Economics 125 – Economics of Population Growth
Winter 2003

Time and Location:	TuTh 6:30 pm - 7:55 pm, Cognitive Science Bldg, Room 001
Instructor:	Jeff Tayman
Office Location:	Department of Economics, Room 109
Office Hours:	TuTh 5:25 pm – 6:25pm
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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. Most of these assignments can be done with a calculator, but would be much easier using an electronic spreadsheet. Microsoft Excel is available in the computer lab. I will spend no time in lecture talking about how to use Excel. Assignment 7 will require software for ARIMA or other time series modeling techniques, including the ability to compute projections.

Exams: There will be an in-class exam on January 28 and an in-class final exam on March 20. 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 7	Course Overview Introduction and Uses of Forecasts	Chapter 1
January 9	Fundamentals of Population Analysis	Chapter 2 **Assignment 1 due (2 pts.)**
January 14	Mortality	Chapter 4 **Assignment 2 due (5 pts.)**
January 16	Fertility	Chapter 5
January 21	Migration	Chapter 6, pp. 97-118 **Assignment 3 due (10 pts.)**
January 23	Migration	Chapter 6, pp. 119-135
January 28	**Exam**	**No Assignment**
January 30	**No Class**	**No Assignment**
February 4	Cohort-Component Method	Chapter 3; Chapter 7, pp. 137-151 **Assignment 4 due (20 pts.)**
February 6	Cohort-Component Method	Chapter 7, pp. 151-160
February 11	Trend Extrapolation	Chapter 8, pp. 161-175 **Assignment 5 due (20 pts.)**
February 13	Trend Extrapolation	Chapter 8, pp. 176-183
February 18	Economic-Demographic Models	Chapter 9, pp. 185-198 **Assignment 6 due (10 pts.)**
February 20	Economic-Demographic Models	Chapter 9, pp. 198-214
February 25	Urban Systems Models	Chapter 10 **Assignment 7 due (13 pts.)**
February 27	Special Adjustments to Forecasts	Chapter 11
March 4	Forecast Errors	Chapter 13, pp 301-331 **Assignment 8 due (10 pts.)**
March 6	Forecast Errors and Evaluation	Chapter 13, pp. 331-339 Chapter 12
March 11	Practical Guide to Forecasting	Chapter14 **Assignment 9 due (10 pts.)**
March 13	New Directions in Forecasting	Chapter 15
March 20	**Final Exam**	

Assignments
Econ-125, Winter 2003

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 numeric 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.
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.

Assignment 4 (20 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.
3. For San Diego County females, calculate gross in- and out- migration rates by age between 1985 and 1990.
4. For San Diego County females, calculate age-specific cohort change ratios (CCR) between1990 and 2000.

Assignments
Econ-125, Winter 2003 (Continued)

Assignment 5 (20 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 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, 2) Exponential Trend, 3) Shift-Share, 4) Share of Growth; and 5) an average of the four methods. In this exercise the population projection for San Diego County will be the sum of the MSA projections (bottom-up method).

Assignment 7 (13 pts)

1. Demonstrate for San Diego County that using 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.
2. Using 1980 to 2000 as the base period, develop for San Diego County an ARIMA model that relates domestic net migration to changes in civilian wage and salary employment and create annual projections for net domestic migration for 2000-01 to 2004-05.
3. Using 1990 to 2000 as the base period, repeat Task 2.

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.

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.
2. Calculate the following summary measures of error for each trend extrapolation method: MALPE, MEDALPE, %Pos, MAPE, MEDAPE, and RMSPE