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POLICY BRIEF

Unintended Consequences of Restrictions on H-1B Visas

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The H-1B visa program allows US-based companies to issue temporary visas for high-skilled foreign workers whom those companies wish to hire. Currently the H-1B program grants only 65,000 visas (with an additional 20,000 allocated for those who have earned higher degrees from US institutions) to high-skilled foreign workers through a lottery process.[1] Because of the cap on the number of visas allowed, over 60 percent of H-1B visa applications are randomly declined every year. H-1B visa holders work primarily in computer-related and science, technology, engineering, and mathematics (STEM) occupations.

In the past four years, the Trump administration has proposed narrowing the H-1B visa program's definition of "specialty occupations" and has proposed prioritizing the applications of companies that would pay the highest wages for their foreign workers. The reason for doing so is to end abuse of the H-1B visa lottery and help American workers by making it more costly to hire foreign workers.

What are the consequences of the current restrictions on the number of high-skilled foreign workers whom US companies can hire? In particular, what are the effects of these restrictions on American workers? Such questions often arise in the disagreements regarding the H-1B visa program. Some have argued that high-skilled foreign workers with H-1B visas are either displacing American workers or lowering American wages.

We review this claim and make suggestions for how to reform the H-1B visa program. In general, research indicates that limiting H-1B visas decreases the number of American high-skilled jobs, induces more American companies to hire workers overseas, harms small technology startups, and reduces America's global leadership in innovation.

The views presented in this document do not represent official positions of the Mercatus Center or George Mason University.

There is bipartisan agreement that the H-1B visa program is flawed and in need of reform.[2] With a new Biden presidency comes a new opportunity to improve the H-1B visa program in a way that benefits Americans and reestablishes the United States as a global leader in innovation.

DOES LIMITING H-1B VISAS HELP AMERICAN WORKERS?

To answer the question, it is useful to examine what happens when H-1B visa restrictions prevent American companies from hiring high-skilled foreign talent.

For example, US Citizenship and Immigration Services (USCIS) received 119,193 H-1B visa applications in 2007 and a further 163,000 applications in 2008. However, the H-1B lottery process granted just 65,000 H-1B visas in each of those years, which means that only half of those roughly 282,000 jobs were given to foreign workers; the other half, in theory, could have gone to American workers. So what happened to the remaining jobs when prospective foreign workers were denied visas? Did companies hire American workers to fill those vacancies?

To answer this question, economists Giovanni Peri and coauthors study computer-related occupations in cities across the United States (a majority of the H-1B visa applications are for employers in computer-related industries).[3] They find that, for the most part, companies do not hire more skilled Americans when the foreign workers they intended to hire had their visas denied. The authors conclude that "these results dispel the idea that by reducing skilled immigration, employers would increase their demand for native skilled workers" and that "employers of computer-related workers did not hire more natives when the foreign workers they intended to hire were denied H-1B visas."[4]

In fact, the study shows that in cities where companies experience more H-1B visa denials (by pure "luck" of the H-1B lottery process), jobs for Americans workers in computer-related industries decreases in the years following. In other words, more American jobs are lost when companies' ability to hire foreign workers is restricted. Moreover, the study finds that college-educated Americans experience slower wage growth in cities that experience more H-1B visa denials.

By contrast, in the cities that receive more H-1B visa acceptances (again, by luck), more American jobs are created in computer-related industries, and wages for college-educated Americans grow. This finding is similar to that of a different study by the same authors, where they estimate the effect of H-1B STEM workers on the wages of college-educated and non-college-educated Americans.[5] Once again, the researchers find that foreign STEM workers stimulate new wage growth for both college-educated and non-college-educated Americans.

Microsoft's experience comports with these findings. According to Bill Gates, "Microsoft has found that for every H-1B hire we make, we add on average four additional employees to support them in various capacities."[6]

This result may seem counterintuitive—why would it be the case that *more* Americans jobs are created when *more* vacancies are filled by high-skilled foreign workers? Two competing economic theories attempt to explain this effect. The first is that high-skilled foreign workers are substitutes for high-skilled American workers. That is, any particular job that goes to a foreigner could have been filled by an American. The second theory is that high-skilled foreign workers are complements for American workers, which means that companies have some roles that they cannot fill with American workers and others that can be filled by American workers. That is, American high-skilled workers and foreign high-skilled workers may possess different skillsets that are effective when combined together. For example, to create an artificial intelligence robotics department, a company might require a highly specialized skillset that it cannot find in the United States, so it hires a foreign worker to lead the department. However, the department needs additional workers to be on the team, and these are filled by American workers. This means that when a company cannot hire high-skilled foreign workers to create the department, then the additional department jobs for American workers are also lost.

