Economics of Innovation
Fall 2016
Duke University Fuqua School of Business

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Tuesdays 1:25 to 4:00 pm, Room: Conference Room 4
First class Aug 30, Final class Nov 29 | No class on Oct 11

Course Description: This course focuses on technical change, its determinants and consequences, and its links to firm strategy and market structure. Our objective is to understand the *economic* determinants and consequences of technical change. However, technical change needs to be understood in a historical context, and consequently, the readings cover both historical description and economic analysis.

Course requirements: The course is intended as a PhD course. Intermediate microeconomics and econometrics are pre-requisites. Advanced undergraduates or masters students with appropriate preparation and interest are welcome.

The class will be run as a seminar class. You are expected to have done the readings and come prepared to discuss them in class. To this end, we will hand out discussion questions prior to many of the classes, and you will be expected to answer the questions in a 2-3 page paper based on the readings for each week. You are to turn in the paper at the beginning of class. The primary grading criterion is whether your paper demonstrates that you have read and digested the readings assigned.

We will also have students present key papers during the semester—that is convey the main points from a reading, and succinctly summarize the contribution to the literature.

We shall guide the discussions. Readings should be easily accessible using Google Scholar (particularly via JSTOR for published articles). Chapters from books and older readings will be made available the week before as pdf files through the course website. Readings marked with a (*) are mandatory.

Grading:
Most weeks, short 2-3 page papers, as discussed above, will be assigned. You may miss a maximum of one assignment per mini term without hurting your grade (i.e., the worst paper in each mini-term will be dropped.)

You will also be required to write a research paper. A one page proposal for your paper topic should be submitted to the instructors by September 30th . The paper should be related to the broad themes of the nature and determinants of technological change. Ideally, it should help you develop dissertation research or support your research papers. The weights for the course grade follows:

Research paper	50%
Class participation	25%
Short papers	20%

Week 1, Aug 30 | Early Views and Endogenous Growth | Bryan and Cohen

*1942, J. Schumpeter, Capitalism Socialism and Democracy
Read Ch 7, the Late Schumpeter on his "creative destruction", and Ch 12
*1962, K. Arrow, "Economic Welfare and the Allocation of Resources for Invention," in NBER, *The Rate and Direction of Inventive Activity*, pp. 609-619.
*1959, R. Nelson, "The simple economics of basic scientific research," *Journal of Political Economy*, pp. 297-306
*1962, J. Schmookler, "Economic Sources of Inventive Activity," *Journal of Economic History*, March, 1962, pp. 1-20.
*D. Mowery and N. Rosenberg, "The influence of market demand upon innovation: a critical review of some recent empirical studies," in Rosenberg, ed., *Inside the Black Box: Technology and Economics*, pp. 193-195, 225-238.
1959, R. Nelson, The economics of invention: A survey of the literature. The Journal of Business, 32(2): 101-119.
1962, R. Nelson, The Link Between Science and Invention: The Case of the Transistor, in NBER Volume The Rate and Direction of Inventive Activity
Classic case study of the mutual feedback between science and invention
1994, H. Brooks, The Relationship Between Science and Technology, RP
Science affects technology in six ways, and technology feeds back into science
1966, R. Nelson and E. Phelps, Investment in Humans..., AER P&P
Formalization of catch-up with explicit role for human capital in diffusion
1986, P. Romer, Increasing Returns and Long-Run Growth, JPE
Origin of endogenous growth lit where current knowledge begets future growth
1990, P. Romer, Endogenous Technological Change, JPE
Knowledge affects growth like Romer 86 but created as an equilibrium choice
1991, G. Grossman and E. Helpman, Quality Ladders..., RESTUD
Expands differentiated products models to allow quality-improving innovation
1999, C. Jones, Growth: With or Without Scale Effects, AER
Endogenous growth involves tricky modeling choices to get realistic growth paths
1997, S. Kortum, Research, Patenting and Technological Change, Ecta
Why is research output not growing even as we have many more scientists?
2011, R. Goettler and B. Gordon, Did AMD Spur Intel to Innovate More?, JPE
Structural examination of how competition moves quality ladder
WP, B. Jones, The Knowledge Trap: Human Capital and Development Reconsidered
Diversity in occupations matters so effect of human capital on growth is large
1992, P. Aghion and P. Howitt, A Model of Growth Through Creative Destruction, Econometrica, Vol. 60, No. 2 (March, 1992), 323-351
The classic model of Schumpeterian Growth
*2014, P. Aghion, U. Akcigit and P. Howitt, What Do We Learn From Schumpeterian Growth Theory?, in The Handbook of Economic Growth (http://scholar.harvard.edu/files/aghion/files/what_do_we_learn_0.pdf)
What have we learned from creative destruction models a la Aghion-Howitt?

