

LABOR ECONOMICS 250B
UCSD
PROFESSORS ELI BERMAN AND JULIAN BETTS
Winter 2008
COURSE OUTLINE

The course will provide a blend of theoretical labor economics and applied research. The three main themes will be labor demand, wages and inequality, and labor supply. The coverage of labor supply includes models of hours worked as well as *effective* hours worked, that is, how productive workers are per hour worked. There will also be a fairly heavy methodological emphasis. 250A is NOT a prerequisite for 250B, although it will prove helpful.

We will cover three broad themes:

A Labor Demand

B Increased Returns to Skills and Increased Income Inequality

C The Supply Side of the Labor Market (Including Education and Training)

Professor Berman will teach topics A and B and Professor Betts will teach topic C.

Requirements for the Course/Schedule

To do well in this course you should have completed microeconomics and econometrics (A-C) courses. It would be helpful if you have already taken Labor Economics 250A or its predecessor 236B, because there we covered many of the empirical methods that we will use in this course. If you are unsure please consult one of the past 250A course syllabi, at <http://weber.ucsd.edu/~jbetts/> and discuss with either of us if there are holes in your knowledge of the relevant empirical methods.

You are required to: write your own original term paper, on a subject in labor economics of your choosing; write and present a referee report; and complete two midterms. You are also expected to attend and participate actively in all classes.

Here is some advice on finding a topic for your term paper. Perusing recent issues of the Journal of Labor Economics, the Journal of Human Resources, or general interest journals such as the AER, JPE, Econometrica, R.E.Stat etc. may give you some ideas on topics. NBER working papers provide another source. The reading list for this course might also help you. Second, if you already have a general area in mind (immigration, labor supply, economics of education etc.) but not a specific topic one of the more difficult challenges is to whittle your interest down to something more specific. The Handbook of Labor Economics provides literature reviews that may help you see what areas are overly well trodden and which areas are relatively sparsely researched. A third approach is to flip through the Statistical Abstract of the United States or related government publications such as the Digest of Education Statistics – sometimes seeing what sorts of data the government collects and patterns in data can get your creative juices flowing. Fourth, *talk to both of us about your ideas. This is why we are here!*

Evaluation

5% A paper proposal. Please email both of us a one to three page proposal with a few references by Thursday of Week 2 (1/17). (Feel free to consult either of us informally before that time.) We offer you three options for this paper. Consider in weeks 1 and 2 which of these options will be most helpful to you as you seek to complete your Ph.D.:
1) Come up with a *proposal* for an original empirical paper. In week 2 please submit to us one or two ideas for original papers. We will work with you to decide which to pursue. The final paper should be a *proposal* for an original empirical paper, which states how this paper would contribute to the literature, devises an empirical strategy that is (ideally) based in theory, and discusses data sources that you could use. Ideally, your proposal would be of sufficient quality that you could submit it as a grant proposal to an outside organization. (We do not require submitting a grant application, but encourage you to think along these lines. We and will work with you if you decide to follow this route.)
2) Alternatively you could initiate or continue an applied (or a theoretical) project. Some of you may have initiated more empirically (or theoretically) oriented projects in 250A, 220F, or other graduate courses. You are welcome to continue that work in this course, but you must clear this with us and provide us with the final version you prepared for those classes, along with a clear statement of how you will extend that analysis. Note that if the empirical project is limited in scope it may be conceivable for you to start from scratch, develop a plan, acquire and clean data, and perform the empirical analysis. (This goes beyond option 1 above.) We certainly would welcome this but do talk to us first so that we can help judge whether this sounds feasible over the 10 weeks of quarter.
3) Alternatively write a 10-15 page literature review of a topic in labor economics. This literature review **MUST** also include thoughtful suggestions for future research.

45% A final draft of your paper. Due: In class on Thursday of week 10 (March 13). Please bring two copies. (We would also appreciate receiving a copy by email.) There will be no extensions beyond the end of quarter, and papers submitted after March 13 will lose 5 percentage points (out of 45) per day late.

10% A 40 minute presentation and 2-4 page written referee report on ONE recent NBER working paper of your choice (but in the area of labor economics). Please send both of us by email by Thursday 1/25 the titles and WP numbers of a few papers you would like to present in class. Feel free to consult with either or both of us in advance. Rank order the papers if you select more than one, and we can jointly decide which might be the most appropriate. One week before the scheduled presentations, please email the paper to all classmates and to us, or give all of us a paper copy. In your presentation, you should plan to present the paper as if it were “yours”, to offer constructive criticism and ideas for how you might extend the work. A rough guideline for the talk might be 20-25 minutes for presentation of the paper, 10-15 minute discussion of your “referee comments”, and 5 minutes for questions from classmates and us.

