Research Statement

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I am an economic historian whose work focuses primarily on the development and diffusion of management and technology innovations and their impact on firm productivity. My research also addresses a key question in economic history: to what extent did the war effort during World War II spur new managerial techniques and production technologies, and how did these innovations persist and diffuse to the rest of the world in the war's aftermath? I identify the causes and the effects of adoption and diffusion of new technologies on firm productivity by exploiting a wealth of historical policy variation and unique historical data, which I collect from primary sources.

1) Management and Productivity

The first strand of my research explores the effects of management interventions on firm performance. The idea that management affects firm productivity goes back at least to Walker (1887) and empirical research has documented that the large and persistent observed variations in productivity across establishments in both developed and developing countries are strongly correlated with the adoption of management practices (Syverson, 2004; Bloom and Van Reneen, 2007; Foster et al., 2008; Hsieh and Klenow, 2009). Establishing a causal relationship, however, is not trivial: more productive firms may simply adopt better management practices. Recently, a few studies, providing random assignment of managerial consulting to a small sample of companies, have shown that the effect of management on firm performance is causal (Bloom et al., 2013; Bruhn, Karlan, and Schoar, 2018).

Despite the advancements of research, fundamental questions about the links between managerial practices and firm performance remain unanswered. For instance, what are the long-run effects of the adoption of managerial practices on firm productivity? Do such practices diffuse from adopting firms to other companies?

I answer these questions in two papers. In "The Long-Term Effects of Management and

Technology Transfers" (*AER 2019*), I examine the long-run causal effects of management on firm performance, using evidence from the United States Technical Assistance and Productivity Program. Between 1952 and 1958, the US sponsored training trips for Italian managers to US firms. I collected new data on the around 6,000 Italian small and medium-sized firms supposed to participate in the program and I exploit that, due to an unexpected budget cut, only some of them ended up receiving the US training. I find that companies that eventually participated in the program increased their performance for at least fifteen years, relative to similar firms that ended up being excluded because of the cut, with a cumulative productivity gain of 50 percent. Effects persisted because of structural changes in firm organization and improved access to the credit market.

In "Dynamic and Spillover Effects of Management Interventions" (*JPE 2022*, with Nicola Bianchi), I show that management consulting to US war contactors between 1940 and 1945 under the Training Within the Industry (TWI) program was a key channel through which WWII government programs affected the post-war boom. I collected a new panel dataset on all 11,575 large U.S. firms that applied to the program and exploit the fact that, due to as-good-as random variations in available funding and personnel, only some of these companies ended up receiving the TWI training. The results indicate that the TWI program led to permanent increases in firm performance: productivity of receiving firms rose by 27 percent in ten years, relative to similar applicant companies that were not trained. Moreover, I document complementarities between different bundles of practices and substantial productivity spillovers from trained firms to firms in their supply chain.

Taken together, the results of the two papers indicate that management interventions have large and persistent effects on the performance of both small and medium-sized firms and large companies. To the best of my knowledge, these papers are among the first to provide a long-term analysis. My estimates of short-term magnitudes are comparable or smaller to other findings in the literature. My AER (2019) and JPE (2022) papers find, respectively, a 15 percent and a 5.3 percent increase in productivity within one year of the two programs. Bloom et al. (2013) document a 17 percent increase in productivity one year after offering management consulting to large Indian firms, and Bruhn et al. (2018) a 26 percent increase in response to managerial consulting offered to 432 small Mexican enterprises and a 70 percent growth in sales five years after. Consistent with my longer-term results, in a follow-up survey on the same firms, Bloom et al. (2020) still find a

significant performance gap between treatment and control plants eight years after the experiment.