Week 2, Sept 6 | Innovation in 2 Industrial Revolutions and Today | Bryan

* 1997, P. Temin, Two Views of the British Industrial Revolution, JEH
Was the IR broad or simply driven by a few small industries?
* 1999, J. Mokyr, Editor's Introduction: The New Economic History and the Industrial Revolution

A lengthy summary of how science and technology drove the IR in Mokyr's View

2002, J. Mokyr, The Gifts of Athena (in particular pp 1-77)

Diffusion of useful knowledge, not its creation, was essential in modern growth

2009, R. Allen, The Industrial Revolution in Miniature: The Spinning Jenny in Britain, France, and India, JEH

The IR did not happen in Britain simply because Britain had better inventions

1993, M. Kremer, Population Growth and Technological Change…, QJE

Can Romer-style endogenous growth explain the long long long run of history?

* 2000, O. Galor and D. Weil, Population, Technology and Growth..., AER

Famous Unified Growth Model of Malthusian and Post-Malthusian eras

1960, A. E. Musson and E. Robinson, Science and Industry in the Late 18th Century, EHR

What did the technological world look like at the dawn of the IR?

1994, J. De Vries, The Industrial Revolution and the Industrious Revolution, JEH

Increase in labor supply and market production preceded Industrial Revolution

2005, G. Clark, The Condition of the Working-Class in England, 1209-2004, JPE

Changes in fertility and economy-wide income preceded the Industrial Revolution

2004, N. Crafts, Steam as a General Purpose Technology..., EJ

Empirics show steam can only explain tiny portion of TFP growth during IR

* 1990, P. David, The Dynamo and the Computer, AER P&P

Electricity took long time from invention to impact; similar for the computer?

1987, G. Clark, Why Isn't the Whole World Developed? Lessons from the Cotton..., JEH

Is culture important for the early modern income differences?

1990, G. Wright, The Origins of American Industrial Success, 1879-1940, AER

Exploitation of natural resources helps explain the rise of America

1993, B. Z. Khan and K. Sokoloff, 'Schemes of Practical Utility': Entrepreneurship and Innovation Among 'Great Inventors' in the United States, 1790-1865, JEH

Great inventors in early modern era actively pursued market opportunities

2006, N. Lamoreaux, M. Levenstein and K. Sokoloff, Mobilizing Venture Capital During the Second Industrial Revolution..., Capitalism and Society

Something looking very much like venture capital existed in the late 1800s

* 2013, N. Lamoreaux, K. Sokoloff and D. Sutthiphisal, Patent Alchemy..., BHR

Active sales markets for patents are not a new phenomenon

2011, R. Richter and J. Streb, Catching Up and Falling Behind: Knowledge Spillover from American to German Toolmakers, JEH

How does "stealing machines" in a country today affect innovation tomorrow?

* WP, B. Z. Khan, Knowledge, Human Capital and Economic Development...