We will schedule two days for these presentations, probably later in the quarter.

20% A midterm on sections A and B in class on Feb. 7.

20% A second midterm on section C during finals week.

Readings

We provide a detailed reading list later in this syllabus. A very useful supplementary graduate text on labor economics (the only one we know of) is available at the bookstore:

Cahuc, Pierre and Andre Zylberberg (2004), **Labor Economics**, Cambridge, MA: MIT Press.

Office Hours

Professor Betts will hold office hours Wednesdays 1-2:30 throughout the quarter. Also feel free to email either of us if the announced hours cause conflicts for you, to set up an alternative time for a meeting. Professor Berman's hours will be announced at a later date.

E-mail addresses: jbetts@ucsd.edu and elib@ucsd.edu

Please put “250” somewhere in the subject of your message so that we can keep track of correspondence related to the report.

A More Detailed Agenda:
A. Labor Demand (Berman)

Static Models

Empirical Applications of Static Models

Dynamic Models

Equilibrium with Heterogeneous Labor

Immigration

B. Increased Returns to Skills and Increased Income Inequality (Berman)

The basic facts on quantities and prices

Race

International Evidence

Historical Perspective

Basic Human Capital Theory

Trade as an Explanation

Skill Biased Technological Change as an Explanation

Human Capital and Technological Change in Growth Models

C. The Supply Side of the Labor Market (Betts)

1) The Quantity of Labor Supplied

i) Static Labor Supply -- Theory and Estimation

ii) Dynamic Labor Supply -- Theory and Basic Estimation

iii) Using Non-linear Budget Constraints Induced by Taxes and Subsidies to

Estimate Labor Supply Responses

iv) Pensions and Retirement

v) Health Insurance and Labor Supply

2) The Quality of Labor Supplied: Human Capital

a) The Economics of Education

- i) Human Capital Theory
- ii) Econometric Techniques For Estimating The Returns To Education
 - a) Standard Approach
 - b) Heckman Selectivity Correction
 - c) IV Methods
 - d) Fixed Effect Methods
- iii) Human Capital Versus Signaling
 - a) A Review of the Signaling Model
 - b) Empirical Evidence
- iv) The Social Returns to Education and Education Externalities
- v) The Determinants of School Quality
 - a) Literature Review on School Inputs and Student Outcomes
 - b) The Labor Market for Teachers
 - c) Peer Groups and Ability Grouping
 - d) School Choice and School Competition
 - e) School Standards and Accountability
- vi) Postsecondary School Quality

b) On-the-Job Training

Papers preceded by an asterisk (*) represent key papers that we will focus on extensively in class. Please let us know of any incorrect references in the attached reading list.

READING LIST

A. Labor Demand

Static Models

*Hamermesh, Daniel S. Labor Demand, Princeton, NJ: Princeton University Press, 1993, chapters 2&3.

J. Hicks, Theory of Wages, chapter 1, Appendix, sections 18-19.

* D. Hamermesh, "The Demand for Labor in the Long Run," in O. Ashenfelter and R. Layard, eds., Handbook of Labor Economics, vol. 1, 1986.

Empirical Applications of Static Models

* K. Clark and R. Freeman, "How Elastic is the Demand for Labor?" RESTAT, November 1980, pp. 509_520.

C. Brown, C. Gilroy, and A. Kohen, "The Effect of the Minimum Wage on Employment and Unemployment," Journal of Economic Literature, June 1982.

R. Freeman, "The Effect of Demographic Factors on Age_Earnings Profiles," Journal of Human Resources, 1979, pp. 289-318.

R. Freeman, "The Effect of the Increased Relative Supply of College Graduates on Skill Differences and Employment Opportunities," in Z. Griliches et al., Income Distribution and Economic Inequality, Campus Verlag, 1978, pp. 240-55.

*Z. Griliches, "Capital_Skill Complementarity," RESTAT, November 1969.

D. Card, "Unexpected Inflation, Real Wages, and Employment Determination in Union Contracts," American Economic Review, September 1990.

