

Economics 125 – Economics of Population Growth Winter 2004

Time Locatio: TuTh 6:30 pm - 7:50 pm, Petersen Hall, Room 103
Instructor: Jeff Tayman
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Class Web Page http://www.econ.ucsd.edu/classes/Winter%202004/125_tayman/econ125_w04.htm
Teaching Assist. Lone Christiansen (lechristiansen@ucsd.edu); Economics Room 126

Course Purpose: This course is designed to teach you the foundations of demographic analysis and forecasting. You will learn the terminology, analytical tools, major forecasting methods (trend extrapolation, cohort-component, and structural models), and practical guidance needed to create, evaluate, interpret, and use population forecasts. We will also cover fundamental demographic concepts such as population size, distribution, composition, and components of change (fertility, mortality, and migration), relationships between economic and demographic processes, and conclude with some new directions in population forecasting research.

Prerequisites: Economics 120 A-B-C. Economics 178 is recommended.

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

You are expected to read the assigned material prior to lecture and please bring the book with you to class.

Assignments: You will be required to complete 9 assignments. Assignments are to be handed in at the beginning of class and I will accept no late work. Eight of these assignments are set up to be done with an electronic spreadsheet. Microsoft Excel is available in the computer lab, and I will spend no time teaching how to use Excel.

Exams: There will be an in-class exam on January 27 and an in-class final exam on March 19. The final exam will only include material covered after the first exam. I will give no late examinations without a compelling and fully documented medical excuse.

Grading: A student can earn a maximum of 300 points as follows: Assignments (100 points or 33%), first exam (65 points or 22%), and final exam (135 points or 45%).

I do not grade on a strict curve, but you will receive an A if you earn 270 or more points; a B with 240-269 points; a C with 210-239 points; and a D with 180-209 points. The final breakpoints for each grade may turn out to be lower than those indicated.

Econ-125 Course Schedule:

Date	Topics	Assignment
January 6	Course Overview Introduction and Uses of Forecasts	Chapter 1
January 8	Fundamentals of Population Analysis	Chapter 2 Assignment 1 due (2 pts.)
January 13	Mortality	Chapter 4 Assignment 2 due (5 pts.)
January 15	Fertility	Chapter 5
January 20	Migration	Chapter 6, pp. 97-118 Assignment 3 due (10 pts.)
January 22	Migration	Chapter 6, pp. 119-135
January 27	Exam	No Assignment
January 29	No Class	No Assignment
February 3	Cohort-Component Method	Chapter 3; Chapter 7, pp. 137-151 Assignment 4 due (24 pts.)
February 5	Cohort-Component Method	Chapter 7, pp. 151-160
February 10	Trend Extrapolation	Chapter 8, pp. 161-175 Assignment 5 due (24 pts.)
February 12	Trend Extrapolation	Chapter 8, pp. 176-183
February 17	Economic-Demographic Models	Chapter 9, pp. 185-198 Assignment 6 due (10 pts.)
February 19	Economic-Demographic Models	Chapter 9, pp. 198-214
February 24	Special Adjustments to Forecasts	Chapter 11, pp. 239-258 Assignment 7 due (5 pts.)
February 26	Special Adjustments to Forecasts	Chapter 11, pp. 258- 277.
March 2	Forecast Errors	Chapter 13, pp 301-326 Assignment 8 due (10 pts.)
March 4	Forecast Errors	Chapter 13, pp. 326-341
March 9	Evaluating Projections	Chapter 12 Assignment 9 due (10 pts.)
March 11	Guide to Small Area Projections New Directions in Forecasting	Chapters 14 & 15
March 19	Final Exam	7:00 – 10:00 p.m.

Assignments
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Assignment 1 (2 pts.)

Find newspaper or magazine article showing the use or implication of a forecast.

Assignment 2 (5 pts.)