Great inventors in early modern era were generally not trained scientists

* 2013, A. Nuvolari and J. Sumner, Inventors, Patents and Inventive Activities..., BHR

Invention of Porter beer is a great example of collective invention

1983, R. Allen, Collective Invention, JEBO

In new industries collective sharing of knowledge has long been common,

Week 3, Sept 13 | Innovation Geography, Spillovers, Diffusion | Bryan

1996, D. Audretsch and Feldman, M, R&D Spillovers and the Geography of Innovation and Production, AER

Innovation is much more concentrated geographically than production

WP, A. Matray, The Local Spillovers of Listed Firms

Is agglomeration causally linked to the clustering of innovative activity?

* 2010, G. Ellison, E. Glaeser, and W. Kerr, What Causes Industry Agglomeration? Evidence from Coagglomeration Patterns, AER
Input-output analysis can help identify why industries agglomerate

1992, Z. Griliches, The Search for R&D Spillovers, Scandinavian Journal of Economics
Identifying R&D Spillovers has traditionally been incredibly difficult
1993, A. Jaffe, M. Trajtenberg, and R. Henderson, Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations, QJE
Backward patent citations provide evidence for spillovers
* 2013, N. Bloom, M. Schankerman, and J. Van Reenen, Identifying Technology Spillovers and Product Market Rivalry, Ecta
Technology spillovers dominate socially-inefficient market stealing
2014, S. Kantor and A. Whalley, Knowledge Spillovers from Research Universities: Evidence from Endowment Value Shocks, RESTAT
University research instrumented using endowment shocks spills over to industry
2010, P. Azoulay, J. Graff Zivin and J. Wang, Superstar Extinction, QJE
Premature death of scientific superstars can help measure local spillovers
* 2010, T. Conley and C. Udry, Learning about a New Technology: Pineapple in Ghana, AER
Social network data to examine how a new pineapple spreads in Ghana
* 1957, Z. Griliches, Hybrid Corn: An Exploration in the Economics of Technical Change, Econometrica
Examines the rationality of the lagged diffusion of hybrid corn in a classic study
1957, J. Coleman, E. Katz and H. Menzel, The Diffusion of an Innovation Among Physicians, Sociometry
The classic diffusion paper, among doctors in Chicagoland
* 2003, B. Hall, Innovation and Diffusion, in Handbook of Innovation
Handbook chapter summarizing economics of diffusion
2010, D. Comin and B. Hobijn, An Exploration of Technology Diffusion, AER
Why does technology take so long to diffuse across countries?
WP, D. Gross, Scale versus Scope in the Diffusion of New Technology
Products diffuse partially via changes in the scope of tasks they perform
1995, E. Rogers, Diffusion of Innovations
Legendary psuedotextbook covering diffusion literature from many different fields
1995, G. Saloner and A. Shephard, Adoption of Technologies with Network Effects, RAND Journal
Empirical investigation of the diffusion of a network good
WP, K. Bryan and Y. Ozcan, The Impact of Open Access Mandates on Innovation
Inventors use academic knowledge more if it is easier to access
* 2010, J. Evans, Industry Induces Academic Science to Know Less about More, AJS
Industry collaboration causes academics to work less deeply and more broadly,

Week 4, Sept 20 | Path Dependence and Industry Evolution | Bryan

1985, P. David, Clio and the Economics of QWERTY, AER P&P
Path dependence can explain QWERTY, though see Liebowitz and Margolis
1990, R. Cowan, Nuclear Power Reactors: A Study in Technological Lock-in, JEH
Path dependence based on a minor factor led to dominance of light water
1994, S. Liebowitz and S. Margolis, Network Externality: An Uncommon Tragedy JEP
Socially inefficient path dependence is not what happened to the QWERTY

* 2006, S. Page, Path Dependence, Quarterly Journal of Political Science
Great typology of ways that "path dependence" can be thought of formally
* WP, K. Bryan and J. Lemus, The Direction of Innovation
Strategic interdependence and not just "minor factors" induce path dependence

