Summer 2022

Seminar Development Economics IV

Economics of Innovation: An Application to China

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Dates: *Logistics:* Apr 21, 4:00-5:30pm (online) | *Introduction:* Apr 30, 9:00am-4:30pm | *Draft* (presentation): May 21, 9:00am-2:45pm (online) | *Research Proposal* (presentation): Jul 15 and 16, 9:00am-4:30pm and 9:00am-12:15pm | *Term Paper* (submission): Sep 1

Course objective: This graduate block seminar examines innovation from an applied microeconomics perspective, with a focus on China. A tentative list of topics includes: I. *Private and Public Incentives for R&D*, II. *R&D Policy Evaluation*, III. *Knowledge Production*, IV. *Patent Indicators*, V. *Returns to Innovation*, and VI. *International Competition and Innovation* (the literature in the syllabus may be subject to updates). We will also highlight relevant empirical approaches, discuss Chinese data, and explore China's institutional context. The *Background Readings* list some handbooks, textbooks, and survey papers. Students will improve their skills in reviewing and discussing papers as well as developing individual research proposals. Term papers may conceivably become part of your dissertation.

Course requirements: The course will be run as a graduate block seminar with introductory lectures, student presentations, and peer discussions in which students will actively participate. During the course, students will work on the broad topic of China's innovation-driven development. Students first present a *Draft* of their topic to receive initial comments, followed by a second presentation of the advanced *Research Proposal*. At each step, the lecturer and fellow students provide individual recommendations for further improvement of the research. The final research proposal (*Term Paper*) will be submitted by the end of the semester (due date is Sep 1).

Grading: Grading will be based on the presentation of the advanced research proposal (30%), peer discussion of another research proposal (10%), and the submitted term paper (60%). In the presentation, students demonstrate that they are able to select the relevant literature, identify a research question, and critically review prior evidence. The term paper discusses such findings and also proposes an empirical approach and data to extend existing research. The length of the term paper is 15 pages, incl. tables and figures. The cover sheet, table of contents, list of figures, list of tables, bibliography and the appendix are excluded from the page count. Please use the following formatting: font size: 12 pt, line spacing: 1.5 times, alignment: justification, margins (right, left, top, bottom): 2.5 cm each. Students must be present and actively participate during all seminar dates and submit all written course requirements on time.

Background Reading I | *Innovation*

Aghion, P., Griffith, R. 2005. Competition and Growth: Reconciling Theory and Evidence, MIT Press.

Aghion, P., Howitt, P. 2009. The Economics of Growth, MIT Press.

Fagerberg, J., Mowery, D., Nelson, R. (editors), 2005. The Oxford Handbook of Innovation, Oxford University Press.

Greenhalgh, C., Rogers, M., 2010. Innovation, Intellectual Property, and Economic Growth, Princeton University Press.

Hall, B., Rosenberg, N. (editors), 2010. Handbook of the Economics of Innovation, Volume 1 and 2, North-Holland.

Stoneman, P. (editor), 1995. Handbook of the Economics of Innovation and Technological Change, Blackwell Publishers.

Background Reading II | *China*

Brandt, L., Litwack, J., Mileva, E., Wang, L., Zhang, Y., Zhao, L. 2020. China's Productivity Slowdown and Future Growth Potential. World Bank Policy Research Working Paper 9298.

Brandt, L., Rawski, T. (editors), 2008. China's Great Economic Transformation, Cambridge University Press.

Brandt, L., Rawski, T., 2020. China's Great Boom as a Historical Process, IZA DP No. 13940, (*forthcoming in:* The Cambridge Economic History of China, 2022).

Cao, C., Li, N., Li, X., Liu, L. 2013. Reforming China's S&T System. *Science* 341, 460-462.

Fan, S., Kanbur, R., Wei, S.J., Zhang, X. (editors), 2014. The Oxford Companion to the Economics of China, Oxford University Press.

Naughton, B., 2021. The Rise of China's Industrial Policy 1978 to 2020. Universidad Nacional Autónoma de México.

Wei, S.J., Xie, Z., Zhang, X., 2017. From "Made in China" to "Innovated in China": Necessity, Prospect, and Challenges, *Journal of Economic Perspectives* 31, 49–70.

Background Reading III | *Econometrics*

Angrist, J.D., Pischke, J., 2009. Mostly Harmless Econometrics. Princeton University Press.

Athey, S., Imbens, G.W., 2017. The State of Applied Econometrics: Causality and Policy Evaluation. *Journal of Economic Perspectives* 31, 3-32.