Many other researchers come to the conclusions that high-skilled H-1B workers do not displace American workers.[7]

Furthermore, although foreign workers can substitute for American workers, most of the evidence shows that this substitution is concentrated among low-skilled labor, and any negative effects of substitution significantly decrease or disappear in the long term.[8] Regarding high-skilled labor substitution, two influential studies find that an influx of foreign high-skilled workers negatively affects high-skilled American workers, but both of these studies are specific to academic roles.[9] Moreover, in one of the two studies, economists George Borjas and Kirk Doran focus solely on American mathematicians whose research *already* overlaps with that of Soviet mathematicians, thereby creating a substitution effect.[10] In a review essay of these studies, economists David Card and Peri point out that the effect of immigration on academics and research mathematicians is difficult to generalize to high-skilled immigration overall because "the number of positions in top academic institutions and the number of papers in top academic journals are relatively rigid, so these are natural places to look for strong displacement effects."[11]

Still unanswered is the question of whether there is any evidence of a substitution effect overall with high-skilled labor through the H-1B visa program. Two research papers present mixed findings.[12] In one paper, Doran and coauthors find that the H-1B visa can, at least partially, crowd out other workers, but the authors do not conclusively determine whether this crowding-out effect applies primarily to other foreign workers or to American workers. One estimate is that there is no crowding out of American workers, but another estimate is that the native crowding-out effect "could not be ruled out entirely."[13] In a second paper, economist John Bound and coauthors construct a simulation using data from 1994 to 2001, when the share of high-skilled foreign workers entering the United States rapidly grew.[14] The authors find that when the economy is open

to immigration, the equilibrium number of total college graduates employed increases owing to immigration, and they find that overall wages increase. However, they also find distributional effects on computer scientists: the number of US computer scientists decreases every year as the number of immigrants increases (even though, on net, American employment increases). The authors speculate that this result could be caused by some college graduates leaving computer science roles and entering other roles or industries.

Taken together, most research finds that H-1B workers do not lower wages for American workers and do not cause an overall decrease in American jobs, though there can be some distributional changes in specific jobs, such as computer scientists leaving that industry and entering another one when the industry experiences an influx of foreign workers. However, even in those cases, there is no overall loss in American jobs from the H-1B visa program. In fact, the overwhelming evidence indicates that restrictions on the H-1B visa may well run counter to goals of helping American workers.

However, the story does not end there, because even when companies are unable to acquire foreign talent, they still want to innovate and grow. What do companies do when they face restrictions on hiring the foreign workers whom they need?

H-1B VISA RESTRICTIONS LEAD TO OFFSHORING

When many US companies cannot fill their vacancies with American workers and are unable to obtain visas for foreign workers, they turn to other alternatives—mainly, offshoring.

Britta Glennon, a professor at the University of Pennsylvania, examines 2,263 US companies that have offices worldwide. She finds that from 1994 to 2014, when US multinational companies faced H-1B visa restrictions that prevented them from hiring the high-skilled foreign workers that they needed, the companies instead increased employment in their overseas locations—mainly in Canada, China, and India.[15]

In another study, Lee Branstetter, Britta Glennon, and J. Bradford Jensen find that, as a result of large IT and software-based innovation shifts in the past several decades, US companies have begun to expand offices overseas to meet the skilled labor shortages they face in the United States.[16] In particular, US multinationals increase their presence and hiring in locations that have a large number of STEM workers with IT and software skills. Two other studies, though using different methods, also find that immigration restrictions at home lead to US multinational offshoring, thereby creating more employment overseas.[17]

Multinational offshoring in response to burdensome restrictions on the ability to hire high-skilled foreign workers is becoming more frequent. In 2007, for example, Microsoft announced that

it planned to open a research and development foreign affiliate office in Vancouver. That location was chosen because it is close to the Microsoft offices and because it "allows the company to recruit and retain highly skilled people affected by immigration issues in the U.S."[18] In 2018, Microsoft again announced that it planned to open a new headquarters office in Toronto and that one of the reasons for doing so was to "attract top talent."[19] The CEO of data backup company Carbonite also announced in 2017 that if it could not hire the talent that it needs from the United States, it would have to increase employment in its offices in Canada and Europe. Canada is often a top choice for American technology companies because of its proximity to their US offices and because Canada's immigration policies allow for more foreign high-skilled workers to live in Canada.

