

Talent, Immigration, and U.S. Economic Competitiveness

Executive Summary

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For generations, highly skilled labor in science, technology, engineering, and mathematics (STEM) has been a catalyst for innovation, job creation, and rising standards of living in America. And these highly innovative STEM workers have long been not just native-born Americans but immigrants as well. Immigration has played a vital role in helping American companies meet their growing demand for skilled labor—demand that absent immigration would be growing well ahead of supply, forcing companies and the country to endure a talent crunch.

This white paper delivers three central messages.

Message #1: Talent—especially the talent of highly educated STEM workers—has long driven much of America’s innovation and economic growth. In the increasingly global economy, America’s need for talent has grown even more acute. Despite the nation’s historic innovation prowess, concern is rising among leaders that our strength is waning.

- Of the rise in real U.S. output per person over the 20th century, over 80% was accounted for by innovation (as proxied by rising educational attainment and research and development) and technological progress. Innovation requires STEM talent.
- Workers in STEM occupations are much more educated than are workers in other occupations. Compared with workers in non-STEM jobs, today workers in STEM occupations are over 2.2 times more likely to have a bachelor’s degree, 2.7 times more likely to have a master’s degree, and 5.3 times more likely to have a doctorate.
- There are over 4.9 million STEM workers in America: over 1.5 million engineers, 1.4 million software developers and computer programmers, and over 1.3 million computer and information analysts, database administrators, and network architects. Almost all the jobs in the latter two categories are quite new to the U.S. economy. Innovation goes hand in hand with the creation of new demand for STEM labor.
- The World Economic Forum’s 2012 ranking of countries’ “Global Competitiveness” has the United States at #7, down from #2 in 2004, and also at #7 in the “Innovation” category. For 2012, the World Intellectual Property Organization ranks the United States at #10 in its Global Innovation Index—down from #1 in 2009. Absent measures to strengthen America’s innovation capabilities, the nation’s ranking slide will continue.
- Among the 65 countries that participated in the OECD’s most recent examinations of 15 year-olds, U.S. students ranked 15th in reading, 23rd in science, and 31st in mathematics. While there are long-run plans to improve America’s STEM education and training, in the near term U.S.-born students cannot meet the nation’s need for STEM skills.

Message #2: Immigration has played a critical role in helping America meet its steadily growing demand for talent—especially for highly skilled STEM workers. Immigrants have long made outsized contributions to American innovation, both at the highest levels and throughout the economy at all stages of discovering and developing new ideas. Over time, America’s reliance

on talented immigrants has been rising, not falling. America attracts immigrants who achieve very high levels of education and who are strongly inclined toward training in STEM disciplines.

- While immigrants are only 12% of all U.S. residents, they are 27% of recent U.S.-resident Nobel Prize winners in chemistry, medicine, and physics and 25% of recent MacArthur “Genius” Fellows. U.S. immigrants constitute over one-third of current National Academy of Science members in mathematics and engineering and one-third to one-half of university faculty in top-ranked engineering and computer science programs.
- One quarter of U.S. high-technology firms established since 1995 have had at least one foreign-born founder. These new companies employ 450,000 people and generate more than \$50 billion in sales. Immigrants or their children founded 40% of Fortune 500 companies, including firms behind seven of the 10 most valuable global brands.
- The foreign-born share of STEM workers with bachelor’s degrees is 20%, whereas for those with advanced degrees the respective share is about 40%. Among all U.S. workers both with a STEM doctorate and in a STEM occupation, 60% are immigrants. In the key STEM fields of computer science, computer programming, and software development, over 50% of U.S. workers with a master’s degree are immigrants.

Message #3: Even after the Great Recession, America’s need for more talent has persisted as it did for decades before. America’s demand for skilled STEM workers continues to grow, and immigrants continue to help meet this demand—both directly and more broadly through their expansive contributions to America’s innovation potential. Post-recession, unemployment in STEM occupations has been falling sharply as the STEM labor market tightens substantially.

- Relative to non-STEM workers of the same age and educational attainment, STEM workers in America today earn a compensation premium of about 25%—a differential that has changed little over the past 30 years despite the substantial increase in the relative size of America’s STEM labor force. This STEM wage premium has not disappeared because America’s demand for STEM talent remains robust.
- The earnings of STEM workers have risen relative to all other U.S. occupations by 3% to 6% over the past decade. Since 2000, real wages of main STEM occupations have grown, while real wages for nearly all other U.S. occupations have fallen.
- Looking among U.S. STEM workers, there is no evidence that immigrants are paid less than natives. Across a number of data sets and a number of alternative approaches to controlling for the standard differences in earnings across workers (such as age, gender, educational attainment, and industry of employment), there is no statistical difference between the earnings U.S.-born STEM workers and immigrant STEM workers.
- The market for STEM labor is tightening. The unemployment rate for prime-age STEM workers with at least a college degree fell from 4.5% in 2009 to 2.5% in 2012, barely above its 20-year average of 2.45%. In computer occupations (programmers, software developers, computer scientists, computer systems analysts), the unemployment rate has declined even more dramatically—from 5.4% in 2009 to 2.5% in 2012—and is now below its 20-year average of 2.8%. If it has not already happened, the unemployment rate for STEM workers is soon likely to be below its long-run historical level.