Cameron, A.C., Trivedi, P.K., 2005. Microeconometrics: Methods and Applications. Cambridge University Press.

Cunningham, S., 2021. Causal Inference: The Mixtape. Yale University Press.

Imbens, G.W., Rubin, D.B., 2015. Causal Inference for Statistics, Social, and Biomedical Science: An Introduction. Cambridge University Press.

Topic I | *Private and Public Incentives for R&D*

Arrow, K., 1962. Economic Welfare and the Allocation of Resources for Invention, in: Nelson (editor), The Rate and Direction of Inventive Activity: Economic and Social Factors. Princeton University Press, 609–626.

David, P.A., Hall, B.H., Toole, A.A., 2000. Is Public R&D a Complement or Substitute for Private R&D? A Review of the Econometric Evidence. *Research Policy* 29, 497-529.

Hall, B.H., Lerner, J., 2010. The Financing of R&D and Innovation, in: Hall and Rosenberg (editors), Handbook of the Economics of Innovation. North-Holland, 610- 639.

Hottenrott, H., Peters, B., 2012. Innovative Capability and Financing Constraints for Innovation: More Money, More Innovation? *Review of Economics and Statistics* 94, 1126-1142.

Howe, J.D., McFetridge, D.G., 1976. The Determinants of R&D Expenditures. *Canadian Journal of Economics* 9, 57-71.

Metcalfe, S., 1995. The Economic Foundations of Technology Policy, in: Stoneman (editor), Handbook of the Economics of Innovation and Technological Change. Blackwell Publishers, 409-512.

Steinmueller, W.E., 2010. Economics of Technology Policy, in: Hall and Rosenberg (editors), Handbook of the Economics of Innovation. North-Holland, 1181-1218.

Topic II | *R&D Policy Evaluation*

Boeing, P., Peters, B., 2021. Misappropriation of R&D Subsidies: Estimating Treatment Effects with One-sided Noncompliance. IZA DP No. 14852.

Chen, Z., Liu, Z., Serrato, J.C.S., Xu, D.Y., 2021. Notching R&D Investment with Corporate Income Tax Cuts in China. *American Economic Review* 111, 2065-2100.

Dimos, C, Pugh, G., 2017. The Effectiveness of R&D Subsidies: A Meta-Regression Analysis of the Evaluation Literature. *Research Policy* 45, 797-815.

Einioe, E., 2014. R&D Subsidies and Company Performance: Evidence from Geographic Variation in Government Funding based on the ERDF Population-Density Rule. *Review of Economics and Statistics* 96, 710-728.

Gonzalez, X., Jaumandreu, J., Pazo, C., 2005. Barriers to Innovation and Subsidy Effectiveness. *RAND Journal of Economics* 36, 930-950.

Hu, A.G., Deng, Y., 2018. Does Government R&D Stimulate or Crowd Out Firm R&D Spending? Evidence from Chinese Manufacturing Industries. *Economics of Transition* 27, 497-518.

Liu, X., Li, X., Li, H., 2016. R&D Subsidies and Business R&D: Evidence from High-tech Manufacturing Firms in Jiangsu. *China Economic Review* 41, 1-22.

Mao, J., Tang, S., Xiao, Z, Zhi, Q., 2021. Industrial Policy Intensity, Technological Change, and Productivity Growth: Evidence from China. *Research Policy* 50, 104287.

Zuniga-Vicente, J.A., Alonso-Borrego, C., Forcadell, F.J., Galan-Zazo, J.I., 2014. Assessing the Effect of Public Subsidies on Firm R&D Investment: A Survey. *Journal of Economic Surveys* 28, 36–67.

Topic III | *Knowledge Production*

Aghion, P., Van Reenen, J., Zingales, L., 2013. Innovation and Institutional Ownership. *American Economic Review* 103, 277-304.

Blundell, R., Griffith, R., Van Reenen, J., 1999. Market Share, Market Value and Innovation in a Panel of British Manufacturing Firms. *Review of Economic Studies* 66, 529-554.

Boeing, P., Mueller, E., 2019. Measuring China's Patent Quality: Development and Validation of ISR Indices. *China Economic Review* 57, 101331.

Campbell, D.L., Mau, K., 2021. On "Trade Induced Technical Change: The Impact of Chinese Imports on Innovation, IT, and Productivity." *Review of Economic Studies* 88, 2555-2559.

Cong, L.W., Howell, S.T., 2021, Policy Uncertainty and Innovation: Evidence from Initial Public Offering Interventions in China. *Management Science* 67, 6629-7289.