1. For Major Statistical Areas (MSA) in San Diego County, calculate the numeric and percent change, average annual absolute change, and geometric and exponential growth rates between 1990 and 2000.
2. For San Diego County, calculate the percentage distributions by age for total population in 2000 and 2030 and for male and female populations in 2000. (Hint: a distribution represents the share of each age group to the total population).
3. Draw a line graph comparing the total population percent distributions in 2000 and 2030.
4. Draw a line graph comparing the male and female percent distributions in 2000.

Assignment 3 (10 pts.)

1. For San Diego County, calculate age-specific birth rates (ASBR), total and general fertility rates, and the crude birth rate in 2000.
2. For San Diego County females, calculate the child woman ratio (CWR) for ages 0-4 and 5-9 in 2000.
3. Project the ASBRs to year 2005 using the synthetic method and California fertility trends.
4. For San Diego County, calculate age-specific death rates for females and crude death rate in 2000.
5. Project San Diego County female survival rates to year 2005 assuming a 1% annual decrease in mortality rates.
6. Project San Diego County female survival rates to year 2005 assuming a 1% annual increase in survival rates. (Hint: apply the adjustment directly to the survival rate and briefly state why the result is not reasonable for some age groups.)

Assignment 4 (24 pts)

1. For San Diego County females, calculate total net migration between 1990 and 2000 using the demographic balancing equation.
2. For San Diego County females, calculate net migration by age between 1990 and 2000 using the forward survival rate method. (Hint: use population ages 75+ in 1990.)
3. For San Diego County females, calculate gross in- and out- migration rates by age between 1985 and 1990. (Hint: use population ages 80+ in 1985.)
4. For San Diego County females, calculate age-specific cohort change ratios (CCR) between 1990 and 2000. (Hints: use population ages 75+ in 1990 and show CCRs for the age groups in the year 2000.)

Assignments

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Assignment 5 (24 pts)

1. Using the projected survival and fertility rates from Assignment 3 and 1985 to 1990 gross in- and out-migration rates from Assignment 4, create year 2005 population projections for San Diego County females by age using the cohort-component method.
2. Compute the components of the female population change from 2000 to 2005.
3. Using the 1990 to 2000 CCR from Assignment 4 and 2000 CWRs from Assignment 3, create year 2010 population projections of San Diego County females by age using the Hamilton-Perry (HP) method.

Assignment 6 (10 pts)

Using 1980 to 1990 as the base period, create year 2000 total population projections for each MSA in San Diego County based on five extrapolation methods. The extrapolation methods are: 1) Linear Trend (LINE), 2) Exponential Trend (EXPO), 3) Shift-Share (SHIFT), 4) Share of Growth (SHARE); and 5) an average of the four methods. (Note: in this exercise the population projection for San Diego County will be the sum of the MSA projections (bottom-up method)).

Assignment 7 (5 pts)

Demonstrate for San Diego County that employment change lagged 2-years has a closer relationship to net domestic migration than employment change occurring during the same time period as the migration. (Hint: use graphical techniques and a statistical measure.)

Assignment 8 (10 pts)

1. Using the MSA population projections from Assignment 6, control the Linear and Exponential Trend projections to an independent population projection for San Diego County and recompute the average of the four trend methods.
2. Control the 1990 to 2000 female net migration estimates by age from Assignment 4 to the net migration estimate for all females derived by the demographic balancing equation, also from Assignment 4.
3. Using the 2010 female population projections by age from Assignment 5 (HP method), create year 2005 projections by age using linear and geometric interpolation. (Hint: 2005 projections for the total population are based on the bottom-up method.)

Assignment 9 (10 pts)

1. Using the controlled population projections by MSA from Assignment 8, calculate algebraic and absolute percentage errors for each MSA and trend extrapolation method, including the method based on the average.
2. Calculate the following summary measures of error for each trend extrapolation method: MALPE, %Pos, MAPE, MEDAPE, and RMSPE. (Hint: only include errors for the MSAs in these summary measures.)