

Quantitative Assessment of International Student Value^{*}

Esteban Aucejo[†]

Domenico Ferraro[‡]

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Executive Summary

This report examines the role and impact of international students on the U.S. higher education system, with a focus on enrollment patterns, financial contributions, and broader economic and innovation outcomes. The findings highlight the global leadership of the United States in hosting international students, the financial and academic benefits they bring to universities, and their long-term contributions to the labor market and technological advancement.

In 2024, the United States hosted the largest share of international students worldwide, accounting for 16% of the global total of 6.9 million. Despite this, international students represented only 6% of overall higher education enrollment in the U.S.—a far lower share than in peer OECD countries such as Canada (39%), Australia (31%), and the United Kingdom (27%). Students from India and China dominate the U.S. international student population, mirroring patterns observed in other leading host countries.

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[†]Department of Economics, W. P. Carey School of Business, Arizona State University. Email: esteban.aucejo@asu.edu.

[‡]Department of Economics, Office of the University Economist, and Seidman Research Institute, W. P. Carey School of Business, Arizona State University. Email: domenico.ferraro@asu.edu.

Most international students in the U.S. attend public four-year institutions. Arizona State University, for example, ranked sixth nationally in international student enrollment in 2023. Far from displacing domestic students, international students—who generally pay higher out-of-state tuition rates—help subsidize public higher education. Their tuition revenue has offset declining state appropriations and supported expanded access for domestic students. For example, international-student tuition now rivals state support at ASU—\$360M (FY24) rising to \$397M (FY25) versus \$411M (FY24) and \$409M (FY25) in General Fund appropriations—making international enrollment a core revenue pillar.

Evidence also shows no decline in education quality, as indicated by stable student-faculty ratios across institutions with large international student populations. Higher nonresident enrollment does not crowd out residents overall. However, at flagship public research universities, increases in nonresident enrollment are associated with some reductions in resident enrollment.

The influence of international students and foreign-born graduates extends well beyond campus. Immigrants contribute disproportionately to U.S. innovation, representing 16.5% of patent inventors and generating patents of higher quality and market value on average. Foreign-born workers in STEM fields earn higher wages than their native-born peers and contribute more in taxes, reinforcing their fiscal importance. US technology firms, including Amazon, Infosys, Google, Meta, and Microsoft, rely heavily on the H-1B visa program to retain this talent. In Arizona, Arizona State University and the University of Arizona together form the second largest group of H-1B employers after major private firms, underscoring the central role of universities in attracting and sustaining global talent.

Overall, the evidence indicates that international students not only strengthen the financial health of U.S. higher education but also fuel innovation, economic growth, and global competitiveness.

Highlights

International Students in Higher Education: A Worldwide Comparison

- The U.S. is the top global destination—16% of all international students—yet they are only 6% of total U.S. enrollment (vs. 39% Canada, 31% Australia, 27% UK).
- U.S. international students are STEM-heavy (59%), with the largest cohorts from

India (29%) and China (25%).

International Students in Higher Education: Across Sectors, States, and Institutions

- More than 90% of international students attend four-year institutions; 52% are in public four-years, where they are 6% of total enrollment (vs. 10% at private not-for-profit four-years).
- We find no evidence that larger international cohorts compromise instructional quality, as student-faculty ratios remain stable.
- Increases in nonresident enrollment do not crowd out residents overall. Among flagship public research universities, however, there is some evidence that increases in nonresident enrollment are associated with reductions in resident enrollment.
- ASU ranked 6th nationally for international enrollment in 2023.

The Economic Significance of International Students' Net Expenses

- Using FY 2024-2025 data, international students are a major revenue pillar. ASU booked about \$360M in international-tuition revenue in FY 2024 and just over \$397M in FY 2025. State General Fund appropriations were about \$411M (FY 2024) and \$409M (FY 2025). In short, international-student tuition now roughly matches the state's General Fund support for ASU.
- Net spending by international students (tuition, fees, living, net of aid) rose from \$10B (2003) to more than \$33B (2017); education-related travel exports reached \$50.2B in 2023.
- Arizona is among the top 12 states (more than \$700M in 2017); that year, AZ higher-ed exports exceeded half the value of AZ goods exports to China.

OPT as a Labor Market Bridge

- OPT/STEM OPT is a key study-to-work bridge that boosts the value of U.S. degrees.
- Policy extensions expanded STEM OPT to up to 36 months, driving a 400% increase in STEM OPT participation (2008–2016), making OPT a major enrollment draw.

- OPT helps offset H-1B constraints; each additional international STEM graduate yields modest but positive local skilled employment (approximately 0.23 per master's, 0.08 per bachelor's, 2003–2017).

Contribution to Long-Term Economic Performance

- Immigrants are pivotal to innovation: 16.5% of U.S. inventors and roughly one-fourth of high-quality patents.
- Foreign-born workers in STEM earn higher hourly wages and pay more taxes on average than natives.
- Reliance on H-1B workers is pronounced in the tech sector at the national and state level.
- In Arizona, public universities rank among the largest H-1B employers: ASU is third statewide, and ASU plus the University of Arizona together constitute the second-largest employer cluster—evidence of the system's importance in attracting and retaining international researchers, faculty, and staff.

1. Introduction

Education remains one of the most significant comparative advantages of the United States in the global economy. In 2023, education-related travel exports totaled \$50.2 billion, making this sector the seventh largest U.S. service export and contributing approximately 14% of the nation's services trade surplus.¹ Notably, this figure surpasses the combined export surpluses of major agricultural products such as soybeans and corn. In Arizona, according to the William Seidman Research Institute, the tuition and non-tuition spending of international students generated an estimated \$679 million in state GDP. This is also a uniquely job-intensive export sector: per the [International Trade Administration \(2022\)](#), educational services support more U.S. jobs per \$1 billion of exports than any other sector in the economy. In 2022, the total jobs created by exports from the educational sector only supported approximately 150,000 jobs.

¹Source: U.S. Bureau of Economic Analysis, *Table 2.1. U.S. Trade in Services, by Type of Service* (accessed June 8, 2025).

International students play a central role in driving these exports. Beyond their direct contributions to tuition, fees, and living expenses, they also help sustain and strengthen the local economies' and financial health of U.S. higher education institutions, particularly public universities that have faced declining state appropriations. For Arizona, institutions such as Arizona State University have emerged as key players in attracting international students, thereby supporting both institutional budgets and the broader state economy.

This report provides a comprehensive quantitative assessment of the economic and educational contributions of international students at both the national and the state levels. It builds upon and refines existing estimates, including those provided by the Seidman Research Institute, to offer a clearer picture of the value international students bring to higher education and local economies.

Outline The report is organized as follows. Sections 2 and 3 examine the impact of international students on US higher education institutions, including their role in shaping enrollment patterns, funding structures, and academic outcomes. Section 4 explores their broader economic contributions, with particular attention to their net expenditures and the fiscal implications for Arizona and the nation as a whole. Section 5 delves into the Optional Practical Training (OPT) program. Section 6 focuses on the impact of international students on the U.S. labor market and how they contribute to the development of key economic sectors. Finally, Section 7 provides concluding remarks.

2. International Students in Higher Education: A Worldwide Comparison

The global number of internationally mobile students has increased markedly over the past two decades, as documented by [International Organization for Migration \(2024\)](#) and [Institute of International Education \(IIE\) \(2024\)](#). In 2001, just over 2.2 million students were enrolled in higher education abroad. This figure rose to more than 3.8 million by 2011 and exceeded 6.9 million by 2022—more than tripling since the beginning of the century.

The United States holds a clear comparative advantage in the provision of educational services and remains the leading destination for international students pursuing post-secondary degrees. As shown in Figure 1, the U.S. hosted the largest share of international

students globally in 2024, accounting for 16% of the total and welcoming over 1.1 million learners, followed by Canada (12%), the United Kingdom (11%), and Australia (6%).²

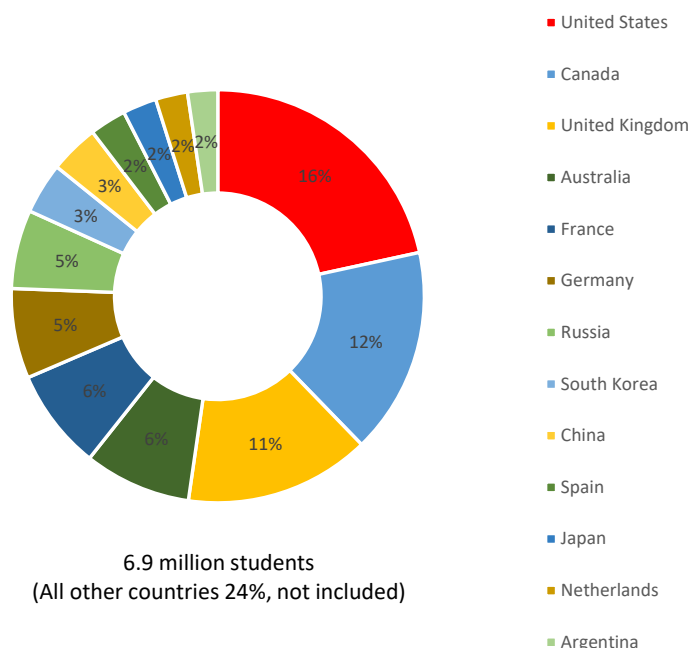


Figure 1: Top Host Destinations for International Students, 2024 ([Institute of International Education \(IIE\), 2024](#))

However, international students make up only a small share of total enrollment in U.S. higher education compared to other countries. As shown in Figure 2, they account for just 6% of total enrollment in the U.S.—a proportion significantly lower than in Canada (39%), Australia (31%), and the United Kingdom (27%). In fact, the U.S. share falls below the OECD average. In terms of recent trends, Figure 3 shows that the share of international students in the U.S. has increased by roughly 1 percentage point in the last decade. Notably, part of the increase observed since 2023 reflects the return of students who had deferred their studies during the COVID-19 pandemic. Taken together, these patterns suggest that international student participation in U.S. higher education has remained broadly stable over the 2016–2024 period.

According to the [Institute of International Education \(IIE\) \(2024\)](#), 30% of international students in the U.S. are enrolled in undergraduate programs, 45% in graduate programs,

²77% of the international students in the US are enrolled in doctoral universities, 13% in master's colleges and universities, 3% in baccalaureate colleges, 5% in associate's colleges, and 2% in special focus institutions ([Institute of International Education \(IIE\) and U.S. Department of State, Bureau of Educational and Cultural Affairs, 2024](#)).

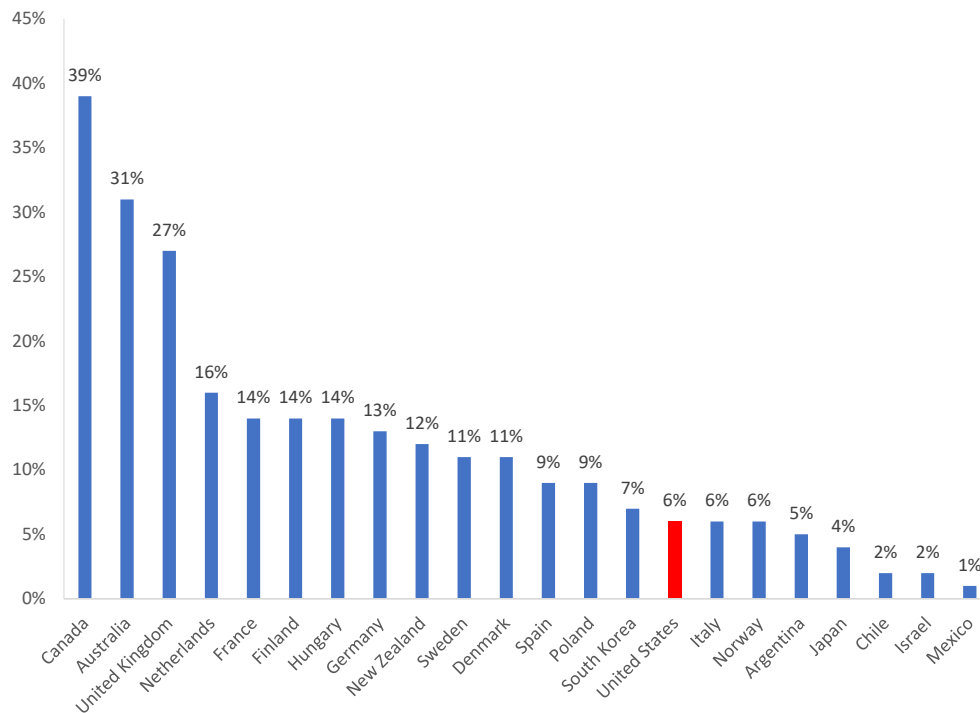


Figure 2: International Students as Percentage of Total Higher Education, 2024 ([Institute of International Education \(IIE\), 2024](#))

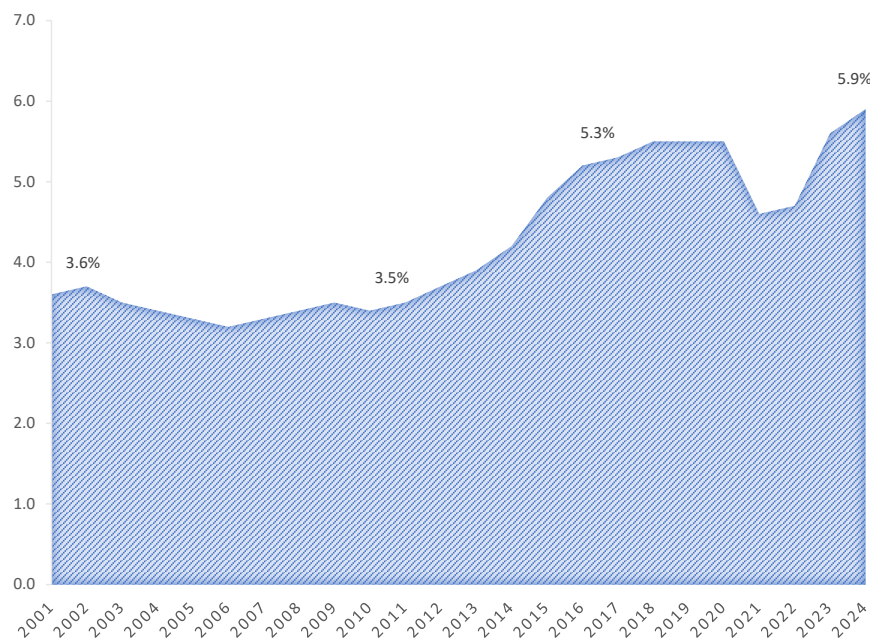


Figure 3: US Trends in International Students as Percentage of Total Higher Education, 2024 ([Institute of International Education \(IIE\), 2024](#))

and the remaining 25% participate in other or unspecified study programs.³ In comparison, the proportion of international students enrolled in undergraduate studies is higher in other major host countries, standing at 42% in the United Kingdom and 47% in Australia. Figure 4 highlights the fields of study pursued by international students globally, illustrating that the United States is among the top three countries where international students predominantly choose STEM fields. Specifically, 59% of international students in the U.S. enroll in STEM programs.

The emphasis on STEM education among international students in the U.S. is highly relevant given the persistent demand-supply gap in STEM talent identified by [National Academies of Sciences, Engineering, and Medicine \(2024\)](#). This ongoing shortfall has implications for maintaining technological leadership, particularly as it affects emerging technologies crucial for sustained innovation and competitiveness. Indeed, international talent plays a substantial role in addressing this gap; in 2021, 50% of the 10 million international graduates working in the U.S. possessed STEM degrees. Furthermore, while foreign-born individuals constitute only 14% of the U.S. population, they represent a notable 25% of the STEM workforce, underscoring their critical contribution to the nation's technological advancement.

