Industrial Policy: The Great Comeback

Presentation to the 2022 Dunwoody Great Decisions Lecture Series
March 17, 2022, 7:30 p.m. -8:45 pm

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Some Prior Questions: Role of Government in the Economy?

- Industrial policy is grounded in economic theory
- “Are we the intellectual slaves of some defunct economist?”
- From Adam Smith: a *de minimis* approach except for national defense
- Mercantilism and its children: protectionism and autarky
- Classical trade theory: free and fair trade, no barriers, global trade leading to sea of “rising ships”
- To: F. von Hayek: centralized planning strips away individua liberties
- To: John Maynard Keynes: market failures, active role of government
- Keynes: federal spending to manage business cycles; when markets “fail”
- To: Milton Friedman’s Chicago School: free markets, monetarism, less government involvement
- National planning/*dirigisme*, 1947 J. Monnet + 1949 Marshall Plans for European recovery
- The Four Asian Tigers: the special case of the East Asian Miracle (Singapore model)

Industrial Policy: The Definitional Debate

- Is a consensus definition possible?
- "Any government policy encouraging resources to shift from one sector to another by changing input costs, output prices, and regulatory treatment." (Todd N. Tucker)
- Long reluctance to pursue industrial policies outside of defense with bipartisan support
- Original emphasis on heavy manufacturing with military applications
- Aerospace, steel, shipbuilding, telemetry, etc.
- Policy measures: trade restrictions, direct subsidies, tax credit, public spending on R&D, government procurement (Buy America)
- In short, it is about "the government putting a thumb on the scale!"
- *Reaching too far*: Are the Manhattan Project, the Apollo Mission industrial policies?
- War against cancer? Grand challenges of the UN Sustainable Development Goals?

Early Efforts: The US Historical Context

- Alexander Hamilton: backing manufactures to Congress in a famous report
- Supporting military arsenals (Harpers Ferry) and shipyards
- Opposed by Jeffersonian Southerners, more agriculture-oriented
- World War II: A major crossroads-- Vannevar Bush, FDR's science advisor
- New model: Federally funded research linking university, industry and military
- Lots of critical war tech advances (e.g., Rad Lab, MIT; impactful period for GT)

Evolving History: First Phase to Respond to External Crises

- The federal government moved through four major phases post-World War II
- *First period*: The Cold War, 1946-1991 and the Korean War
- New nuclear weapons labs (Lawrence Livermore), air defense
- Further accelerated by the October 4, 1957 Sputnik Crisis
- Leading to the 1958 National Defense Education Act: catch-up and overtake
- Creation of NASA and DARPA (Defense Adv. Res. Projects Agency)
- A return to the World War II model of R&D/innovation pipeline
- Looking for revolutionary advances, linking science and technology
- Apollo Mission/Moon Landing: creation of space and satellite communications inventions
- This first phase played a central role: aviation, space, electronics, computing, internet

Evolving History: Second Phase

- Era of competition with Japan, 1970s-1980s
- Japan's quality production systems to capture automotive/electronics leadership
- A disconnected US innovation pipeline: inability to commercialize quickly downstream
- Result: "rustbelt" with declining Midwestern industrial areas
- Aggravated by deindustrialization and offshoring
- Measures to bridge "Valley of death" between research and technology commercialization
- Bay-Dole Act of 1980 assigned ownership of federally funded research to universities
- Promoting commercialization; big wave of technology licensing at Georgia Tech
- US Trade Assistance Centers to counter unfair import competition

Evolving History: Third Phase

- Climate change and energy innovation: early 21st century
- Clinton and Obama administrations: optimization Department of Energy
- Emphasis on cleanup and technoinnovation
- Creation of an ARPA-E (Advanced Research Projects Agency-Energy)
- Creation of major renewable energy programs
- Creating an innovation pipeline: both research and driving technologies into market
- Promotion of renewable energy start-ups
- Intervention of government in 2008 recession: Telsa saved from bankruptcy!
- Noting that government action in a recession is not industrial policy

