Winter 2020 **Liran Einav**
Tuesdays and Thursdays, 9:30-11:20am **Heidi Williams**

Econ 244: Market Failures and Public Policy

This course will cover selected topics in applied microeconomics, with particular focus on insurance and credit markets (aka "selection markets"), markets for innovation, and healthcare markets. The common theme (as the course name suggests) is that in all three contexts there are good a priori reasons to be concerned about potential market failures, suggesting that some type of government intervention or regulation may be critical for achieving efficient market outcomes. These three markets are also particularly useful in illustrating the connection and interplay between economic research and public policy.

The focus of the course will be on topics, not methods, and will therefore cater to a broad set of students – especially those with interests in applied microeconomics, broadly defined. While, formally, this class is not attached to any of the second-year sequences, it should be particularly complementary to the second-year sequences in IO and public economics.

In addition to discussing existing work and bringing students closer to the research frontier, the course will emphasize areas of inquiry where additional research is feasible and warranted, thus hopefully generating possible leads for second-year research papers.

Course logistics and requirements

The class meets regularly on Tuesdays and Thursdays, 9:30–11:20am in Room 218 (Landau Economics). A tentative list of lectures is below. We will be using Canvas to post material and send announcements.

Student requirements will include three components (weight in the final grade in parentheses):
1. Problem sets that will mostly include reviews of papers, concepts, and research ideas (30%)
2. Class attendance, preparation, participation, and occasional short class presentations (35%)
3. Research paper proposal (35%)

Class topics and schedule

A. Selection markets (Liran)

1. Tue, Jan 7: Intro to selection markets
2. Thu, Jan 9: Testing for asymmetric information
3. Tue, Jan 14: Empirical models of insurance demand
4. Thu, Jan 16: Empirical models of insurance demand
5. Tue, Jan 21: Estimating welfare in insurance markets
6. Thu, Jan 23: Credit markets
7. Tue, Jan 28: Credit markets
8. Thu, Jan 30: Reclassification risk vs. adverse selection

B. Markets for innovation (Heidi)

9. Tue, Feb 4: Introduction to markets for innovation
10. Thu, Feb 6: Market size and market design
11. Tue, Feb 11: Economics of science
12. Thu, Feb 13: Taxes and innovation
13. Tue, Feb 18: Public funding of research
14. Thu, Feb 20: Intellectual property rights
15. Tue, Feb 25: Immigration and innovation
16. Thu, Feb 27: Innovation and inequality

C. Healthcare markets (Liran and Heidi)

17. Tue, Mar 3: Entry regulation for medical technologies (Heidi)
18. Thu, Mar 5: Risk adjustments (Liran)
19. Tue, Mar 10: Unintended consequences (Liran)
20. Thu, Mar 12: Estimating the returns to medical spending (Heidi)

Reading List

(*) = paper discussed in class

A. Selection markets

1. Theoretical background

- Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," QJE, 1970.
- Arrow, "Uncertainty and the Welfare Economics of Medical Care," AER, 1963.
- Arrow, Essays in the Theory of Risk Bearing (Chicago: Markham, 1971).
- (*)Einav and Finkelstein, "Selection in Insurance Markets: Theory and Empirics in Pictures," JEP, 2011.
- Pauly, "The Economics of Moral Hazrad: Comment," AER, 1968.
- Rothschild and Stiglitz, "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information," QJE, 1976.

2. Testing for Asymmetric Information in Insurance Markets

- (*)Chiappori and Salanie, "Testing for Asymmetric Information in Insurance Markets," JPE, 2000.
- Chiappori and Salanie, "Testing Contract Theory: A Survey of Some Recent Work," in M. Dewatripont and L. Hansen, ed., Advances in Economics.
- Fang, Keane, and Silverman, "Sources of Advantageous Selection: Evidence from the Medigap Insurance Market," JPE, 2008.
- (*)Finkelstein and McGarry, "Multiple dimensions of private information: evidence from the long-term care insurance market," AER, 2006.
- Finkelstein and Poterba, "Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market," JPE, 2004.
- Genesove, "Adverse Selection in the Wholesale Used Car Market," JPE, 1993.
- Israel, "Do We Drive More Safely When Accidents Are More Expensive? Identifying Moral Hazard from Experience Rating Schemes," working paper.
- Pueltz and Snow, "Evidence on Adverse Selection: Equilibrium Signaling and Cross-Subsidization in the Insurance Market," JPE, 1994.