Finally, the primary countries of origin for international students attending the four leading destination countries (the U.S., Canada, the United Kingdom, and Australia) are India and China. Figure 5 highlights that Canada hosts the highest proportion of Indian students, representing 46% of its international student population. Meanwhile, Australia has the largest share of Chinese students, comprising 33% of its international student community. In the United States, Indian students account for 29% of international students, closely followed by Chinese students at 25%. To conclude, Figure 6 shows, for completeness, the share of international students in the US by country of origin, highlighting the fact that India and China are outliers when compared to other countries.

In summary, the United States hosts the largest number of international students worldwide; however, these students represent a relatively small proportion of its total higher education enrollment compared to other OECD countries. A notable majority of these international students pursue degrees in STEM fields, positioning them as crucial contributors to U.S. innovation and competitiveness, particularly in critical areas such as artificial intelligence and other emerging technologies. Additionally, while students from

³Approximately 243,000 international students in the academic year 2023/2024 remained in the United States to gain practical work experience through Optional Practical Training (OPT) (Source: Open Doors Report on International Educational Exchange).



Figure 4: Field of Study of International Students, 2024 ([Institute of International Education \(IIE\), 2024](#))

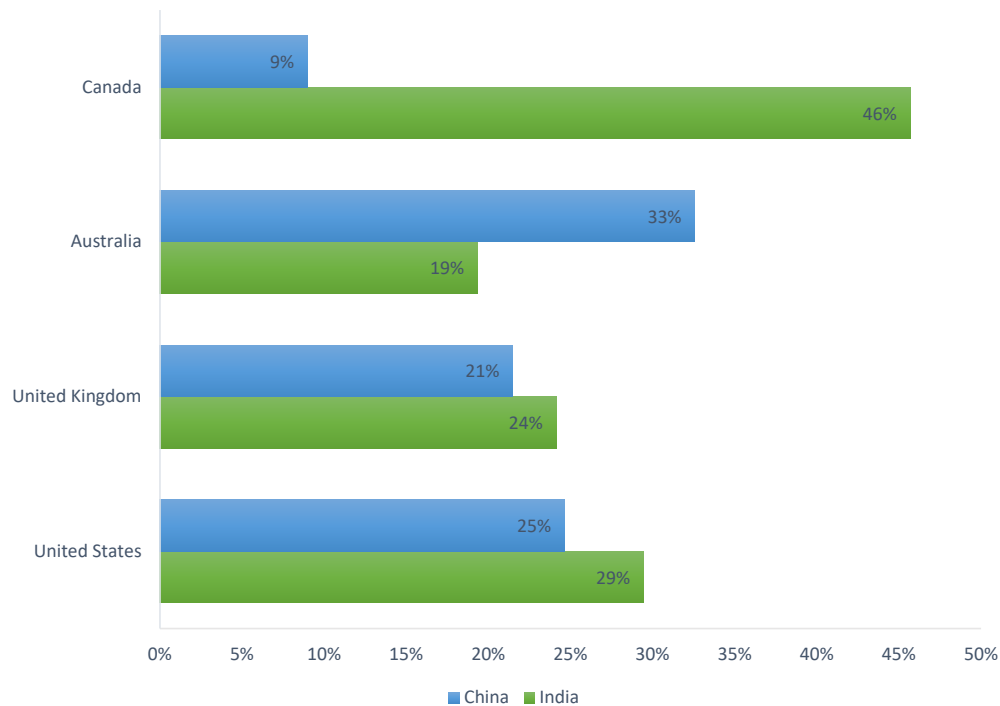


Figure 5: International Students by Country of Origin - Top 2 Countries, 2024 ([Institute of International Education \(IIE\), 2024](#))

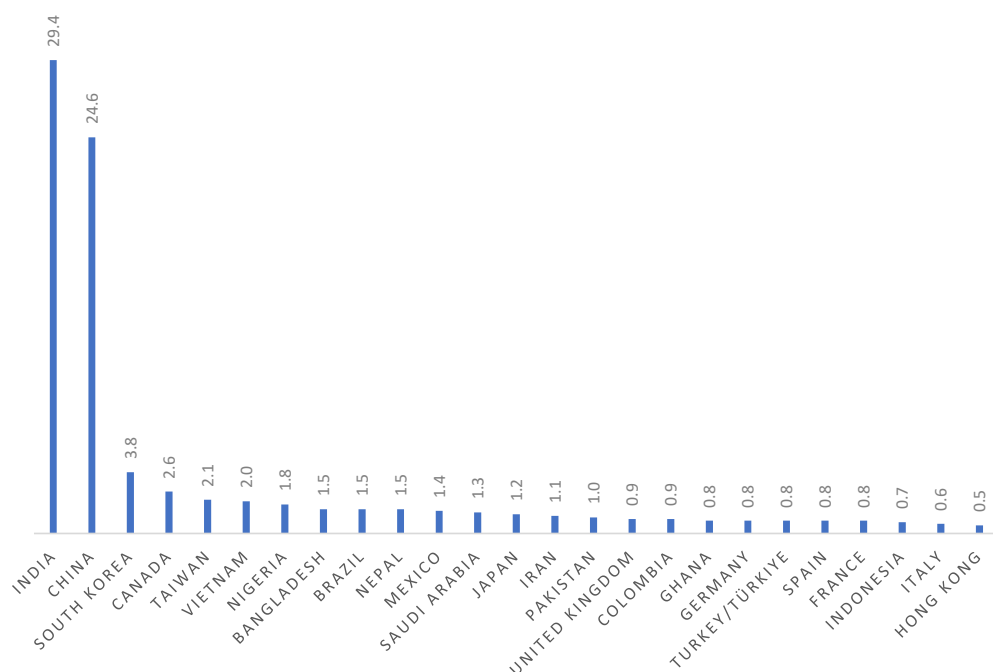


Figure 6: Share of International Students in the US by Country of Origin (Top 25), 2024 (Institute of International Education (IIE) and U.S. Department of State, Bureau of Educational and Cultural Affairs, 2024)

India and China make up over half of the international student population in the U.S., their combined share is similar to those found in other leading host countries such as Canada, the United Kingdom, and Australia.

3. International Students in Higher Education: A Comparison across Sectors, States, and Institutions

First, it is important to understand how international students are distributed across different sectors of higher education in the US. Figure 7 shows that in the Fall of 2023, more than 90% of international students were enrolled in four-year institutions. Specifically, 52.3% were attending public four-year institutions, while 40% attended private not-for-profit four-year institutions. However, because public four-year institutions enroll a significantly larger overall student population, international students accounted for only about 6% of total enrollment in that sector, compared to approximately 10% in the private not-for-profit four-year sector.

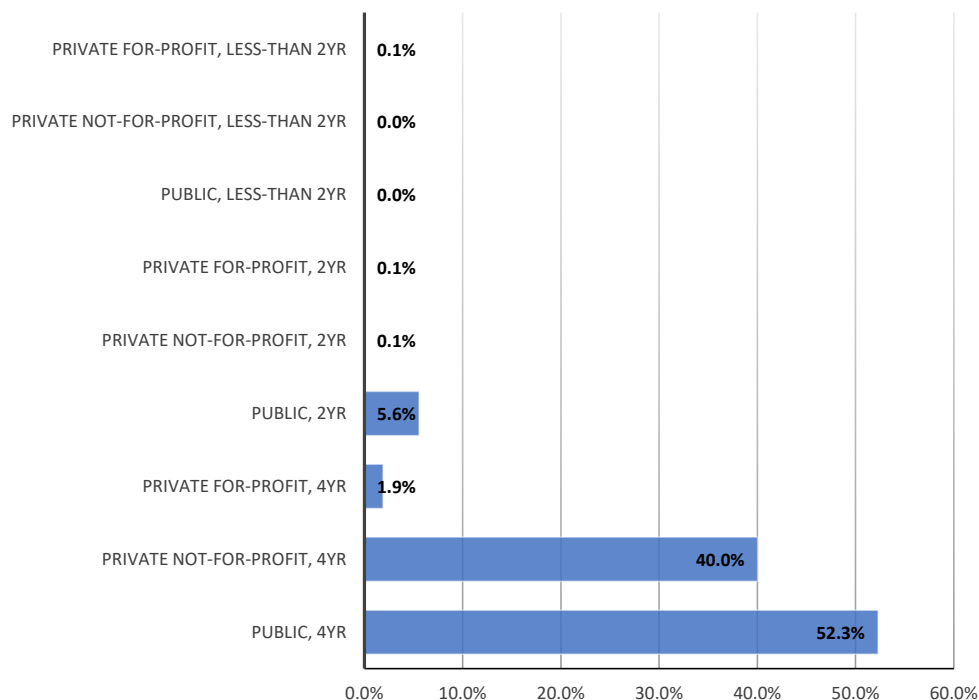


Figure 7: Share of Total International Students by Higher Education Sector, 2023 ([National Center for Education Statistics, 2023](#))

Figure 8 illustrates the distribution of international students across U.S. states. California and New York each enrolled 11% of all international students, followed by Texas and Massachusetts with 7% each, and Illinois and Florida with 5% each. The remaining states each enrolled less than 5% of the total international student population, where Arizona accounts for approximately 2% of the total international student enrollment, ranked in 17th place among all the US states.

However, since the size of the higher education system varies considerably across states, it is also important to consider the share of international students relative to total state enrollment. Figure 9 shows that Massachusetts had the highest proportion of international students in Fall 2023, representing 15% of its total higher education enrollment, followed by the District of Columbia and New York, each with 10%. In contrast, international students in Arizona make up just 3% of total enrollment, placing the state 34th in terms of international student concentration.

Next, we identify the institutions with the highest number of international student enrollments. Figure 10 presents the top 25 institutions by international student enrollment in Fall 2023. New York University ranks first, followed by Columbia University, the University of Southern California, Georgia Institute of Technology, the University of Illinois

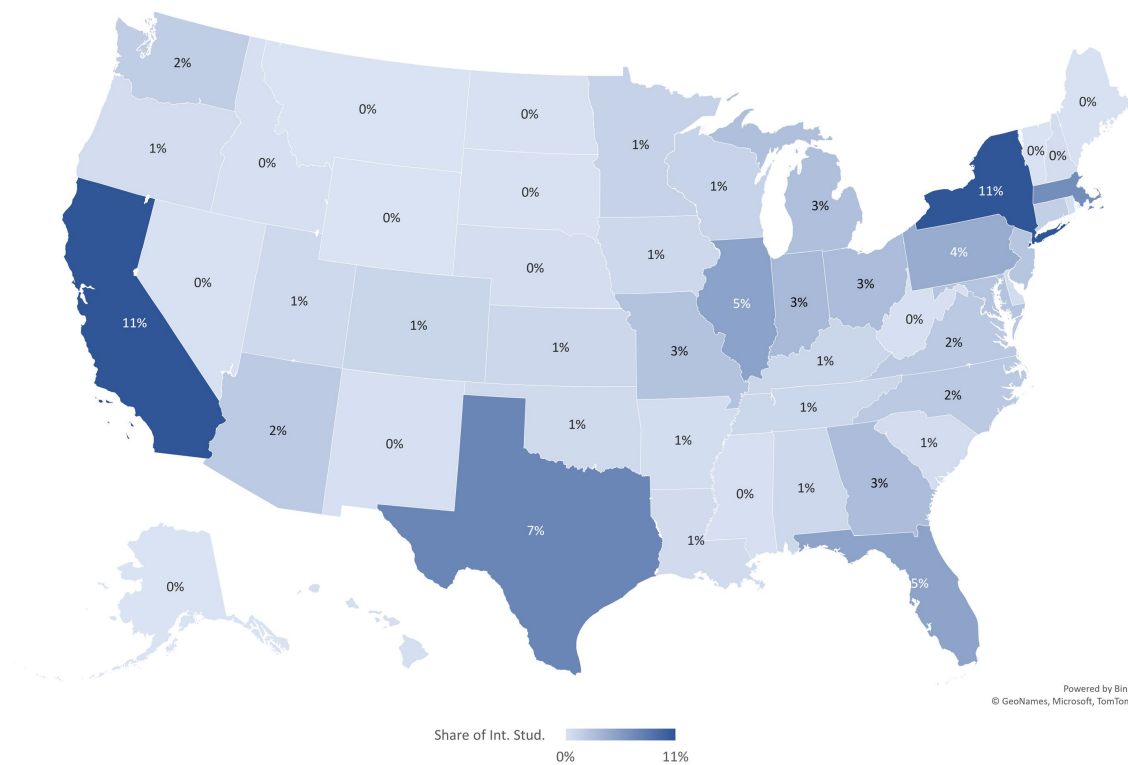


Figure 8: Share of Total International Students Across States, 2023 ([National Center for Education Statistics, 2023](#))

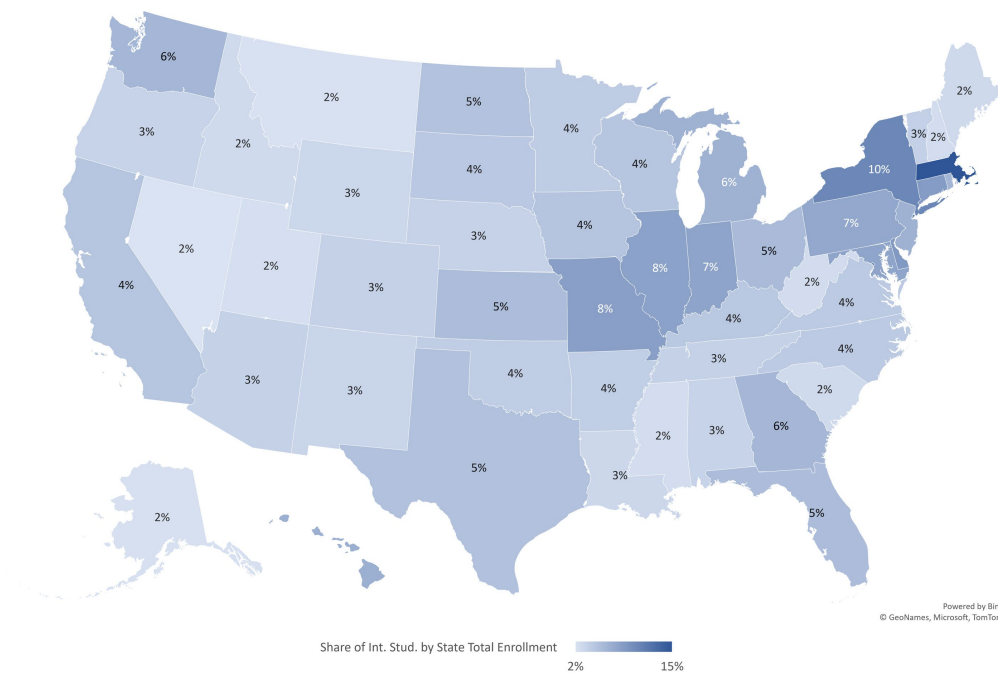


Figure 9: Share of International Students by State Total Enrollment, 2023 ([National Center for Education Statistics, 2023](#))

Urbana-Champaign, and Arizona State University (Immersion). Notably, 14 of the top 25 institutions are public four-year universities, highlighting the important role international students play in supporting these institutions. When adjusting enrollment figures by the size of the state population, Arizona State University rises to second place among this group of institutions (see Appendix Figure A.1).

