



Rising to the Challenge

Rising to the Challenge

The U.S. economy was the world leader in the 20th century; moving into the 21st century, however, various parties have raised alarms about whether this nation's economy can continue to be competitive. The U.S. economy remains the largest in the world, possessing a highly skilled work force, world class companies, and, according to some, the world's best higher education system. Despite these positive attributes, U.S. citizens have been hit by stagnating job growth and falling incomes, while businesses have faced increasing global competition. In short, the concern is that future generations of Americans will not enjoy a higher standard of living than is enjoyed today. With the right policies and commitment, the United States can compete globally and provide its citizens with better lives.

Exceptional Performance

During the 20th century, the pace of innovation was staggering, leading to new industries and companies, such as those in the biotech and information technology fields. Innovation also spurred growth in traditional industries, as businesses fundamentally changed the way they produced and distributed their goods and services.

In the process, the United States became the world's most innovative, most educated, and most competitive nation. Since 1980, the United States made up between 20 and 25 of the world's economy while having only about 5 percent of the world's population.¹ The exceptional economic performance of the United States helped to improve the lives of its citizens, particularly during the decades after World War II. Between 1950 and 2000, incomes soared, with real disposable personal income per capita increasing 213 percent, from \$9,240 to \$28,899.² The U.S. economy created millions of new jobs, many in new firms and industries.

These economic gains were coupled with gains in other areas. The United States provided electricity and phone service throughout the country, built the Interstate Highway System, provided clean water to hundreds of millions, put men on the moon, developed the Internet, and decoded the human genome. (Box 1.1 describes in more detail the construction of the Interstate Highway System.) Advances in medical science helped propel significant increases in life expectancy in the United States. Life spans, as measured at birth, rose from 47.3 years in 1900 to 77.9 in 2007.³ Advances in agricultural science increased the productivity of our farms by 150 percent between 1948 and 2008.⁴

The United States has a strong tradition of scientific advancement; about 40 percent of Nobel Prizes have been awarded to U.S. citizens⁵ and a 2011 study placed 40 percent of the world's 100 most innovative companies in the United States.⁶

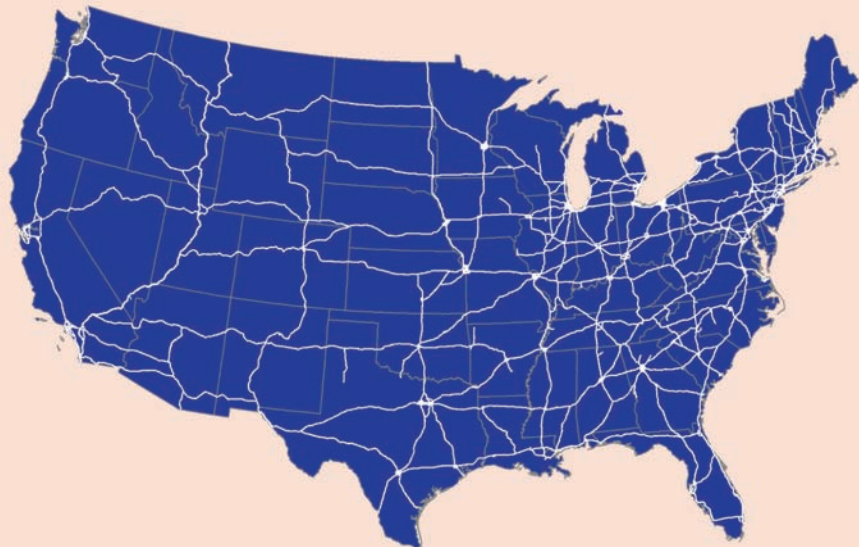
Box 1.1

The Interstate Highway System

Perhaps no other infrastructure investment in the United States so transformed society as the Interstate Highway System. The Federal-Aid Highway Act of 1956 was signed into law by President Dwight D. Eisenhower, and it authorized \$25 billion for the construction of 41,000 miles of highways (see the map below), at the time making it the largest public works program in American history. As of 1991, construction cost \$128.9 billion for about 43,000 of the system's miles. About 90 percent of the funding came from the Federal government, generally from revenue raised by taxes on motor fuel, and about 10 percent from the states.