3. Estimating Demand for Insurance

- (*)Cardon and Hendel, "Asymmetric Information in Health Insurance: Evidence from the National Medical Expenditure Survey," RAND, 2001.
- (*)Cohen and Einav, "Estimating Risk Preferences from Deductible Choice," AER, 2007.
- Einav, Finkelstein, and Schrimpf, "Optimal Mandates and The Welfare Cost of Asymmetric Information: Evidence from the U.K. Annuity Market," Econometrica, 2010.

4. Welfare in Insurance Markets

- (*)Bundorf, Levin, and Mahoney, “Pricing, Matching and Efficiency in Health Plan Choice,” AER, forthcoming.
- (*)Einav, Finkelstein, and Cullen, “Estimating welfare in insurance markets using variation in prices,” QJE, 2010.
- Einav, Finkelstein, Ryan, Schrimpf, and Cullen, “Selection on Moral Hazard in Health Insurance,” AER, 2013.
- Einav, Finkelstein, and Levin, “Beyond Testing: Empirical Models of Insurance Markets,” Annual Reviews of Economics, 2010.
- Handel, “Adverse Selection and Switching Costs in Health Insurance Markets: When Nudging Hurts,” AER, 2013.
- Lustig, “The Welfare Effects of Adverse Selection in Privatized Medicare,” working paper.

5. Credit Markets

- Ausubel, “The Failure of Competition in the Credit Card Market,” AER 1991.
- Ausubel, “Adverse Selection in the Credit Card Market,” University of Maryland Working Paper, June 1999.
- (*)Adams, Einav, and Levin, “Liquidity Constraints and Imperfect Information in Subprime Lending,” AER, 2009.
- (*)Einav, Jenkins, and Levin, "Contract Pricing in Consumer Credit Markets," Econometrica, 2012.
- Einav, Jenkins, and Levin, “The Impact of Information Technology on Consumer Lending,” RAND, 2013.
- Jaffee and Russell, "Imperfect Information, Uncertainty and Credit Rationing," QJE, 1976.
- (*)Karlan and Zinman, “Observing Unobservables: Identifying Information Asymmetries with a Consumer Credit Field Experiment,” Econometrica, 2009.
- Stiglitz and Weiss, "Credit Rationing in Markets with Imperfect Information," AER, 1981.

B. Markets for innovation

1. Introduction to markets for innovation

- Key references:
    i. Arrow, Kenneth (1962) "Economic Welfare and the Allocation of Resources for Invention," NBER Chapters in: The Rate and Direction of Inventive Activity: Economic and Social Factors, pages 609-626. National Bureau of Economic Research, Inc. [link]
    ii. Bloom, Nicholas, John Van Reenen, and Heidi Williams (2019) "A Toolkit of Policies to Promote Innovation," *Journal of Economic Perspectives* 33 (3): 163-84. [link]
    iii. Nelson, Richard R. (1959) "The Simple Economics of Basic Scientific Research," *Journal of Political Economy* 67(3): 297-306. [link]

iv. Scotchmer, Suzanne (2006). *Innovation and Incentives,* Cambridge, Massachusetts: MIT Press.

- Market failures:
  i. (*)Bloom, Nicholas, Mark Schankerman, and John Van Reenen (2013) **"**Identifying technology spillovers and product market rivalry," *Econometrica* 81(4): 1347-1393. [link]
  ii. Jaffe, Adam B. (1986) "Technological Opportunity and Spillovers of R & D: Evidence from Firms' Patents, Profits, and Market Value," *American Economic Review 76*(5): 984-1001. [link]
  iii. Jaffe, Adam B., Manuel Trajtenberg, and Rebecca Henderson (1993) "Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations," *Quarterly Journal of Economics* 108(3): 577–98. [link]