Figure 11 displays both the number of international students and their share of total enrollment at the top five institutions in Arizona with the highest international student populations in Fall 2023. Arizona State University (Campus Immersion) enrolled the largest number of international students—approximately 3.5 times more than the second-largest institution in the state, the University of Arizona. In terms of proportion, international students made up 16% of total enrollment at ASU Immersion, compared to 7% at the University of Arizona.

To conclude, we present preliminary evidence on the potential relationship between the share of international students enrolled at each institution and the student-faculty ratio in four-year public colleges. A positive correlation could suggest that an increasing presence of international students may affect the quality of education received by domestic students by increasing the student-faculty ratio. However, as shown in Figure 12,

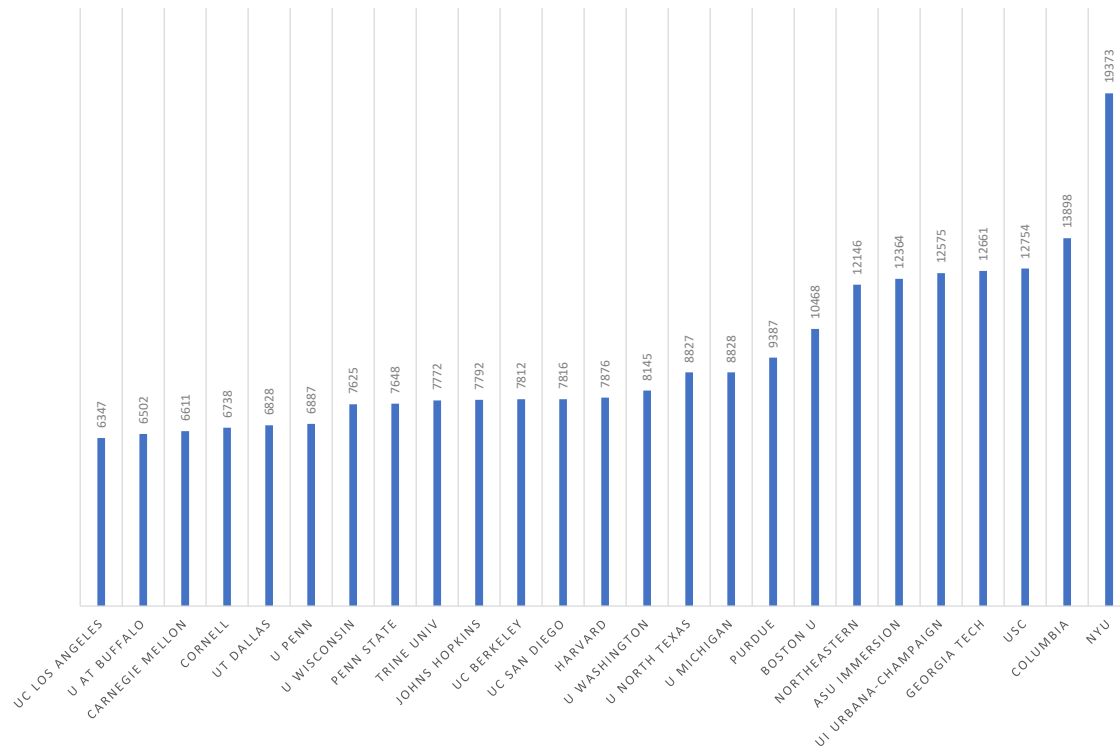


Figure 10: Number of International Students Top 25 Institutions, 2023 ([National Center for Education Statistics, 2023](#))

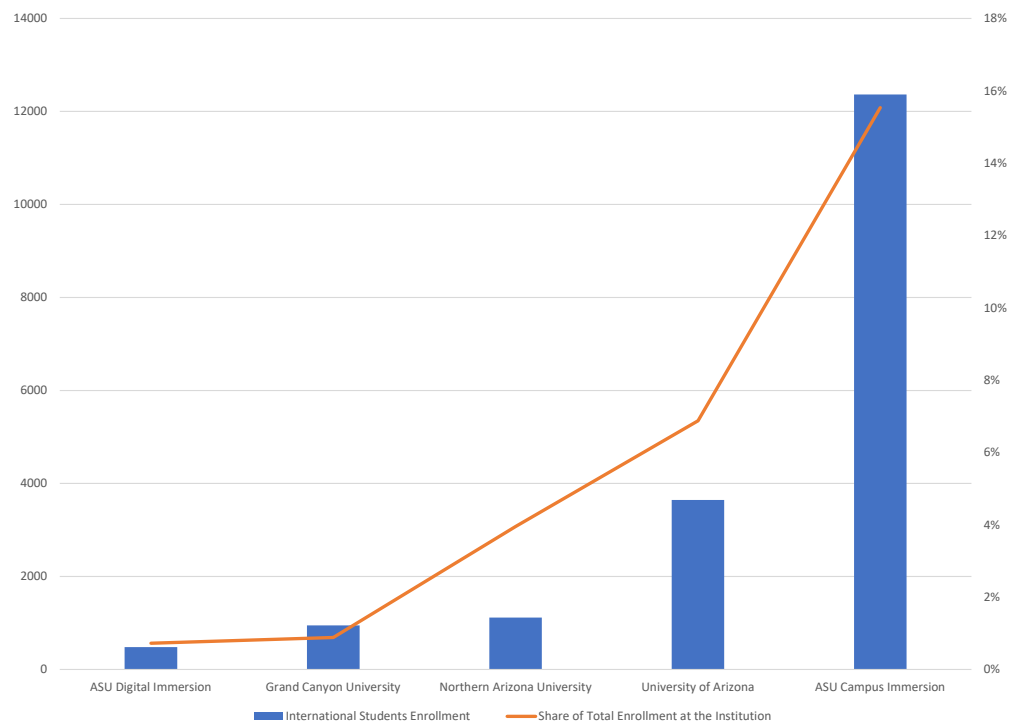


Figure 11: Number and Share of International Students Top 5 Institutions in Arizona, 2023 ([National Center for Education Statistics, 2023](#))

which focuses on four-year public institutions, there appears to be no raw association between these two variables, implying that a higher proportion of international students does not necessarily correspond to a higher student-faculty ratio. Notably, Arizona State University (ASU) maintains a student-faculty ratio that is very close to the average for all public four-year institutions, despite enrolling a relatively large proportion of international students. In the next section, we discuss whether the empirical evidence shown in the economics of education literature supports the presence of crowd-out effects.

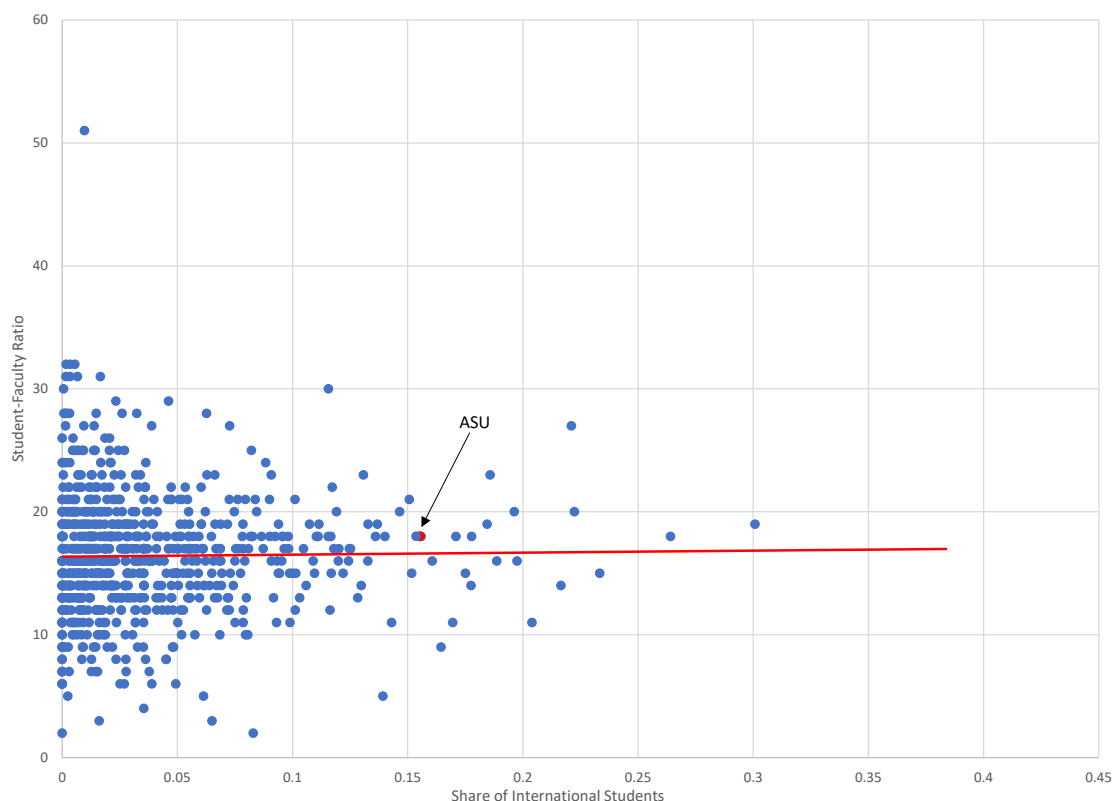


Figure 12: Student-Faculty Ratio vs. International Students as Share of Total Enrollment by Institution (Only Four-year Public Institutions), 2023 ([National Center for Education Statistics, 2023](#))

In summary, the data indicate that the majority of international students are enrolled in public four-year institutions across the US. Notably, Arizona State University ranks sixth nationally in the total number of international students enrolled. This underscores ASU's prominent role in attracting and serving international students, positioning it as a notable outlier both nationally and within the state.

3.1. Crowd-out or Cross-subsidize?

The number of international students in the U.S. higher education has sparked debate over whether these students displace native-born applicants or, instead, enhance domestic education by contributing vital resources (Belkin, 2017). With state appropriations declining, many public universities have come to rely on the higher tuition paid by foreign students—who typically pay full out-of-state rates—as a critical revenue source that helps subsidize educational opportunities for in-state students (Bound et al., 2019, 2020). Critics, however, worry that growing international enrollment may crowd out U.S. students, particularly in highly sought-after programs, or alter the composition of the domestic student body. In this section, we aim to synthesize findings from recent research on these issues, focusing on the fiscal impact of international students, their role as substitutes for lost public funding (especially at research universities), and potential displacement (or lack thereof) of domestic undergraduates and graduates (including heterogeneous effects by subgroup and institution type).

3.1.1. Shifting Revenue Sources: The Decline of Appropriations and Rise of Tuition

A consistent finding across studies is that international students have become an important financial pillar for U.S. higher education, helping institutions weather cuts in government support. Public research universities, in particular, have leveraged foreign enrollment to offset declining state funding. Empirical evidence shows that a 10% reduction in state appropriations roughly leads to a 16% increase in international undergraduate enrollment at public research campuses. No similar surge occurred at less-research-intensive public institutions facing state cuts, underscoring that research universities uniquely turned to global demand as a budgetary stopgap. The tuition revenue brought by international students partially compensates for lost state funds, reducing the need to raise in-state tuition or cut instructional spending (Bound et al., 2020). Indeed, the evidence strongly suggests that without access to foreign students, public flagships would have been forced into larger class size increases or tuition hikes for residents (Bound et al., 2019, 2021). Many universities now derive a significant share of their tuition income from overseas students, highlighting their growing fiscal reliance on international enrollment (Bound et al., 2021). On average, the share of tuition revenue from international students rose from less than 5 percent in 2005 to 12 percent in 2016, with some institutions exceeding 30 percent (Chen, 2021).

This dynamic effectively means that international students serve as financial substitutes for dwindling public funding. Research universities capable of attracting out-of-state and international applicants tapped into a much larger pool of full-paying students abroad than exists domestically. In contrast, less-selective public colleges (with more local markets) could not as readily replace lost subsidies with foreign tuition. Notably, states appear to recognize this substitution effect: universities that enroll more international undergraduates tend to receive smaller state appropriations, whereas those institutions less able to draw foreign tuition see relatively higher state support (Chen, 2021). In sum, at research-intensive universities especially, foreign students have functioned as a vital revenue substitute for shrinking state dollars, enabling these institutions to maintain operations and even expand access without unduly burdening in-state students financially.

If we focus on Arizona, according to the [State Higher Education Executive Officers Association \(SHEEO\) \(2025\)](#), total education revenue per full-time equivalent (FTE) student at Arizona's public higher education institutions averaged in 2024 \$16,414, which represents approximately 85% of the national average of \$19,092. Total education revenue includes both education appropriations (state and local funding) and net tuition revenue, providing a measure of the financial resources available to support instruction, excluding capital expenditures and medical programs. Although this figure marks an increase of 40.8% in Arizona since 1980 in constant adjusted dollars, it falls short of the 46.7% increase observed at the national level over the same period. A closer look at the components of total revenue reveals striking differences in the evolution of funding sources between Arizona and the national average. Education appropriations per FTE in Arizona declined by 26.9% between 1980 and 2024, dropping from \$9,179 to \$6,707 (in constant adjusted dollars).⁴ In contrast, the national average increased by 13.5%, rising from \$10,296 to \$11,683 (in constant adjusted dollars). To compensate for the decline in state support, Arizona institutions have become increasingly dependent on tuition revenue. Net tuition revenue per FTE in Arizona rose dramatically—from \$2,478 in 1980 to \$10,175 in 2024 (in constant adjusted dollars)—an increase of 310.7%. Nationally, net tuition revenue also increased, but to a lesser extent: from \$2,721 to \$7,510 (in constant adjusted dollars), or 176.0%. This shift highlights Arizona's growing fiscal reliance on student tuition as a primary revenue source and the increasing importance of international students in contributing to tuition revenues.

⁴Constant dollar figures include Cost of Living Index (COLI), Enrollment Mix Index (EMI), and Higher Education Cost Adjustment (HECA).

3.1.2. Enrollment Effects: Cross-Subsidization vs. Crowd-Out

Despite fears that international students might displace domestic students, the empirical evidence to date indicates little to no crowding-out in aggregate. In fact, international enrollment growth often coincides with expanded domestic enrollment, consistent with a cross-subsidization mechanism. Public universities appear to use the tuition surplus from foreign students to create additional seats for locals. According to [Chen \(2021\)](#), for every one international undergraduate added, public institutions increased in-state freshman enrollment by about two students, on average, and ultimately awarded roughly 1.4 more degrees to domestic students within six years. Universities achieving large foreign inflows were able to keep resident tuition lower and increase instructional expenditure. These findings directly contradict the notion of a fixed number of seats: instead of a zero-sum game, international student revenue allowed colleges to enlarge the pie. Similarly, at the graduate level, studies find either neutral or positive impacts on domestic student numbers. [Shih \(2017\)](#) reports that a 10-student increase in foreign graduate enrollment ultimately raised domestic graduate enrollment by roughly 8 students, a result he links to universities reinvesting foreign tuition to fund additional slots for U.S. students. This “crowd-in” effect was especially evident at public schools that prioritize in-state education. By contrast, private universities showed no significant change in domestic enrollment when foreign numbers rose, suggesting they may instead channel international revenues into other objectives rather than enlarging class size.

Therefore, a key insight is that cross-subsidization tends to occur when institutions value domestic enrollment and have capacity to expand. Public universities, which often charge resident tuition below cost and thus have an incentive to subsidize local students, exhibit the strongest crowd-in effects ([Shih, 2017](#)). This study further shows that the positive impact in graduate programs comes mainly from full-paying foreign master’s students. Increases in foreign master’s enrollment are associated with significant gains in domestic student numbers. This suggests that the tuition paid by international master’s students helps fund additional enrollment opportunities for American students, particularly in programs that rely on subsidies.