Today, after more than 50 years, there are more than 46,000 miles in the Interstate Highway System. It is often touted as one of the greatest public works investments in the nation's history. The Interstate Highway System replaced a lower capacity, lower speed, less safe, and more expensive (per mile of travel) highway system. The system thus allowed regions and localities that were not part of the nation's economy to become integrated and open to new economic opportunities.¹

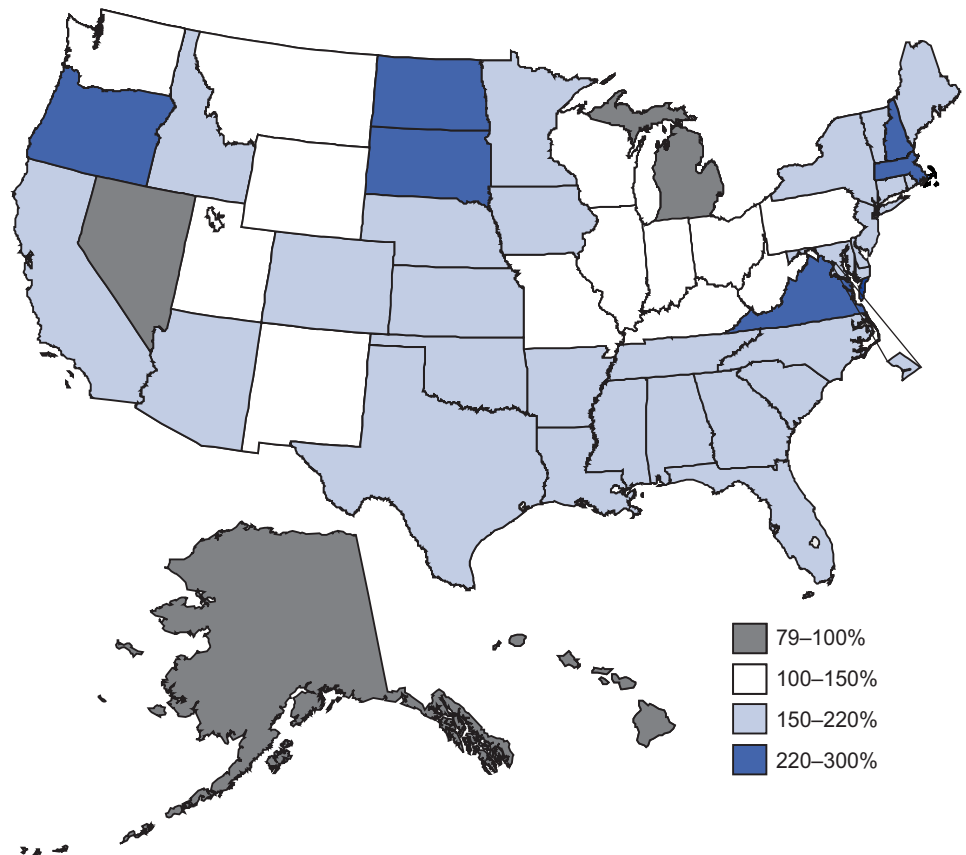
Map of the United States Interstate Highway System



1. Source: mappery.com/maps/United-States-Interstate-Map.

States across the country contributed to and benefitted from the U.S. economic strength during the 20th century. From 1963 to 2008, state-level real income per person increased in every state by at least 79 percent, and some states experienced gains of close to 300 percent. A total of 34 states (including the District of Columbia, which had the highest increase) saw growth of more than 150 percent (see figure 1.1).

Figure 1.1
Growth in Real GDP per Capita by State, 1963–2008



Source: Bureau of Economic Analysis, Economics and Statistics Administration calculations.
 Note: Percent change in real Gross Domestic Product per capita by state, 1963 (first available year of data) to 2008.

