1. (25) Three separate literatures address the consequences of population change. One considers the relation of population change to economic development, for example studies by the National Research Council (1986), Acemoglu and Johnson (2007), Kelley and Schmidt (2005). Another considers the economic consequences of immigration to industrial nations, for example studies by Borjas (2003), Card (2005, 2009). A third considers the economic consequences of population aging, for example Cutler et al, 1990.

   a) (5) In what ways do the sources of demographic variation considered by these literatures differ?

   b) (5) Do these literatures focus on similar potential consequences of population change, or on different ones?

   c) (5) If you find any differences in focus in your answer to b) are these purely idiosyncratic, or are they related in some logical way to the different sources of population change under consideration?

   d) (5) Do these literatures reach conclusions about the economic consequences of population change that are consistent or inconsistent with one another?

   e) (5) Summarize and conclude: Are there good reasons for these separate literatures to exist?

2. (25) This question concerns sex bias in familial behavior:

   a) (8) Becker’s economic theory of fertility does not distinguish between male and female children. Discuss how you might introduce male and female children into his Quantity-Quality theory. You do not need to write down a mathematical model, but you should discuss any issues that arise and possible implications of your two-sex analysis for sex biased fertility, sex biased investments per child, and the effects on these of income.
b) We know from many studies that in some cultures, there is a sex bias in fertility. Does this sex bias carry over to a bias in investment in the human capital of male and female children? Describe an empirical analysis you could do to investigate this question.

c) Drawing on the theory of marriage, discuss the later consequences for female well being and other outcomes, including female labor force participation, of male-biased sex selection and investment.

3. Write briefly about each of the following questions:

a) Describe variations in health by socio-economic status over the life cycle in the US, and offer explanations for this pattern.

b) Explain why altruistic parents might invest less than the optimal amount (define this) in their children’s education.

c) Discuss possible reasons for the decline of marriage in recent decades in the industrial nations, and the rise of out-of-wedlock childbearing.

4. A corporation provides new employees with an exciting but stressful year of training. Recruits are continually entering and exiting training throughout the calendar year, but the number of places is fixed, so entrances have to equal exits (from dropouts and graduates) at all times.

Recognizing that entrances are like births and exits are like deaths, the CEO consults a demographer.

a) A selection of useful formulas is given at the end of this question. The probability of dropping out within the first quarter (the first three months) is 0.413. If rates were assumed to be constant across the period, what would be the monthly probability of dropping out? What would be the corresponding hazard rate?

b) For those who complete their first quarter of training, the probability of dropping out in the next three months is 0.343. After the training program has been running for a long time, the distribution of trainees by duration of training at any given time reaches a stable state. In this stable state, what would be the ratio of all first-quarter trainees to all second quarter trainees?
c) The longer a person stays in the program, the higher the person’s acquired human capital, and the lower the probability of dropping out as a function of the length of time $x$ in training. Suppose the hazard (measured in units per month) is given by the same formula as the Gompertz curve, $\alpha \exp(\beta x)$ but with a negative value for the slope parameter $\beta$. Take $\alpha = 0.200$ and $\beta = -0.080$. Is this model consistent with the numbers in Part “a”? What is the predicted probability of completing all four quarters, that is, all twelve months of training?

d) Write down the numerical entries in a Leslie Matrix with three-month-wide age groups for projecting the number of trainees forward in time.

e) The company offers attractive benefits, so there is an incentive for individuals with less-than-excellent health (LTEH) to persist in training, raising graduation rates but imposing future costs. What is the economic term for such a phenomenon? Suppose a proportional hazards model is appropriate, and hazards for LETH recruits equal $\exp(-0.222)$ times the baseline hazards of Part “c”. What is the predicted graduation rate for LTEH recruits?