Berman Eli and Linda Bui (2000), "Air Quality Regulation and Labor Demand: Evidence from the L.A. Basin," Journal of Public Economics xx x.

Dynamic Models

* W. Oi, "Labor As A Quasi_Fixed Factor," Journal of Political Economy, 1962, pp. 538-55.

S. Nickell, "Dynamic Models of Labour Demand," Handbook of Labor Economics, vol. 1, 1986.

* D. Hamermesh, "Labor Demand and the Structure of Adjustment Costs," American Economic Review, September 1989, pp. 675-90.

Equilibrium with Heterogeneous Labor

*Lang, Kevin and William T. Dickens. "Neoclassical and Sociological Perspectives on Segmented Labor Markets," in Farkas, G. and England, P. ,eds., Industries, Firms, and Jobs, New York: Plenum, 1988.

*Kahn, Shulamit. "Economic Estimates of the Value of Life," Institute of Electrical Engineers Technology and Society, June 1986.

Rosen, Sherwin. "The Theory of Equalizing Differences." in Handbook of Labor Economics, Vol. I.

Willis, Robert J. "Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions," in Handbook of Labor Economics.

Immigration

* J. Altonji and D. Card, "The Effects of Immigration on the Labor Market Outcomes of Less_Skilled Natives," in J. Abowd and R. Freeman, eds., Immigration, Trade, and the Labor Market, U. of Chicago Press and NBER, 1991.

*Card, David, "The Impact of the Mariel Boatlift on the Miami Labor Market," Industrial and Labor Relations Review, 43 (January 1990): 245-57.

Chiswick, Barry R. "The Effect of Americanization on the Earnings of Foreign-born Men," Journal of Political Economy 86(5) (1978).

Friedberg, Rachel "The Impact of Mass Migration on the Israeli Labor Market," The Quarterly Journal of Economics 2001 116 (4)1373-1408.

*Borjas, George, "Self_Selection and the Earnings of Immigrants," American Economic Review, 77 (Sept. 1987): 531-53.

Berman, Eli, "Language-Skill Complementarity: Estimated Returns to Immigrant Language Acquisition," (with Kevin Lang and Erez Siniver), Labour Economics, 10 (3), (June 2003) 265-290.

Bleakely, Hoyt, and Aimee Chin, "Returns to English Language Skills among first generation immigrants: How much and why?" Review of Economics and Statistics, forthcoming.

B. Increased Returns to Skills and Increased Income Inequality ***The basic facts on quantities and prices***

Blackburn, M.L., D.E. Bloom and R.L. Freeman (1990). "The Declining Economic Position of Less_Skilled American Males," in G. Burtless (ed.), *A Future of Lousy Jobs?* Brookings, Washington D.C.

* Bound, John and George Johnson (1992) "Changes in the Structure of Wages During the 1980s: An Evaluation of Alternative Explanations," *American Economic Review*, 82(June).

* Katz, Lawrence F. and Kevin M. Murphy (1992). "Changes in Relative Wages, 1963-1987: Supply and Demand Factors," *Quarterly Journal of Economics*, 107(February) 35-78.

Murphy, Kevin M. and Finis Welch (1993) Industrial change and the rising importance of skill, in

Sheldon Danziger and Peter Gottschalk (eds.) *Uneven Tides: Rising Inequality in America*, New York: Russell Sage Foundation.

Murphy, Kevin M. and Finis Welch (1992) "The Structure of Wages," *Quarterly Journal of Economics*, 107(February): 285_326.

Race

Bound, John and Richard Freeman (1992) "What Went Wrong? The Erosion of Relative Earnings Among Young Black Men in the 1980s," *Quarterly Journal of Economics* 107(1), February.

International Evidence

Blau, Francine D. and Lawrence M. Kahn (1994) "International Differences in Male Wage Inequality: Institutions versus Market Forces," NBER WP #4678, March.

* Freeman, Richard and Lawrence Katz (1994) "Rising wage inequality: The United States vs. other advanced countries," in Richard Freeman (ed.) *Working Under Different Rules*, New York: Russell Sage Foundation.

Katz, Lawrence F., Gary W. Loveman and David G. Blanchflower (1993). "A comparison of Changes in the Structure of Wages in Four OECD Countries," National Bureau of Economic Research Working Paper #4297, March.

Historical Perspective

Goldin, Claudia and Robert Margo (1992) "The Great Compression: The Wage Structure in the United States at Mid-Century," *Quarterly Journal of Economics*, 107(1), February.