The fact that US multinational companies are increasing employment in their offices overseas in response to H-1B visa restrictions should alarm those who wish to increase US employment. In this sense, the H-1B restrictions to hiring foreign high-skilled labor lead to the unintended consequence of sending more companies and jobs overseas.

What happens to businesses that do not have an international presence—usually small businesses—when they cannot find suitable US talent to fill their roles and when they cannot hire the right foreign talent because of H-1B visa restrictions?

WHAT DO GREATER H-1B VISA RESTRICTIONS MEAN FOR SMALL BUSINESSES?

Whereas US multinational companies can use the option of increasing jobs overseas when they cannot hire the right foreign talent on American soil, this is not the case for many other US technology companies. For example, multinational offshoring is likely not an option for small, young technology startups in the United States. This can be problematic because the Trump administration has proposed that USCIS prioritize applications for companies that will pay the highest wages for their foreign employees. Similar to Trump, one of president-elect Biden's proposed reforms is also to favor high wage requirements for temporary working visas. Both proposals would raise the costs of hiring high-skilled foreign talent, which would naturally favor larger and more established companies, who have more cash reserves and are better able to adapt to the higher costs. In other words, large companies would almost always outcompete small businesses in hiring the foreign talent that both types of companies need. Raising wage requirements for high-skilled foreign workers would hurt small technology startups' ability to hire foreign workers, but would it result in these startups hiring more American workers instead?

One answer can be found through research conducted by a coauthor of this study, Liya Palagashvili, and her team at NYU School of Law. In 2017, the team led an effort to interview and survey technology startup CEOs and other members of the startup community across the nation.[20] It conducted 88 interviews in the United States and complemented this fieldwork with a 2019 online

survey of 406 executives of small, US technology startups (companies in existence for fewer than seven years and with fewer than 200 employees).

As part of the fieldwork interviews, the final question to respondents was what public policies, if any, would they change to better help their startups grow and succeed. This was an open-ended question, and the most common answer across interviews was to loosen restrictions on their ability to hire foreign talent. In fact, more than one-third of interviewees directly said that this was the biggest challenge for their startups.

When the team inquired further, most respondents explained that they need either software developer talent or highly specialized technical talent, which they struggle to meet with US workers. The interviewees indicated that they would *prefer* to hire US workers owing to the uncertainty of the H-1B visa process, but that they cannot find the right talent in the time they have to fill the position.

What do the small startups do instead? Almost all the interviewees who face these challenges alternatively hire foreign workers as overseas contractors. Most of these are software developers or other highly specialized technical talent based in Belarus, Ukraine, or the Baltic states (Lithuania, Latvia, and Estonia). For example, a New York City–based software company CEO who contracts out with workers overseas said, "As a startup, when you need talent, you can't leave a position unfilled for six months. We need talent filled, not even next week, but today."[21] Contracting with workers is significantly inferior to employing them, but respondents indicated it is their best option for survival.

The findings from the fieldwork interviews are consistent with the findings of the online survey. Technology startup CEOs were asked to report the number of foreign employees or foreign contractors they hire. For those who indicated that they work only with foreign contractors, the team asked if the decision to hire foreign contractors (as opposed to employees) is a reaction to the process of obtaining a visa. Approximately 70 percent of startup executives answered "yes" to this question, implying that overseas contractors are being used as a substitute for foreign employees that they could not hire in the United States owing to the visa process.

The responses from small startups indicate that changes to the H-1B visa program to make it more restrictive and costly will not necessarily lead small businesses to hire more Americans. Instead, small startups will continue to settle for hiring overseas contractors rather than hiring what they would prefer—foreign workers as employees.

HOW DO RESTRICTIONS TO THE H-1B VISA IMPACT INNOVATION?

US policy has often focused on strong economic growth and innovation. However, by making it more difficult for innovative American companies to hire the competitive foreign talent they need to continue innovating and growing, America may lose its edge as a global leader in innovation.[22]

An influential study by economists William Kerr and William Lincoln finds that higher H-1B visa admissions increase US patenting and inventing through the direct contributions of immigrant inventors.[23] At the same time, these higher H-1B visa admissions *did not* displace American workers.

