The Costs of the Foreign Student Influx

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The Trump administration's draconian cuts to federal research funding and moves to restrict visas for foreign doctoral students has created a feeling of siege in the academy and segments of the tech industry.

Chinese international students, who disproportionately go into tech fields, have been particularly impacted. Secretary of State Marco Rubio has vowed to "aggressively" revoke visas of some students from that country amid escalating tensions between Washington and Beijing over trade and geopolitics. His announced criteria for these evictions have been vague, and could possibly apply to a broad swath of this student population. On the other hand, as part of a trade deal with China, Trump has also indicated that he will help those Chinese students who do pass muster to find employment in America after graduation.

Critics of the administration's actions have insisted that foreign students and federally funded research are necessary to preserve American competitiveness in science, technology, engineering, and mathematics. They assert that American competitiveness has already been significantly eroded, with the Chinese publishing more papers than the Americans, resulting in lower rankings for the United States in the National Science Foundation (NSF) league tables. Tech industry CEOs, prominent academics, and many commentators contend that limits on foreign students and reductions in federal grants will spell the doom of American tech leadership.

Is the US tech industry's historical success due to the research output of American universities? Are Chinese students in particular "the best and the brightest"? And is China surpassing America in the tech leadership league tables a cause for concern? As a professor of computer science, I have a keen appreciation for the contributions of foreign students to American higher education and industry, definitely including outstanding talents from China. But I've also observed up-close dynamics that many commentators fail to see. Admitting large numbers of foreign students has over the years depressed wages for holders of advanced STEM degrees, thereby discouraging Americans from pursuing doctoral study. Most important, the influx of foreign students and workers has also weakened the distinctive culture that has helped to power American innovation and industry.

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In 1989, the NSF issued a dire warning that America was facing a STEM labor shortage. It did not materialize. Believing that the NSF had been deceptive in its shortage projection, Rep.

Howard Wolpe (D-Mich.) held investigative hearings. Among the documents produced by the hearings was an internal memo from the NSF that fretted that wages for doctorate holders in STEM fields were becoming too high. "It may be in the national interest to actively encourage foreign students" in order to suppress wages, the memo stated. In order to do so, it recommended offering non-monetary compensation in lieu of higher pay, by granting "permanent resident status to foreign students successfully completing Ph.D degrees at US universities." It celebrated the wage-depressing effects of such a policy, boasting that "A growing influx of foreign Ph.Ds into US labor markets will hold down the level of Ph.D salaries."

At the same time, the memo acknowledged that lower wages would discourage US citizens and permanent residents from pursuing degrees in these fields. In effect, pursuing a doctorate in a STEM field would cost American students money that they would otherwise earn by staying in industry, or shifting to other fields. In the memo's words, "the effective premium for acquiring a Ph.D may actually be negative."

In short, the NSF proposed replacing much of the domestic doctoral student population—the memo pointedly noted that this included "our best" domestic students—with international students. And this is exactly what happened. The year after the NSF memo was written, Congress liberalized policies enabling US employers to sponsor foreign nationals, especially Ph.Ds, for green cards. By 2008 industry leaders such as Cisco Systems Vice President for Research Douglas Comer were describing Ph.D study a "financial loser" for domestic students.

Over time, even those involved in STEM fields began to overlook the core importance of these wage effects. In 2020, Moshe Vardi, a computer scientist at Rice University, wrote an article titled, "Where Have All the Domestic Graduate Students Gone?" Vardi, one of the few social critics working in academic computer science, wrote that graduate programs in computer science admit so many international students "mainly because they do not have enough qualified domestic applicants." He lamented the fact that Ph.D study is "simply not attractive enough to US undergrad CS students," but made no mention of the huge gap between the starting salaries of new bachelor's graduates and the "negative wages" of pursuing even a master's degree.

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Many observers have noted the differences between Chinese and American cultures of research. In an interview last year, Philip Wong, a professor of electrical engineering at Stanford University, noted that Chinese researchers in his field are now producing more papers than American scholars, even in top venues. Yet he also observed that American scholars still tend to be "a little bit ahead" in "coming up with new ideas." Although China and other East Asian countries now actually have more papers than the US in top research conferences, as to coming up with "new ideas that have not been discussed before … the US is still the principal place where these new ideas come from. But once these new ideas become known," scientists in East

Asian countries are adept at extending them. "Any new ideas that we come up with … the next week it shows up in China, and they do it better than you," Wong said.

At a May [panel](#) hosted by the Asia Society Policy Institute, the economist Lizzi Lee offered a similar, though more strongly stated, analysis. "If we think about the technologies behind lithium batteries, technologies behind AI, technologies behind automation, those were not moonshot inventions by Chinese scientists and Chinese engineers. But China was able to leverage that technology, localize it, deploy at scale, fast, in a very cost-effective way," she said.

For Lee, this is a reason to reconceive the very meaning of innovation. "Here in the US," she said, "we tend to equate innovation as invention, ideas, really great innovation is worthy of a Nobel prize. But I think China shows us that we need to rethink the definition of innovation itself. Sometimes innovation just looks like relentless iteration." Yet as both Wong and Lee point out, "moonshots" are America's forte, a prized comparative advantage that should not be traded away.

DeepSeek, the Chinese AI firm, is an example of the dynamics Wong and Lee describe. Press reports often characterize the company's LLM as highly innovative, even a "breakthrough." It is indeed an excellent product, and it does signify that China has entered the big leagues in AI. But it is innovative in the sense of tweaking existing technology. DeepSeek's [Group Relative Policy Optimization](#) (GRPO) is seen as its most cutting-edge feature, but it is just an extension of research conducted by others. DeepSeek itself has acknowledged this fact, describing GRPO as "a variant of reinforcement learning (RL) algorithm of Proximal Policy Optimization (PPO)."