I will examine the development and diffusion of management practices in the wider context of the rise of big businesses in the US in my book, *Professionals and Productivity: the Diffusion of Soft Technologies during and after WWII* (under contract with *Princeton University Press*). As explained by Chandler (1977), in the 1840s the large size of the new railways and telegraph companies created the need of a managerial hierarchy to supervise several operating units in different parts of the country and to coordinate and monitor their activities. Solving organizational issues also allowed the great wave of mergers in the US manufacturing sector between 1895 and 1904 (Lamoreaux, 1985). Big businesses were so pervasive in the US that they shaped the hierarchical structure of government bureaucratic organizations (Galambos, 1975). The new companies faced numerous economic and technological changes and some organizational and management arrangements proved to be better than others for coping with a changing environment (Voich and Wren, 1976). Economic and technological changes allowed firms who had adopted new organizational and managerial arrangements to thrive but let to substantial spreads in productivity, even among large businesses. For example, among prospective WWII contractors, firms in the top quartile of productivity were twice as productive as firms in the bottom quartile (Bianchi and Giorcelli, 2021).

My book will argue that WWII was major inflection point in the history of American business. The large-scale diffusion of innovative management practices to US firms involved in war production acted as a technology that put them on a higher growth path for decades, but also helped creating the "American Way" of business. In the following decade, the transfer of soft technologies to war-torn European and Japanese economies revolutionized their production methods, with positive, long-lasting effects on adopting companies. I will quantify these effects by expanding my data collection on the Productivity Program in Italy to all the 270 study trips for managers from 17 European countries to the US, including the reported changes in firm performance. I am also collecting data on the 393 Study Tour Reports from the Japanese Productivity Institute, on the management workshops organized by U.S. managers in Japan, and on the participating firms.

I plan to continue research in this area by investigating the effects of management education during WWII on manager professional outcomes. Specifically, I will use evidence from the Engineering, Science, and Management War Training Program in the US, that offered MBA-style

programs to around 300,000 managers between 1940 and 1945. Preliminary results, obtained by a regression discontinuity around the admission scores to the program, indicate that participating managers were able to reach better positions within their current companies and were more likely to move to larger and more productive firms after the end of the war. Adoption of management practices and firm performance improved upon managers completing the training program.

2) Technology Adoption, Innovation and Scientific Diffusion

The second strand of my research studies the determinants of innovation and technology adoption. Firm productivity is affected not just by management practices but also by technology adoption and innovation. Previous scholars have shown that in developing countries the adoption of foreign technologies may determine a substantial boost in productivity of plants (Pavcnik, 2002; Mel et al., 2008; Goldberg et al., 2009; Bloom et al., 2013; Hardy and Jamie, 2020). Consequently, technology transfer interventions have been widely used to promote industrialization in developing countries (Hoekman et al., 2004; Robinson, 2009), especially through the diffusion of state-of-the-art capital goods (Stokey, 2020). However, little we know about the *causal* effects of technology transfer programs on industrialization and early economic development, mostly due to lack of data and natural variation in the delivery of such policies, as well as their relative recent implementation.

I study the impact of technology adoption and innovation on industrialization by analyzing the international aid programs sponsored by both the US and the Soviet Union in the aftermath of WWII. This line of work is, to the best of my knowledge, the first that uses detailed microeconomic data to assess the effects of the two largest international aid programs on economic development: the Marshall Plan and the Sino-Soviet Alliance.

The Marshall Plan was an economic and financial aid program sponsored by the US between 1948 and the late 1950s to help European economies recover from WWII. My AER 2019 paper examines the transfer of technologically advanced machineries from the US to Italian firms and finds that their impact on firm outcomes was modest and stopped growing as the life-cycle of capital ended if not accompanied by human capital training. In "Reconstruction Aid, Public Infrastructure, and Economic Development" (*JEH 2022*, with Nicola Bianchi), I examine the effects of Marshall Plan reconstruction grants on Italian post-WWII development. I exploit variation from the amount of bombing Italian provinces suffered in the last phases of WWII that,