*1996, S. Klepper, Entry, Exit, Growth, and Innovation over the Product Life Cycle, AER
Some industries follow very clear "product life cycle" for predictable reasons
*2002, R. Nelson and S. Winter, Evolutionary Theorizing in Economics
Summary of Nelson and Winter's selection-based model of industry dynamics
2002, J. Gans, D. Hsu and S. Stern, When Does Start-Up Innovation Spur the Gale of Creative Destruction?, RAND
Why don't incumbents with complementary assets just buy promising startups?
*2014, S. Helper and R. Henderson, Management Practices, Relational Contracts, and the Decline of General Motors, JEP
Relational contracts means shifting technology can be difficult for incumbents
2014, M. Marx, J. Gans and D. Hsu, Dynamic Commercialization Strategies, MS
Rather than shift technologies or sit tight, firms can wait to see what tech does
WP, S. Alder, D. Lagakos and L. Ohanian, Competitive Pressure and the Decline of the Rust Belt: A Macroeconomic Analysis
Rust belt declines because of labor-management relations limit tech adoption

Week 5, Sept 27 | General Purpose Technology and Recombination | Bryan

2001, L. Fleming, Recombinant Uncertainty in Technological Search Management, MS
Recombinant knowledge across fields is valuable
* 1998, M. Weitzman, Recombinant Growth, QJE
Limit to growth is finding new combinations from huge set of existing knowledge
* 2013, B. Uzzi, S. Mukherjee, M. Stringer and B. Jones, Atypical Combinations and Scientific Impact, Science
Optimally your work should be weird but not too weird
WP, A. Galasso and M. Schankerman, Patents and Cumulative Innovation: Causal Evidence from the Courts
Patents limit subsequent use in complex fields where many users are small
2014, S. Kaplan and K. Valiki, The Double Edged Sword of Recombination in Breakthrough Innovation, SMJ
Uses topic modeling to show recombinant inventions are not breakthroughs
* 1996, W. Baumol, Entrepreneurship: Productive, Unproductive, and Destructive, JBV
Innovators can be socially useful or rent-seekers, and have been both historically
1995, T. Bresnahan and M. Trajtenberg, General Purpose Technologies: Engines of Growth?, Journal of Econometrics
Introduces idea of key "general purpose technologies" in history of innovation
2004, N. Rosenberg and M. Trajtenberg, A General Purpose Technology at Work: The Corliss Steam Engine in the Late Nineteenth Century United States, JEH
Empirical case of how a GPT leads to growth-inducing reallocation
* 2005, B. Jovanovic and P. Rousseau, General Purpose Technologies, in The Handbook of Economic Growth
How did the economy react to the introduction of electricity and IT?
* 1979, N. Rosenberg, Technological Interdependence in the American Economy, Technology and Culture

Why is it so hard to find evidence that certain technologies matter for growth?

* 2014, D. Acemoglu, U. Akcigit, D. Hanley and W. Kerr, Transition to Clean Technology

How can directed technical change guide policies to limit climate change?

Week 6, Oct 4 | Firm Characteristics and Innovation | Cohen

*2010, W.M. Cohen, Fifty Years of Empirical Studies of Innovative Activity and Performance, [henceforth: ***FYES***] in Hall and Rosenberg, eds, *Economics of Innovation*

Read pages 159-168

1987, S. Winter, Knowledge and competence as strategic assets, in D. Teece, ed., The Competitive Challenge

* 1989, W. Cohen & D. Levinthal, Innovation and Learning: the Two Faces of R&D, EJ

* 1990, W. Cohen & D. Levinthal, Absorptive Capacity: A New Perspective on Learning and Innovation, ASQ

Read one of the two above articles on absorptive capacity

1998, R. Henderson & I. Cockburn, Absorptive Capacity, Coauthoring Behavior, and the Organization of Research in Drug Discovery, J. Ind. Econ.