Basic Human Capital Theory

G. Becker, Human Capital, 2nd edition, 1975.

* Y. Ben_Porath, "The Production of Human Capital and the Life Cycle of Earnings," Journal of Political Economy, August 1967, pp. 352_65.

Hellerstein, Judith K., David Neumark and Kenneth R. Troske (1994) "Wages, Productivity and Worker Characteristics," Northwestern University, mimeo, November.

* R. Willis, "Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions," in O. Ashenfelter and R. Layard, eds., Handbook of Labor Economics, vol. 1, 1986.

* Mincer, Jacob (1994) "The Production of Human Capital and the Lifecycle of Earnings: Variations on a Theme," NBER WP #4838, August.

Mincer, Jacob (1994) "Investment in U.S. Education and Training," NBER WP #4844, August.

Trade as an Explanation

Borjas, George J. and Valerie A. Ramey (1994) "Foreign Competition, Market Power and Wage Inequality, UCSD mimeo.

Feenstra, Robert C. and Gordon Hanson, "Globalization, Outsourcing, and Wage Inequality" American Economic Review Paper and Proceedings, LXXXVI (1996), 240-245.

Helpman, Elhanan and Paul R. Krugman, Market Structure and Foreign Trade, (Cambridge, MA: MIT, 1985).

Krugman, Paul and Robert Lawrence (1993). "Trade, Jobs and Wages," National Bureau of Economic Research Working Paper #4478, September.

Lawrence, Robert and Matthew Slaughter (1993) 'International Trade and U.S. wages in the 1980s: Great sucking sound or small hiccup', *Brookings Papers on Economic Activity*, Fall, n2, pp161(66)

Sachs, Jeffrey and Howard Shatz (1994) 'Trade and jobs in U.S. manufacturing', *Brookings Papers on Economic Activity*.

Skill Biased Technological Change as an Explanation

Allen, Steven (1993) Technology and the Wage Structure, *Journal of Labor Economics*, 2001, vol. 19, issue 2, pages 440-83.

* Berman, Eli, John Bound and Zvi Griliches (1994) 'Changes in the demand for skilled labour within US manufacturing industries: Evidence from the Annual Survey of Manufacturing', *Quarterly Journal of Economics*, 109, 367_98.

* Berman, Eli, John Bound and Stephen Machin "Implications of Skill-Biased Technological Change: International Evidence," (1998), *Quarterly Journal of Economics*, 113, November.

Mincer, Jacob (1991). "Human Capital, Technology and the Wage Structure: What do Time Series Show?" National Bureau of Economic Research Working Paper #3581.

Autor, David, Lawrence Katz and Alan Krueger (1998) "Computing Inequality" Quarterly Journal of Economics, 113.

Berman, Eli and Stephen Machin, "Skill-Biased Technology Transfer Around the World," Oxford Review of Economic Policy 16(3), Fall 2000.

Human Capital and Technological Change in Growth Models

Barro and Sala_I_Martin (1994) *Economic Growth*

Lucas, Robert E. (1988) "On the Mechanics of Economic Development," *Journal of Monetary Economics*, XXII, 3-42.

Mankiw, N. Gregory, David Romer and David N. Weil (1992) "A Contribution to the Empirics of Economic Growth," *The Quarterly Journal of Economics*, May.

C. The Supply Side of the Labor Market

1) The Quantity of Labor Supplied

a) Labor Supply

* Blundell, Richard and Thomas MaCurdy (1999) "Labor Supply: A Review of Alternative Approaches", in *Handbook of Labor Economics*, Volume 3A, eds O. Ashenfelter and D. Card, Amsterdam: Elsevier Science.

Killingsworth, Mark (1983), *Labor Supply*, (Cambridge: Cambridge University Press) Chapters 1 and 2.

* Ben-Porath, Yoram (1973), "Labor Force Participation Rates and the Supply of Labor", *Journal of Political Economy* (May/June).

i) Static Labor Supply -- Theory and Estimation

* Heckman, James (1974), "Shadow Prices, Market Wages and Labor Supply", *Econometrica* (July).

* Heckman, James (1979), "Sample Selection Bias as a Specification Error With an Application to the Estimation of Labor Supply Functions", in James Smith (Ed.) *Female Labor Supply*, (Princeton: Princeton University Press).