In another study, economists Anirban Ghosh, Anna Maria Mayda, and Francesc Ortega investigate whether the H-1B visa quota hampers US innovation and the growth of firms.[24] They find that increases in the number of H-1B admissions lead to increased worker productivity and company profits, especially in companies that conduct research and development. Since they use research and development expenditures as a proxy for innovation, their findings indicate that a reduction in H-1B admissions leads to a reduction in innovation. This finding is consistent with that of economists Rasha Ashraf and Rina Ray,[25] who find that a sharp reduction in the annual H-1B visa cap in 2004 led to reduced proactive and contemporaneous research and development investment among firms that are dependent on immigrant workers. Another study examines the effect of the 2004 reduction in the H-1B quota on publicly traded firms.[26] It finds that firms that use the H-1B visa program more reduced innovation and capital investment following the adoption of the restriction.

Two other studies have also noted that US global leadership in science and technology heavily depends upon foreign-born workers, who are responsible for a large share of US Nobel prizes, patents, journal articles, and other measures of innovative activity.[27]

In a more recent study, researchers Stephen Dimmock and coauthors find that US startups that win more H-1B visa acceptances to hire foreign skilled workers are more likely to have a successful exit via an initial public offering or acquisition, as compared to those companies that had lower "win rates" for their workers' H-1B visa applications.[28] Moreover, companies with greater H-1B visa acceptances are more likely to receive external financing during the next three years than companies that are not as successful in obtaining H-1B visas for their foreign high-skilled workers. Companies with greater H-1B visa acceptances also have more patent filings—indicating, again, an increase in innovation for the company.[29]

The researchers conclude that "the findings that a higher win rate in H-1B visa lotteries leads to improved funding and patenting outcomes of start-up firms suggest that foreign workers do not simply displace domestic U.S. workers at start-up firms, but rather bring valuable human capital that is otherwise difficult for these firms to obtain."[30]

Thus, research indicates that restrictions in H-1B visas make it more difficult for companies to keep their edge in innovation, as the number of patents, inventions, and company research and development expenditures decrease. An unintended consequence of more restrictive policies is that the H-1B visa restrictions may benefit other countries that continue to acquire the world's most talented high-skilled workers, whereas American companies may be harmed and experience an overall reduction in innovation and productivity.

REFORMING THE H-1B VISA LOTTERY

There is a growing consensus that the H-1B visa lottery system needs to be reformed. The findings discussed here indicate that when immigration policy restricts the ability of US companies to hire the right foreign talent, the unfilled jobs do not necessarily go to Americans. Instead, the jobs can disappear—and with them, other potential American jobs disappear as well. Multinational companies such as Microsoft respond by moving operations abroad. But small technology startups tend to use overseas contractors as a second-best option when they cannot find the right Americans to fill a position and cannot hire a foreign employee. Although some unfilled jobs may eventually go to Americans if companies keep these positions vacant for a long time, this does not seem to happen for most jobs. Indeed, we find that in general, high-skilled foreign workers tend to be complements for American workers, and thus when there are more H-1B workers, more American jobs are created and wages for Americans grow. Lastly, American companies may lose their edge as global leaders in innovation because they will be outcompeted by other companies in acquiring high-skilled workers across the globe.

The Biden administration has proposed several measures that represent a sharp contrast from the Trump administration's restrictive policy proposals. Most notably, the Biden administration has proposed that it will increase overall, per-year H-1B visa issuance. This type of reform is also supported by researchers Dan Griswold and Jack Salmon, who suggest increasing the H-1B cap to ensure that supply of high-skilled workers more closely meets the demand.[31] Increasing the cap to at least 115,000 (with upper bound of 195,000) would also reflect the number of H-1B visas that were allocated in either the American Competitiveness and Workforce Improvement Act or the American Competitiveness in the 21st Century Act.[32] In another essay, Griswold suggests adding the option of setting visa fees to provide a market test for the need for the foreign workers.[33] Additionally, visa fees (perhaps set at $5,000) would also raise government revenues.

The Biden administration's proposals to increase per-year H-1B visa issuance is a step in the right direction, but another recommendation to reform the H-1B visa system (and to avoid some abuse of the system in the future) is to create a new way for high-skilled workers to enter the United States.

For example, other countries, such as Canada, have a quasi-merit-based system for attracting high-skilled talent, granting permission to individuals who obtain a high number of merit-based points, which are based on factors such as individuals' education levels, work experience, a current job offer from a Canadian company, their language skills, and so on. In this way, individuals who have greater educational credentials, more work experience, greater language skills, and a job offer can obtain enough points to enter Canada as a worker.[34] In fact, Canada has recently reformed its points-based system to give preference to skilled applicants with a job offer over any other applicant.[35] Griswold and Salmon have pointed out that Canada is now becoming the preferred destination for high-skilled talent around the world.[36]

By ensuring that American companies are able to hire high-skilled foreign workers when they meet the necessary prerequisites, reforming the H-1B visa lottery would help US workers and preserve America's edge as a global leader in innovation.