Successful, world-class companies are located in virtually every state in the United States; 39 states are home to at least one Fortune 500 company. Within states, and across state boundaries, regional innovation clusters arose. Silicon Valley became the world’s information technology (IT) epicenter, but other areas also contributed significantly to the IT revolution, including the regional industry

clusters in Texas, Washington State, Massachusetts, Georgia, North Carolina, Virginia, and Michigan (“Automation Alley”, in Southeast Michigan). Major medical advances have been made in many states, including Alabama, California, and Pennsylvania.

Over time, Americans came to take these economic advances for granted and expected these trends to continue into the future. This economic progress fueled belief in an important facet of the American dream—the expectation that our children’s quality of life would be better than our own.

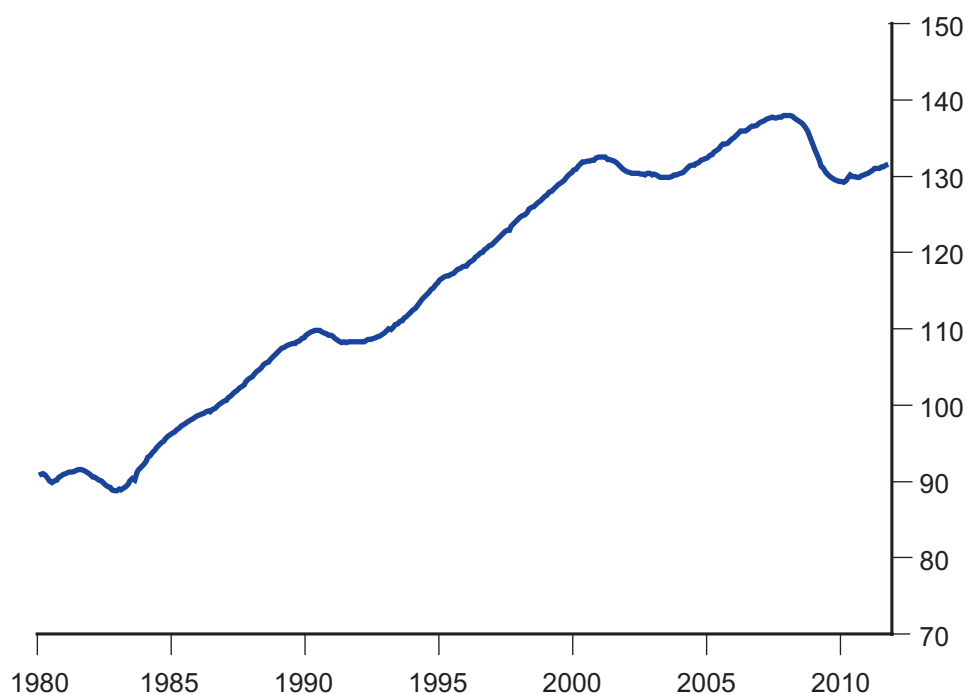
Alarms

While the United States exited the 20th century as the undisputed economic and innovation leader, the competitive landscape was shifting.⁷ As the economies of more countries around the world grew and developed, these countries became stronger competitors to the United States. Though there are benefits to the United States from these changes, alarms are being raised about these trends and there is also growing angst that the United States is no longer competing as strongly on the world economic stage. One recent poll found that 47 percent of Americans “strongly agree” and 43 percent “somewhat agree” with the statement that the United States is in danger of losing its global competitive edge in innovation.⁸ Another survey found that 71 percent of Americans believe that our high schools are falling short when it comes to preparing students for science and engineering jobs and 76 percent believe that if the next generation does not work to improve its science and math skills, it risks becoming the first one that is worse off than its parents’ generation.⁹

Alarm 1: Jobs

The United States’ ability to create jobs has deteriorated during the past decade. Employment increased at an annual rate of just 0.6 percent between the February 2001 and January 2008 employment peaks (figure 1.2). This rate is one-third as fast as the 1.8 annual rate of employment growth between the June 1990 and February 2001 employment peaks. A recent study by McKinsey Global Institute found that the United States has been experiencing increasingly lengthy jobless recoveries: “it took roughly 6 months for employment to recover to its prerecession level after each postwar recession through the 1980s, but it took 15 months after the 1990–91 recession and 39 months after the 2001 recession.”¹⁰

Figure 1.2
Nonfarm Payroll
Employment,
1980–2011



Source: Bureau of Labor Statistics.