while uncorrelated with economic performance, strongly predicted the amount of reconstruction grants received. Provinces that received more grants were able not only to rebuild, but also to modernize their infrastructure networks. The expanded transportation structure increased agricultural production between 10 and 20 percent and the number of industrial firms by 30 percent. Moreover, provinces that received more grants increased technology adoption and the use of labor-saving machines. In a related paper, "The Effects of Fiscal Decentralization on Publicly Provided Services and Labor Markets" (*conditionally accepted at EJ*, with Nicola Bianchi and Enrica Martino), we exploit variations from WWII bombing in Italian cities that affected the age of buildings and, consequently, the amount of local taxes municipalities could raise when fiscal decentralization was implemented in the late 1990s. Fiscal decentralization reduced local spending but expanded municipal services, such as nursery schools, which in turn increased female labor supply, thereby reducing the gender gap in employment.

Almost concurrent with the Marshall Plan, the Soviet Union sponsored a wide economic and military aid program in the newly-formed People's Republic of China. In "Technology Transfer and Early Industrial Development" (under preparation for submission), my coauthor Bo Li and I focus on the so-called "156-Projects", large industrial facilities that received state-of-the-art Soviet capital and the transfer of industry-specific know-how between 1950 and 1957. As-good-as-random delays in project completion that arose from Soviet side and the unexpected end of the Alliance determined that some facilities received the planned transfer, while others were completed by China alone using domestic technologies. The results indicate that the know-how component of the program was fundamental for the establishment of pioneering plants, that showed a productivity gain over 50 percent in the following 40 years. These plants were able to move from imitating to developing new technologies when China was a closed economy, and created large industry spillovers. A back-of-the-envelope calculation shows that, without Soviet transfer, the Chinese real GDP per capita growth between 1953 and 1978 would have been halved, confirming its vital importance in Chinese industrialization.

It is commonly thought that innovation can be increased by expanding scientific education. In the paper "Scientific Education and Innovation" (*JEEA 2020*, with Nicola Bianchi), we take a step back and study what is the effect of inducing more students to enroll in university-level STEM majors on the individual probability of producing innovation. We find that university-level scientific education had two direct effects on the development of patents by students who had

acquired a STEM degree. First, the policy changed the direction of their innovation. Second, it allowed these individuals to reach top positions within firms and be more involved in the innovation process. STEM degrees, however, also changed occupational sorting. Some higher-achieving individuals used STEM degrees to enter jobs that required university-level education, but did not focus on patenting. In future work on this research line, Bo Li and I plan to study the effects of China-USSR and China-USA student exchange programs on Chinese patents and scientific publications, to better understand the relationship between education and innovation.

Despite the importance of scientific advances on economic development, evidence on the impact of scientific progress on culture remains scant. In "How Does Scientific Progress Affect Cultural Changes? A Digital Text Analysis" (*JOEG 2022*, with Nicola Lacetera and Astrid Marinoni), we focus on a unique episode in the history of science, the elaboration of the theory of evolution by Charles Darwin, and study its effect on the broader cultural discourse. We measure cultural discourse through the digitized text analysis of a corpus of hundreds of thousands of books as well as of Congressional and Parliamentary records for the US and the UK. We find that key Darwinian concepts increased their presence in the public discourse immediately after the publication of his theory, while they diffused in the political debate with some lags. Moreover, several words that embedded the key concepts of the theory of evolution experienced semantic and sentiment changes – further channels through which Darwin's theory influenced the broader discourse. Our findings represent the first large-sample, systematic quantitative evidence of the relation between two key determinants of long-term economic growth, and suggest that natural language processing offers promising tools to explore this relation.

3) Intellectual Property Rights and Creativity

The third strand of my research studies the effects of intellectual property right on creativity. In modern world, copyrights have become crucial for innovation, as they cover nearly all the content that is now subject to digitization, ranging from text, music, to video. Despite their importance, the evidence about the effects of intellectual property rights on creativity is limited, due to little variation in copyright laws today.