Evolving History: Fourth Phase

- Importance of advanced manufacturing to maintain global competitiveness
- US manufacturing never fully recovered from the second phase: reshoring?
- Poor manufacturing performance 2000-2010
- Manufacturing employed declined by one third
- Due largely to Chinese competition
- Six million jobs lost by 2019 in manufacturing
- Fixed plant investment declined
- Social disruption, loss of middle-skill jobs
- How to reverse "*innovate here, produce there*"? Reshoring?
- Creation of 16 US Manufacturing Innovation Institutes (applied R&D consortia)
- Investment insufficient for manufacturing transformation

The Chinese Challenge

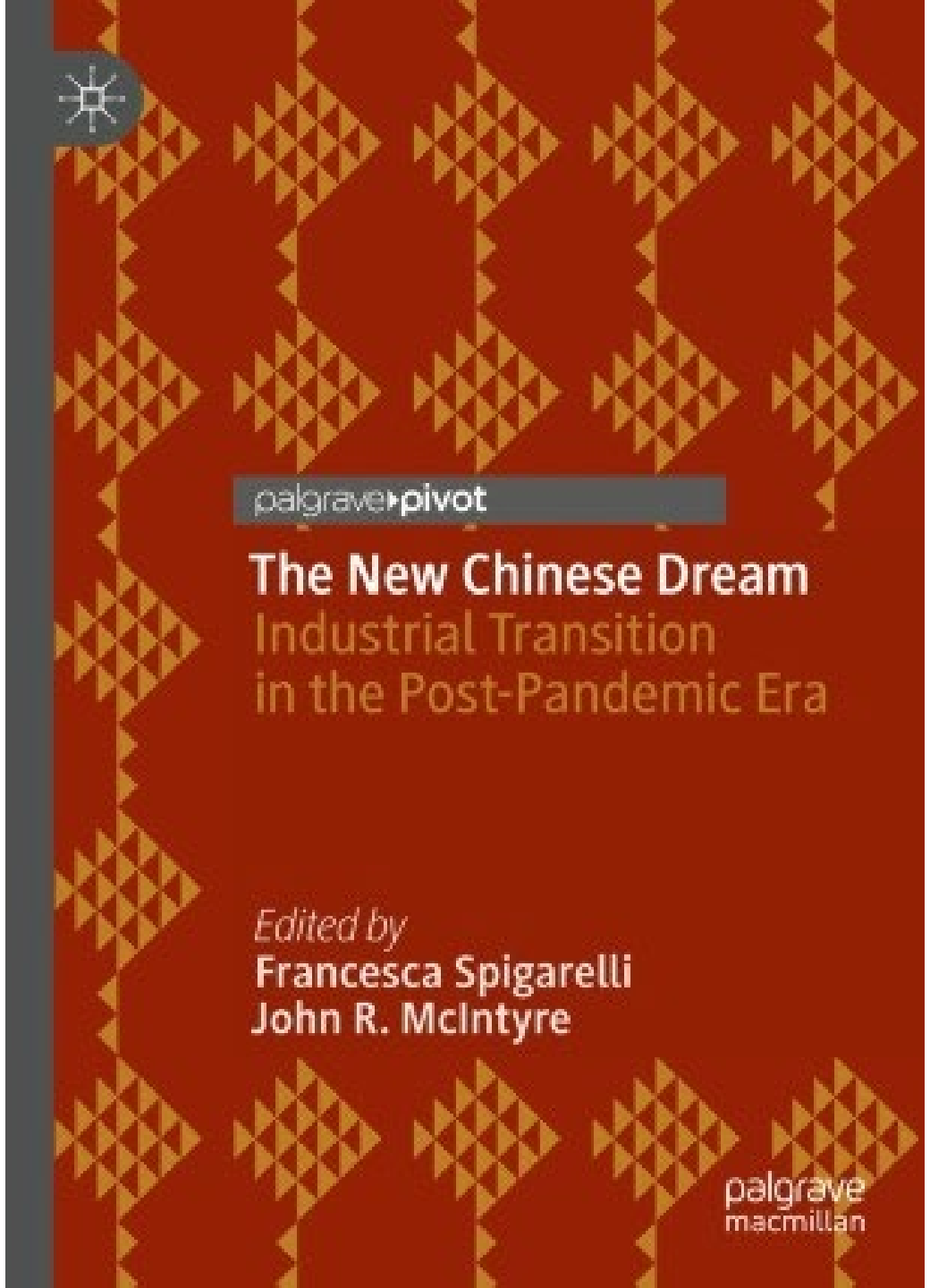
- Advent of China on world scene: joined WTO in 2001
- Historian Angus Maddison: China's rise as a global economic power
- China largest world economy in 1820 (estimate)!
- Today, China's GDP as % of world GDP: 15% ~ (PPP 23%?)
- China as so-called "factory of the world"
- "Socialism with Chinese characteristics"….?
- Made in China 2025: Making China preeminent manufacturer by 2049~
- US Spec. Trade Rep Lighthizer: "*China's government is aggressively working to undermine US high-tech industries*, " 2018
- Full array of tariff measures, export controls, IP safeguards, visa issuance
- Managing the "*Thucydides Trap,"* in a bipolar world

