

Syllabus

Harris School of Public Policy
University of Chicago

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Fall Quarter, 2024: Regional Innovation and Growth, PP45211

Information about this course

Background

Why do some cities and regions thrive while others struggle? How can regional policymakers support sustainable, equitable economic growth, enabled by local private enterprise, technology development, and industry? How can regions best respond to changes in national industrial policies? And what does a productive relationship between government and the private sector look like? This applied course will focus on place-based economics and the roles of research and innovation in driving regional economic growth. Learning from the successes of tech-driven “superstar” cities and the challenges of smaller cities, this course will prepare students to develop realistic, region-specific development goals and strategies, whether coming from the private, public, or nonprofit sector perspective. Our discussions will also familiarize students with the critical and rapidly evolving technology market, and the proper role of government in managing that market and protecting citizens.

Course objectives

1. Gain familiarity with industrial policy, entrepreneurship, venture capital, technology, and applied research, and understand how entrepreneurship and technology development support local growth and economic vitality.
2. Understand regional production through a function of talent, capital, and technology.
3. Understand how public policy has acted to support the growth of regional technology economies and design a strategy for supporting regional economic growth.
4. Understand the critical issues that technology presents policy makers from a perspective of economic fairness, privacy, and respect for humanity.

Instructor

Tom is the executive director and co-founder of the Frontier Mission Network, a business consortium serving the new defense industrial base and national security community of Chicago. He holds degrees from Penn State University, the Medill School of Journalism at Northwestern University, and the University of Chicago's Harris School of Public Policy. He has authored opinions for the Washington Post, Deadspin, ESPN the Magazine, Philadelphia Magazine, Inside Higher Ed, and Crain's Chicago Business, and has been a regular contributor to Governing. He was a McClatchy Newspapers bureau correspondent in Afghanistan in 2009 and 2010.

How this class will work

- Our class will meet twice a week, including the first week of the quarter.
- Course materials, assignments, and announcements will be posted on Canvas.
- Your learning experience will be guided and enhanced by course discussions, and your attendance and participation in course discussions will be factored into your grade.

Student assignments

You will be graded on three problem sets and your final project, as well as course participation. The breakdown is as follows:

- 30% problem sets
- 60% final project
- 10% participation in course discussions

Textbook

“The Entrepreneurial State” by Mariana Mazzucato.

Grading policies and procedures

All assignments are expected to be submitted through Canvas by 9:00 a.m. the Monday they are due. If you would like an extension, please email me with an explanation and expect that the maximum additional time I can provide will be an additional week. Students who wish to take the course pass/fail rather than for a letter grade must use the Harris Pass/Fail request form and must meet the Harris deadline, which is generally 9:00 a.m. on the Monday of the fifth week of courses. Students who take the course pass/fail must attend class meetings and turn in all assignments, achieving marks on assignments that are overall commensurate with at least a C-letter grade.

Final project

Your final project will be a white paper exploring a market you select at the beginning of the course and will provide a detailed growth strategy rooted in the region’s economic assets. I will provide detailed expectations concerning the final project during the initial weeks of the course.

Class policy on AI

Using a large language model (LLM) virtual assistant to better communicate thoughts and concepts, and to check punctuation, is permitted, though I ask you to identify work that has been produced with the assistance of AI, in accordance with university policy.

Instructor Office Hours

I will host office hours after our Wednesday lectures.

Academic integrity

Collaborating with your colleagues is encouraged. Drawing upon the insight of others is required. Copying the work of your classmates and plagiarism will earn you swift referral to Harris School dean of students. All written work must include proper citations.

Week-by-week schedule

Week 1: Why do economies grow? Why do some regions grow faster than others? And what is the ultimate goal of economic growth?