I identify the effects of copyrights on creative output in "Copyright and Creativity: Evidence from the Italian Operas in the Napoleonic Age" (*JPE, 2020*, joint with Petra Moser) by exploiting exogenous variation arising from the timing of Napoleon's military victories. In 1801,

Lombardy and Venetia adopted French laws, including copyrights, after they came under French rule. In 1804, France's parliament adopted the code civil. Under the code, French-controlled areas could keep any extant copyright laws and France would no longer impose its copyright laws. As a result, only Lombardy and Italy adopted copyrights, while the rest of Italy did not. Analyses of historical records on opera premieres and notable performances shows that the introduction of copyright laws increased both the quantity and the quality of creative output. In contrast, copyright extensions – as part of a political process towards Italian unification – appear to have minimal effects on creativity, at best. Specifically, extensions of copyrights beyond the life of the original composer are associated with a decline of new operas.

To what extent are the authors of copyrighted works able to take advantages of the benefits of intellectual property rights protection? In the book chapter "Poets and Novelists" in «Subjects of Literacy and Artistic Copyright» (*Edward Elgar*, 2022, forthcoming), I examine contract agreements signed by poets and novelists in the 19th century to document that strategically used copyright laws to increase their revenues and gain more autonomy from the editors.

Creativity could also be influenced by public funding for the arts. In work in progress with Petra Moser, titled "Public Funding for the Arts: Effects on Creativity, Human Capital, and Institutions," we find that cuts to theater funding –as a result of Italy's unification in 1861 – discouraged the creation of new content and increased the re-use of repertory works. In the long run, cities more affected by the budget cut produced fewer artists and a lower number of patents in artistic-related fields.

Teaching and Service

Teaching is an integral part of my life as a scholar. At UCLA, I have taught graduate courses in European and US economic history (ECON 241 and ECON 242, 2016-2023), and an undergraduate course in European economic history (ECON 181, 2016-2022), a class that attracts approximately 115 students. I have also co-organized the economic history and the applied proseminars – workshop for graduate student work-in-progress – and the economic history quarterly mini-conferences. In Fall 2018 I was awarded the Warren Scoville Distinguished Teaching Award as the best instructor in the UCLA Economics Department.

I have served or am serving on the committee of 16 Ph.D. students (9 of which are in progress) both at the UCLA Economics Department and at UCLA Anderson School of Business and I have informally advised many students in the field of economic history and applied economics.

I have been invited to present my work at several seminars and conferences, including Harvard, MIT, Princeton, Yale, UC-Berkeley, Northwestern, NYU, U Michigan, UBC, UC-San Diego, Queen's, Caltech, Duke, UC-Davis, Pompeu Fabra, the NBER, the OECD, the Economic History Association and the Barcelona GSE Summer Forum.

I have refereed for the following journals: American Economic Journal: Applied Economics, American Economic Journal: Economic Policy, American Economic Review, Diacronie. Studi di Storia Contemporanea, Economic History Review, European Journal of Law and Economics, Explorations in Economic History, Journal of Economic Behavior and Organization, Journal of Economic History, Journal of European Economic Association, Journal of Human Resources, Journal of Labor Economics, Journal of Law, Economics and Organization, Journal of Political Economy, Journal of Urban Economics, Labor Economics, Management Science, Oxford Bulletin of Economics and Statistics, Quarterly Journal of Economics, RAND Journal of Economics, Review of Economic Studies, Review of Economics and Statistics, Strategic Management Journal. I have also served as a grant reviewer for the European Research Council (ERC), Chilean National Fund for Scientific and Technological Research (FONDECYT), Israel Science Foundation (ISF), National Foundation of Science (NFS), Research Grant Council of Hong Kong (RGC)

I also seek to disseminate my research to a broader audience. I have co-organized the Galatina Summer Workshop in 2019 and 2020, bringing together scholars from multiple fields. Additionally, my work has been covered by several blogs, including the NBER Digest, VoxEu, Faculty and Econimate – a video blog in stick figures, has been translated in Chinese by Weixin, and has been presented at the Italian Parliament.

Works by the Author

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