Griliches, Z., 1990. Patent Statistics as Economic Indicators: A Survey. *Journal of Economic Literature* 28, 1661-1707.

Hu, A.G., Zhang, P., Zhao, L., 2017. China as Number One? Evidence from China's Most Recent Patenting Surge. *Journal of Development Economics* 124, 107-119.

Topic IV | *Patent Indicators*

Boeing, P., Mueller, E., 2016. Measuring Patent Quality in Cross-Country Comparison. *Economics Letters* 149, 145-147.

Dang, J., Motohashi, K., 2015. Patent Statistics: A Good Indicator for Innovation in China? Patent Subsidy Program Impacts on Patent Quality. *China Economic Review* 35, 137-155.

Fang, L., Lerner, J., Wu, C., 2018. Corruption, Government Subsidies, and Innovation: Evidence from China. NBER Working Paper 25098.

Hall, B., Jaffe, A., Trajtenberg, M., 2001. The NBER Patent Citations Data File: Lessons, Insights and Methodological Tools. NBER Working Paper 8498.

Higham, K., de Rassenfosse, G., Jaffe, A.B., 2021, Patent Quality: Towards a Systematic Framework for Analysis. *Research Policy* 50, 104215.

Kuhn, J., Younge, K., Marco, A., 2020. Patent Citations Reexamined. *RAND Journal of Economics* 51, 109-132.

Nagaoka, S., Motohashi, K., Goto, A., 2010. Patent Statistics as an Innovation Indicator, in: Hall and Rosenberg (editors), Handbook of the Economics of Innovation. North-Holland, 1084-1127.

Sun, Z., Lei, Z., Wright, B., Cohen, M., Liu, T. 2021. Government Targets, End-of-Year Patenting Rush and Innovative Performance in China. *Nature Biotechnology* 39, 1068-1075.

Topic V | *Returns to Innovation*

Bloom, N., Jones, C., Van Reenen, J., Webb, M., 2020. Are Ideas Getting Harder to Find? *American Economic Review* 110, 1104-44.

Boeing, P., Huenermund, P., 2020. A Global Decline in Research Productivity? Evidence from China and Germany. *Economics Letters* 197, 109646.

Boeing, P., Mueller, E., Sandner, P., 2016. China's R&D Explosion – Analyzing Productivity Effects Across Ownership Types and Over Time. *Research Policy* 45, 159-176.

Chen, Y., Igami, M., Sawada, M., Xiao, M., 2021. Privatization and Productivity in China. *RAND Journal of Economics* 52, 884-916.

Fang, J., He, H., Li, N., 2020. China's Rising IQ (Innovation Quotient) and Growth: Firm-Level Evidence. *Journal of Development Economics* 147, 102561.

Feng, P., Ke, S., 2016. Self-Selection and Performance of R&D Input of Heterogeneous Firms: Evidence from China's Manufacturing Industries. *China Economic Review* 41, 181-195.

Hall, B.H., 2011. Innovation and Productivity. NBER Working Paper 17178.

Hall, B.H., Mairesse, J., Mohnen, P., 2010. Measuring the Returns to R&D, in: Hall and Rosenberg (editors), Handbook of the Economics of Innovation. North-Holland, 1033-1082.

Topic VI | *International Competition and Innovation*

Aghion, P., Bloom, N., Blundell, R., Griffith, R., Howitt, P., 2005. Competition and Innovation: An Inverted-U Relationship. *Quarterly Journal of Economics* 120, 701-728.

Autor, D., Dorn, D., Hanson, G., Pisano, G., Shu, P., 2020. Foreign Competition and Domestic Innovation: Evidence from US Patents. *American Economic Review: Insights* 2, 357-374.

Bena, J., Simintzi, E., 2017, Globalization of Work and Innovation: Evidence from Doing Business in China. Mimeo.

Bian, B., Meier, J.M., 2021. Did Western CEO Incentives Contribute to China's Technological Rise? Mimeo.

Bloom, N., Draca, M., van Reenen, J., 2016. Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT, and Productivity. *Review of Economic Studies* 83, 87-117.

Hombert, J., Matray, A., 2018, Can Innovation Help U.S. Manufacturing Firms Escape Import Competition from China? *Journal of Finance* 73, 2003-2039.

Shu, P., Steinwender, C., 2019. The Impact of Trade Liberalization on Firm Productivity and Innovation, in: Lerner and Stern (editors), *Innovation Policy and the Economy* 19. NBER and University of Chicago Press, 39-68.