Lecture 1.1: We will begin by understanding course expectations. We will also set context for the course and define place-based economics. We will define success for regional economies, a seemingly simple concept that is often lost in regional economic development. We will discuss why we are so focused on cities as a platform for technology development and economic growth. We will define an understanding of the role of government and its relationship with the private sector – not simply one as market manager, but as an actor in the market itself, serving to shape markets rather than simply correct market failures. Then we will discuss how the conversation surrounding technology-driven place-based industrial policies has changed in recent years.

Lecture 1.2: In our second lecture, we will outline the economic variables that support regional growth that we will explore in this course. We will examine Robert Solow’s exogenous growth model that predominated after the Industrial Revolution, the updated version of the model authored by Paul Romer, and examine relevant data to understand why growth across regional economies has diverged. The Solow and Romer models define technology as a critical variable in regional growth, and we will define exactly what technology is, moving beyond using “tech” as a symbol.

Concepts: Solow and Romer’s growth models, the post-WWII convergence and post-Great Recession divergence of regional economies, place-based policies, deindustrialization, resource allocation.

Reading: “A Contribution to the Theory of Economic Growth” by Robert Solow; “Endogenous Technical Change” by Paul Romer; “Tech: The Goal, or Just Another Path to Growth?” by Thomas Day (Chicago Policy Review). Optional: “The Paradox of Place-Based Policy” by Walter Frick (ProMarket).

Data: Regional Innovation and Growth data set, Brookings Metro Monitor data.

For next week: Open and examine a data set that I will provide and select a city within the top 40 largest municipal statistical areas to evaluate for this course.

Week 2: Where does technology come from? How do federal-university partnerships drive innovation? And what was the real story of how a Northern California orchard became “Silicon Valley”?

Lecture 2.1: Our second week will be focused on the intersection between government and technology. We will draw a map of U.S. research community and understand how research has often been funded by the U.S. military since before World War II. This relationship continues to this day, and we will explore the evolving relationship between the U.S. government, the Pentagon, and the technology industry. As we will discover, the novel technologies of today trace their roots back to fundamental discoveries enabled by public support of basic research –

and we will appreciate the importance of basic science in enabling future technological progress. We also will pinpoint laboratories and facilities where researchers are advancing the understanding of the physical world.

Lecture 2.2: We will explore the process for bringing technologies into the commercial market beginning with the fundamental discovery that enabled it and explore the role of public funding in research commercialization. We will discuss how stakeholders at the early stages of technology development can define the products that R&D later enables. And we will discuss the concepts of technology push and market pull, and ask ourselves, does government create value? (Answer: yes!).

Concepts: Basic and applied research, general purpose technologies, technology readiness levels, national laboratory system, the end of American dominance of R&D, technology push and market pull, technology countermeasures, the COVID-19 vaccine and mRNA technology, DARPA.

Reading/Viewing: “The Entrepreneurial State” by Mariana Mazzucato, chapter 1-2; “The Secret History of Silicon Valley” by Steve Blank (YouTube recording); “Stagnation and Scientific Incentives” by Jay Bhattacharya and Mikko Packalen. *Optional:* “Here’s Why It’s So Hard to Bring Science to Market” by Greg Satell (Digital Tonto); “Can the Pentagon Lead the Tech Sector Again?” by Thomas Day; “Why Is the U.S. Defense Industrial Base So Isolated from the U.S. Economy?” by Gregory Allen and Doug Berenson (CSIS).

Problem Set 1 assigned: First problem set with ensure complete understanding of the Solow and Romer models and will ask you to explore the research assets of your market.

Week 3: How are cities designed to maximize the impact of technology on their local economies? How can regions attract the private capital needed to support R&D?

Lecture 3.1: We put our urban planning hats on and discuss how cities are designed to best support technology-enabled growth. We will explore placemaking strategies and efforts to increase urban density and reign in suburban sprawl. We will explore the role of local real estate and innovation districts like Cambridge’s Kendall Square. And we will explore how cities are designed to support match technology push (generated at universities and local R&D facilities) with market pull, engineering collaborations with local firms and capital managers with research laboratories within market verticals.