Note: In millions of jobs.

Alarm 2: Wages and the Middle Class

The middle class in the United States has struggled as incomes and wages have generally stagnated. One commonly referenced measure of the financial well-being of the middle class is real median household income; that is, the income of households in the middle of the income distribution after adjusting for inflation. From 1980 to its peak in 1999, real median household income increased about 20 percent (see [figure 1.3](#)). Since that peak, real median household income has stalled, and even before the Great Recession, real median household income fell from \$53,252 in 1999 to \$52,823 in 2007 (in 2010 dollars). Individuals at the very top of the income distribution have fared better during this time than others; one study found that between 1993 and 2008, income grew almost 4 percent per year for those with incomes in the top 1 percent of the income distribution.¹¹ The lack of income growth echoes the lack of earnings growth workers have experienced over recent decades. With few exceptions (such as the second half of the 1990s), the typical American worker has experienced long stretches of flat or

Figure 1.3
U.S. Median
Household Income,
1977–2009



Source: Household Median Income from the U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements.
 Note: In 2010 dollars.

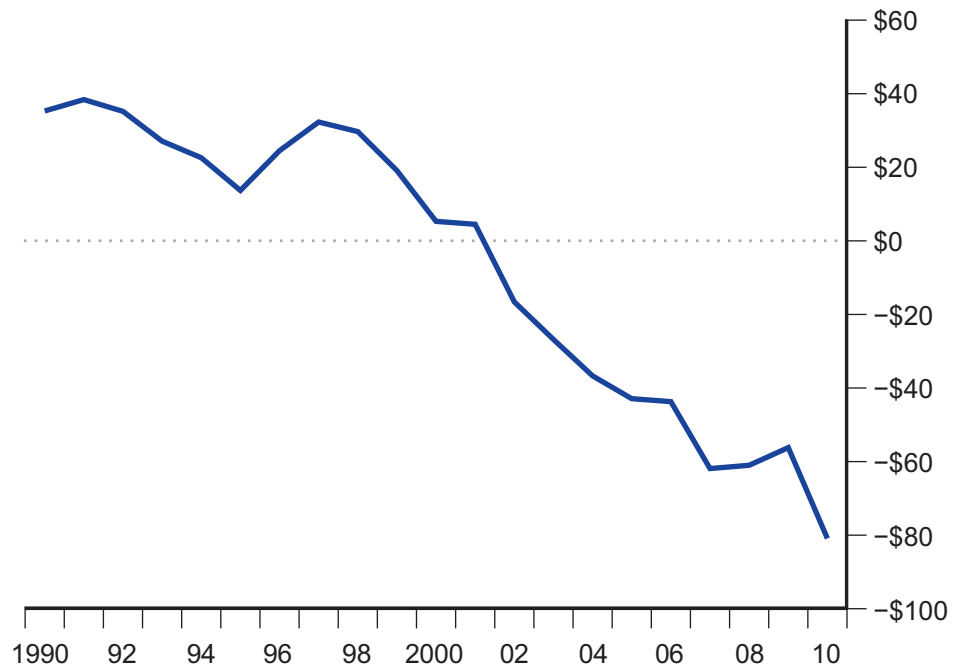
even declining earnings for full-time work, despite an incredible rise in his or her productivity. Between the fourth quarter 1979 and the fourth quarter 2010 (that is, essentially over the length of a generation), real median weekly earnings of full-time wage and salary workers edged up just 4.9 percent, while workers’ productivity increased 90.9 percent. Reasons offered for these wage trends include the decline in the fraction of workers covered by collective bargaining, increased international competition, technological change, immigration, and minimum wages, among others.¹² Regardless of the reasons, this stagnation makes it impossible for many Americans to increase their financial standard of living and feeds the perception that the next generation will be no better off than its parents’ generation.