2. Market size and market design

- Market size and innovation
  i. (*)Acemoglu, Daron, and Joshua Linn (2004) "Market Size in Innovation: Theory and Evidence from the Pharmaceutical Industry," *Quarterly Journal of Economics* 119(3): 1049–1090. [link]
  ii. Finkelstein, Amy (2004). "Static and Dynamic Effects of Health Policy: Evidence from the Vaccine Industry," *Quarterly Journal of Economics* 119(2): 527–564. [link]
  iii. Kremer, Michael, and Christopher M. Snyder (2015) "Preventives Versus Treatments," *Quarterly Journal of Economics* 130 (3): 1167–1239. [link]
- Market design: Advanced Market Commitments
  i. Kremer, Michael (2001) "Creating Markets for New Vaccines: Part I: Rationale," *Innovation Policy and the Economy Volume 1*, Adam B. Jaffe, Josh Lerner, and Scott Stern (editors), Cambridge, Massachusetts: MIT Press. [link]
  ii. Kremer, Michael (2001) "Creating Markets for New Vaccines: Part II: Design Issues," *Innovation Policy and the Economy Volume 1*, Adam B. Jaffe, Josh Lerner, and Scott Stern (editors), Cambridge, Massachusetts: MIT Press. [link]
  iii. Kremer, Michael and Rachel Glennerster (2004) *Strong Medicine: Creating Incentives for Pharmaceutical Research on Neglected Diseases*, Princeton, New Jersey: Princeton University Press.
  iv. Kremer, Michael and Heidi Williams (2010) "Incentivizing Innovation: Adding to the Tool Kit," *Innovation Policy and the Economy Volume 10,* Josh Lerner and Scott Stern (editors), Chicago, Illinois: University of Chicago Press. [link]
- Anti-trust and innovation:
  i. Segal, Ilya, and Michael D. Whinston (2007) "Antitrust in Innovative Industries," *American Economic Review* 97 (5): 1703-1730. [link]
  ii. Shapiro, Carl (2012) "Competition and Innovation: Did Arrow Hit the Bull's Eye?" *The Rate and Direction of Inventive Activity Revisited*, Josh Lerner and Scott Stern (editors), Chicago, London: The University of Chicago Press. [link]

3. Economics of science

- Key references:
  i. Hill, Ryan and Carolyn Stein (2019) "Scooped! Estimating Rewards for Priority in Science," MIT working paper. [link]
  ii. Merton, Robert K (1973) *The Sociology of Science: Theoretical and Empirical Investigations*, Chicago: University of Chicago Press.
  iii. Stephan, Paula (2012). *How Economics Shapes Science*. Cambridge, Massachusetts; London, England: Harvard University Press.
- Compensating differentials:
  i. Aghion, Philippe, Mathias Dewatripont and Jeremy C. Stein (2008) "Academic Freedom, Private Sector Focus and the Process of Innovation," *RAND Journal of Economics* 39(3): 617–635. [link]
  ii. Murray, Fiona, Philippe Aghion, Mathias Dewatripont, Julian Kolev, and Scott Stern (2016) "Of Mice and Academics: Examining the Effect of Openness on Innovation," *American Economic Journal: Economic Policy* 8 (1): 212-252. [link]
  iii. (*)Stern, Scott (2004**)** "Do Scientists Pay to be Scientists?" *Management Science* 50(6): 835-53. [link]
- Burden of knowledge hypothesis:
  i. Jones, Benjamin F. (2009) "The Burden of Knowledge and the 'Death of the Renaissance Man': Is Innovation Getting Harder?" *Review of Economic Studies* 76(1):283–317. [link]
  ii. Jones, Benjamin F. (2010) "Age and Great Invention," *Review of Economics and Statistics* 92(1): 1-14. [link]
  iii. (*)Jones, Benjamin F. (2011) "As Science Evolves, How Can Science Policy?" Innovation Policy and the Economy Volume 11, Josh Lerner and Scott Stern (editors), Chicago: The University of Chicago Press. [link]
  iv. Jones, Benjamin F. and Bruce Weinberg (2011) "Age Dynamics in Scientific Creativity," *Proceedings of the National Academy of Sciences* 108(47): 18855-19096. [link]
  v. Wuchty, Stefan, Benjamin F. Jones, and Brian Uzzi (2007) "The increasing dominance of teams in the production of knowledge," *Science* 316(5827), 1036–1039. [link]

4. Taxes and Innovation

- Tax policy and R&D investments:
  i. Akcigit, Ufuk, John Grigsby, Tom Nicholas, and Stefanie Stantcheva (2018) "Taxation and Innovation in the 20th Century," NBER Working Paper No. 24982. [link]
  ii. (*)Dechezleprêtre, Antoine, Elias Einiö, Ralf Martin, Kieu-Trang Nguyen, and John Van Reenen (2016) "Do tax Incentives for Research Increase Firm Innovation? An RD Design for R&D*,"* NBER Working Paper No. 22405. [link]
  iii. Hall, Bronwyn H. and John Van Reenen (2000) "How Effective are Fiscal Incentives for R&D? A New Review of the Evidence," *Research Policy* 29. [link]