Lecture 3.2: The second lecture of week 3 is all about venture capital. We will look at the functions of venture capital and understand how deal structure can influence downstream consequences. We will also discuss the venture capital market and understand VC as a driver of regional growth, and why some state and local policymakers in regions without much local VC have stepped into the funding void. Finally, we will explore the limits of the venture capital model and think about other funding models to grow new ventures.

Concepts: Qualified Opportunity Zones, innovation districts, urban density, locally commissioned venture capital funds, sequence of venture capital funding and structure of venture capital funds, gender and racial inequity in venture capital markets.

Reading/Viewing: “The Entrepreneurial State” by Mariana Mazzucato, chapters 3-4; “Geography, Venture Capital, and Public Policy” by Josh Lerner; “Building for proximity: The role of activity centers in reducing total miles traveled” by Adie Tomer and Caroline George (Brookings); “Neighborhoods Are Not Local Labor Markets” by Tim Bartik (Liberal Patriot). *Optional:* “I’ve Seen a Future Without Cars, and It’s Amazing” by Farhaad Manjoo (NY Times); “Why Software is Eating the World” by Marc Andreessen; “How research universities are evolving to strengthen regional economies,” by Joseph Parilla and Glencora Haskins (Brookings).

Data: Zillow Home Value Index, U.S. Census data on growth of cities and suburbs, Pitchbook data on venture capital investment, Kastle “Getting America Back to Work” Dashboard.

Problem Set 1 due

Week 4: How should cities and regions build on their unique assets and advantages? Is it wise to build a regional economy around one core industry or even one company? Or should policymakers look to diversify regional economies?

Lecture 4.1: Harvard Business School's Michael Porter has popularized the "clusters" concept, or the idea that regional economies grow around industries unique to a region's assets. Porter also explores four failed strategies that have undermined previous efforts regional growth: Repealing regulations and lowering taxes to attract industry, building aesthetically pleasing downtowns, going to extreme lengths to attract a headquarters or plant (Amazon HQ2), and following "the next big thing" in technology. We will look at Porter's work and programs guided by cluster-focused economic development. We will also explore growth strategies that drive technology push – R&D tax credits, for example – and strategies drive market pull, such as tax credits for private actors to purchase new technologies.

Lecture 4.2: The theme of the second lecture of week 4 is the relationship between a city and a large employer, sometimes mutually beneficial and sometimes not. We will also take a more critical look at publicly subsidized job training programs, research and development tax credits, and the tens of billions of dollars that American cities and states have provided in relocation incentives.

Concepts: Clusters and the importance of aligning a region's research institutions, local incentives to lure corporate relocations, chips, R&D tax credits, systems integrators.

Reading/Viewing: “Using Place-Based Jobs Policies to Help Distressed Communities” by Timothy Bartik (Upjohn Institute); “Clusters and the New Economics of Competition” by Michael Porter (Harvard Business Review); “Reshaping Regional Economic Development:

Clusters and Regional Strategy” by Michael Porter (video recording); “The New Challenges of Assessing Big Tech’s Impact” by Michael Gofman and Zhao Jin (ProMarket).

Data: U.S. Economic Development Agency Cluster Mapping Project, Inc. 5000 Fastest-Growing Private Companies in America.

Problem Set 2 assigned: Second problem set will examine the economic assets of each city, and where they align with industry.

Week 5: How can cities and regions keep and attract educated and skilled workers? Just how far should policymakers go to attract these works? What is the role of culture in supporting regional growth?

Lecture 5.1: In Week 1 we defined a production function that includes technology. This week we will define the relationship between talent and production. Has the relationship between talent (skills) and regional growth increased in recent years? How about wages net of housing and regional growth? We will explore the vital role of housing supply in supporting labor productivity growth. We will seek to understand the lifestyle demands of most high-skill workers. This week will be critical in understanding how agglomerating talent into cities drives growth.