Alarm 3: Manufacturing

These employment and wage trends also roughly coincide with the increased pressure from abroad faced by the U.S. manufacturing sector (though the manufacturing sector has increasingly relied on foreign markets). The manufactured goods trade balance has worsened. In 2010, the trade deficit in manufactured

goods was \$565.4 billion and is on track to exceed that amount in 2011, even with strong export growth.¹³ The United States continues to lose ground in key manufacturing sectors, including those sectors that are likely to drive our economy in the future. The United States ran a trade surplus in “advanced technology products,” which includes biotechnology products, computers, semiconductors, and robotics, until 2002 (see figure 1.4).¹⁴ In 2010, however, the United States ran an \$81 billion trade deficit in this critically important sector.¹⁵

Figure 1.4
Advanced Technology Products Trade Balance, 1990–2010



Source: U.S. Census Bureau, Foreign Trade Division.
 Note: Billions of dollars. In nominal dollars.

Alarm 4: Innovation

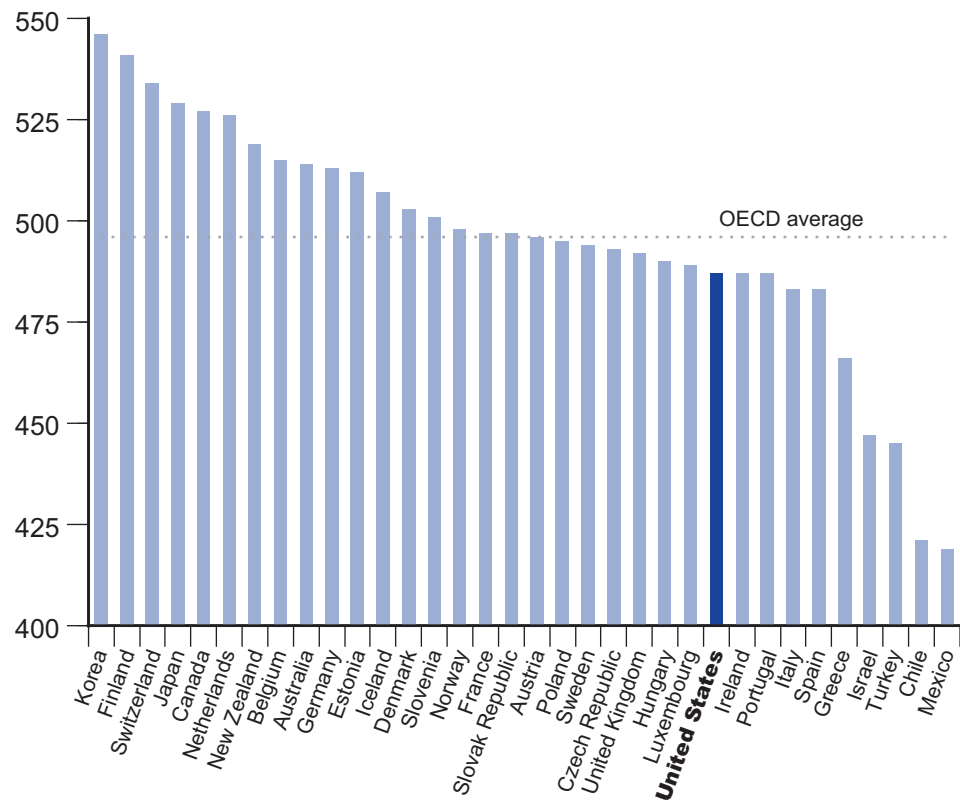
After reviewing 16 key indicators—such as the number of scientists and engineers, corporate and government R&D, venture capital, productivity, and trade performance—the July 2011 *Atlantic Century* report indicated that the United States had made little or no progress in its competitiveness since 1999 and now ranks fourth in innovation-based competitiveness.¹⁶ A report from 2005, *Rising Above the Gathering Storm*—a volume authored by a committee convened in 2005 by the National Academy of Sciences—expressed deep concern that the

scientific and technological building blocks critical to the economic leadership of the United States were eroding at a time when many other nations were actively laying strong foundations in these same areas.¹⁷ In their 2010 follow-up report, that same committee unanimously stated that “our nation’s outlook has not improved but rather has worsened.”¹⁸