- Tax policy and inventor mobility:
    i. Akcigit, Ufuk, Salomé Baslandze, and Stefanie Stantcheva (2016) "Taxation and the International Mobility of Inventors," *American Economic Review* 106(10): 2930–2981. [link]
    ii. Moretti, Enrico and Daniel J. Wilson (2014) "State Incentives for Innovation, Star Scientists, and Jobs: Evidence from Biotech," *Journal of Urban Economics* 79(C): 20-38. [link]
    iii. (*)Moretti, Enrico and Daniel J. Wilson (2017) "The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists," *American Economic Review* 107(7): 1858–1903. [link]

5. Public funding of research

- Key references:
    i. Freeman, Richard and John Van Reenen (2008) "What if Congress Doubled R&D Spending on the Physical Sciences?" *Innovation Policy and the Economy Volume 9,* Josh Lerner and Scott Stern (editors), Cambridge, Massachusetts: MIT Press. [link]
    ii. Goolsbee, Austan (1998) "Does Government R&D Policy Mainly Benefit Scientists and Engineers?" *American Economic Review Papers and Proceedings* 88(2): 298–302. [link]
- Impacts of publicly funded research investments:
    i. (*)Azoulay, Pierre, Joshua S. Graff Zivin, Danielle Li, and Bhaven N. Sampat (2019) "Public R&D Investments and Private-Sector Patenting: Evidence from NIH Funding Rules," *Review of Economic Studies* 86(1): 117–52. [link]
    ii. Jacob, Brian A. and Lars Lefgren (2011) "The Impact of Research Grant Funding on Scientific Productivity," *Journal of Public Economics* 95(9–10): 1168–1177. [link]
    iii. Li, Danielle, Pierre Azoulay, and Bhaven N. Sampat (2017) "The applied value of public investments in biomedical research," *Science* 356(6333): 78-81. [link]
    iv. Moretti, Enrico, Claudia Steinwender, and John Van Reenen (2019) "The Intellectual Spoils of War? Defense R&D, Productivity and International Technology Spillovers," Working paper. [link]
    v. Sampat, Bhaven N. and Frank R. Lichtenberg (2011) "What are the respective roles of the public and private sectors in pharmaceutical innovation?" *Health Affairs* 30(2): 332-339. [link]
- Designing publicly funded research grants
    i. (*)Azoulay, Pierre, Joshua S. Graff Zivin, and Gustavo Manso (2011) "Incentives and creativity: evidence from the academic life sciences," *RAND Journal of Economics* 42(3): 527-554. [link]
    ii. Manso, Gustavo (2011) "Motivating Innovation," *The Journal of Finance* 66(5): 1823-1860. [link]
- Universities
    i. (*)Hvide, Hans K. and Benjamin F. Jones (2018) "University Innovation and the Professor's Privilege," *American Economic Review* 108(7): 1860–1898. [link]
    ii. Lach, Saul and Mark Schankerman (2008) "Incentives and Invention in Universities," *RAND Journal of Economics* 39(2): 403–433. [link]

iii. Larrimore Ouellette, Lisa and Andrew Tutt (forthcoming) “How do Patent Incentives Affect University Researchers?” *International Review of Law and Economics.*

- Public funding for private firms
  i. Lerner, Josh (1999) “The Government as Venture Capitalist: The Long-Run Impact of the SBIR Program,” *The Journal of Business* 72(3): 285-318. [link]
  ii. Howell, Sabrina T (2017) “Financing Innovation: Evidence from R&D Grants,” *American Economic Review* 107(4): 1136–1164. [link]