Moffitt, Robert (1984), "The Estimation of a Joint Wage-Hours Labor Supply Model", *Journal of Labor Economics*, (October).

Mroz, Thomas (1987), "The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions", *Econometrica*, (July).

ii) Dynamic Labor Supply -- Theory and Basic Estimation

Altonji, Joseph (1986), "Intertemporal Substitution in Labor Supply: Evidence from Micro Data", *Journal of Political Economy*, (June), Supplement.

Camerer C, Babcock L, Loewenstein G, et al., (1997), "Labor supply of New York City cabdrivers: One day at a time," *Quarterly Journal of Economics*, 112 (2): 407-441 May.

* Heckman, James (1974), "Life Cycle Consumption and Labor Supply: An Explanation of the Relationship between Income and Consumption Over the Life Cycle", *American Economic Review* (March).

Heckman, James and Thomas MaCurdy (1980), "A Life Cycle Model of Female Labor Supply", *Review of Economic Studies*, (January).

Lucas. Robert E. and Leonard Rapping (1969), "Real Wages, Employment, and Inflation", *Journal of Political Economy*, (October).

* MaCurdy, Thomas (1981), "An Empirical Model of Labor Supply in a Life Cycle Setting", *Journal of Political Economy* (December).

* Oettinger, Gerald S (1999), "An empirical analysis of the daily labor supply of stadium vendors," *Journal of Political Economy* 107 (2): 360-392 April.

Connolly, Maria (2008), "Here Comes the Rain Again: Weather and the Intertemporal Substitution of Leisure," *Journal of Labor Economics*, 26 (1), January 73-100.

iii) Using Non-linear Budget Constraints Induced by Taxes and Subsidies to

Estimate Labor Supply Responses

*Richard Blundell, Alan Duncan, and Costas Meghir (1998), "Estimating Labor Supply Responses Using Tax Reforms," *Econometrica*, July, 827-61.

* Imbens, Guido W., Donald B. Rubin and Bruce I. Sacerdote (2001), "Estimating The Effect Of Unearned Income On Labor Earnings, Savings, And Consumption: Evidence From A Survey Of Lottery Players," *American Economic Review*, 2001, v91(4,Sep), 778-794.

Ziliak, James and Thomas Kneisner (1999), "Estimating Life Cycle Labor Supply Tax Effects," *Journal of Political Economy*, April, 326-59.

Eissa, Nada and Jeffrey Liebman (1996), "Labor supply response to the earned income tax credit" *Quarterly Journal of Economic*, May (111:2).

Moffitt, Robert (1986), "The Econometrics of Piecewise-Linear Budget Constraints," *Journal of Business and Economic Statistics*, 4:3, 317-328.

iv) Pensions and Retirement

Coile, Courtney and Jonathan Gruber (2000), "Social Security and Retirement," NBER Working Paper No. 7830, August.

Samwick, Andrew (1998) "New Evidence on Pensions, Social Security, and the Timing of Retirement," *Journal of Public Economics*, November 1998, 207-36.

Gruber, Jonathan and Peter Orszag (2000), "Does the Social Security Earnings Test Affect Labor Supply and Benefits Receipt?" NBER Working Paper No. 7923, September.

v) Health Insurance and Labor Supply

Madrian, Brigitte (1994), "Employment-Based Health Insurance and Job Mobility: Is There Evidence of Job Lock?" *Quarterly Journal of Economics*, February, 27-54.

Gruber, Jonathan and Madrian, Brigitte C (1997) "Employment separation and health insurance coverage", *Journal of Public Economics*; December.

2) The Quality of Labor Supplied: Human Capital

a) The Economics of Education

i) Human Capital Theory

Becker, Gary (1975), **Human Capital**, 2nd edition, Chicago: University of Chicago Press.

* Ben-Porath, Y, "The Production of Human Capital and the Life Cycle of Earnings," *Journal of Political Economy*, August 1967, pp. 352-65.

ii) Econometric Techniques For Estimating The Returns To Education

a) Standard Approach

b) Heckman Selectivity Correction

Mincer, Jacob (1974), *Schooling, Experience and Earnings*, New York: Columbia University Press for NBER.

* Griliches, Zvi (1977), "Estimating the Returns to Schooling: Some Econometric Problems", *Econometrica*, **45**, Jan. pp. 1-22.

* Heckman, James (1979), "Sample Selection Bias as a Specification Error", *Econometrica*, **47**, pp. 153-161.