China as Rival: Made in China 2025: Leading Sectors

- Targeted sectors where technoleadership competition will unfold:
- Objectives are Year 2049 targeted (100th anniversary of creation of Chinese State)
- New generation of infotech (looking for digital sovereignty)
- Advanced numerically controlled machines/robotics (leading mfg power)
- Aerospace technology (engines + airborne equipment; see McIntyre's research on Chinese aircraft mfg)
- Biopharmaceuticals (particularly active pharma ingredients)
- Energy renewable technologies (leading in wind turbines)
- Farming and railway equipment (fast/bullet trains)
- Pursuit of weapons research on a separate track!
- Alarm is shared across all OECD countries

Conclusions

- Major shift in fiscal policy: outpouring of billions of dollars for post-covid industrial policy
- Semiconductor industry as foundational technology to rise to the Chinese challenge
- Overdependence on TSMC, largest chip maker in Taiwan!
- Rare earth and other key material where China dominates
- Bring back chip foundries to US shores: move under way, slow
- US decline underlined when Apple switched from Intel to TSMC for its chips
- Major legislation pending: Chips Act (Creating Helpful Incentives to Produce Semiconductors)
- Authorized $53 billion for US industry intervention
- Europeans followed with an EU Chips Act
- Other US legislation: The Endless Frontier Act in conference
- Need for creative solutions: public-private partnerships


palgrave pivot
The New Chinese Dream
Industrial Transition
in the Post-Pandemic Era
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Gross expenditures on R&D for selected countries, by performing sector and source of funds: 2017 or most recent year

(PPP billions of dollars and percent share)