6. Intellectual property rights

- Key references:
  i. Boldrin, Michele, and David K. Levine (2013) “The Case against Patents,” *Journal of Economic Perspectives* 27(1): 3–22. [link]
  ii. Budish, Eric, Benjamin N. Roin, and Heidi L. Williams (2016) “Patents and research investments: Assessing the empirical evidence,” *The American Economic Review* 106(5): 183-187. [link]
  iii. Moser, Petra (2013) "Patents and Innovation: Evidence from Economic History," *Journal of Economic Perspectives* 27 (1): 23-44. [link]
  iv. Williams Heidi L. (2017) “How do patents affect research investments?” *Annual Review of Economics 9*: 441–469. [link]
- Optimal patent design
  i. Lee, Tom and Louis L. Wilde (1980) “Market Structure and Innovation: A Reformulation,” *The Quarterly Journal of Economics* 94(2): 429-436. [link]
  ii. Lemley, Mark A. and Carl Shapiro (2005) “Probabilistic Patents,” *Journal of Economic Perspectives* 19(2):75-98. [link]
  iii. Loury, Glenn (1979) “Market Structure and Innovation,” *The Quarterly Journal of Economics* 93(3): 395-410. [link]
  iv. Nordhaus, William (1969) *Invention, Growth, and Welfare: A Theoretical Treatment of Technological Change*, Cambridge, Massachusetts: MIT Press.
- Empirics: Patents and innovation
  i. (*)Budish, Eric, Benjamin Roin, and Heidi Williams (2015) “Do firms underinvest in long-term research? Evidence from cancer clinical trials,” *American Economic Review* 105(7): 2044-2085. [link]
  ii. Cohen, Wesley M., Richard R. Nelson, and John P. Walsh (2000) “Protecting their intellectual assets: Appropriability conditions and why US manufacturing firms patent (or not),” NBER Working Paper No. 7552. [link]
  iii. Lerner, Josh (2002) "150 Years of Patent Protection," *American Economic Review: Papers and Proceedings* 92(2): 221–225. [link]
  iv. Lerner, Josh (2009) "The Empirical Impact of Intellectual Property Rights on Innovation: Puzzles and Clues," *American Economic Review: Papers and Proceedings* 99(2): 343-348. [link]
  v. Levin, Richard C, Alvin K. Klevorick, Richard R. Nelson, and Sidney G. Winter (1987) "Appropriating the returns from industrial research and development." *Brookings Papers on Economic Activity* 3:783-831. [link]
  vi. Moser, Petra (2005) "How Do Patent Laws Influence Innovation? Evidence from Nineteenth-Century World's Fairs," *American Economic Review* 95(4): 1214-1236. [link]

- Patent scope
    i. Gilbert, Richard and Carl Shapiro (1990) “Optimal patent length and breadth,” *RAND Journal of Economics* 21(1): 106-112. [link]
    ii. Klemperer, Paul (1990) “How broad should the scope of patent protection be?” *RAND Journal of Economics* 21(1): 113-130. [link]
    iii. Lerner, Josh (1994) "The importance of patent scope: an empirical analysis," *The RAND Journal of Economics* 25(2): 319-333. [link]
- Sequential innovation
    i. (*)Galasso, Alberto and Mark Schankerman (2015) “Patents and Cumulative Innovation: Causal Evidence from the Courts,” *Quarterly Journal of Economics* 130(1): 317–69. [link]
    ii. Green Jerry R. and Scotchmer Suzanne (1995) “On the Division of Profit in Sequential Innovation,” *RAND Journal of Economics* 26(1): 20-33. [link]
    iii. Kitch, Edmund (1977) “The nature and function of the patent system,” *Journal of Law and Economics* 20(2): 265-290. [link]
    iv. Scotchmer, Suzanne (1991). “Standing on the shoulders of giants: Cumulative research and the patent law,” *Journal of Economic Perspectives* 5(1): 29–41. [link]
    v. (*)Sampat, Bhaven and Heidi L. Williams (2019) “How Do Patents Affect Follow-On Innovation? Evidence from the Human Genome,” *American Economic Review* 109(1): 203–36. [link]
- Disclosure
    i. Furman, Jeffrey L., Markus Nagler, and Martin Watzinger (2018) “Disclosure and Subsequent Innovation: Evidence from the Patent Depository Library Program,” NBER Working Paper No. 24660. [link]
    ii. Lisa L. Ouellette (2012) “Do Patents Disclose Useful Information?” Harvard Journal of Law & Technology 25(2): 531-593. [link]
    iii. Roin, Benjamin (2005) “The Disclosure Function of the Patent System (or Lack Thereof),” *Harvard Law Review* 118(6): 2007–2028. [link]
- Prizes, patents, and patent buyouts
    i. Gallini, Nancy and Suzanne Scotchmer (2001) “Intellectual Property: When is it the Best Incentive System?” *Innovation Policy and the Economy Volume 2,* Adam Jaffe, Josh Lerner and Scott Stern, (editors), Cambridge Massachusetts: MIT Press. [link]
    ii. Kremer, Michael (1998) “Patent buyouts: A mechanism for encouraging innovation,” *Quarterly Journal of Economics* 113(4): 1137-1167. [link]
    iii. Wright, Brian (1983) “The Economics of Invention Incentives: Patents, Prizes, and Research Contracts,” *American Economic Review,* 73(4): 691-707. [link]
- Excludability
    i. Bryan, Kevin and Yasin Ozcan (2019) “The Impact of Open Access Mandates on Invention,” Working paper. [link]
    ii. Cohen, Wesley M. and John P. Walsh (2008) “Real Impediments to Academic Biomedical Research,” *Innovation Policy and the Economy Volume 8*, Adam B. Jaffe, Josh Lerner, and Scott Stern (editors), Chicago: University of Chicago Press. [link]
    iii. Furman, Jeffrey L., and Scott Stern (2011) “Climbing atop the Shoulders of Giants: The Impact of Institutions on Cumulative Research.” *American Economic Review*, 101 (5): 1933–63. [link]