* Willis, R.J. and S. Rosen (1979), "Education and Self-Selection", *Journal of Political Economy*, **87**, (Supplement, October), pp. S7-S36.

c) IV Methods

* Angrist, Joshua D. and Alan B. Krueger (1991), "Does Compulsory School Attendance Affect Schooling and Earnings?", *Quarterly Journal of Economics*, **56**, #4, pp. 979-1014.

Angrist, Joshua D. and Alan B. Krueger (1991), "The Effect of Age at School Entry on Educational Attainment: An Application of Instrumental Variables with Moments from Two Samples", *Journal of the American Statistical Association*, **87**, #418, June, pp. 328-336.

Angrist, Joshua D. and Alan B. Krueger (1994), "Why do World War II Veterans Earn More than Nonveterans?", *Journal of Labor Economics*, **12**, #1, Jan., pp. 74-97.

* Ashenfelter, Orley and Alan Krueger (1994), "Estimates of the Economic Return to Schooling from a New Sample of Twins", *American Economic Review*, December.

* Bound, John, David A. Jaeger and Regina M. Baker (1995), "The Cure Can be Worse than the Disease: A Cautionary Tale Regarding Instrumental Variables", *Journal of the American Statistical Association*, June.

Card, David (1999), "The Causal Effect of Education on Earnings", in Orley Ashenfelter and David Card (eds.), *Handbook of Labor Economics Volume 3A*.

Card, David (1993), "Using Geographic Variation in College Proximity to Estimate the Return to Schooling", NBER Working Paper 4483. Published in 1995 in *Aspects of Labour Market Behaviour: Essays in Honour of John Vanderkamp*, Louis Christofides et al. (eds.), Toronto: University of Toronto Press.

Kane, Thomas J. and Cecilia E. Rouse (1995), "Labor Market Returns to Two- and Four-Year College", *American Economic Review*, June.

Staiger, Douglas and James H. Stock (1997), "Instrumental variables regression with weak instruments", *Econometrica* v65, n3 (May 1997).

Harmon, Colm and Ian Walker (1995), "Estimates of the Economic Return to Schooling for the United Kingdom", *American Economic Review*:1278-1286.

d) Fixed Effect Methods

Altonji, Joseph and Thomas Dunn, (1996), "The Effects of Family Characteristics on the Return to Education", *Review of Economics and Statistics*, (November).

Angrist, Joshua and Whitney Newey (1991), "Over-identification Tests in Earnings Functions with Fixed Effects", *Journal of Business and Economic Statistics* (July).

Ashenfelter, Orley and David Zimmerman (1997), "Estimates of the Returns to Schooling from Sibling Data: Fathers, Sons and Brothers", *Review of Economics & Statistics* v79, n1 (Feb.).

* Ashenfelter, Orley and Alan Krueger (1994), "Estimates of the Economic Return to Schooling from a New Sample of Twins", *American Economic Review* (December). (Note: This paper uses both instrumental variables and fixed effects.)

* Light, Audrey (1995), "The Effects of Interrupted Schooling on Wages", *Journal of Human Resources* (Summer).

iii) Human Capital Versus Signaling

a) A Review of the Signaling Model

* Spence, Michael (1973), "Job Market Signalling", *Quarterly Journal of Economics*.

Stiglitz, Joseph (1975), "The Theory of Screening, Education, and the Distribution of Income", *American Economic Review*.

b) Empirical Evidence

Altonji, Joseph (1995), "The Effects of High School Curriculum on Education and Labor Market Outcomes", *Journal of Human Resources*, (Summer).

Altonji, Joseph and Charles R. Pierret (2001), "Employer learning and statistical discrimination", *Quarterly Journal of Economics*, Feb. 116:1 313-350.

* Bedard, Kelly (2001), "Human capital versus signaling models: University access and high school dropouts", *Journal of Political Economy*, Aug., (109:4), 749-775.

Farber, Henry S. and Robert Gibbons (1995), "Learning and Wage Dynamics", *Quarterly Journal of Economics* (November).

Gibbons, Robert and Lawrence F. Katz (1991), "Layoffs and Lemons", *Journal of Labor Economics*, **9**, #4, pp. 351-380.

* Lang, Kevin and David Kropp (1986), "Human Capital versus Sorting: The Effects of Compulsory Attendance Laws", *Quarterly Journal of Economics*, **101**, #3, pp. 609-624.

