

Why U.S. Immigration Barriers Matter for the Global Advancement of Science

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While talent can be born anywhere, few places specialize in nurturing it. Accordingly, talented individuals have pursued opportunities abroad for centuries. For instance, Aristotle moved from Northern Greece to Athens to attend Plato's Academy and then to Macedonia to tutor a young Alexander the Great. More recently, the United States has emerged as a hub for foreign talent, playing an outsized role in the global knowledge network of scientific activity in recent decades. However, the recent introduction of restrictive immigration policies in the United States may adversely impact scientific activity. While studies have examined the potential negative impact of restrictive U.S. immigration policies on U.S. competitiveness in science and innovation, there has been less focus on understanding how U.S. immigration barriers may in turn impact scientific

activity globally. In this context, our work studies the impact of U.S. immigration barriers on global knowledge production and examines which policy actions are more likely to help advance the global knowledge frontier.

The impact of immigration barriers on global science and on worldwide cross-border flows remains an understudied question, mainly due to the difficulty of collecting and linking data on migration and scientific production on a global scale. Yet examining the impact of U.S. immigration barriers on the global advancement of science appears both essential and timely—especially given the potentially large consequences of immigration flows for global innovative activity. Individuals from developing countries who show similar talent as youths from advanced countries are less able to contribute to advancing the global knowledge frontier, suggesting that large scientific gains can be achieved by easing barriers for



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their migration to places where their talent can be nurtured. Moreover, recent developments—the COVID-19 pandemic and changes in U.S. immigration policy—have created further barriers for cross-border migration and may significantly disrupt the current equilibrium. For instance, student visas to the United States fell by 70 percent between fiscal years 2019 and 2020. Many of the immigrants who can no longer come to the United States to work and study due to recent immigration and travel barriers represent a substantial share of the most talented individuals from around the globe.

Our contribution is to quantify how U.S. immigration barriers could impact the advancement of science using hand-curated data sets of talented individuals—including Nobel laureates, Fields medalists, and participants of the International Mathematical Olympiads (IMO), a prominent worldwide math competition for talented high school students. Our data set includes career histories of migration and lifetime scientific output of 2,200 IMO medalists from over 100 countries. We combine these data with newly collected unique survey data of 610 recent IMO participants, including which universities they applied to, were admitted to, and attended. The survey also includes a series of questions asking respondents to make choices between hypothetical university offers in different countries—where offers were either funded or unfunded. These questions allow us to shed light on the role of funding as a constraint to pursuing education abroad.

We present four main findings. First, using data on Nobel Prize winners and Fields medalists, we document that the migrants to the United States play a central role in the global knowledge network—representing 20–33 percent of these frontier knowledge producers. Second, using novel survey data and hand-curated life histories of IMO medalists, we show that migrants to the United States are significantly more productive than migrants to other countries—even

after accounting for one’s talent during his or her teenage years. Migrants to the United States are four to six times more productive than stayers, while migrants to the United Kingdom are more than twice as productive as stayers. Using information on the future occupations of the medalists, we show that the U.S. productivity premium is driven by both the choices migrants make when they arrive (i.e., migrants are more likely to choose academic careers when they migrate to the United States) and individual productivity traits (i.e., among those who choose academic careers in math, migrants to the United States are more productive than stayers). Third, we document that financing costs are a key factor preventing foreign talent from migrating to the United States. In particular, among developing-country IMO participants, 66 percent dream of studying in the United States, while only 25 percent manage to do so. Fourth, our findings suggest that certain push incentives that reduce immigration barriers to the United States—by addressing financing constraints for top foreign talent—could increase the global scientific output of future cohorts of talent by 42 percent. We conclude by discussing policy options for the United States and the global scientific community, with a particular focus on the effectiveness of scholarships versus other science policy actions, such as offering green cards to foreign talent.

NOTE

This research brief is based on Ruchir Agarwal, Ina Ganguli, Patrick Gaule, and Geoff Smith, “Why U.S. Immigration Barriers Matter for the Global Advancement of Science,” IZA Institute of Labor Economics Discussion Paper no. 14016, January 2021, <https://www.iza.org/publications/dp/14016/why-us-immigration-barriers-matter-for-the-global-advancement-of-science>.



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