iv. Murray, Fiona, Philippe Aghion, Mathias Dewatripont, Julian Kolev, and Scott Stern (2016) "Of Mice and Academics: Examining the Effect of Openness on Innovation," *American Economic Journal: Economic Policy* 8(1): 212–52. [link]
v. Walsh, John P., Charlene Cho and Wesley M. Cohen (2005) "View from the Bench: Patents, Research and Material Transfers," *Science*, 309(5743):2002-2003. [link]
vi. Walsh, John P., Wesley M. Cohen and Charlene Cho (2007) "Where excludability matters: Material versus intellectual property in academic biomedical research," *Research Policy*, 36(8): 1184-1203 [link]
vii. Williams, Heidi L (2013) "Intellectual property rights and innovation: Evidence from the human genome," *Journal of Political Economy* 121(1): 1-27. [link]

7. Immigration and innovation

- H-1B visas and innovation
  i. (*)Doran, Kirk, Alexander Gelber, and Adam Isen (2014) "The Effects of High-Skilled Immigration Policy on Firms: Evidence from H-1B Visa Lotteries," NBER Working Paper 20668. [link]
  ii. (*)Kerr, William R. and William F. Lincoln (2010) "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention," *Journal of Labor Economics* 28(3): 473–508. [link]
- Historical evidence
  i. Akcigit, Ufuk, John Grigsby, and Tom Nicholas (2017) "Immigration and the Rise of American Ingenuity," *American Economic Review: Papers and Proceedings*, 107(5): 327-31. [link]
  ii. (*)Borjas, George J., and Kirk B. Doran (2012) "The Collapse of the Soviet Union and the Productivity of American Mathematicians." *Quarterly Journal of Economics* 127(3): 1143–1203. [link]
  iii. Doran, Kirk and Chungeun Yoon (2018) "Immigration and Invention: Evidence from the Quota Act," Working Paper. [link]
  iv. Moser, Petra, Alessandra Voena, and Fabian Waldinger (2014) "German Jewish Émigrés and US Invention." *American Economic Review* 104(10): 3222–3255. [link]
  v. Moser, Petra and Shmuel San (2019) "Immigration, Science, and Invention: Evidence from the 1920s Quota Acts," Working Paper. [link]

8. Innovation and inequality

- Who becomes a scientist/inventor?
  i. Agarwal, Ruchir and Patrick Gaule (2018) "Invisible Geniuses: Could the Knowledge Frontier Advance Faster?" IMF Working Paper No. 18/268. [link]
  ii. Aghion, Philippe, Ufuk Akcigit, Ari Hyytinen and Otto Toivanen (2018) "The Social Origins and IQ of Inventors," Working Paper. [link]
  iii. Akcigit, Ufuk, John Grigsby and Tom Nicholas (2017) "The Rise of American Ingenuity: Innovation and Inventors of the Golden Age," Working Paper. [link]
  iv. (*)Bell, Alex, Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen (2019) "Who Becomes an Inventor in America? The Importance of Exposure to Innovation," *Quarterly Journal of Economics* 134(2): 647–713. [link]

v. Ellison, Glenn, and Ashley Swanson (2016) "Do Schools Matter for High Math Achievement? Evidence from the American Mathematics Competitions," *American Economic Review* 106 (6): 1244-1277. [link]

