

**Research Statement**  
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I am an economic historian whose work examines the determinants 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 management and technology adoption by exploiting a wealth of historical policy variation and unique historical data, collected 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 Reenen, 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 et al., 2018).

Despite the advancements of research, fundamental questions about the links between managerial practices and firm performance remain unanswered. In particular, little is known on whether management interventions have persistent effects on plant outcomes or if their effects are only short-lived. 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 sponsored training trips for European managers to learn modern management practices at 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. Firms that received management training not only adopted the most advanced managerial practices, but also undertook structural changes in their organization and improved access to the credit market. These channels allowed the initial effects to amply and persist over time. By contrast, the impact technologically advanced capital goods on firm performance did not persist over time if it is not accompanied by proper managerial training.

Another open question in the management literature regards whether management consulting can cause a virtuous cycle of growth within large firms, an hypothesis known as the “Toyota Way” (Liker, 2004). For example, after an initial positive shock to management, complementarities among managerial areas or positive spillovers along the supply chain could make it easier for big firms to get better over time (Womack et al., 1990). In “Dynamic and Spillover Effects of Management Interventions” (JPE 2020, with Nicola Bianchi), I study the dynamic and spillover effects of management interventions on firm performance by examining the Training Within the Industry (TWI) program that offered management consulting to large US war contractors between 1940 and 1945. Using newly-assembled

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data on all 11,575 U.S. contractors that applied to the program, I leverage on as-good-as random variations in funding and personnel available for the TWI. As a result, only some of these companies received the TWI training and, conditional on receiving it, firms were trained in different types of managerial techniques. The results indicate that the TWI program led to permanent growth in firm outcomes, productivity and profitability in the 10 years after the program implementation. Moreover, I document complementarities between different bundles of practices: the costs of adding new managerial practices fell as others were previously adopted, transforming a single management intervention into a stream of improvements. Finally, I show that the TWI program generated positive spillover effects on the supply chain of trained firms. Remarkably, both the trained applicants and the firms in their supply chain improved their management practices in similar ways, which suggests that there was a transfer of managerial knowledge from the trained firms.

Taken together, the results of these two papers indicate that management interventions can have persistent and complementary impact on the performance of both small and medium-sized firms and large companies and generate spillovers in their supply chain. To the best of my knowledge, these works are among the very first to document such effects using large-scale non-experimental data. Moreover, they provide the first quantitative and comprehensive analysis of US publicly funded management training programs during and after WWII, that not only diffused “soft” technologies, but also developed an effective way for firms to adopt them.

Intended for a general audience, my book “Professionals and Productivity: the Diffusion of Soft Technologies during and after WWII” (under contract with Princeton University Press) will investigate the role of WWII in spurring new managerial production technologies in the US and their diffusion to Western Europe and Japan in the war aftermath. Traditionally, WWII has been considered the source of “an extraordinary surge of growth” in the US, thanks to the advancements in science and technology it pushed. Professionals and Productivity will argue that wartime was also a 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. The core of management innovation developed during World War II, despite a few changes, has persisted over years and has shaped today’s firm best practices.

My new research on management is focused on understanding the role of management education on manager professional outcomes and on business school development. In the work-in-progress “The Effects of Managerial Education on Managers Career,” I study the Engineering, Science, and Management War Training (ESMWT) Program, that offered MBA-style programs to around 300,000 US 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.

## 2 Industrial Policy, Technology Adoption and Innovation

The second strand of my research focuses on industrial policy and its effect on technology adoption. Traditionally, countries have started growing rich as their production shifted from agriculture to the industrial sector. In order to accelerate this process, several governments in developing countries have extensively used active industrial policy. However, little we know about the causal effects of such policies on industrialization and early economic development, mostly due to lack of data and natural variation in their delivery of such policies, as well as their relative recent implementation.

I study the impact of industrial policy on technology adoption and industrialization by analyzing the two major international aid programs sponsored by both the US and the Soviet Union in the aftermath of WWII: 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. In “Reconstruction Aid, Public Infrastructure, and Economic Development” (JEH 2023, 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 2023, with Nicola Bianchi and Enrica Maria 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: Evidence from the Sino-Soviet Alliance” (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.

Governments may also push technological advancements by sponsoring large education programs that aims at expanding scientific education. In the paper “Scientific Education and Innovation” (JEEA 2020, with Nicola Bianchi), we 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 rights 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, 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), 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.

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