The bipartisan acknowledgment of problems with the H-1B visa program creates an opportunity to reform the system altogether, and the Biden administration's proposal is the correct first step. Congress should now look to countries with more successful high-skilled immigration programs, such as Canada, when designing a better alternative to the H-1B visa program.

ABOUT THE AUTHORS

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NOTES

1. However, there is no cap for H-1B visas for universities, nonprofit research institutions, and governments.
2. See, for example, a proposed bipartisan bill: H-1B and L-1 Visa Reform Act of 2017, S. 180 115th Cong. (2017); Sara Ashley O'Brien, "Bipartisan Bill Aims to Reform H-1B Visa System," CNN, January 25, 2017.
3. Giovanni Peri, Kevin Shih, and Chad Sparber, "The Effects of Foreign Skilled Workers on Natives: Evidence from the H-1B Lottery" (working paper, 2014).
4. Peri, Shih, and Sparber, "The Effects of Foreign Skilled Workers on Natives," 4, 21.
5. Giovanni Peri, Kevin Shih, and Chad Sparber, "STEM Workers, H-1B Visas, and Productivity in US Cities," *Journal of Labor Economics* 33, no. S1 (2015): S225–S255.
6. Competitiveness and Innovation on the Committee's 50th Anniversary with Bill Gates, Chairman of Microsoft, Hearing before the H. Comm. on Science and Technology, 110th Cong. 9–23 (2008) (statement of William H. Gates, chairman, Microsoft Corporation; co-chair, Bill and Melinda Gates Foundation).
7. Jennifer Hunt and Marjolaine Gauthier-Loiselle, "How Much Does Immigration Boost Innovation?," *American Economic Journal: Macroeconomics* 2, no. 2 (2010): 31–56; Stephen G. Dimmock, Jiekun Huang, and Scott J. Weisbenner, "Give Me Your Tired, Your Poor, Your High-Skilled Labor: H-1B Lottery Outcomes and Entrepreneurial Success" (NBER Working Paper No. 26392, National Bureau of Economic Research, Cambridge, MA, October 2019); William R. Kerr and William F. Lincoln, "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention," *Journal of Labor Economics* 28, no. 3 (2010): 473–508; Sari Pekkala Kerr, William R. Kerr, and William F. Lincoln, "Skilled Immigration and the Employment Structures of US Firms," *Journal of Labor Economics* 33, no. S1 (2015): S147–S186.
8. George J. Borjas, *Immigration Economics* (Cambridge, MA: Harvard University Press, 2014); George J. Borjas, "The Labor Demand Curve Is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market," *Quarterly Journal of Economics* 118, no. 4 (2003): 1335–74.
9. George J. Borjas and Kirk B. Doran, "The Collapse of the Soviet Union and the Productivity of American Mathematicians," *Quarterly Journal of Economics* 127, no. 3 (2012): 1143–203; George J. Borjas, "Immigration in High-Skill Labor

Markets: The Impact of Foreign Students on the Earnings of Doctorates" (NBER Working Paper No. 12086, National Bureau of Economic Research, Cambridge, MA, March 2006).

10. Borjas and Doran, "The Collapse of the Soviet Union."

11. David Card and Giovanni Peri, "*Immigration Economics* by George J. Borjas: A Review Essay," *Journal of Economic Literature* 54, no. 4 (2016): 1333–49.

12. Kirk Doran, Alexander Gelber, and Adam Isen, "The Effects of High-Skilled Immigration Policy on Firms: Evidence from the H-1B Visa Lotteries" (NBER Working Paper No. 20668, National Bureau of Economic Research, Cambridge, MA, November 2014); John Bound, Gaurav Khanna, and Nicolas Morales, "Understanding the Economic Impact of the H-1B Program on the U.S." (NBER Working Paper No. 23153, National Bureau of Economic Research, Cambridge, MA, February 2017).

13. Doran, Gelber, and Isen, "The Effects of High-Skilled Immigration Policy on Firms."

14. Bound, Khanna, and Morales, "Understanding the Economic Impact of the H-1B Program on the U.S."

15. Britta Glennon, "How Do Restrictions on High-Skilled Immigration Affect Offshoring? Evidence from the H-1B Program" (NBER Working Paper No. 27538, National Bureau of Economic Research, Cambridge, MA, July 2020).