Lecture 5.2: Our second lecture of week 5 will briefly cover the role of culture in growing regional economies, then pivot to a discussion of technology infrastructure. We will also explore broadband policy and the challenges facing rural communities.

Concepts: Regional culture, the movement of people into cities, housing prices and government-driven restrictions on housing supply, noncompete agreements, positive association between production and employment of grads in traded sectors, broadband policy, net neutrality, immigration and regional growth, skill-biased technological change.

Reading: Chapters from “Regional Advantage” by Annalee Saxenian; “Census shows big city population improvements, countering predictions of the ‘urban doom loop’” by William Frey (Brookings); “A Techno-Industrialist Manifesto” by Aaron Slodov (PirateWires). *Optional:* “With high-tech manufacturing plants promising good jobs in Ohio, workforce developers race to get ready” by Mark Muro (Brookings); “How Big Tech Uses Net Neutrality To Subvert Competition” by Roslyn Layton (ProMarket).

Data: Pew Center data on under-30 population by city; Bureau of Labor Statistics data on occupation by MSA; MigrationPatterns.org and OpportunityAtlas.org data.

Week 6: How do R&D, innovation, and the patent process affect regional growth? What policies can increase these markers of technological change and increase productivity?

Lecture 6.1: We will explore the patenting process, patent law, and the correlation between patenting and regional growth. We will also untangle who is funding R&D at what stage and understand why it is so critical that government supports high-risk, high-reward research projects. And we will discuss the critical role of technology transfer in advancing technologies and growing regional economies.

Lecture 6.2: Our second lecture of Week 6 will focus on startup culture, its good and self-destructive elements. We will discuss the sweeping changes in R&D in the United States during the 1970s, and how new models for technology commercialization emerged that put special emphasis on startups. Startups commercializing technologies in the high sciences require much more early-stage capital than startups building mobile applications. To help solve this challenge the U.S. federal government has created the Small Business Innovation Research (SBIR) program, which we will explore.

Concepts: Patent law, standards, patent trolls, Human Genome Project, technology transfer, Bayh-Dole Act, SBIR, clinical trials, Joseph Schumpeter.

Reading: “The Entrepreneurial State” by Mariana Mazzucato, chapter 5-6. *Optional:* “The Cypto Collapse and the End of Magical Thinking that Infected Capitalism” by Mahir Desai (NY Times); “Small yards, big tents: How to build cooperation on critical international standards” by Cameron Kerry (Brookings).

Data: U.S. Patent and Trademark data on patenting activity by MSA; Stats America.

Problem Set 2 due

Problem Set 3 assigned: Third problem set will require students take the provided data set and begin not only understanding correlations between explanatory variables – including patents, venture financing, and workforce education – and growth, but begin understanding how to increase regional growth.

Week 7: Who is driving R&D and innovation in the private sector? How does the growth in open-source innovation affect different regions? What policies can best facilitate technology transfers that raise productivity?

Lecture 7.1: Gone are the days where General Electric will take on the risk attendant to building out an invention under their own R&D budget. What happened? What is the new model for supporting corporate innovation and privately funded R&D? We will use our first lecture of week 7 to understand how corporate innovation has changed and allowed for a market where small- and medium-sized businesses struggle to challenge “big tech.”

Lecture 7.2: We will begin by discussing the growth of open-source innovation. We will then examine the current state of manufacturing supply chains and understand how the national and

international conversation has changed since COVID-19. Finally, we will explore deindustrialization and *reindustrialization* of advanced economies.

Concepts: Stock buybacks, financialization, private equity, corporate innovation, corporate venture capital, the “innovator’s dilemma,” M&A, open-source innovation, offshoring and reshoring of manufacturing.

Reading: “The Entrepreneurial State” by Mariana Mazzucato, chapters 7-8; chapter from “Innovator’s Dilemma” by Clayton Christensen. *Optional:* “Big Energy” by Scott Galloway; “A Soap Maker Cracks the Code to ‘Made in America’” by Austen Huffard (Wall Street Journal); “Tensions Rise in Silicon Valley Over Sales of Start-Up Stocks” by Erin Griffin (NY Times).