* 2000, F.M. Scherer & Harhoff, Technology policy for a world of skew-distributed outcomes, RP

* 1992, Cohen & Klepper, The Anatomy of Industry R&D Intensity Distributions, AER

* 1987, Clark, Chew & Fujimoto, Product Development in the World Auto Industry, Brookings Papers on Economic Activity

* 2010, Hall & Lerner, The Financing of R&D and Innovation, in Hall and Rosenberg, eds., Economics of Innovation

2007, J. Lerner & J. Wulf, Innovation and Incentives: Evidence from corporate R&D, RESTAT

* 1942, J. Schumpeter, Capitalism, Socialism and Democracy, Chapter 12

* 2010, H. Sauermann & W.M. Cohen, What makes them tick? Employee motives and Firm Innovation, MS

2004, S. Stern, Do Scientists Pay to Be Scientists?, MS

* 1991, March, J., Exploration and Exploitation in Organizational Learning, Org. Sci.

*2014, Arora, Belenzon and Rios, Make, Buy, Organize: The interplay between R&D, external knowledge, and firm structure, Strategic Management Journal, 35: 317–337

Week 7, Oct 18 | Firm Size, Diversity, and Innovation | Cohen

* 1942, J. Schumpeter, *Capitalism, Socialism and Democracy*, Chapters 7 and 8.

* 2010, W.M. Cohen, FYES

Read pages 131-140

* 1990, F.M. Scherer & D. Ross, Industrial Market Structure and Economic Performance

Read pp 651-660 and Chapter 17

* 1996, W.M. Cohen and S. Klepper, A reprise of size and R&D, EJ

1996, W. M. Cohen & S. Klepper, Firm size and the nature of innovation within industries: The case of process and product R&D, RESTAT

* 1996, R. Henderson & I. Cockburn, Scale, Scope, and Spillovers: Determinants of Research Productivity in the Pharmaceutical Industry, RAND

* 1959, Jewkes, Sawers, and Stillerman, The Sources of Invention,

Read Chapter 7 and Epilogue, pp. 117-151, 194-228.

* 1991, W. Cohen and S. Klepper, The Tradeoff between Firm Size and Diversity for Technological Progress, J. Small Bus. Econ.

Week 8, Oct 25 | Division of Labor and Tech Markets | Bryan and Cohen

* 1776, A. Smith, The Wealth of Nations
  Read Chapter 1 from the foundational text on the division of labor
* 1951, G. Stigler, The Division of Labor is Limited by the Extent of the Market, JPE
  Smithian (following Young 1928) rather than Coasean theory of firm scope

1998, T. Bresnahan and A. Gambardella, The Division of Inventive Labor and the Extent of the Market, in General Purpose Technologies and Economic Growth

* 2010, A. Arora and A. Gambardella, The Market for Technology, in the Handbook of the Economics of Innovation
  Handbook chapter on modern literature of sale and purchase of technology,

1994, E. von Hippel, Sticky Information and the Locus of Problem Solving..., MS
Users innovate because their knowledge of what is needed is hard to transfer

2009, A. Arora, W. Vogt and J. Yoon, Is the Division of Labor Limited by the Extent of the Market?: Evidence from the Chemical Industry, ICC
Empirical test confirming Bresnahan and Gambardella

2009, M. Marx, D. Strumsky, and L. Fleming, Mobility, Skills, and the Michigan Non-Compete Experiment, MS
Noncompete agreements limit mobility of technically skilled employees

* 2011, O. Sorenson and S. Samila, Non-compete Covenants?: Incentives to Innovate or Impediments to Growth, MS
  Noncompete agreements are bad for entrepreneurship

2011, J. Singh, and A. Agrawal, Recruiting for Ideas: How Firms Exploit the Prior Inventions of New Hires, MS
Not much evidence that you get firm's knowledge when you buy a researcher

1994, P. Bolton and M. Dewatripont, The Firm as a Communication Network, QJE
How do you organize a firm to get the right information to the right people?