- Who benefits from product innovation?
  i. Cutler, David M, Ellen Meara, and Seth Richards-Shubik (2012) "Induced Innovation and Social Inequality: Evidence from Infant Medical Care," *Journal of Human Resources* 47 (2): 456-492. [link]
  ii. Jaravel, Xavier (2019) "The Unequal Gains from Product Innovations: Evidence from the U.S. Retail Sector," *The Quarterly Journal of Economics* 134(2): 715–783. [link]
- Who benefits from patents?
  i. (*)Kline, Patrick, Neviana Petkova, Heidi Williams, and Owen Zidar (2019) "Who Profits from Patents? Rent-Sharing at Innovative Firms," *Quarterly Journal of Economics* 134(3): 1343-1404. [link]
  ii. (*)Van Reenen, John (1996) "The Creation and Capture of Rents: Wages and Innovation in a Panel of U. K. Companies," *Quarterly Journal of Economics* 111(1):195–226. [link]

C. Health care markets

1. Entry regulation for medical technologies

- Carpenter, Daniel P. (2010) *Reputation and Power: Organizational Image and Pharmaceutical Regulation at the FDA*, United States: Princeton University Press.
- (*)Grennan, Matthew and Town, Robert J (forthcoming) "Regulating Innovation with Uncertain Quality: Information, Risk, and Access in Medical Devices," *American Economic Review.* [link]
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- Oostrom, Tamar (2019) "Funding of Clinical Trials and Reported Drug Efficacy," MIT working paper. [link]
- Peltzman, Sam (1973) "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments," *Journal of Political Economy 81*(5): 1049-1091. [link]. See also:
  - McGuire, Thomas, Richard R. Nelson and Thomas Spavins (1975) "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments": A Comment," *Journal of Political Economy* 83:655-61. [link]
  - Peltzman, Sam (1975) "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments: A Reply," *Journal of Political Economy 83*(3), 663-667. [link]
- Scott-Morton, Fiona and Margaret Kyle (2011) "Markets for pharmaceutical products," *Handbook of Health Economics Volume 2*, Mark Pauly, Thomas McGuire, and Pedro Barros (editors), New York NY: Elsevier. [link]
- Stern, Ariel Dora (2017) "Innovation Under Regulatory Uncertainty: Evidence from Medical Technology," *Journal of Public Economics* 145:181–200. [link]

2. Risk adjustment

- Brown, Duggan, Kuziemko, and Woolston. "How does Risk Selection Respond to Risk Adjustment? New Evidence from the Medicare Advantage Program." AER, 2014.
- Einav, Finkelstein, Kluender, and Schrimpf. "Beyond statistics: The Economic Content of Risk Scores." AEJ Applied, 2015.
- (*)Einav, Finkelstein, and Tebaldi. "Market Design in Regulated Health Insurance Markets: Risk Adjustment vs. Subsidies." Mimeo, 2019.
- (*)Glazer and McGuire. "Optimal Risk Adjustment in Markets with Adverse Selection: An Application to Managed Care." AER, 2000.
- Glazer, McGuire, and Shi. "Risk Adjustment of Health Plan Payments to Correct Inefficient Plan Choice from Adverse Selection." NBER wp, 2014.
- Newhouse, Price, Huang, McWilliams, and Hsu. "Steps To Reduce Favorable Risk Selection In Medicare Advantage Largely Succeeded, Boding Well For Health Insurance Exchanges." Health Affairs, 2012.

3. Unintended consequences

- (*)Einav, Finkelstein, and Mahoney. "Provider Incentives and Healthcare Costs: Evidence from Long-Term Care Hospital," Econometrica, 2018.
  (*)Einav, Finkelstein, and Mahoney. "Long Term Care Hospitals: A Case Study in Waste," Mimeo, 2019.
- Eliason, Grieco, McDevitt, and Roberts, "Strategic Patient Discharge: The Case of Long-Term Care Hospitals," AER, 2019.

4. Estimating the returns to medical spending

- Almond, Douglas, Joseph J. Doyle, Amanda E. Kowalski, and Heidi Williams (2010) "Estimating Marginal Returns to Medical Care: Evidence from At-risk Newborns," *Quarterly Journal of Economics* 125(2): 591-634. [link]
- (*)Chandra, Amitabh, and Douglas O. Staiger (2007) "Productivity Spillovers In Healthcare: Evidence From The Treatment Of Heart Attacks," *Journal of Political Economy* 115: 103-140. [link]
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