Yasheng Huang, the MIT economist and author of *Capitalism With Chinese Characteristics*, has long argued that China's progress is hampered by its *hukou* (戶口) system, which binds each citizen to his orher official residency area. Over the course of 40 years of acquaintance with China and Chinese culture through marriage, language, and professional ties, I have come to believe that the country's educational system equally impedes its potential. Creative thinking is discouraged through the emphasis on rote learning, described as *tian yazi* (填鴨子), or "stuff the duck." Teachers are revered, which sends the message, "Don't question what you are taught." The Chinese character for "imitate" is the same as the one for "learn" (學, *xue*). The math portion of the much-vaunted university entrance exam is extremely formulaic, asking umpteen variations of questions on ellipses.

These cultural practices extend across East Asia, and have contributed to a culture of less innovative research. Only one of the 79 recipients of the Turing Award, "the Nobel of computing," has been Chinese, and there have been none from other East Asian countries. As Lee points out, there are important benefits to China's culture of iteration. But to the extent that

America relies on foreign students in STEM fields, it risks losing its unique culture of innovation. This will impoverish research globally.

What about China's lead over the US in STEM research publication counts? Here, appearances can be deceiving. Even more so than their American counterparts, Chinese researchers are under pressure to publish as many papers as possible. Chinese researchers not only receive major funding and promotion on the basis of their publication in prestigious journals, they also frequently receive cash-per-publication bonuses reaching as high as $150,000, according to one study. As its authors noted, "The purpose of research for some Chinese institutions and scholars is not to advance knowledge, but rather to improve their rankings and indicators, even at the cost of research integrity."

This problem has been acknowledged by official sources in China. "Most Chinese scientific researchers admit they write papers purely for promotion because the country's academic appraisal system favours quantity over quality," a report in the pro-government *South China Morning Post* noted. "The publish-or-perish culture has contributed to the rampant academic misconduct that has emerged in recent years." The story was based on a poll of more than 48,000 researchers conducted by the China Association for Science and Technology, which found that nearly half of researchers believed that authorities appraised scientific research in a way that was "misleading."

Given these facts, the question of which country is "ahead of" the other in AI is fundamentally meaningless. Comparing counts of published papers is not of much value, especially in the Chinese case. And the endless comparisons we see of which company's language learning model is faster than the others, contains more parameters than the others, and so on, are just an issue of who has the latest tweaks. It doesn't mean anyone is achieving fundamental breakthroughs.

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As a result of the NSF's policy changes and the 1990 Immigration Act, the US higher education system has become a key bridge for immigration, especially from East Asia. More recently, India became a major player as well. The route is famous: After earning a bachelor's degree in the home country, one studies for a master's or doctorate in the US, and is then hired and sponsored for a green card by an American firm. This has worked out well for the universities, which receive more tuition while paying students smaller stipends. It has also benefited employers, who could rely on universities to vet potential workers, and then offer them lower wages because they depended on the company for their visas.

This is particularly true for the doctoral programs. Federal research funds paid for the foreign students' tuition, travel, and living expenses, and since NSF policy suppressed growth in

stipends, the universities would attain "more bang for the buck." Note again the point about tuition. Though advocates of the foreign student program argue that foreign students who pay full tuition subsidize American students, in the Ph.D case, it's actually the US taxpayer who is providing that subsidy.

As a rule, employers do not hire doctoral students because of their specific research findings, which tend to be theoretical and arcane, of little or no use to most employers. As one reviewer put it regarding a major AI research conference, "Reviewing BioML ICML papers feels like reading a lot of convoluted papers slapping on some ad hoc method from NLP to solve problems that don't actually exist." Turing Award winner Michael Stonebraker has been even more blunt, referring to the "diarrhea of papers."

Instead, employers rely on doctoral programs as a form of vetting and general training. The prestige of a student's doctoral program provides a highly useful filter, and the Ph.D process itself should, in principle, sharpen the student's analytical and problem-solving skills.

 Why should taxpayers be expected to foot the bill for what amounts to little more than a free vetting system for employers? Similarly, some advocates of funding doctoral students have pointed to the number of PhDs who went on to found successful companies. Again, very nice, but it came from use of the programs as a vetting process, rather than due to the specific research conducted under their auspices.

It should also be noted that in the era before federal government research largesse, it was common for Ph.D students to be supported by teaching assistantships and the like. AI and computer science research is of the pencil-and-paper variety, not the "wet labs," clinical trials and so on in the life sciences. Claims that "Without federal funds, AI Professor X would no longer be able to do research" are highly misleading.

It would likely be better for employers, and cheaper for taxpayers, if firms vetted applicants via internships, after a bachelor's or master's degree. Palantir has been experimenting with this.

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None of this is to say that there should be a ban on foreign students, that doctoral programs should be denied public funding, or that all AI research is useless. Nor do I offer solutions to the complex problems described here. Instead, my goal here is to clarify the tradeoffs policymakers face. Contrary to claims made in the press, the halls of Congress, and by many experts: No, the Chinese are not about to overtake the United States in innovation; no, federal research funding is not key to US power in the tech economy; and no, neither does the foreign student program play

such a role. In fact, the opposite is true: The international student program is suppressing our ability to innovate.

The current political maelstrom will force a re-examination of these issues. No matter how the present chaos regarding research funding and foreign students is ultimately resolved, and regardless of which party prevails in the 2026 and 2028 elections, we will see permanent changes. Given the current interruption to research activities, universities will be forced to revisit their long held policies and procedures for granting tenure. Some, possibly many, foreign students will react to the current visa uncertainty by opting to study in other countries, forcing universities to do more to attract domestic students to doctoral studies. We may be seeing the most significant changes to academia in decades.