Data: National Science Foundation data on business R&D done in Metropolitan Statistical Areas; Harvard Growth Lab’s Metroverse data.

Week 8: How has R&D and technology policy moved to the center of global power competition? Instead of simply competing with China, have we seen U.S. in fact replicating its industrial policies? How will increasing antitrust scrutiny of big tech firms affect future innovation and productivity growth?

Lecture 8.1: A generation ago, more than 200,000 Chicagoans were employed in steel manufacturing; now steel has withered away in the South and West Sides. The story of Chicago’s manufacturing economy is a familiar one in the industrial Midwest. For decades America’s manufacturing base gave way to a new information economy, but have recent federal policies reversed this trend? We will explore how the manufacturing value chain has changed since China entered the World Trade Organization, and how it is changing again with digital and on-site manufacturing technologies. We will also discuss the Chinese and American innovation models, and how the American industrial policies have sharply changed in recent years.

Lecture 8.2: This is our “big tech” lecture. We will discuss the growth of the big five tech firms – Google, Facebook, Amazon, Microsoft, and Apple – and the role of antitrust enforcement in regulating these firms. Much concerning Big Tech is happening in the court systems in the United States and Europe, and we will explore the concerns at the center of this litigation, and legislation to regulate Big Tech being debated in Washington and legislatures across the globe.

Concepts: Tech Cold War, supply chains, the big five technology companies, antitrust policy, American and global regulation of technology corporations.

Reading/Viewing: “The Entrepreneurial State” by Mariana Mazzucato, chapter 9; “Startup Acquisitions Have Undecided Effects on Innovation and Economic Growth” by Christian Fons-Rosen, Pau Roldan-Blanco, and Tom Schmitz (ProMarket); “Strategic sector investments are poised to benefit distressed US counties” by Marc Muro, et al (Brookings); *Optional:* “A World With Far Fewer Mergers” by Brooke Fox and Walter Frick (ProMarket); “How Companies Got So Good at M&A” by David Harding, Dale Stafford, and Suzanne Kumar (Bain & Company); “We Must Regulate A.I. Here’s How” by Lina Khan (NY Times); “Why Dropping Market Power from the Merger Guidelines Matters” by Carl Shapiro (ProMarket); “How Big Tech Is

Killing Innovation” by Mark Lemley and Matt Wansley (NYTimes); “China’s Technology Transfer Strategy” by Mike Brown and Panveet Singh (DIU).

Data: U.S. Department of Commerce data on exports from municipal areas; U.S. Department of Commerce’s Export Analysis Tool.

Problem Set 3 due

Week 9: What’s next? How are new sectors driving value in the 2020s? And are we at the beginning of several new technology frontiers that could fundamentally change humanity?

Lecture 9.1: We will discuss current trends that define technology markets. Our conversation will explore how policymakers can anticipate the dramatic economic changes these new technology fields will catalyze in the near future, and how to make technology work for, not against, communities.

Lecture 9.2: Our course will end with a look toward the future and discuss what I believe to be the most promising drivers of future value, including quantum computing, nanotechnology, and genomic sciences.

Concepts: 5G, quantum computing, nanotechnology, genomics, CRISPR.

Reading/Viewing: *Optional:* “The Dystopia We Fear Is Keeping Us From the Utopia We Deserve” by Ezra Klein (NY Times); “Quantum computing is the next revolution” by Michio Kaku (YouTube recording); “AI Could Actually Help Rebuild The Middle Class” by David Autor (Noema); “Is a Revolution in Cancer Treatment Within Reach?” by Kate Pickert (NY Times); “Medicine may be on the cusp of an era of astonishing innovation” by David Wallace-Wells (NY Times).

Final Project due