While the overall picture shows no general crowding-out of native-born students, earlier studies did find heterogeneous effects across domestic subgroups and fields. For instance, [Borjas \(2004\)](#) observed that in graduate programs, increases in foreign student numbers were associated with lower enrollment of native White male students, even as enrollment of native females and minorities actually rose slightly. His estimates sug-

gested that 10 additional international grad students might reduce White male enrollment by about 4, but simultaneously increase the number of domestic female, Asian, and Hispanic students by on the order of 2 each. However, his overall estimates indicate that no aggregate crowd-out effect is found for native students when looking at total enrollment. Finally, he shows that in public universities, crowd-out effects are generally weaker and mostly insignificant. However, in private universities, the crowd-out effect is stronger, particularly for white native students. Using a broad sample of public research, [Curs and Jaquette \(2017\)](#) find that increases in nonresident enrollment do not crowd out residents overall. At prestigious public research universities, however, growth in nonresident enrollment is associated with reductions in resident enrollment.

[Shih \(2017\)](#) helps reconcile these mixed findings: when universities have the incentive and ability to expand, foreign students do not simply displace natives; they help *fund* the enrollment of additional domestic students. However, if an institution were instead to treat foreign tuition revenue as a means to enhance per-student resources or selectivity without expanding seats, some displacement at the margin could occur (e.g., if a fixed cohort size is maintained, an admitted international student might take the place of a lower-quality domestic applicant).

In practice, the evidence of the 2000s-era enrollment boom indicates that most public institutions chose expansion over substitution, as the net effect was increased total enrollment of U.S. students. Importantly, universities did not lower admissions standards to accommodate more paying foreigners. [Chen et al. \(2023\)](#) and [Chen \(2021\)](#) show that incoming international students often have stronger academic credentials (especially in math) than the average domestic student, and their presence actually coincided with higher average SAT scores in the freshman class. Thus, the data do not support a scenario where less-qualified foreign students crowd out qualified natives; if anything, institutions added high-caliber international students and used the revenue to enroll more locals across the board.

One nuanced effect is in the realm of students' field of study. A recent study ([Anelli et al., 2023](#)) finds that an influx of international peers in STEM majors can influence native-born students' major choices: some U.S. students shifted out of STEM fields and into other (potentially higher-earning) majors in response to greater foreign student concentration in STEM classes. This suggests a form of indirect crowd-out within specific fields – domestic students may avoid fields where competition (academic or later labor market) from foreign talent is intense. However, this is not a reduction in overall educational attainment;

rather, it is a reallocation of domestic students across majors. There is little evidence that international undergraduates or graduates prevent Americans from pursuing higher education altogether. In fact, the increase in foreign enrollment in the 2000s was accompanied by greater six-year graduation rates for domestic students at the same universities (Chen, 2021), indicating that broadened access and improved resources benefited U.S. student success.

3.1.3. Recap

Across the studies reviewed, a clear narrative emerges: international students generally **subsidize, not crowd out, domestic students** in U.S. higher education. The influx of foreign students in the past two decades provided a timely financial lifeline to many universities, particularly public research institutions facing public disinvestment. That revenue has been used to expand educational access for U.S. residents and maintain academic quality. Fears of natives being displaced have not materialized in aggregate; instead, domestic enrollment and degree attainment have often grown alongside international enrollment. Where displacement effects appear, they tend to be narrow (e.g., in specific graduate programs or majors) and are often offset by broader gains. In sum, international students have become integral to the financial and intellectual ecosystem of U.S. higher education, helping universities fulfill their educational mission in an era of fiscal constraints while contributing to the country's human capital development. Policymakers and educators would do well to recognize that, far from crowding out American students, international students often enable more Americans to be educated and help sustain the excellence of U.S. higher education.

4. The Economic Significance of International Students' Net Expenses

In 2023, education-related travel exports totaled \$50.2 billion, making education the seventh-largest U.S. service export and contributing approximately 14% of the nation's services trade surplus.⁵ Arizona alone accounted for an estimated \$885 million of this total, according to preliminary data from the Seidman Research Institute. A key driver of this

⁵U.S. Bureau of Economic Analysis, *Table 2.1. U.S. Trade in Services, by Type of Service* (accessed June 8, 2025).

economic activity is the spending by international students. As shown in Figure 13, their net contributions—defined as tuition, fees, and living expenses after subtracting institutional financial aid—increased from \$10 billion in 2003 to over \$33 billion by 2017 ([Education Research Section, Princeton University, 2025](#)).⁶ To put this into perspective, the combined export surpluses of two of America’s leading agricultural products—soybeans (\$22.7 billion) and corn (\$13.8 billion)—reached roughly \$36.5 billion in 2024, underscoring the outsized role of education in the U.S. trade balance. Finally, it is worth noting that in 2017, international students pursuing bachelor’s degrees accounted for over half of total net expenditures (51%), followed by those enrolled in master’s programs (37%), associate degree programs (7%), and doctoral programs (5%).

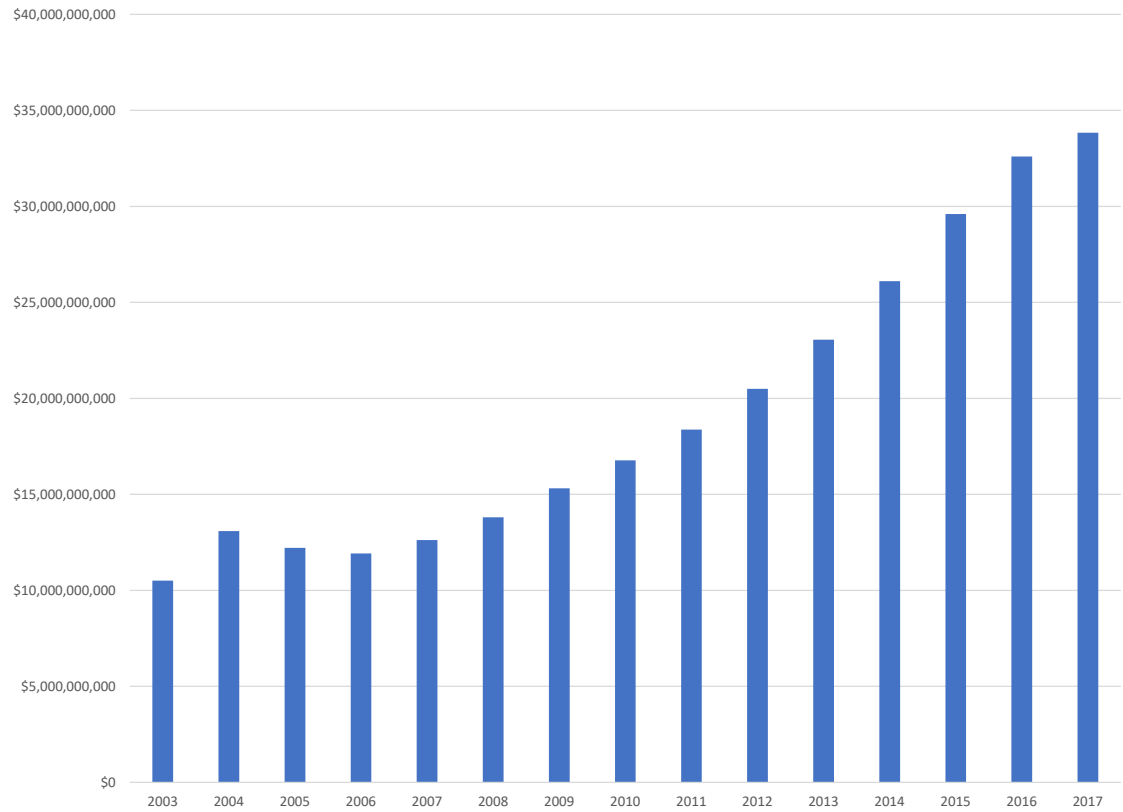


Figure 13: Net contributions of International Students in the US (defined as tuition, fees, and living expenses minus institutional financial aid), 2017 (in constant 2019 dollars using the higher education price index) ([Education Research Section, Princeton University, 2025](#))

Figure 14 breaks down international students’ net higher education expenses by state in 2017. California led the nation with \$5,888 million in net spending by international

⁶More recently, international students contributed approximately \$40 billion to the U.S. economy in 2024 ([NAFSA, 2024](#)).

4.1. Financial Impact of International Students on AZ Universities

Figure 15 illustrates the net expenses of international students across the top four major universities in Arizona in 2017, revealing the outsized role of Arizona State University (ASU) in this sector. ASU alone generated \$456 million in net expenses—about 64% of the state’s total—with bachelor’s students contributing the largest share (\$298 million, or 42% of Arizona’s total), followed by master’s (\$133.68 million, 19%) and doctoral students (\$24 million, 3%). The University of Arizona ranks a distant second, accounting for \$157 million (22% of the state’s total), with most of that from bachelor’s students (\$118 million, 17%) and smaller contributions from master’s (\$25 million, 4%) and doctoral students (\$14 million, 2%). Northern Arizona University and Grand Canyon University play smaller roles, contributing 5% and 1% of total net expenses, respectively, largely driven by undergraduate enrollment.

Taken together, these figures highlight Arizona State University’s (ASU) central role in Arizona’s higher education export economy. ASU’s capacity to attract and serve large numbers of international students at both undergraduate and graduate levels makes it the state’s primary driver of tuition, fees, and related spending from abroad—solidifying its position as a key player in maintaining Arizona’s standing in the global higher education market. Notably, when we consider that General Fund appropriations for all ASU campuses in FY 2017 totaled approximately \$305 million, while international students generated \$456 million in net expenses and contributed around \$275 million in gross tuition and fees, it is clear that these students play a major role in supporting ASU’s finances. Using more recent figures, international students’ revenue contribution has grown even larger in importance. ASU recorded about \$360 million in international tuition in FY 2024 and just over \$397 million in FY 2025, versus \$411 million and \$409 million in state General Fund appropriations. In effect, international-student tuition now parallels the level of taxpayer support.

Applying Chen et al. (2023)’s estimate—that a 10% increase in the F-1 visa refusal rate reduces new international enrollment by 12.2%—to ASU’s 2017 figures implies a substantial revenue shortfall. Specifically, a 12.2% drop in international students would translate into roughly \$55.6 million in lost net contributions (i.e., 18% of general fund appropriations) and about \$33.6 million in forfeited gross tuition and fees (i.e., 11% of general fund appropriations). In summary, we can conclude that international students play a significant role in financing higher education in Arizona. For FY 2025, the same calculation yields a \$48.4 million revenue loss—about 12% of state appropriations.

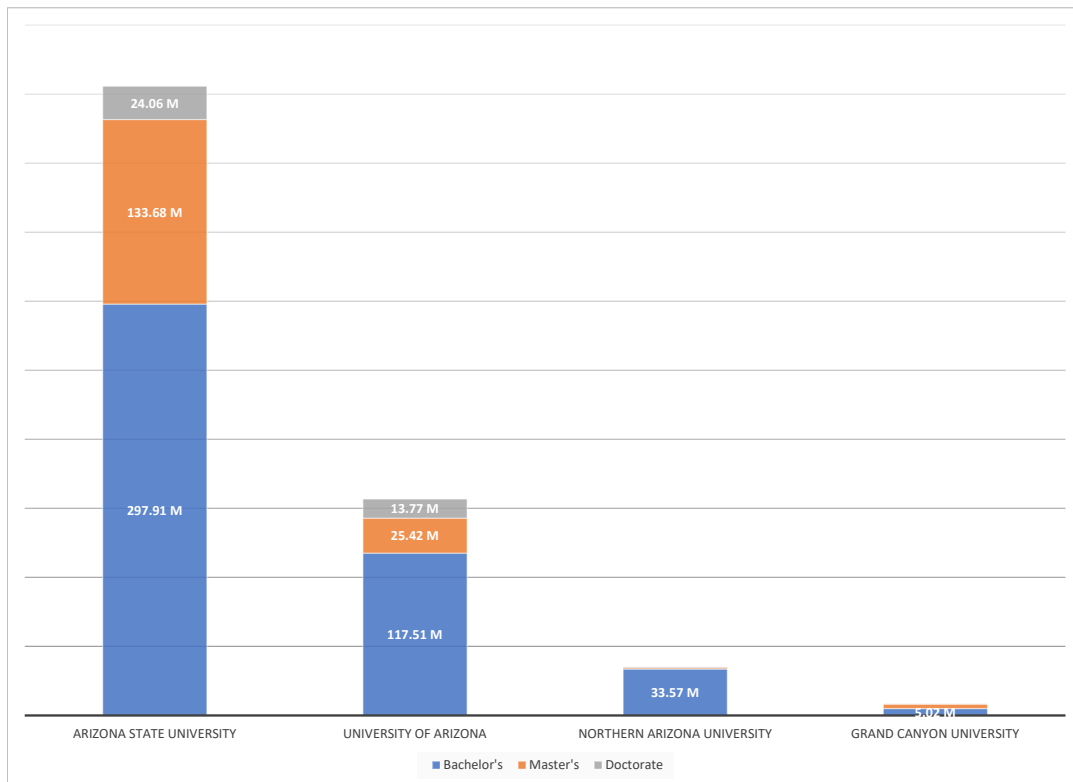


Figure 15: Net contributions of International Students by Institution—defined as tuition, fees, and living expenses minus institutional financial aid), 2017 ([Education Research Section, Princeton University, 2025](#))

5. OPT as a Labor Market Bridge

The Optional Practical Training (OPT) program significantly bridges U.S. higher education and the skilled labor market, especially within STEM disciplines. By permitting international students to work temporarily in the U.S. following graduation, OPT considerably enhances the value of American degrees, effectively converting academic credentials into viable career opportunities. Policy expansions in 2008 and 2016 notably increased OPT duration for STEM graduates—from an initial 12-month period to up to 36 months—leading to a dramatic 400% rise in STEM OPT participation between 2008 and 2016 ([Ruiz and Budiman, 2018](#)). For students from countries such as India and China, where the appeal of U.S. employment opportunities in technology and engineering remains strong, this extended work authorization period represents a substantial attraction.

Critically, OPT compensates for the stringent restrictions and limited availability of H-1B visas, positioning it as a strategic pathway for international students aiming for employment in the United States ([Zavodny, 2019](#)). Many international students increasingly regard OPT not merely as an academic extension but as a crucial foothold into the U.S. workforce. This perception significantly boosts enrollment in STEM programs, with universities effectively offering both academic training and potential entry points into competitive U.S. labor markets.

Despite its attractiveness, the transition of international students into permanent U.S. employment remains comparatively limited. According to [Beine et al. \(2023\)](#), each additional international student completing a master's or bachelor's degree from 2003 to 2017 resulted, on average, in only 0.23 and 0.08 additional skilled workers entering the U.S. labor force, respectively—with significant effects exclusively within STEM fields. In contrast, native graduates exhibit substantially higher local employment retention rates, with 50–67% employed in the same metropolitan area of their university—nearly five to six times greater than the transition rate for international bachelor's degree holders ([Conzelmann et al., 2023](#)). This disparity underscores the constraints within the current U.S. visa and immigration systems, highlighting OPT's strengths as well as its limitations in retaining global talent.