Rose, Heather and Julian R. Betts (2004), "The Effect of High School Courses on Earnings", *Review of Economics and Statistics*, May (**86**:2), pp. 497-513.

Weiss, Andrew (1988), "High School Graduation, Performance, and Wages", *Journal of Political Economy* (**96**:4).

iv) The Social Returns to Education and Education Externalities

Currie, J. and Moretti, E. "Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings." *Quarterly Journal Of Economics*, 2003, 118(4), pp. 1495-532.

Lochner, L. and Moretti, E. "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports." *American Economic Review*, 2004, 94(1), pp. 155-89.

Milligan, K.; Moretti, E. and Oreopoulos, P. "Does Education Improve Citizenship? Evidence from the United States and the United Kingdom." *Journal Of Public Economics*, 2004, 88(9-10), pp. 1667-95.

* Moretti, Enrico, (2003) "Human Capital Externalities in Cities", available at <http://www.econ.berkeley.edu/~moretti/papers.html>.

Moretti, E. "Estimating the Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-Sectional Data." *Journal Of Econometrics*, 2004a, 121(1-2), pp. 175-212.

_____. "Workers' Education, Spillovers, and Productivity: Evidence from Plant-Level Production Functions." *American Economic Review*, 2004b, 94(3), pp. 656-90.

Rauch, J. E. "Productivity Gains from Geographic Concentration of Human-Capital - Evidence from the Cities." *Journal of Urban Economics*, 1993, 34(3), pp. 380-400.

v) The Determinants Of School Quality

a) Literature Review on School Inputs and Student Outcomes

Basic Literature Review

Coleman, James et al. (1966), "*Equality of Educational Opportunity*", Washington: Government Printing Office.

* Hanushek, Eric A. (1986), "Production and Efficiency in Public Schools", *Journal of Economic Literature*, **24**, #3, pp. 1141-1177.

See also the articles in Burtless, Gary (Ed.) (1996), "*Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success*." (Washington, DC: Brookings Institution).

More Recent Evidence

* Angrist, Joshua D., and Victor Lavy, (1999) , "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement," *Quarterly-Journal-of-Economics*. May, 114(2): 533-75

* Betts, Julian R., (1995), "Does School Quality Matter? Evidence from the National Longitudinal Survey of Youth", *Review of Economics and Statistics*.

* Betts, Julian R., (1996), "Is There a Link Between School Inputs and Earnings? Fresh Scrutiny of an Old Literature", in Gary Burtless (Ed.), "*Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success*." (Washington, DC: The Brookings Institution).

Betts, Julian R. (1996), "Do School Resources Matter Only for Older Workers?", *Review of Economics and Statistics* (**78**:4), pp. 638-652.

Betts, Julian R. (2001), "The Impact of School Resources on Women's Earnings and Educational Attainment: Findings from the National Longitudinal Survey of Young Women", *Journal of Labor Economics*, (**19**:3), pp. 635-657.

Betts, Julian R. and Jamie L. Shkolnik (2000), "The Behavioral Effects of Variations in Class Size: The Case of Math Teachers", *Educational Evaluation and Policy Analysis*, Summer, (**20**:2), pp. 193-213.

Betts, Julian R., Andrew Zau and Lorien Rice (2003), **Determinants of Student Achievement: New Evidence from San Diego**, San Francisco: Public Policy Institute of California.

Bishop, J.H., (1989), "Is the Test Score Decline Responsible for the Productivity Growth Decline?", *American Economic Review*, **79**, pp. 178-197.

* Card, David and Alan B. Krueger (1992a), "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States", *Journal of Political Economy*, **100**, pp. 1-40.

Card, David and Alan B. Krueger (1992b), "School Quality and Black-White Relative Earnings: A Direct Assessment", *Quarterly Journal of Economics*, **57**, #1, pp. 151-200.

Card, David and Alan B. Krueger (1996), "School Resources and Student Outcomes: An Overview of The Literature and New Evidence from North and South Carolina", *Journal Of Economic Perspectives*, (**10**:4), (Fall).

Grogger, J., (1996), "Does School Quality Explain the Recent Black/White Wage Trend?", *Journal of Labor Economics* (April).

Hanushek, Eric A. and Lori L. Taylor (1990), "Alternative Assessments of the Performance of Schools: Measurement of State Variations in Achievement", *Journal of Human Resources*, **25**, #2, pp. 179-201.

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