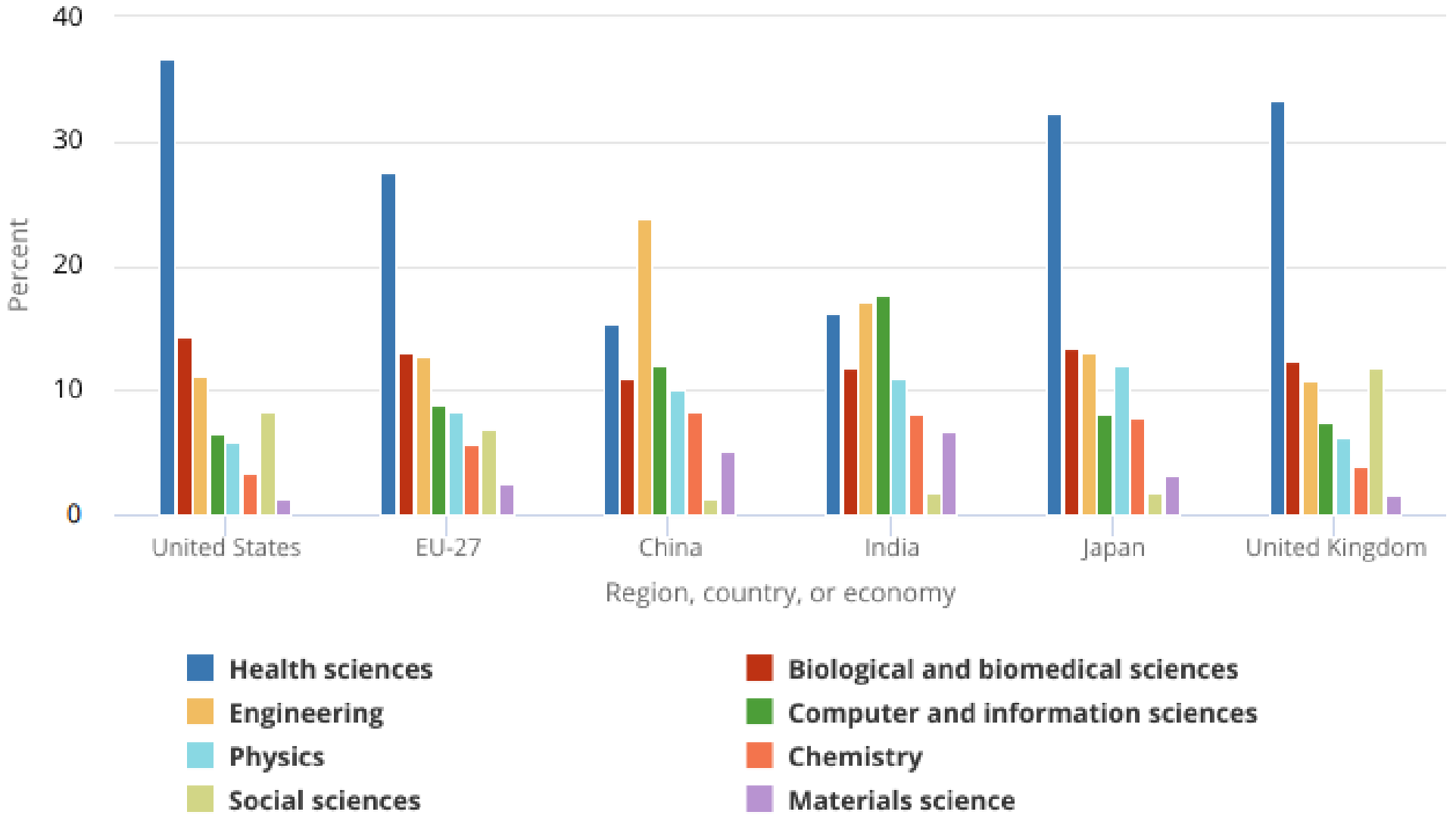
		R&D performance: Share of total (%)				R&D source of funds: Share of total (%)			
Country	GERD (PPP $billions)	Business	Government	Higher education	Private nonprofit	Business	Government	Other domestic	Rest of the world
United States (2017)[a]	549.0	72.9	9.9	13.0	4.3	62.5	23.1	7.3	7.1
China (2017)	496.0	77.6	15.2	7.2	na	76.5	19.8	NA	0.6
Japan (2017)	170.9	78.8	7.8	12.0	1.4	78.3	15.0	6.1	0.6
Germany (2017)	132.0	69.1	13.5	17.4	na	66.2	27.7	0.4	5.8
South Korea (2017)	91.0	79.4	10.7	8.5	1.4	76.2	21.6	0.9	1.3
France (2016)	62.3	65.0	12.7	20.7	1.7	55.6	32.8	3.9	7.7
India (2015)	49.7	43.6	52.5	3.9	0.0	NA	NA	NA	NA
United Kingdom (2016)	47.4	67.6	6.5	23.7	2.2	51.8	26.3	6.4	15.6

na = not applicable; country does not recognize the category or does not report the data item. NA = not available.

GERD = gross domestic expenditure on R&D; PPP = purchasing power parity.

Source: https://bit.ly/37GwcVN

S&E research portfolios, by eight largest fields of science and by selected region, country, or economy: 2020



https://ncses.nsf.gov/pubs/nsb20214/assets/publication-output-by-country-region-or-economy-and-scientific-field/figures/nsb20214-figpbs-003.pdf

Select readings suggested

- C. P. Zachary, Endless Frontier: Vannevar Bush, Engineering of the American Century, Princeton University Press, 1997. https://amzn.to/3qfqOzk

- Scott Lincicome and Huan Zhu, *Questioning Industrial Policy: Why Government Manufacturing Plans Are Ineffective and Unnecessary*, Cato Working Paper No 63, June 16, 2021 Cato Institute https://bit.ly/3Jq0xG0

- Council on Foreign Relations, *Backgrounder, Is Industrial Policy Making a Comeback?* March 16, 2021, Why the U.S. Government's Role in the Economy Could Grow (cfr.org)

- John McIntyre and Francesca Spigarelli, eds., The New Chinese Dream: Industrial Transition In the Post-Pandemic Era, Palgrave MacMillan, 2021. https://amzn.to/3tknrZM

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