The economic implications of OPT, while generally positive, are nuanced. Economists highlight potential equity concerns, suggesting that the increased availability of foreign-born STEM workers through OPT and related programs may exert downward pressure on wages or discourage domestic student enrollment in these fields. Studies indicate

moderated wage growth in computer science and technology occupations due to the influx of international graduates through OPT and H-1B visas (Bound et al., 2021). However, these concerns must be balanced against significant innovation and productivity gains driven by foreign-born talent, which substantially bolster U.S. competitiveness in global technology sectors.

Data from the American Community Survey clearly illustrate the disproportionate representation of foreign-born individuals in STEM occupations: 21.9% of foreign-born individuals with at least a bachelor's degree are employed in STEM fields, nearly double the 12.2% rate among their native-born counterparts. This highlights OPT's critical role as a conduit for highly educated international talent into sectors essential for innovation and economic growth.

Additionally, the OPT program signals globally that a U.S. education offers pathways to employment in a premier labor market, reinforcing international student enrollment, particularly in engineering and computer science. This enrollment not only financially sustains U.S. higher education institutions but also enriches their academic environments and research capacities.

With intensifying global competition for high-skilled international workers, nations such as Canada and Australia offer streamlined pathways from education to employment, increasingly competing directly with the U.S. model (Bound et al., 2021). Maintaining programs like OPT, therefore, remains strategically essential to sustaining America's edge in attracting and retaining global STEM talent.

The next section explores in greater depth how international students contribute to long-term economic performance, with a specific emphasis on their role in scientific advancement and innovation.

6. Assessing International Students' Contribution to Long-Term Economic Performance

Innovation is widely recognized as the key driver of sustained economic growth, with research and development (R&D) forming its foundation.⁹ International students, especially those in STEM graduate programs, frequently participate in university-based research and transition into R&D-intensive sectors, contributing directly to technological

⁹R&D comprises creative work undertaken on a systematic basis to expand the stock of knowledge and to apply this knowledge to develop new products, processes, or services.

progress and productivity gains. Therefore, beyond their immediate role in the labor market through programs like OPT, international students play an increasingly vital part in the long-term economic performance of the United States—particularly by contributing to the U.S. innovation ecosystem.

To provide some context, Figure 16 illustrates the ratio of R&D spending to GDP across OECD countries. This measure includes R&D conducted by domestic firms, universities, research institutions, and government agencies—regardless of whether it is funded domestically or from abroad (excluding domestic funds spent on R&D outside the country). As shown, only a handful of countries surpass the 3% threshold. In 2023, the United States allocated 3.4% of its GDP to R&D, significantly above the OECD average of 2.7%, and ranking third behind Israel (6.3%) and South Korea (5.0%), while closely trailing Sweden (3.6%) and Japan (3.4%).

These high levels of R&D investment underscore the critical need for a steady pipeline of research talent—much of which is supplied by international students. Next, we explore in more detail how international workers contribute to scientific output, innovation metrics such as patents and publications, and the broader U.S. knowledge economy.

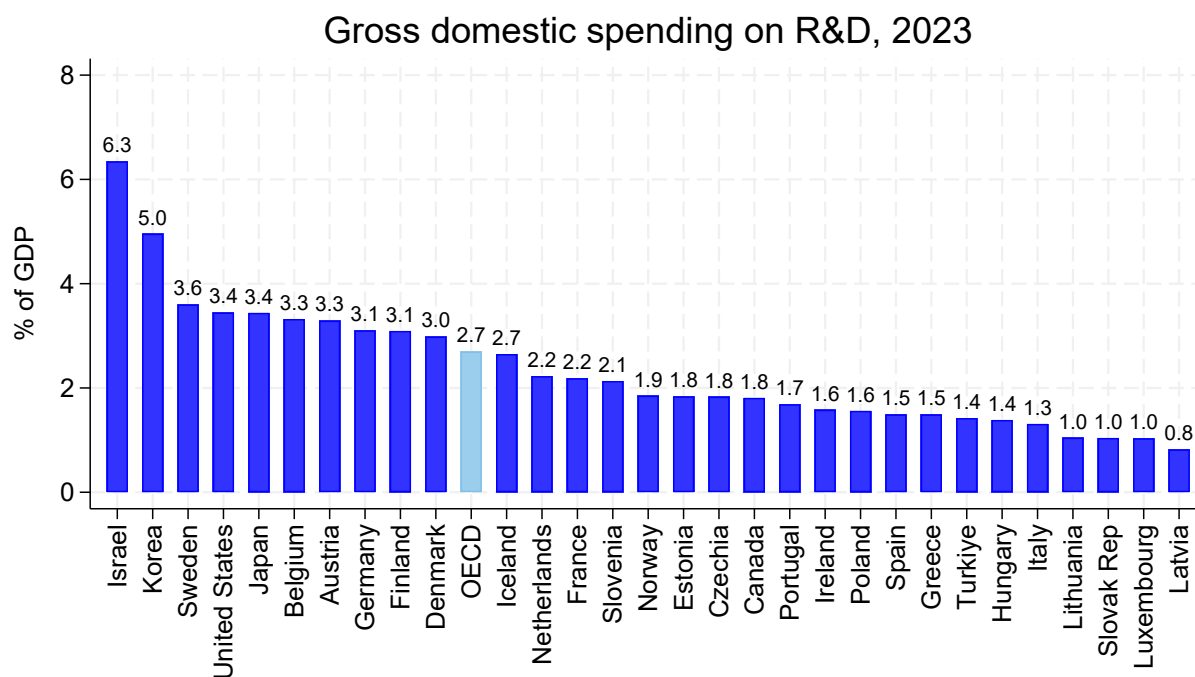


Figure 16: R&D as percentage of GDP. See <https://www.oecd.org/en/data/indicators/gross-domestic-spending-on-r-d.html>.

6.1. U.S. Patents & Innovation

Patents are a measure, albeit imperfect, of innovative output. Imperfect because many companies across industries do not patent at all, relying on secrecy as a means to protect their inventions from the competition (Mezzanotti and Simcoe, 2023). Figure 17 shows the number of triadic patent families based on OECD data for 2022. Triadic patent families are a set of patents filed at three of these major patent offices: the European Patent Office (EPO), the Japan Patent Office (JPO) and the United States Patent and Trademark Office (USPTO). Triadic patent family counts are attributed to the country of residence of the inventor and to the date when the patent was first registered. In 2022, the total of the OECD was 53,157. Japan ranks first with 16,659. The U.S. ranks second with 15,000. And following with a large margin, Germany and South Korea with 4,546 and 4,015, respectively.

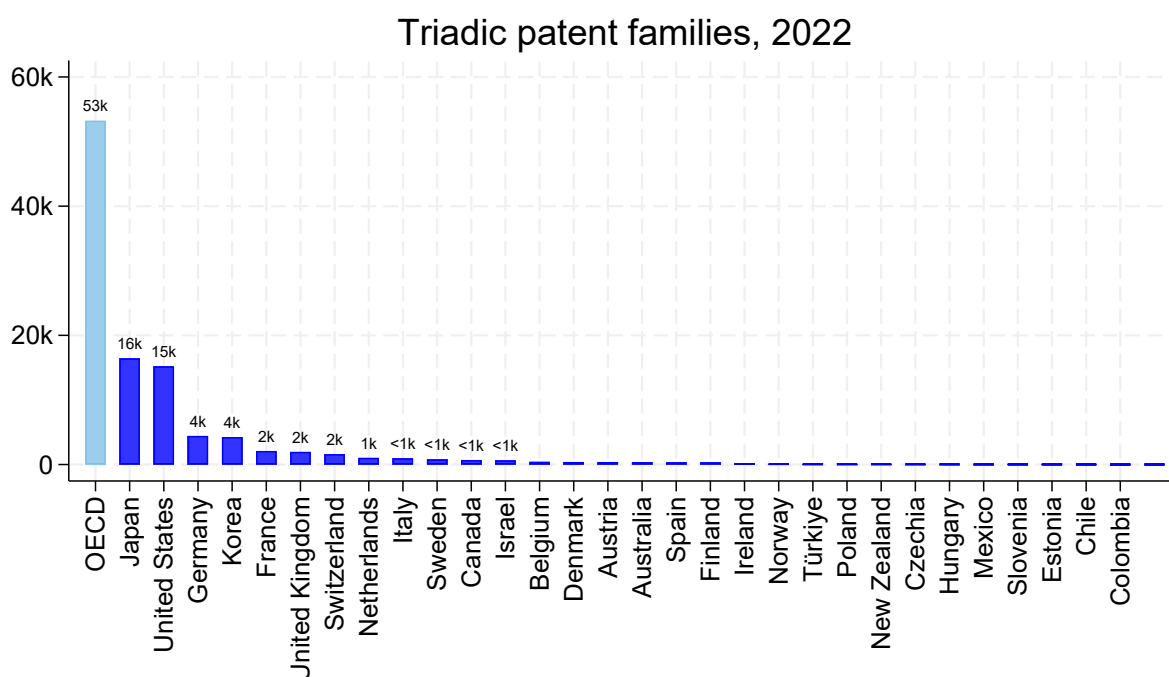


Figure 17: Number of triadic patent families. Triadic patent families are a set of patents filed at three of these major patent offices: the European Patent Office (EPO), the Japan Patent Office (JPO) and the United States Patent and Trademark Office (USPTO). Triadic patent family counts are attributed to the country of residence of the inventor and to the date when the patent was first registered. See <https://www.oecd.org/en/data/indicators/triadic-patent-families.html>.

A substantial share of this innovation can be traced back to the contributions of immi-

grants, who form a vital part of the U.S. innovation ecosystem. According to [Bernstein et al. \(2022\)](#), immigrants were responsible for nearly 25% of high-quality patents (as measured by citation counts and market value, see Figure 18), and their shares of patents and citation-weighted innovation output exceeded their representation in the inventor pool. Similarly, [Hunt and Gauthier-Loiselle \(2010\)](#) find that immigrants patent at roughly twice the rate of natives, a difference largely driven by their disproportionate attainment of science and engineering degrees.

Academic institutions are a key channel for this pipeline. [Stuen et al. \(2012\)](#) show that each additional doctoral student in science and engineering adds roughly 0.9 journal articles per year, indicating how graduate education—and a significant share of it coming from international enrollees—directly generates research output. These findings underscore how high-skilled immigration—particularly through graduate education—directly supports the knowledge production that fuels economic growth.

Taken together, this evidence reinforces a consistent narrative: international students in U.S. colleges—particularly in STEM fields—form the education-to-innovation pipeline that fuels patenting, research, firm formation, and ultimately long-term economic growth. Their journey from tuition-paying student to innovation-producing professional underscores the dual value they bring: immediate economic contributions through spending and tuition, followed by sustained contributions via labor market productivity and inventive output.

6.2. Productivity Differences Between Natives and Foreign-Born

Previous sections documented that foreign-born individuals in the U.S. are more likely than natives to pursue STEM degrees and graduate education, and to contribute disproportionately to scientific innovation. A natural question that follows is whether these educational and innovative advantages are reflected in labor market outcomes, particularly in earnings per hour worked.

We define labor productivity using hourly wages, calculated as annual labor earnings divided by total hours worked. This measure captures the economic value workers generate per hour and allows us to compare wage differences between nativity status, fields, and educational attainment.

National Patterns Figures 19 and 20 report average hourly wages and labor earnings in 2023 across three occupational categories—non-STEM, STEM-related, and core STEM—for

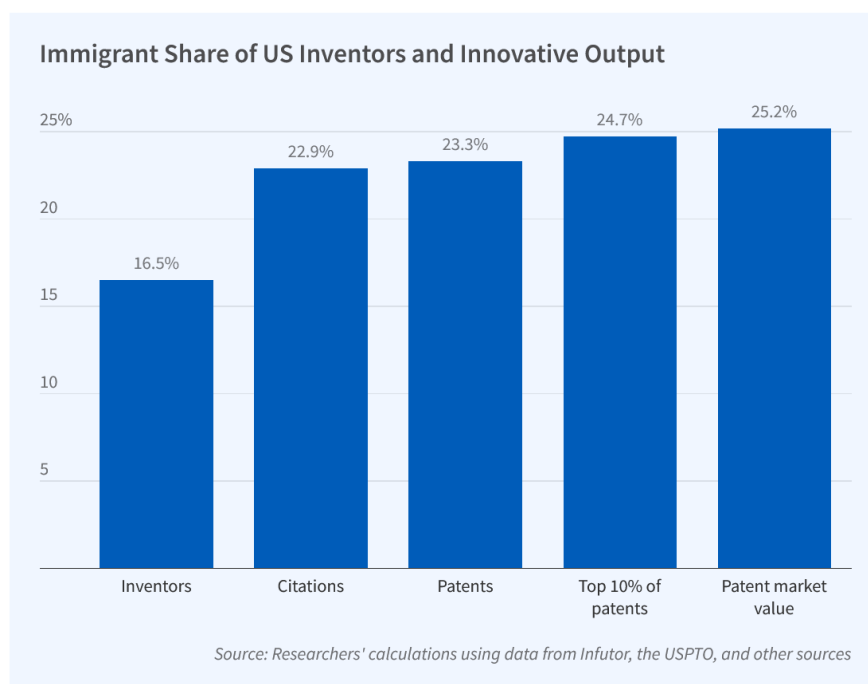


Figure 18: Contribution of immigrants to U.S. innovation ([Bernstein et al., 2022](#))

native and foreign-born workers, with a breakdown by educational attainment (bachelor's degree or higher). A key finding emerges clearly: foreign-born workers with a bachelor's degree in STEM and STEM-related fields (where foreign-born individuals tend to concentrate) earn higher average hourly wages than similarly educated natives. This hourly wage premium also manifests itself as differences in overall labor earnings as foreign-born tend to earning not only more per hour but also overall.

Age Composition and Wage Profiles One potential concern is that wage differences may simply reflect age or experience differences between native and foreign-born workers. To address this, Appendix Figures [A.3–A.6](#) display hourly wages across four age groups: 22–34, 35–44, 45–54, and 55–64. The results suggest that while younger foreign-born workers (ages 22–34) earn slightly less on average than natives, the pattern reverses by age 35, with foreign-born workers consistently earning more per hour across older age groups—especially in STEM occupations.