* 2011, G. Manso, Motivating Innovation, Journal of Finance
  Optimal labor schemes for scientists are lenient about failure

1994, J. Lerner and U. Malmendier, Contractibility and the Design of Research..., QJE
How to get the firm you contract with to actually do the research you want?

* 1994, P. Aghion and J. Tirole, The Management of Innovation, QJE
  Incomplete contracts as an explanation for why R&D is sometimes internal

1989, B. Holmstrom, Agency Costs and Innovation, JEBO
Exploration of how mech. design can explain strange-looking R&D contracts

2008, P. Aghion, M. Dewatripont and J. Stein, Academic Freedom..., RAND
Give academics autonomy in basic research because it's cheaper

1990, N. Rosenberg, Why Do Firms Do Basic Research (with their own money?), RP
By accident, because of agency problems, because they are big or like risk

1994, B. Holmstrom and P. Milgrom, The Firm as an Incentive System, AER
Performance incentives need bundle with additional organizational features

* 2016, A. Arora, W. Cohen, J. Walsh, "The acquisition and commercialization of invention in American Manufacturing: Incidence and impact", RP

Week 9, Nov 1 | Market Structure and Innovation | Cohen

* 1990, F.M. Scherer & D. Ross, Industrial Market Structure and Economic Performance
Read Chapter 17, pp 630-651
* 2010, W.M. Cohen, FYES
Read pp 140-159
* 1962, K. Arrow, Economic Welfare and the Allocation of Resources for Invention, in NBER Volume, The Rate and Direction of Inventive Activity
Read pp 619-626
1984, F.M. Scherer, *Innovation and Growth*
Read Chapter 12, pp 239-248
*2009, R.R. Nelson and S. Winter, An Evolutionary Theory of Economic Change
Read Chapter 13, pp 308-328
* 1998, J. Sutton, Technology and Market Structure
Read Chapter 1, pp 3-31
1994, P. Geroski, Market Structure, Corporate Performance and Innovative Activity
Read Chapter 3-4, pp 26-60
* 1996, S. J. Nickell, Competition and Corporate Performance, JPE
2005, Aghion, P., Griffith, R. Competition and Growth: Reconciling Theory and Evidence. MIT Press, Cambridge, MA.
2006, R. Gilbert, Looking for Mr. Schumpeter: Where are we in the competition innovation debate, Innovation Policy and the Economy

Week 10, Nov 8 | Industry level Determinants of Innovation: Demand and technological opportunity | Cohen

* W. M. Cohen, FYES
Read pp 168-182
1962, J. Schmookler, Economic Sources of Inventive Activity, JEH
* 1982, D. Mowery and N. Rosenberg, The influence of market demand upon innovation: a critical review of some recent empirical studies, in Rosenberg, ed., Inside the Black Box: Technology and Economics
Read pp 193-195, 225-238
1988, E. von Hippel, The Sources of Innovation
Read Ch. 2 and 8, pp 11-27, 102-116
* 2004, D. Acemoglu and J. Linn, Market size in innovation: Theory and evidence from the pharmaceutical industry, QJE
* 1976, N. Rosenberg, The Direction of Technological Change: Inducement Mechanisms and Focusing Devices, in Perspectives on Technology
1986, A. Jaffe, Technological opportunity and spillovers of R&D, AER
1993, A. Jaffe, M. Trajtenberg and R. Henderson, Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations," QJE
1995, A. Klevorick, R. Levin, R. Nelson, and S. Winter, On the sources and significance of interindustry differences in technological opportunities, RP
1982, R. R. Nelson, The role of knowledge in R&D efficiency, QJE

Week 11, Nov 15 | Patents, IPRs, and Economic Modeling | Bryan

* 1979, G. Loury, Market Structure and Innovation, QJE
The classic "patent race" model and why firms might innovate too much
1980, T. Lee and L. Wilde, Market Structure and Innovation: A Reformulation, QJE

A minor but important caveat to Loury's patent race

1982, J. Reinganum, A Dynamic Game of R and D..., Ecta
How do patent races change when we allow non-static strategies?

