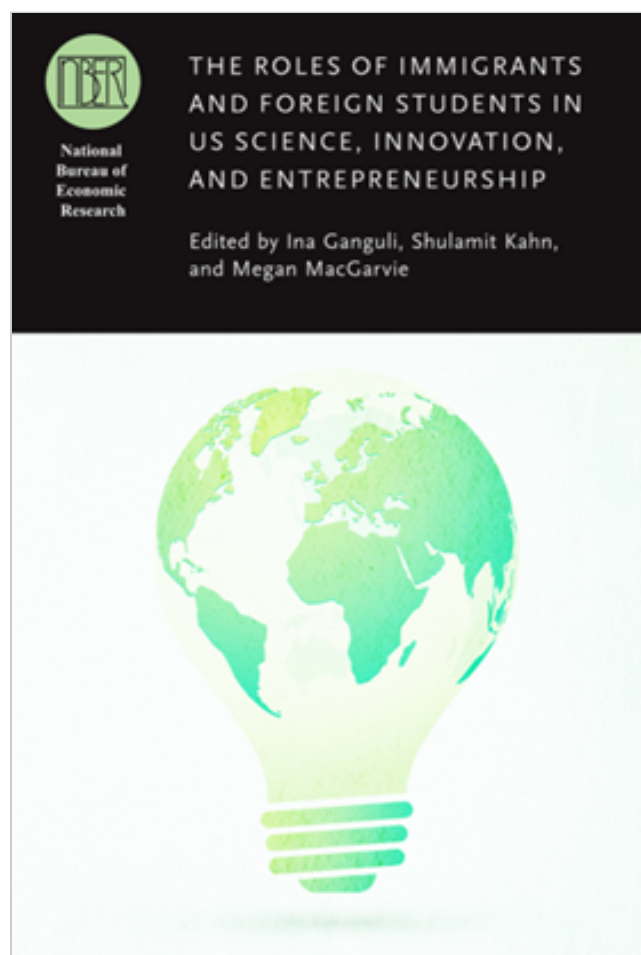


## Immigration and innovation

The impact of foreign-born workers on the U.S. labor market remains a primary focus of immigration policy and research. In a recent book titled *The Roles of Immigrants and Foreign Students in U.S. Science, Innovation, and Entrepreneurship*, editors Ina Ganguli, Shulamit Kahn, and Megan MacGarvie offer a collection of eight novel papers presenting recent findings in the literature on immigration economics. The collection provides evidence that (1) foreign-born students still want to work in the United States, although this may be changing for Chinese students, (2) foreign-born students who remain to work in the United States after graduation are positively selected by ability, and (3) the presence of more foreign-born entrepreneurs or employees in a firm is associated with more productivity growth and innovation by most measures.

Many foreign-born students come to the United States to attend top-rated academic institutions. A relevant question with implications for student visa policies is how many foreign students who build human capital in the United States actually remain in the country to use that capital in the U.S. labor market. In chapter 2, Ina Ganguli and Patrick Gaulé estimate that, among Ph.D. students, foreign-born students are more likely to accept postdoctoral appointments in the United States than are native-born students. This difference is robust to test scores and career preferences, suggesting that American educational institutions select students interested in living in the United States. Similarly, in chapter 8, Michael Roach, Henry Sauermann, and John Skrentny show that about 42 percent of foreign-born Ph.D. students wish to stay in the United States permanently and about 37 percent wish to work in the country for some time before returning home. These rates are similar across degree fields, but the average is pulled down by Chinese students, only about 17 percent of whom intend to stay in the United States permanently. The authors urge further study of this difference between



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Chinese and other foreign-born students, but they provide ample evidence that immigrants sourced from institutions of higher education have a lasting presence in the United States.

In chapter 1, Stefano Breschi, Francesco Lissoni, and Ernest Miguelez examine why some foreign-born students stay to work in the United States, whereas others return to their home countries. The chapter explores this question by using a novel dataset (based on a data-linkage project between LinkedIn and PatentsView) of patent-holding Indian immigrants employed in the U.S. information and communications technologies (ICT) industry. Using PatentsView, the authors pull data on patents from the top 179 ICT companies. After linking patent holders from these companies to LinkedIn profiles and restricting the sample to Indian inventors whose first move outside of India was to the United States, the authors arrive at a dataset containing around 5,500 such individuals. The analysis explores differences between those who return home and those who stay in the United States, distinguishing between “education” migrants (those who studied at an educational institution at the time of migration) and “work” migrants (those who worked at the time of migration). Breschi, Lissoni, and Miguelez find evidence that return migrants in both the education and work categories are negatively selected with respect to education; that is, those who stay in the United States tend to have higher educational attainment, on average. On the other hand, the authors also find that work migrants who return home are positively selected by the number of patents, implying that those with more patents are more likely to return to India. The authors urge caution in interpreting this mixed result in the absence of further research, but they do demonstrate that many of the latter migrants publish patents and work in the United States for a considerable time.

Given the evidence that many immigrants come to the United States for work, what is their effect on innovation and the firms that hire them? The other papers in the book seek to answer this question. Chapters 3, 4, and 6 explore the relationship between immigration and innovation at the firm level. Because much of the high-skilled immigration to the United States occurs through the H-1B work visa program, which allows the admission of a limited number of immigrants with a college degree up to an annual cap, chapters 3 and 4 focus on the impact of those immigrants.

Using Labor Condition Applications (LCAs), which are documents filed by firms seeking to employ an H-1B worker, Gaurav Khanna and Munseob Lee (chapter 3) compare the performance of firms that file LCAs with the performance of firms that do not. The authors stress that, since filing an LCA is the first step involved in the H-1B program and because not all LCAs are approved, their data reflect a firm’s tendency to hire high-skilled immigrants. For their dependent variable, Khanna and Lee construct a measure of product reallocation that reflects how many products come off and on the market—a measure of creative destruction. The authors find that LCAs are positively associated with product reallocation, with firms that apply for foreign workers more dynamically bringing in new products and taking out old ones. Although causation is difficult to establish, the authors do find that increased LCAs precede greater product reallocation, but periods of greater product reallocation have no correlation with later LCAs.

Anna Maria Mayda et al. (chapter 4) take a similar approach by using a firm’s number of approved H-1B workers as a treatment variable. Through a Freedom of Information Act request filed with the U.S. Citizenship and Immigration Services, the authors obtained data on the entire universe of approved H-1B applications from 1997 to 2012. Their findings, like those reported in chapter 3, suggest that larger companies (based on revenue) have a

higher propensity to employ H-1B workers and that greater revenue growth follows the introduction of more such workers.

Taking a different approach, J. David Brown et al. (chapter 6) examine immigrant-owned tech firms with data from the U.S. Census Bureau American Survey of Entrepreneurs. Since tech firms have relatively high rates of innovation and employ many foreign-born workers, the authors try to estimate the effect of immigrant ownership on innovation. Their measures include product and process innovation, intellectual property, and R&D spending. All measures are positively associated with immigrant ownership, and except for intellectual property, they are significant. Many of the innovation measures, most notably R&D spending, are robust to a myriad of controls.

Academics interested in the relationship between immigration and U.S. scientific and technological innovation should explore the evidence presented in this book. Although the book applies some advanced econometric concepts and may challenge nontechnical audiences, it is a welcome advance in the literature on immigration economics. Those with academic or policy interests concerned with the effects of foreign-born workers on the labor market may find it valuable, and those who wish to add to the literature may benefit from learning more about the novel datasets created by some authors.