Interpreting Wage Gaps: Selection and Specialization The observed wage premiums for foreign-born workers—especially in STEM—likely reflect a combination of factors. First, foreign-born workers are disproportionately represented in high-paying technical occupations due to educational self-selection and immigration policies that favor skill-

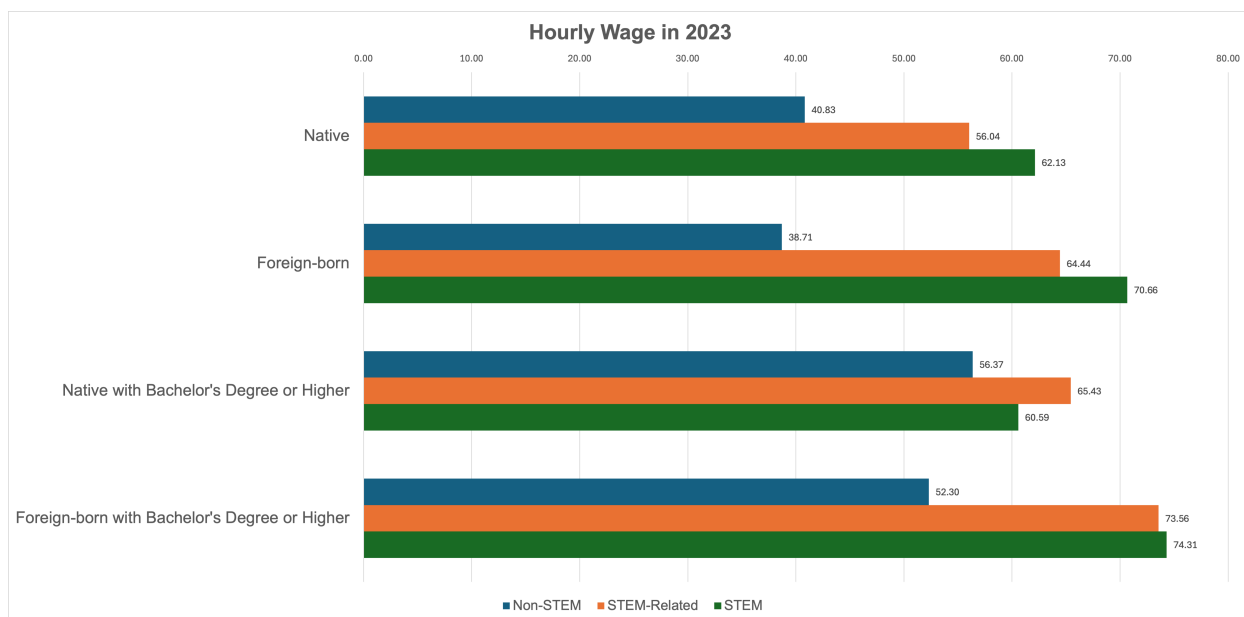


Figure 19: The figure shows the hourly wage in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>).

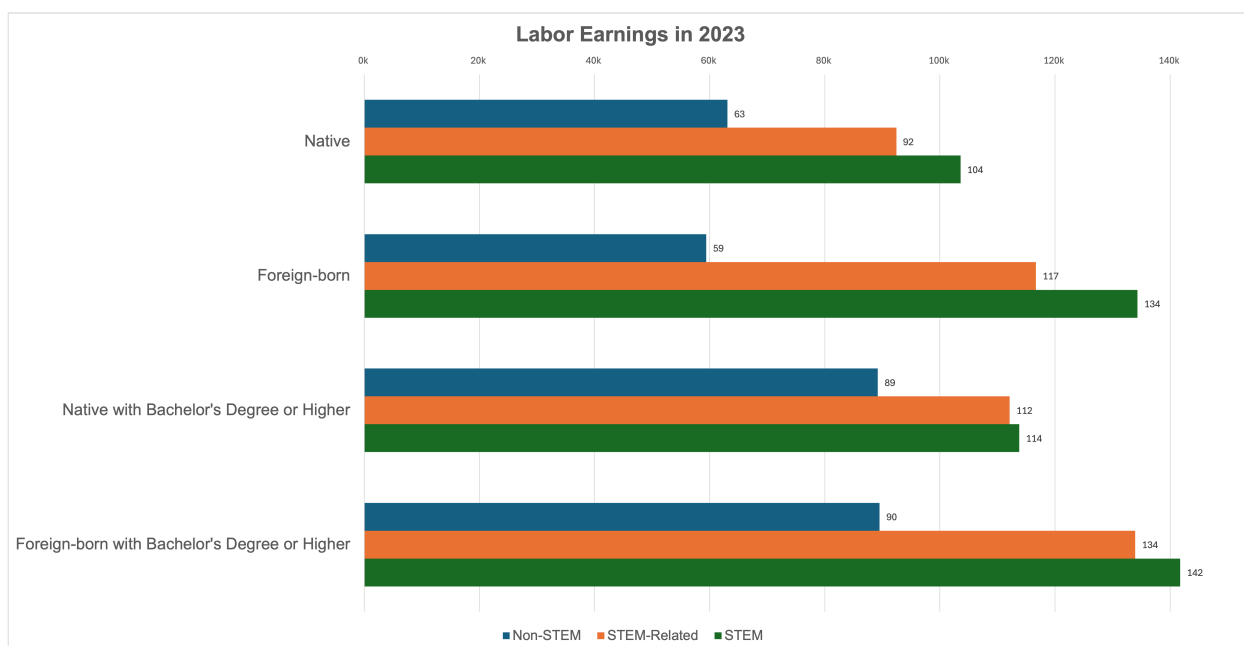


Figure 20: The figure shows the labor earnings in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>).

based admissions (e.g., H-1B and OPT pipelines). Second, as previous sections have shown, foreign-born individuals are more likely to hold advanced degrees in science and engineering, which command higher market returns.

Although hourly wages are not a direct measure of productivity, they reflect the labor market's valuation of worker output. The evidence presented here suggests that foreign-born workers—especially those in STEM—are not only successfully integrating into the U.S. labor market, but are also commanding wages on par with or above those of their native-born peers, particularly once experience and educational attainment are taken into account.

6.3. Implications for Federal and State Tax Revenues

The previous subsection showed that foreign-born individuals tend to earn higher hourly wages and have greater overall labor earnings. This subsection examines the implications of these findings for federal and state tax revenues. A central component of the analysis is the estimation of individual tax liabilities using data from the American Community Survey (ACS)—the same sample used to compute average wages and earnings. We calculate tax liabilities at the individual level using TAXSIM, a publicly available program developed by the National Bureau of Economic Research (NBER). TAXSIM computes federal and state income tax liabilities from survey data and returns results within seconds.

Figure 21 displays the average tax liabilities, including federal and state, of native and foreign-born individuals. Unsurprisingly, given their earnings, foreign-born individuals tend to pay more in taxes on average than their native-born counterparts. In STEM occupations, the average tax liability for foreign-born workers is \$44,500, compared to \$30,000 for natives. In STEM-related occupations, the respective averages are \$40,600 and \$29,600. These differences are substantial. Another way to highlight this gap is through ratios: in STEM fields, foreign-born individuals pay 1.5 times more in taxes than natives; in STEM-related fields, the ratio is slightly lower, with foreign-born workers paying 1.4 times as much.

Among individuals with at least a bachelor's degree, foreign-born workers have higher average tax liabilities than natives—\$47,200 vs. \$34,200 in STEM occupations, and \$46,700 vs. \$37,200 in STEM-related occupations. This means that, on average, foreign-born individuals pay approximately 1.4 times more in taxes than natives in STEM fields, and 1.25 times more in STEM-related occupations.

A similar pattern emerges when examining state tax liabilities. Figure 22 presents

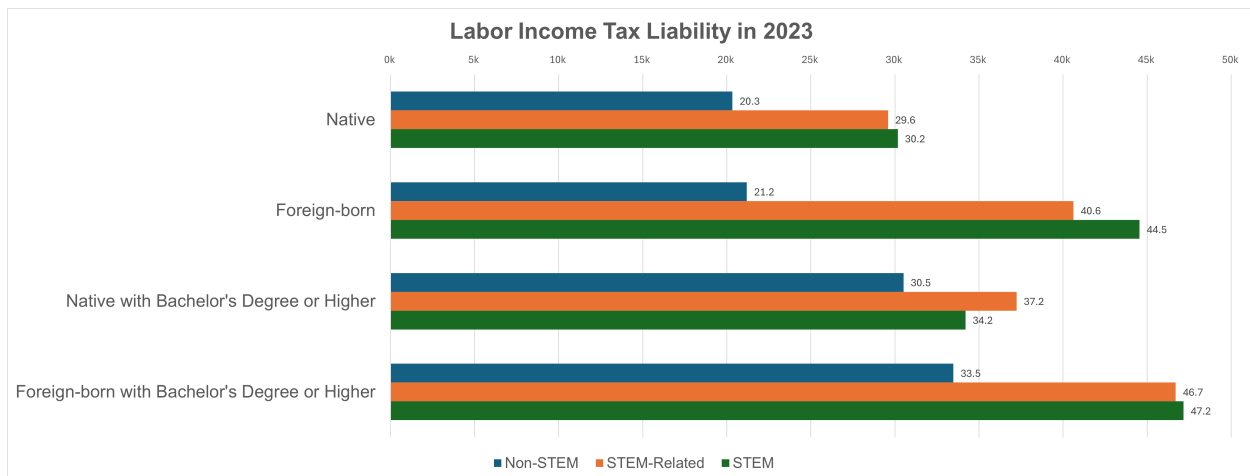


Figure 21: The figure shows average tax liabilities at the *federal* and *state* level in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>). We use NBER TAXSIM to calculate tax liabilities.

average state-level tax payments, showing that foreign-born individuals pay significantly more than natives. In STEM occupations, foreign-born workers pay an average of \$11,800, compared to \$7,600 for natives. In STEM-related occupations, the respective averages are \$10,100 and \$7,200.

In conclusion, foreign-born individuals, on average, contribute more in taxes to both federal and state governments than native-born individuals. International students, in particular, not only help fund university systems across the country but also bolster tax revenues after graduation. This contribution occurs for two main reasons: first, they disproportionately enter STEM fields, which generally offer higher wages than non-STEM occupations; and second, within STEM occupations, they tend to earn higher wages on average, which naturally results in greater tax liabilities.

6.4. H-1B Visa Program

The H-1B visa program has been a cornerstone of the U.S. strategy to integrate foreign-born, highly educated workers into the domestic labor market. Established under the Immigration Act of 1990, the H-1B program allows U.S. employers to temporarily hire foreign professionals in “specialty occupations” that require the theoretical and practical

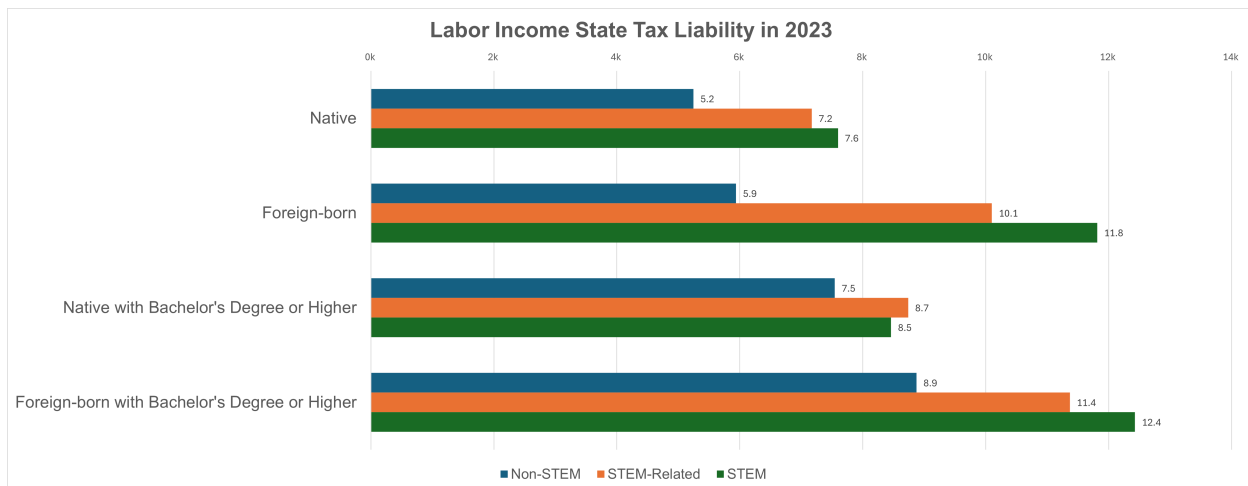


Figure 22: The figure shows average tax liabilities at the *state* level in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor’s degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>). We use NBER TAXSIM to calculate tax liabilities.

application of specialized knowledge, typically at the bachelor’s degree level or above.¹⁰

This visa pathway plays a critical role in extending the educational-to-employment bridge initiated by OPT. It enables U.S.-trained international graduates to remain in the country beyond the temporary post-graduation period, particularly in fields like computer science, engineering, and finance where employer demand for talent exceeds domestic supply.

We analyze next public data from the U.S. Citizenship and Immigration Services (USCIS), which provides detailed insights into H-1B visa petitions and approvals, highlighting the industries and employers most reliant on international expertise.¹¹

6.4.1. Who Hires the Most H-1B Workers?

Table 1 identifies the leading employers of H-1B beneficiaries in 2024, underscoring the significant reliance of prominent tech firms on foreign-born STEM talent. Companies such as Amazon, Infosys, Google, Meta, and Microsoft feature prominently, collectively accounting for thousands of approved H-1B visas. These corporations leverage interna-

¹⁰For a complete description of H-1B eligibility and program rules, see USCIS: <https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-1b-specialty-occupations>.

¹¹Data accessed from the USCIS H-1B Employer Data Hub: <https://bigdataanalyticspub-sb.uscis.dhs.gov/views/H1BEmployerDataHub-Final/H1B-EmployerDataHub>.

tional professionals to support critical business operations, foster technical innovation, and maintain global competitive advantage.

Table 1: 2024 H-1B Beneficiaries—Top 10 Employers All Industries

Rank	Employer (Petitioner)	Beneficiaries Approved
1	AMAZON COM SERVICES LLC	9,265
2	INFOSYS LIMITED	8,140
3	COGNIZANT TECHNOLOGY SOLUTIONS US	6,321
4	GOOGLE LLC	5,364
5	TATA CONSULTANCY SERVICES LIMITED	5,274
6	META PLATFORMS INC	4,844
7	MICROSOFT CORPORATION	4,725
8	APPLE INC	3,873
9	HCL AMERICA INC	2,953
10	IBM CORPORATION	2,906

This reliance further illustrates the strategic importance of the H-1B visa in reinforcing the broader ecosystem linking U.S. higher education, international talent, and the innovation-driven economy. Additionally, the prominence of international employees in leading tech corporations underscores the program’s role in maintaining America’s competitive edge in global technology and innovation landscapes. The concentration of H-1B beneficiaries within these firms highlights both the scale of the demand for specialized skills and the limited availability of such talent domestically, emphasizing the continued necessity for policies that attract and retain high-skilled international professionals.

The broader significance of international talent in U.S. innovation and leadership is further demonstrated by the number of foreign-born CEOs educated. Approximately 11–12% of Fortune 500 CEOs and around 14% of Fortune 100 CEOs are foreign-born, many of whom studied at prominent U.S. universities. Notable examples include Sundar Pichai (CEO of Alphabet Inc., educated at Stanford University), Satya Nadella (CEO of Microsoft, educated at the University of Wisconsin–Milwaukee and the University of Chicago), and Arvind Krishna (CEO of IBM, who holds a PhD from the University of Illinois Urbana–Champaign). These leaders exemplify the powerful potential of U.S. higher education and visa policies to shape global business leadership and reinforce America’s innovative and competitive position internationally.

6.4.2. State Spotlight: Arizona’s Growing Demand for Skilled Foreign Labor

Arizona’s technology sector has evolved from regional prominence to national significance, fueled by rapid workforce expansion and substantial private and public investment. Between 2018 and 2023, Phoenix’s tech workforce grew by 17%, reaching over 108,000 workers. In 2022 alone, software-related jobs in Phoenix rose by 13.4%. Arizona’s semiconductor boom is a major driver of this growth. Taiwan Semiconductor Manufacturing Company (TSMC) is constructing a three-fab campus north of Phoenix—currently the only leading-edge fab in the U.S.—with total planned investment reaching \$65–100 billion and projected employment of 6,000 high-tech workers. In early 2025, Arizona State University was chosen as the site of a flagship CHIPS-funded R&D and packaging facility, further cementing Arizona’s central role in the national semiconductor strategy.