A Selection of Useful Formulas

Survival from hazards: $l_{x+n} = l(x)e^{-h_x n}$

Gompertz Model: $h(x) = \alpha e^{\beta x}$, $l_x = \exp\left((-\alpha/\beta)(e^{\beta x} - 1)\right)$

Survivorship: $l_{x+n} = l_x(1 - nq_x) = l_x - nd_x$
Person-Years Lived: $nL_x = (n)(l_{x+n}) + (n_a x)(n_d x)$

Lifetable death rate: $nm_x = n d_x / nL_x$

Expectation of Life: $e_x = T_x/l_x$

Brass’s Logit System: $l_x = \frac{1}{1 + \exp(-2\alpha - 2\beta Y_x)}$

Leslie Matrix Top Row: $\frac{nL_0}{2l_0} \left( nF_x + nF_{x+n} \frac{nL_{x+n}}{nL_x} \right) f_{ab}$

Leslie Matrix Subdiagonal: $\frac{nL_{x+n}}{nL_x}$

Lotka’s Equation: $1 = \sum (1/2) (n F_{x+n} L_x + n F_{x+nn} L_{x+n}) (f_{fab}/l_0) e^{-r(x+n)}$

Stable Age Pyramid: $nK_x^{stable} = B(nL_x) e^{-rx}$

Lotka’s Parameter: $r \approx \log(NRR)/\mu$
0.1 For Reference: List of Readings Covered on the Field Exam

Background


Economics of Marriage and Divorce


(#)#Grossbard, Shoshana and Catalina Amuedo-Dorantes (2007) “Cohort-level sex ratio effects on women’s labor force participation” Review of Economics of the Household, v.5 n.3 (September), pp.249-278. (May need to get hardcopy from me; not sure.) []

#DAN ARIELY, GUENTER J. HITSCH, ALI HORTACSU (2008) "Matching and Sorting in Online Dating" Working Paper. (bSpace) []


#NGUYEN VI CAO, EMMANUEL FRAGNIERE, JACQUES-ANTOINE GAUTHIER, MARLÈNE SAPIN, ERIC WIDMER (2008) "Optimizing the Marriage Market Through the Reallocation of Partners: An Application of the Linear Assignment Model", Working Paper. (bSpace) []
Economics of Fertility

**Gary S. Becker (1992) "Fertility and the Economy," Journal of Population Economics v.5 n.3 (August) pp.185-201. (Nontechnical, but with a little math; a broad survey and synthesis of the major approaches in the economics of fertility. Not easy reading, but valuable for non-economists as well as economists.)


- AreChildrenNormal.pdf
- TertiltEcHistOfUSFert.pdf (Kelvin)
- BillariFertAndPensions.pdf
- (FLFP_by_age_of_young_child.pdf probably less interesting than others)
- HowParentsAllocateTime.pdf (Alma)
- MorettiDemandForSons.pdf (Emily)
- (OsterHepBAandMaleSexRatio.pdf – retraction of an earlier argument made by Emily Oster on causes of sex ratio imbalance in China)


#DAN ARIELY, GUENTER J. HITSCH, ALI HORTACSU (2008) "Matching and Sorting in Online Dating" Working Paper. (bSpace) [Aaron ]

#NGUYEN VI CAO, EMMANUEL FRAGNIERE, JACQUES-ANTOINE GAUTHIER, MARLÈNE SAPIN, ERIC WIDMER (2008) "Optimizing the Marriage Market Through the Reallocation of Partners: An Application of the Linear Assignment Model", Working Paper. (bSpace) [ Kirsten ]


Causal Analysis in Economic Demography


These next two on causality and natural experiments are optional. No need even to skim unless you want to.


This next one you should skim to get the basic idea.


*Make sure to read each of the three following illustrations of causal analysis in economic demography at least lightly, enough to figure out why there is a problem of causal inference, what is the research strategy for identification, and how the results change when this strategy is employed. Do not read each in detail, it would take you forever! These should be considered in relation to the Moffit article on causal inference.


