is turned in. **Group members with handwritten names will receive a score of zero. 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.**

You are expected to complete your problem sets/research paper on your own or as a group and in your own or the group's computations, graphs, tables, and words. The problem sets /research paper have been developed to facilitate your learning and to provide a method for fairly evaluating your knowledge and abilities (not the knowledge and abilities of others). You are authorized to discuss the problem sets/research paper with your classmates. However, you are NOT authorized to use the answers developed by another person, another group, or copy the work completed by others, including the Economics Tutor, in the past or present or write your academic problem sets /research paper in collaboration with another person unless he/she is part of your group. If the work submitted is suspected to be other than your own or the group, you or the group will be reported to the Academic Integrity Office. If you do not understand these expectations please speak with me as soon as possible.

Problem Sets— There are eight problem sets. All assignments can 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 7-8 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 46% of your grade instead of 31%. 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 360 points as follows: Assignments (70 points, 19%), first exam (55 points, 15%), final exam (110 points, 31%), pop quizzes (35 points, 10%) and research paper (90 points, 25%).

You will receive no lower than: an (A-) with 324 points; a (B-) with 288 points; a (C-) with 252 points; and a (D) with 216 points. Depending on the distribution of class points, the above breakpoints may be lowered.

Course Schedule, Econ-125, Spring 2009

Date	Topics	Assignment
Mar. 31	Course Overview Introduction and Uses of Forecasts	Chapter 1
Apr. 2	Fundamentals of Population Analysis	Chapter 2 SANDAG *INFO* (2006)
Apr. 7	Mortality	Chapter 4;Rogers (1995)
Apr. 9	Fertility	Chapter 5 Jacoby (2008); Demeny (1993); Easterlin (1978) **Assignment 1 due**
Apr. 14	Finish Fertility and Migration	Chapter 6, pp. 97-118
Apr. 16	Migration	Chapter 6, pp. 119-135 **Assignment 2 due**
Apr. 21	Finish Migration & Exam Review	
Apr. 23	**Exam**	
Apr. 28	Demographic Change and Social Security	Siegel (2002); SSA (2008); Lee, et al (2003); Calmes (2005); Gladwell (2006); Weaver (2008); Myers (2007) **Assignment 3 due**
Apr. 30	Cohort-Component Method	Chapter 3; Chapter 7, pp. 137-151**;** Isserman (1993)
May 5	Cohort-Component Method	Chapter 7, pp. 151-160
May 7	Trend Extrapolation	Chapter 8, pp. 161-175 **Assignment 4 due**
May 12	Trend Extrapolation	Chapter 8, pp. 176-183
May 14	Economic-Demographic Models	Chapter 9, pp. 185-198; Hunt (1993) **Assignment 5 due**
May 19	Economic-Demographic Models	Chapter 9, pp. 198-214 **Paper Due**
May 21	Special Adjustments to Forecasts	Chapter 11, pp. 239-258 **Assignment 6 due**
May 26	Special Adjustments to Forecasts	Chapter 11, pp. 272-277
May 28	Forecast Errors	Chapter 13, pp 301-326**;** Swanson and Tayman (1995) **Assignment 7 due**
June 2	Forecast Errors	Chapter 13, pp. 326-341
June 4	Evaluating Projections Final Exam Review	Chapter 12 **Assignment 8 due**
June 11	**Final Exam**	**7:00 – 10:00 p.m.**

Problem Sets, Econ-125, Spring 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 Sarasota County Florida and Salt Lake County Utah (1 pt)
3. Describe the major differences between male and female age composition in San Diego. (1 pt)
4. Describe the major differences in the age composition in Sarasota and Salt Lake Counties. (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 20% 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 domestic 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. Migration rather than natural increase has been cited as contributing more to population growth in San Diego. Based on your results for question 1, would you support or refute this argument? (2 pts)
6. Why is the overall net migration from Q1 higher than the net migration based on the gross in- and-out migration data? (1 pt)
   Note: the 2000-05 gross domestic in- and out-migration data are only for use in questions #3 and #6

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 1985 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)

Assignment 6 (7 pts)

1. Estimate a regression equation to project net domestic migration based on employment change lagged 2-years, using time series data from 1985-86 to 2006-07. (2 pts)
2. Using that equation, project net domestic migration for the 2007-08, 2008-09, and 2009-10 time periods. (3 pts)
3. Interpret the slope of the equation. (1 pt)
4. How might this equation be improved? (1 pts)

Assignment 7 (6 pts)

1. Create an independent net migration projection for San Diego County females using the 2010 total population projection from the HP method and the birth and death projections from the CCM. (1 pt)
2. Control the 2005-2010 female gross migration projection by age from the CCM to the independent net migration projection. (3 pts)
3. What is the name of the controlling method you used and why did you select that particular method over the other alternatives? (2 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 the 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, Spring 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. *Population and Development Review*, 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. *Population and Development Review*, 29:1-28 R. Easterlin. 1978. What will 1984 be like? Socioeconomic implications of recent twists in age structure. *Demography*, 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. *Journal of the American Planning Association*, 59: 45-64.
Economic-Demographic Models	G. Hunt. 1993. Equilibrium and disequilibrium in migration modeling. *Regional Studies*, 27: 341-49.
Forecast Error	D. Swanson and J. Tayman. 1995. Between a rock and a hard place: the evaluation of demographic forecasts. *Population Research and Policy Review*, 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 *Applied Demography: Applications to Business Government, Law, and Public Policy*. 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. Brooking Policy Brief # 166 http://www.brookings.edu/papers/2008/06_social_security_weaver.aspx

Research Paper, Econ-125, Spring 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 hope you will find this to be a challenging and 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 must 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? What one measure are you going to use and why?(14 pts)
- Based on the selected measure, 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? (23 points)
- Based on the selected measure, how does the age distribution vary within the 50-year forecast horizon? What are the reasons for these trends? (9 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? (9 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)? You can also create your own assumptions by combining elements from the alternate scenarios or picking your own assumption values that are not in any scenario. (18 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? (9 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)

Research Paper Guidance

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). Don't split tables and figures across pages.
- 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 as a group of no more than **6** people. If you use the ideas, data, and findings, etc. from other research you must cite and give it the appropriate credit. I take plagiarism very seriously; it is a violation of academic integrity standards.

Professor Tayman Office Location- Economic Annex #103