16. Lee G. Branstetter, Britta Glennon, and J. Bradford Jensen, "The IT Revolution and the Globalization of R&D," in *Innovation Policy and the Economy*, ed. Josh Lerner and Scott Stern (Chicago: University of Chicago Press, 2019).

17. William W. Olney and Dario Pozzoli, "The Impact of Immigration on Firm-Level Offshoring" (Discussion Paper No. 11480, Institute of Labor Economics, Bonn, Germany, 2018); Gianmarco I. P. Ottaviano, Giovanni Peri, and Greg C. Wright, "Immigration, Offshoring, and American Jobs," *American Economic Review* 103, no. 5 (2013): 1925–59.

18. Microsoft, "Microsoft Expanding Canadian Operations in Greater Vancouver Area," press release, July 5, 2007, https://news.microsoft.com/2007/07/05/microsoft-expanding-canadian-operations-in-greater-vancouver-area/.

19. Kevin Peesker, quoted in Microsoft Canada, "Microsoft Announces New Canadian Headquarters in Downtown Toronto," press release, September 11, 2018, https://www.newswire.ca/news-releases/microsoft-announces-new-canadian-headquarters-in-downtown-toronto-692971421.html.

20. This study received a grant from the John Templeton Foundation. See "Startup Innovation: The Role of Regulation in Entrepreneurship," John Templeton Foundation, accessed October 15, 2020, https://www.templeton.org/grant/startup-innovation-the-role-of-regulation-in-entrepreneurship.

21. Interview with CEO for New York City–based technology startup, May 23, 2017. By mutual agreement, the name of founder and the company have been removed to ensure anonymity.

22. Daniel Griswold and Jack Salmon, "Attracting Global Talent to Ensure America Is First in Innovation" (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, March 2019).

23. Kerr and Lincoln, "The Supply Side of Innovation."

24. Anirban Ghosh, Anna Maria Mayda, and Francesc Ortega, "The Impact of Skilled Foreign Workers on Firms: An Investigation of Publicly Traded U.S. Firms" (Discussion Paper No. 8684, Institute for the Study of Labor, Bonn, Germany, November 2014).

25. Rasha Ashraf and Rina Ray, "Human Capital, Skilled Immigrants, and Innovation" (working paper, September 14, 2017).

26. Sheng-Jun Xu, "Skilled Labor Supply and Corporate Investment: Evidence from the H-1B Visa Program" (working paper, June 1, 2018).

27. Hunt and Gauthier-Loiselle, "How Much Does Immigration Boost Innovation?"; Francesc Ortega and Giovanni Peri, "The Causes and Effects of International Migrations: Evidence from OECD Countries 1980-2005" (NBER Working Paper No. 14833, National Bureau of Economic Research, Cambridge, MA, April 2009).

28. Dimmock, Huang, and Weisbenner, "Give Me Your Tired, Your Poor, Your High-Skilled Labor."

29. Stephen Dimmock and coauthors note that their results are different than the ones found in a 2014 paper by Kirk Doran and coauthors on the impact of the H-1B visa program on innovation. Dimmock and coauthors argue that the reason Doran and coauthors did not find an effect of the H-1B visa program on innovation is a selection bias in their methodology. Data from the paper by Doran and coauthors come from 2006 and 2007, when a vast majority of visas were allocated on a first-come, first-serve basis (and only a small fraction of visas were allocated through a lottery). This means that only applications submitted on the day when the quota was reached were subject to the lottery. Dimmock and coauthors argue that companies who sponsor H-1B applications on the day the quota is reached have less need for H-1B workers and that the H-1B applicant might be of lesser importance to the company than the average applicant. They conclude, "Thus, this sample selection could bias against finding significant positive effects [on number of patents] of winning the lotteries."

30. Dimmock, Huang, and Weisbenner, "Give Me Your Tired, Your Poor, Your High-Skilled Labor," 6.

31. Griswold and Salmon, "Attracting Global Talent to Ensure America Is First in Innovation."

32. Griswold and Salmon.

33. Daniel Griswold, "Reforming the US Immigration System to Promote Growth" (Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, October 2017).

34. The United States does have an application for "exceptional talent" through the EB-1 and EB-2 visa programs, but these applicants typically have PhDs and are sought out for research roles, and the application process can be very bureaucratic. Software developers, who are in great demand at technology companies, may not qualify as exceptional talent.

35. Griswold, "Reforming the US Immigration System to Promote Growth."

36. Griswold and Salmon, "Attracting Global Talent to Ensure America Is First in Innovation."