Health and Mortality


* “HEALTHY, WEALTHY, AND WISE: SOCIOECONOMIC STATUS, POOR HEALTH IN CHILDHOOD, AND HUMAN CAPITAL DEVELOPMENT” Janet Currie, NBER Working Paper 13987. (A long, detailed paper; skim, but read enough to get main results.)

“A Dynamic Model of Birth Weight” by Emilia Del Bono, John Ermisch, And Marco Francesconi, IZA Discussion Paper No. 3704 (September 2008).


Age Composition, Family Life Cycle, and Intergenerational Transfers

* A.V. Chayanov, The Theory of Peasant Economy, Daniel Thorner et al translators, (University of Wisconsin Press, 1986; originally 1925); pp. 53-60 and bottom 76-81. (get main ideas; don’t need detail)


M. Murphy (1988), Journal of Law and Economics, April, pp. 1-18. (Read carefully.)


The following two articles are optional; not required even to skim.


*Ron Lee “Some notes on modeling the interface of demography and macroeconomics”, on bSpace as PopEconMath. 5 pages.

*Paul Samuelson (1958) "An Exact Consumption-Loan Model of Interest With or Without the Social Contrivance of Money," Journal of Political Economy v.66 n.6 pp.467-482. (This is a very difficult classic article that may seem deceptively simple. I will present some of it translated into the framework in the PopEconMath notes. You should get the points emphasized in class lecture.)


**Immigration**


*David Card “Is the New Immigration Really So Bad?” Economic Journal 115 (November 2005). bSpace (There is some overlap with his Eli Lecture).
Population and Economic Development (with introductions to many of the readings)

A. Background of the controversy and the revisionist view of the mid-1980s. This report was highly controversial in some circles but was generally accepted by economists, and marked the end of the view that population growth in the Third World was an economic catastrophe.


B. Some analytic framework and cross-national results. This article synthesizes a substantial literature on cross-national regression studies of the effects of population growth on economic development, and highlights the “translation” of population age distribution changes into per capita income.


C. Searching for a natural experiment: Abortion, Contraception, and Health. In each case, think about the nature of the “experiment”, and how plausible you find it and the identified supposedly causal effect. For the Acemoglu and Johnson reading, see if you can find the estimated effect of population growth in addition to the health result that they feature.


D. Human capital

**Biology and Economic Demography**

**Cox, Donald (2007) “Biological Basics and the Economics of the Family” Journal of Economic Perspectives v.21 n.2 Spring pp.91-108.** Demography and demographic behavior have a strong biological basis. Here a theorist who did seminal work in the past on intergenerational transfers discusses biological influences on family behavior related to demography.

**“Improvements and Future Challenges in the Field of Genetically Sensitive Sample Designs”, Frank M. Spinath November 2008. (GenesAndEconomics on bSpace)**

**“Individual differences in allocation of funds in the dictator game associated with length of the arginine vasopressin 1a receptor RS3 promoter region and correlation between RS3 length and hippocampal mRNA” A. Knafo†, S. Israel‡, A. Darvasi†, R. Bachner-Melman†, F. Uzefovsky†, L. Cohen§, E. Feldman†, E. Lerer¶, E. Laiba**, Y. Raz††, L. Nemanov‡‡, I. Gritsenko§§, C. Dina§§§, G. Agam,***, B. Deanyyy, G. Bornstein† and R. P. Ebstein* in Genes, Brain and Behavior (2008) 7: 266–275 (GeneticsAndBehavior_2007 on bSpace). (Skim for main ideas; this is a highly technical biology article, but you can easily find the implications of the research.)

*Ronald Lee "Rethinking the Evolutionary Theory of Aging: Transfers, not Births, Shape Senescence in Social Species," Proceedings of the National Academy of Sciences v.100, n.16 (August 5, 2003), pp.9637-9642. (LeePNAS03 in bSpace). (This is short but very difficult; read intro and conclusions, get the flavor of the argument.)