

**Department of Economics**  
**University of California, Berkeley**

**Field Examination in Economic Demography**

**Monday, 12 January 2009, 9:00 A.M. to Noon**

Please answer all parts of all questions. The four questions count equally, and all parts count equally except as indicated in Question 4. Cite the literature where appropriate.

This is a closed-book examination. You should not consult any books or notes during the examination, but you may use your hand calculator. Please start your answer to each of the four questions on a new page. For the question on demographic methods, show your work and label your answers clearly. Answers with decimals should be given with six figures beyond the decimal point.

1. Consider economic influences on marriage behavior and fertility.
  - a) Briefly explain the concept of the gains to marriage, originally developed by Becker. Falling mortality in Third World countries led to rapid population growth in recent decades. Drawing on Becker's theory and class discussion, how might this have affected the division of the gain to marriage between males and females? (Think of the sex ratio in the marriage market.)
  - b) Briefly explain in words the role of the value of female time in the economic theory of fertility; no equations or diagrams are necessary.
  - c) Now consider the effect on both marriage behavior and fertility of a reduction in discrimination against women in the labor force, drawing on the relevant theories you have sketched above.
2. It is often difficult to disentangle cause and effect for events unfolding over the course of the life cycle.
  - a) Why is it difficult to establish the effect on health of income or wealth?

- b) Given the usual kinds of data, are there some parts of the life cycle where we can be more confident in interpreting associations as causal than in other parts? Explain. (This question refers specifically to part a) above.)
- c) Can you think of particular situations that might help you identify a causal effect of income on health? What kind of situation do you need, generally speaking?
- d) Why is it difficult to establish an effect of adolescent childbearing on subsequent income and educational attainment of the mother? Is this reason the same or different than the reason for income and health as queried in a)? Explain.
- e) Briefly describe and explain the strategies used to estimate the effect of adolescent childbearing on subsequent outcomes for the mother. (If you have already answered this earlier, just give a cross-reference here; no need to repeat.)
- f) Could a similar strategy be of any use in the context of the health and income problem? Why or why not?

**3.** The following Leslie Matrix for projecting counts of women in India has been derived from information in the United Nations *World Population Prospects, 2006*. To shorten calculations, the width of age groups has been set at  $n = 15$  years.

The size of the population of India is expected to overtake the population of China in the next few decades. Some of India's more rapid increase is due to higher fertility rates and some is due to age structure. Table 1 shows counts by age for 2005 for Indian women, for Chinese women, and for a stable population based on the Leslie Matrix for India. Assume that survival beyond age 90 can be neglected in our calculations.

$$A = \begin{pmatrix} .3945 & .6031 & .2100 & 0 & 0 & 0 \\ .9649 & 0 & 0 & 0 & 0 & 0 \\ 0 & .9598 & 0 & 0 & 0 & 0 \\ 0 & 0 & .9337 & 0 & 0 & 0 \\ 0 & 0 & 0 & .7841 & 0 & 0 \\ 0 & 0 & 0 & 0 & .4227 & 0 \end{pmatrix}$$

**Table 1. Female Population Counts in Millions for 2005**

$x$	India	China	Stable
0	169	125	169.000
15	142	157	149.445
30	106	168	131.453
45	68	116	112.484
60	36	58	80.831
75	10	21	31.313
total	531	645	674.527

- a) The projections for girls under age 15 with the Indian starting population and no change in age-specific rates are 174.571 million for 2020 and 195.836 million for 2035. Find the corresponding projected counts for girls under 15 that would result from using the Chinese population counts instead of the Indian counts for your starting state.
- b) Calculate the growth rates for the period 2020 – 2035 for the age group under 15 with the Indian starting state and with the Chinese starting state. Would you conclude that age structure is an important influence on growth rates in India?
- c) With the information you have been given, can you find the growth rate for the stable population, the value of Lotka's  $r$ ? If so, what is the value?
- d) The expectation of life at birth for women in India in 2005 was  $e_0 = 64.481$  years. What would be the Crude Birth Rate  $b_0$  in a stationary population with the same life table? Write down a formula from which you could calculate the corresponding Crude Birth Rate in the stable population. (You need not take the time to perform the numerical calculation.)
- e) The proportion aged 30 to 45 in the stable population from Table 1 is 0.194882. The Crude Birth Rate in the stable population comes out to be  $b_r = 0.018341$ . What would be the proportion aged 30 to 45 in a stationary population with the same life table as the stable population?

4. In empirical studies, it is often found that local labor markets with higher proportions of foreign born also have higher wages. The weights of parts in the total of 25 points for this question are shown in parentheses.

- a) (4) How would you interpret the result or association described above in terms of causality?
- b) (4) What should we take to be the treatment here, of which we are trying to assess the effect? What is the counterfactual? (Math expressions are not needed here, but feel free to use them if you prefer.)
- c) (7) What strategies might you suggest for obtaining a better estimate of the effect of the treatment? Draw on the methods that have been used in the literature we read (the readings by Card and Borjas, as well as any other studies discussed in class).
- d) (5) What results have been found when these strategies have been pursued?
- e) (5) Are there additional problems with this approach (comparing outcomes across local labor markets) that do not fit so cleanly into the causality framework discussed by Moffitt? Discuss.

**End of Examination**