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Application to the NBER Digital Economics and AI Tutorial

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Graduate study and training

I am a fifth-year PhD candidate in Economics at Northwestern University. My main interests focus on the economics of innovation and science, science of science, and economic history. In the past, I have attended the NBER Innovation Bootcamp and the Stanford Economics of Transformative AI summer camp.

In my work, I apply AI tools for natural language processing (NLP), text as data, and historical data extraction, and I study the role of tools and technology as inputs to science and innovation. When new technologies relax research constraints, fields benefit unevenly, and researchers redirect their work differently. My historical research on computers informs my study of AI as an input into discovery, while AI tools help me construct and analyze historical data.

Dissertation research

My main dissertation project, coauthored with Franco Malpassi, is *Technological Breakthroughs and the Progress of Science: Evidence from Early Computers*. We study the arrival of digital computers in U.S. university research from 1950 to 1970, assembling a database of 2,138 computer installations across 184 universities and linking it to publication records from OpenAlex and SciSciNet.

Our empirical design combines staggered university adoption with differences in subjects' reliance on manual calculation before 1945 in a triple difference design. We find that computers' impact on science follows the contours of prior demand for computation. Numerically intensive areas gained in publication volume and citations per paper within a decade of installation. Novelty and recombination of ideas surge in exposed fields. Computers shifted research toward simulation and methods, and computer papers drew on older, dormant lines of work.

These patterns are compatible with computers unlocking research paths that were understood in practice but infeasible to pursue with extant tools. Unlike the slow, diffuse gains typical of general-purpose technologies, the returns in science arrive within years and concentrate where computation had been the binding constraint.

My dissertation committee consists of Ben Jones (Kellogg School of Management, Northwestern University), Joel Mokyr (Northwestern University), and Ryan Hill (Kellogg School of Management, Northwestern University).

Other selected ongoing research

With Vitaliia Eliseeva, I'm investigating the role of political power in shaping knowledge and narratives. In *History written by the Loser: Centralization and Confederate Narratives in Southern Textbooks*, we use LLMs to measure the pro-Southern slant in 539 history textbooks between 1860 and 1930 and gauge the effects of a series of laws that centralized textbook adoption decisions at the state level. By leveraging variation in the timing of adoption laws, we show that centralization led to an increase in pro-Southern slant of adopted textbooks in the South, mainly in Civil War related content. We also show exposure to these textbooks leads to downstream effects on racial attitudes years later as measured by Gallup poll responses.

In other ongoing work with Netanel Ben-Porath, we explore the role of regulation in directing innovation. By looking at the EPA's staggered decisions to restrict and ban certain pesticides, we quantify the trade-off between efficacy and safety in technological development. Preliminary results show that pesticide bans lead to more entry into a pest market. Product entry leads to more safety, and efficacy does not suffer in the medium run. We show that firms respond by making their products narrower in terms of biological targets.

Early stage work includes work with Ryan Hill and Annie Liang investigating the role of (artificial) intelligence in science. We are investigating how much jagged AI capabilities complement or substitute for mathematicians, and how increasing capabilities interact with the tasks researchers perform -- moving from proofs or execution towards ideation and posing problems.

Interest in the tutorial

The tutorial would help me develop this research agenda in the economics of innovation and science, science of science, and economic history. I would especially value discussion of how to measure technological adoption and research productivity, identify effects when access to technology is uneven, and validate AI tools for text as data and historical data extraction. I would bring experience constructing historical datasets and applying NLP methods, alongside ongoing projects that study AI's role in scientific discovery.