1997, J. Lerner, An Empirical Exploration of a Technology Race, RAND
Reinganum-style patent races do seem to occur in the disk drive industry

2012, G. Weyl and J. Tirole, Market Power Screens Willingness-to-Pay, QJE
Benefit of patents versus prizes depends on slope of demand curve

* 1998, M. Kremer, Patent Buyouts: A Mechanism for Encouraging Innovation, QJE
Governments should buy patents to reduce deadweight loss, use auction to do it

* 2005, M. Lemley and C. Shapiro, Probablistic Patents, JEP
Patents are not that strong in practice

* 2009, J. Bessen and E. Maskin, Sequential Innovation, Patents, and Imitation, RAND
Patents can discourage innovation in cumulative industries like software

2011, C. Ponce and E. Henry, Waiting to Imitate: On the Dynamic Pricing..., JPE
Inventors earn rents by threatening to give away their tech to rivals if no one pays

2008, M. Lemley, The Surprising Virtues of Treating Trade Secrets as IP Rights, Stan. Law Rev.
Trade Secrets actually are a tool for disclosure if policy is optimal

1994, J. Anton and D. Yao, Expropriation and Inventions: Appropriable Rents..., AER
Inventors without patents can earn rents by threatening to make invention public

1986, M. Katz and C. Shapiro, How to License Intangible Property, QJE
What goes wrong when firms try to sell to product market competitors?

2006, H. Hopenhayn, H. Llobet and M. Mitchell, Rewarding Sequential Innovators..., JPE
Forcing innovators to set a buyout price optimally rewards sequential innovators

1995, J. Green and S. Scotchmer, On the Division of Profit in Sequential Invention, RAND
Basic model of sequential invention

* 2002, D. Acemoglu, Directed Technical Change, RESTUD
How do changes in factor prices affect the incentive to innovate?

A brief handout on modeling in economics will be provided in-class.

2012, L. Brunt, J. Lerner and T. Nicholas, Inducement Prizes and Innovation, JIE
Examines a series of royal society prizes for innovation in the 1800s

WP, B. Sampat and H. Williams, How do patents affect follow-on innovation?...
Formal IP less harmful if easy to license and IP holders have incentive to do so

* 2014, H. Williams, Intellectual Property Rights and Innovation..., JPE
Formal IP causes innovations to be used less frequently by downstream users

1990, A. Trajtenberg, A Penny for your Quotes..., RAND
Citations are a useful proxy for the (otherwise highly skew) value of patents

2001, B. Hall and R. Ziedonis, The Patent Paradox Revisited..., RAND
Why do firms in some industries say patents don't matter but then use them a ton?

2012, P. Moser, Innovation Without Patents: Evidence from World's Fairs, JLAWE
Almost all important innovations in 1800s Britain were not patented,

Week 12, Nov 22 | Industry-level determinants of Innovation: Appropriability | Cohen

* 2010, W.M. Cohen, FYES
Read pp. 182-193.
* WP, W.M. Cohen, R.R. Nelson and J.P. Walsh, Protecting Their Intellectual Assets: Appropriability conditions and why U.S. firms patent (or not),
1987, R. Levin, A. Klevorick, R.R. Nelson and S. Winter, Appropriating the Returns from Industrial Research and Development, *Brookings Papers on Economic Activity,*
* 2005, P. Moser, How do patent laws affect innovation: evidence from nineteenth century trade fairs, AER
* 1986, D. Teece, Profiting from technological innovation: implications for integration, collaboration, licensing and public policy, RP
* 2000, S. Winter, Appropriating the Gains from Innovation, in Day and Schoemaker, eds., Wharton on Managing Emerging Technologies

Week 13, Nov. 29: Readings to be announced.