Beyond semiconductors, Arizona’s broader innovation ecosystem is expanding across fields like optics and photonics. The “Optics Valley” in southern Arizona—anchored by the University of Arizona—employs around 7,700 workers, and contributes approximately \$4 billion annually to the state economy (Phoenix Business Journal). Greater Phoenix has also emerged as one of the top three U.S. metro areas for semiconductor-related patent filings (Greater Phoenix Economic Council). These developments underscore why Arizona’s tech boom is creating fertile ground for high-skilled immigration and why programs like OPT and H-1B—along with U.S. university training—are so central to meeting the region’s growing talent needs.

Although California leads the nation in total H-1B approvals, Arizona shows meaningful reliance on foreign STEM talent. Table 2 presents the top H-1B petitioners in Arizona. Intel leads by a wide margin, with over 2,500 approved petitions, reflecting its deep investment in semiconductor manufacturing and R&D. ASML (a Dutch semiconductor equipment firm) ranks second, followed by Arizona State University (143 beneficiaries) and the University of Arizona (108 beneficiaries). Combined, ASU and UA represent the second-largest cluster of H-1B employers in the state—underscoring the public university system’s role in attracting and retaining international researchers, faculty, and staff.

6.4.3. Comparing States: Concentration vs. Intensity

Tables 3 and 4 report, for each state, the number of distinct H1-B petitioning employers, the number of approved beneficiaries, and beneficiaries as a share of the state population. California leads with 78,860 approved beneficiaries from 9,606 petitioning employ-

Table 2: 2024 H-1B Beneficiaries—Top 10 Employers All Industries Arizona

Rank	Employer (Petitioner)	Beneficiaries Approved
1	INTEL CORPORATION	2,516
2	ASML US LP	209
3	ARIZONA STATE UNIVERSITY	143
4	INTRAEDGE INC	118
5	THE UNIVERSITY OF ARIZONA	108
6	MICROCHIP TECHNOLOGY INC	104
7	SEMICONDUCTOR COMPONENTS INDUSTRIES	88
8	BLUE YONDER INC	85
9	ASM AMERICA INC	84
10	GODADDY COM LLC	81

ers. Arizona ranks 16th with 6,279 approved beneficiaries and 753 petitioners.

Interestingly, adjusted for the number of petitioners, the intensity of the H-1B at the employer level in Arizona (8.3 approvals per employer) nearly matches the intensity of California (8.2), suggesting that the average Arizona employer using the H-1B program is just as dependent on it as its California counterpart. This ratio underscores how deeply integrated the program has become in Arizona’s high-tech and academic sectors, even if the absolute totals of the state are smaller due to scale.

Ranking across states, Arizona places 16th in approved beneficiaries and 18th in beneficiaries per capita, ahead of Connecticut and Minnesota on a per capita basis, and just behind North Carolina and South Dakota. This per capita perspective highlights that Arizona attracts H-1B talent at rates well above many populous states, underscoring the breadth of H-1B use in the state’s high-tech and higher-education ecosystems.

The data illustrate that the H-1B program is not merely a vehicle for a handful of large corporations, but rather a widely used channel for meeting high-skill labor needs across industries and geographies. From tech hubs in California to semiconductor corridors in Arizona, foreign-born STEM professionals play a vital role in sustaining U.S. innovation and productivity.

This widespread reliance on H-1B labor also reinforces the importance of coherent, predictable immigration policy. As other countries expand their own post-study and skilled visa programs, the U.S. can benefit from maintaining pathways like OPT and H-1B not only to attract top talent, but also to retain the individuals it has already educated and

Table 3: 2024 H-1B Beneficiaries—U.S. States

State	No. of Employers (Petitioners)	Beneficiaries Approved	Beneficiaries/State Population
Alabama	273	1,129	0.022%
Alaska	50	240	0.032%
Arizona	753	6,279	0.083%
Arkansas	185	4,337	0.140%
California	9,606	78,860	0.200%
Colorado	602	2,648	0.044%
Connecticut	633	2,957	0.082%
Delaware	319	1,193	0.113%
Florida	2,332	9,558	0.042%
Georgia	1,991	11,650	0.104%
Hawaii	71	195	0.013%
Idaho	81	651	0.033%
Illinois	2,481	19,906	0.157%
Indiana	574	2,827	0.042%
Iowa	268	1,557	0.048%
Kansas	298	1,295	0.044%
Kentucky	251	1,231	0.027%
Louisiana	250	1,065	0.023%
Maine	74	320	0.023%
Maryland	974	12,765	0.204%
Massachusetts	2,433	16,059	0.225%
Michigan	1,564	11,635	0.115%
Minnesota	701	4,518	0.078%
Mississippi	101	454	0.015%
Missouri	619	4,237	0.068%

trained.

Taken together, the data in Figure 19 suggest that the foreign-born population’s comparative advantage in STEM translates not only into stronger educational and research outcomes but also into superior labor market performance—at least in average earnings per hour worked. This has important fiscal implications because taxes in the U.S. are primarily based on earnings, higher wages translate into higher federal and state income tax contributions. Foreign-born STEM workers, by virtue of their higher hourly earnings and often full-time employment in high-productivity sectors, contribute substantially to the public finances. Their earnings also feed into payroll taxes (Social Security and Medicare), consumption taxes (through spending), and, in many cases, property

Table 4: 2024 H-1B Beneficiaries—U.S. States (cont'd)

State	No. of Employers (Petitioners)	Beneficiaries Approved	Beneficiaries/State Population
Montana	60	164	0.014%
Nebraska	212	1,004	0.050%
Nevada	291	772	0.024%
New Hampshire	178	552	0.039%
New Jersey	3,131	31,286	0.329%
New Mexico	176	752	0.035%
New York	5,674	28,487	0.143%
North Carolina	1,179	10,279	0.093%
North Dakota	89	252	0.032%
Ohio	1,185	6,490	0.055%
Oklahoma	226	916	0.022%
Oregon	303	1,501	0.035%
Pennsylvania	1,664	12,594	0.096%
Rhode Island	129	1,737	0.156%
South Carolina	386	1,549	0.028%
South Dakota	71	883	0.096%
Tennessee	609	4,649	0.064%
Texas	6,309	55,757	0.178%
Utah	400	1,543	0.044%
Vermont	57	228	0.035%
Virginia	1,776	25,339	0.288%
Washington	1,025	9,764	0.123%
West Virginia	52	221	0.013%
Wisconsin	470	2,852	0.048%
Wyoming	75	198	0.034%

taxes—making them significant net contributors to the tax base.

7. Conclusion

International students are a critical asset to the United States—academically, fiscally, and economically. Their presence on college campuses enriches the academic environment, fuels university research output, and generates considerable revenue for institutions of higher education. Because international students often pay full out-of-state tuition and make limited use of need-based aid, they contribute more in tuition revenue than their domestic peers. This has allowed many universities to sustain programs and services

that benefit the broader student body. While concerns persist about potential crowd-out effects on domestic enrollment, the preponderance of evidence suggests that international students either have no adverse effect or, in many cases, enable cross-subsidization that enhances access and educational quality for all students.

Beyond their impact on campus, international students—particularly those who graduate into STEM fields—play a key role in strengthening the U.S. labor market and innovation ecosystem. Trained in American universities, they integrate quickly into high-demand sectors such as semiconductors, artificial intelligence, and advanced manufacturing, where their skills are urgently needed. They contribute significantly to productivity and tax revenues, and their patenting and publishing rates often exceed those of their U.S.-born peers. In fact, immigrants account for 16.5% of U.S. inventors, yet their contributions exceed this share in both the quantity and quality of patents, as measured by citations and market value. Much of this innovation can be traced back to international students who remained in the U.S. after graduation, highlighting the long-term payoff of retaining global talent.

These dynamics are particularly visible in Arizona, which is rapidly evolving into a national tech hub. The state has witnessed robust growth in sectors like semiconductors and optics, fueled in part by the contributions of international STEM graduates and companies employing them through the H-1B visa program. In 2024 alone, Arizona-based employers sponsored over 6,200 H-1B beneficiaries, with companies like Intel and ASML leading the charge. Arizona's universities—particularly ASU and the University of Arizona—also rank among the state's top H-1B petitioners, underscoring their dual role in producing and retaining high-skilled talent.

In sum, international students are not merely passive recipients of U.S. education—they are active contributors to the country's innovation, competitiveness, and fiscal health. Their enrollment sustains the financial viability of academic programs, their labor addresses key shortages in high-growth industries, and their ideas generate spillovers that benefit society at large. As global competition for talent intensifies, the ability of the United States to continue attracting and retaining international students will be crucial—not just for higher education, but for the broader trajectory of U.S. economic leadership.

Appendix

A. Additional Figures

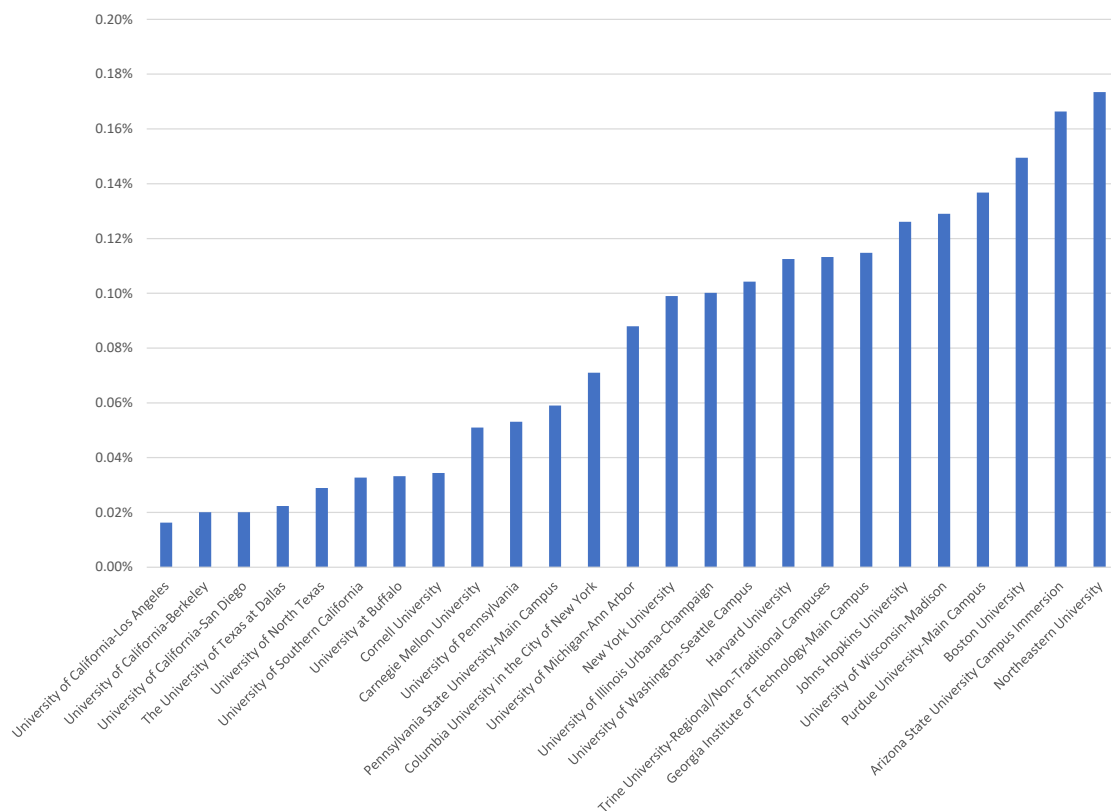


Figure A.1: Number of International Students Top 25 Institutions divided by the size of the state population, 2023 ([National Center for Education Statistics, 2023](#))

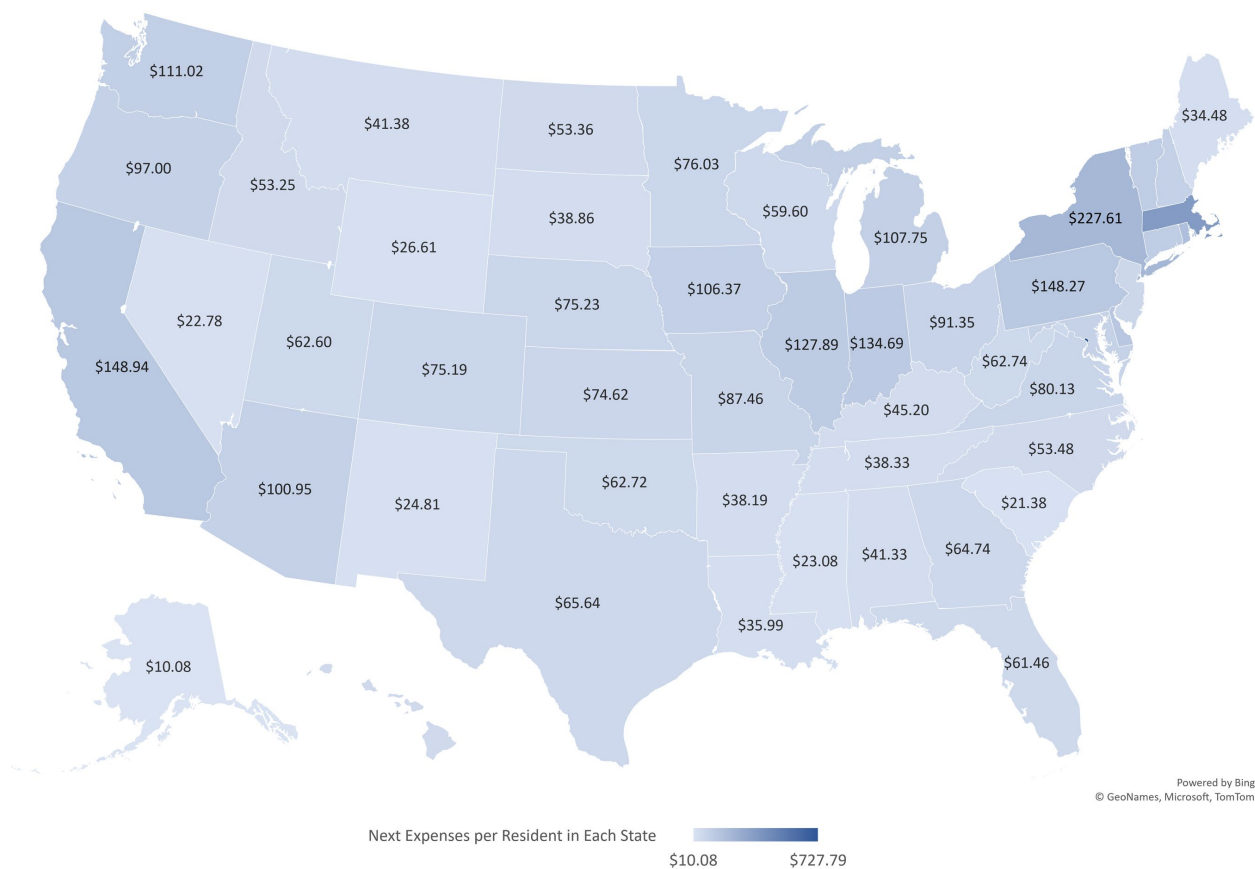


Figure A.2: Net contributions of International Students in the US—defined as tuition, fees, and living expenses minus institutional financial aid per resident in each state, 2017 ([Education Research Section, Princeton University, 2025](#))

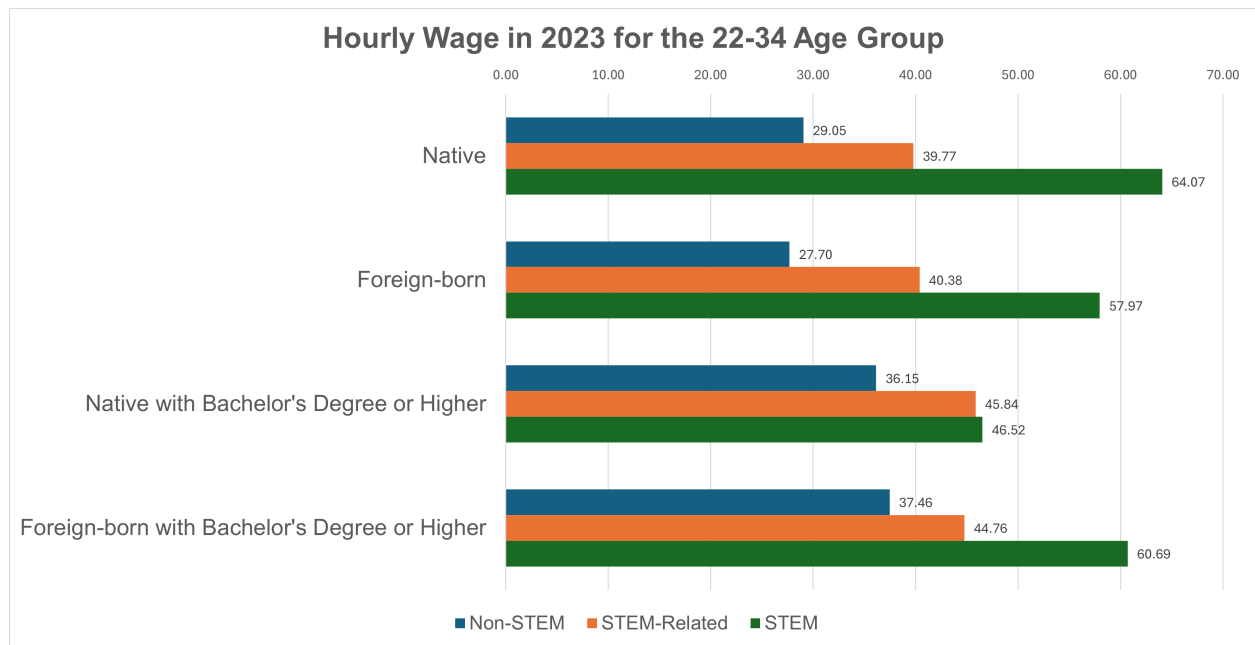


Figure A.3: The figure shows the hourly wage in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>).

