

Proposal for the NBER Innovation Policy Post-Doctoral Fellowship

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Broadly speaking, my research focuses on analyzing factors that affect the production of innovation at the individual-level. Who are the innovators? What causes them to innovate? What are the factors that can potentially be influenced by policy makers? Despite the importance of innovation, empirically we know little about how talented individuals innovate. To shed light on these questions, I have collected data from the Massachusetts Institute of Technology on all graduates that received a bachelor's, master's, or doctoral degree between 1980 and 2010. I constructed the patenting history of each graduate by matching them to the database of U.S. inventors from Lai et. al (2011). I plan to explore several projects with this rich data set.

In my job market paper, "The Long-Term Impact of Business Cycles on Innovation: Evidence from MIT," I focus on the 1980-2005 bachelor's cohorts and show that short-term shocks to graduates' initial career choices have a long-term impact on their patent production. Cohorts graduating during economic booms produce significantly fewer patents over the subsequent two decades. Conceptually, graduating economic conditions could affect long-term patent production through two channels: changing graduates' acquisition of inventive human capital or changing their long-term occupational affiliation. By decomposing the main effect further, I find no evidence that initial economic conditions affect inventors' long-term occupational affiliation, suggesting that the effect on patent production is primarily due to differences in inventors' long-term level of inventive human capital.

The results from my job market paper present some of the first micro-level evidence on the link between talent allocation and innovation. They also point to the importance of a series of new questions. Which are the sectors that expand during bad economic conditions and increase the graduates' long-term inventive skill? Would we observe similar impacts of business cycles on doctoral students, who potentially face different types of career choices from bachelor's students? My research agenda will focus on these two questions during my time as a post-doctoral researcher at the NBER Innovation Policy Workshop.

In order to answer the first question, I will collect data on the initial career choices of the 1980-2005 bachelor's cohorts. Although I do observe the initial career choices of the 2006-2010 cohorts, it is difficult to use this data to extrapolate the initial career choices of the 1980-2005 cohorts.¹ Since MIT does not have such data for the earlier cohorts, I plan to explore two possibilities: the National Student Clearinghouse and LinkedIn. The National Student Clearinghouse potentially has information on the highest degree attained by MIT bachelor's graduates. This will allow me to estimate the impact of graduating economic conditions on advanced degree attainment and establish the link between graduate degree and inventive human capital. LinkedIn has information on the career paths of MIT alumni who have a profile there, although it is unclear how large this sample may be.

My second project will study the impact of business cycles on doctoral students' initial career choices and long-term innovative output. The doctoral graduates differ from the bachelor's graduates in two significant ways. First, the doctoral graduates face

¹ The industry composition of the United States in the early 1980s is different from the late 2000s. For instance, the financial sector has expanded dramatically over the last 30 years (Philippon, 2008).

different types of career choices from the bachelor's graduates. For instance, they are more likely to go into research positions. Second, their decisions to enter and leave graduate schools are more likely to be affected by business cycles than bachelor's graduates' decisions to enter and graduate from college. Thus, business cycles could change the composition of the doctoral student body by affecting both individuals' decisions to enroll in graduate school and which doctoral students choose to graduate. In addition, economic conditions could affect the initial placements of those doctoral students who choose to graduate. My project will focus on distinguishing between these two types of impacts on doctoral graduates' long-term production of innovation.