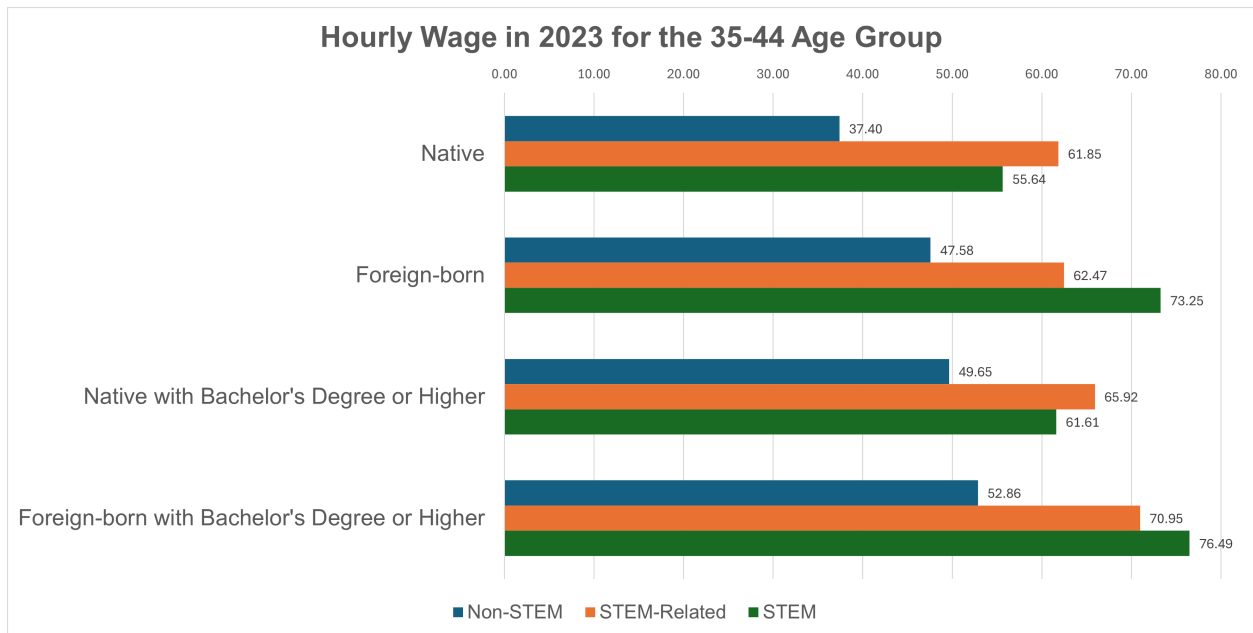


Figure A.4: The figure shows the hourly wage in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>).

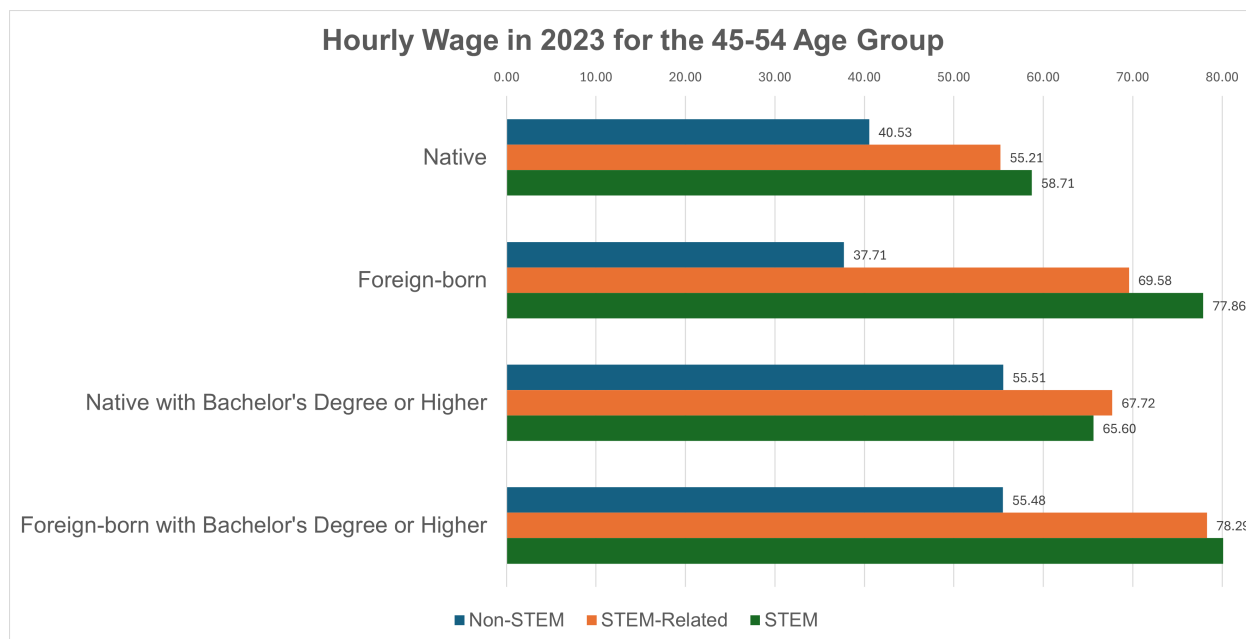


Figure A.5: The figure shows the hourly wage in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>).

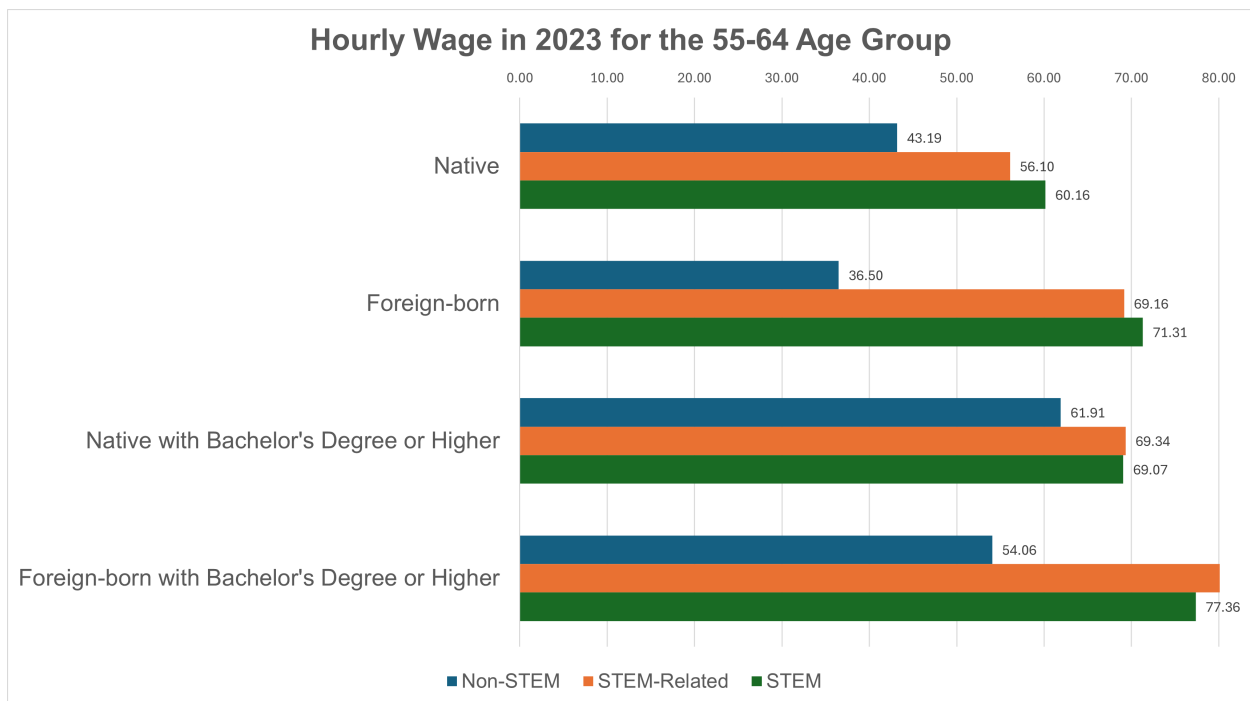


Figure A.6: The figure shows the hourly wage in 2023 across occupations, categorized as non-STEM, STEM-related, and STEM occupations, for natives, foreign-born individuals, and those who possess a bachelor's degree or higher, including both natives and foreign-born, based on the American Community Survey (ACS) data, publicly available from IPUMS (<https://usa.ipums.org/usa/>).

References

- Anelli, M., Shih, K., and Williams, K. (2023). Foreign students in college and the supply of stem graduates. *Journal of Labor Economics*, 41(2).
- Beine, M., Peri, G., and Raux, M. (2023). International college students' impact on the us skilled labor supply. *Journal of Public Economics*, 223:104917.
- Belkin, D. (2017). University of california proposes 20% cap on nonresident students. *The Wall Street Journal*.
- Bernstein, S., Diamond, R., Jiranaphawiboon, A., McQuade, T., and Pousada, B. (2022). The contribution of high-skilled immigrants to innovation in the united states. *NBER Working Paper*, 30797.
- Borjas, G. J. (2004). Do foreign students crowd out native students from graduate programs? *NBER Working Paper*, (w10349).
- Bound, J., Braga, B., Khanna, G., and Turner, S. (2019). Public universities: The supply side of building a skilled workforce. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 5(5):43–66.
- Bound, J., Braga, B., Khanna, G., and Turner, S. (2020). A passage to america: University funding and international students. *American Economic Journal: Economic Policy*, 12(1):97–126.
- Bound, J., Braga, B., Khanna, G., and Turner, S. (2021). The globalization of postsecondary education: The role of international students in the us higher education system. *Journal of Economic Perspectives*, 35(1):163–184.
- Chen, M. (2021). The impact of international students on us colleges: Higher education as a service export. *Available at SSRN* 3859798.
- Chen, M., Howell, J., and Smith, J. (2023). Best and brightest? the impact of student visa restrictiveness on who attends college in the us. *Labour Economics*, 84:102385.
- Conzelmann, J. G., Hemelt, S. W., Hershbein, B. J., Martin, S., Simon, A., and Stange, K. M. (2023). Grads on the go: Measuring college-specific labor markets for graduates. *Journal of Policy Analysis and Management*.

- Curs, B. R. and Jaquette, O. (2017). Crowded out? the effect of nonresident enrollment on resident access to public research universities. *Educational Evaluation and Policy Analysis*, 39(4):644–669.
- Education Research Section, Princeton University (2025). Project advise (analytics and data visualization for international student and education). <https://ers.princeton.edu/project-advise-about>. Accessed: 2025-06-27.
- Hunt, J. and Gauthier-Loiselle, M. (2010). How much does immigration boost innovation? *American Economic Journal: Macroeconomics*, 2(2):31–56.
- Institute of International Education (IIE) (2024). Project Atlas infographic 2024: A quick look at global mobility trends. PDF infographic. Published by the Institute of International Education; data current as of 2024 release.
- Institute of International Education (IIE) and U.S. Department of State, Bureau of Educational and Cultural Affairs (2024). Open Doors 2024 Report on International Educational Exchange. “The number of international students . . . through Optional Practical Training (OPT) reached a record high of 242,782 students.”.
- International Organization for Migration (2024). World migration report 2024: Chapter 2 – international students. Web page. Accessed: 2025-06-17.
- International Trade Administration (2022). Jobs supported by exports, 2022. Excel dataset. File: “Jobs Supported by Exports 2022”. Add URL and access date if citing online.
- Mezzanotti, F. and Simcoe, T. (2023). Innovation and appropriability: Revisiting the role of intellectual property. *NBER Working Paper*, 31428.
- NAFSA (2024). <https://www.nafsa.org/about/about-nafsa/international-students-contribute-record-breaking-level-spending-and-378000-jobs>. Accessed June 26, 2025.
- National Academies of Sciences, Engineering, and Medicine (2024). *International Talent Programs in the Changing Global Environment*. The National Academies Press, Washington, DC.
- National Center for Education Statistics (2023). IPEDS Data Center: Completions Survey (C) Data Files. Available at: <https://nces.ed.gov/ipeds/datacenter/DataFiles.aspx?>

[gotoReportId=7&fromIpeds=true&sid=98affc81-7ade-440e-a9b5-5ce6a77ad9f7&rtid=1](#). Accessed: 2025-06-23.

Office of the United States Trade Representative (2024). Agricultural Trade. Accessed: June 27, 2025.

Ruiz, N. G. and Budiman, A. (2018). Number of foreign college students staying and working in us after graduation surges. *Pew Research Center*.

Shih, K. (2017). Do international students crowd-out or cross-subsidize americans in higher education? *Journal of Public Economics*, 156:170–184.

State Higher Education Executive Officers Association (SHEEO) (2025). State profile: Arizona. <https://shef.sheeo.org/state-profile/arizona/>. Accessed: 2025-06-26.

Stuen, E. T., Mobarak, A. M., and Maskus, K. E. (2012). Skilled immigration and innovation: evidence from enrolment fluctuations in us doctoral programmes. *Economic Journal*, 122(565):1143–1176.

Zavodny, M. (2019). International students, stem opt and the us stem workforce. *National Foundation for American Policy (NFAP)*. *NFAP Policy Brief, March*.