Alarm 5: Education

The United States is struggling to prepare U.S. students in math and science. In 2009, U.S. 15-year-olds had an average score of 487 on the mathematics literacy scale, which was lower than the OECD average score of 496 (see figure 1.5). Seventeen OECD countries ranked above the United States in math, and some 11 other countries had scores that were not significantly different from the U.S. math score. Additionally, science and reading scores were only average and on an earlier assessment of student problem solving ability (2003 Program

Figure 1.5
U.S. Math Test
Scores for 8th
Graders Remain
Below OECD
Averages



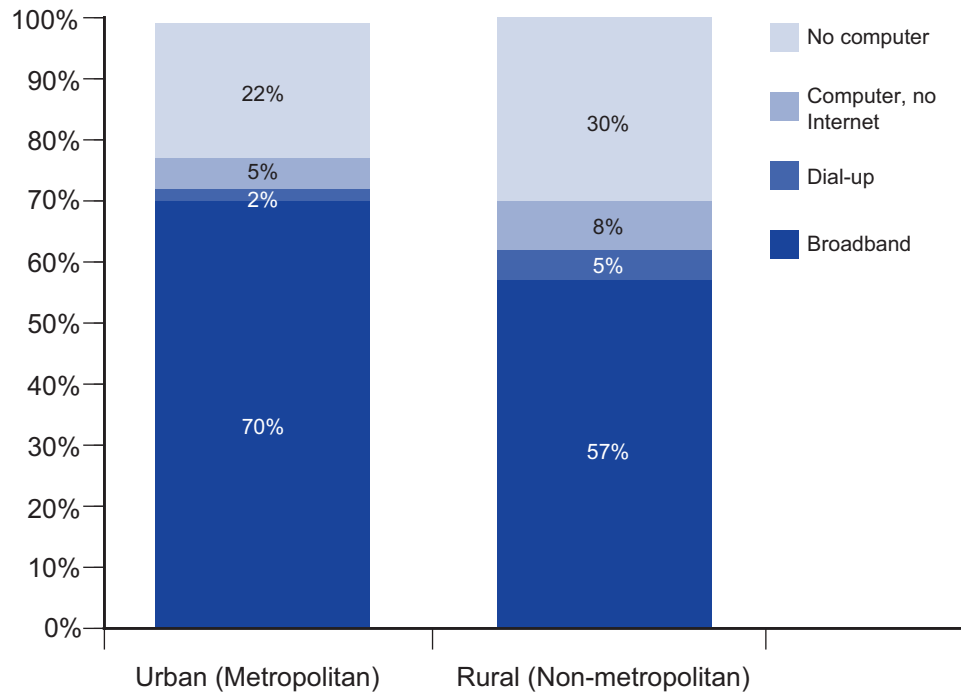
Source: OECD, PISA 2009 database.

for International Student Assessment (PISA)), U.S. students scored behind most of the other developed nations in the world.¹⁹

Alarm 6: Infrastructure

Delays at airports, time lost in traffic jams, bridges in need of repair, and ports that cannot handle the newest ships exemplify how traditional infrastructure in the United States has failed to keep pace with its growing population. The result is higher costs for businesses and inconvenience for all. Digital infrastructure, though stellar in some respects, has not yet reached large portions of our population, making it difficult for them to participate in the 21st century economy. Large and disturbing differences in broadband adoption still persist by income, race and ethnicity, and education. Also, some communities are disadvantaged with respect to broadband access and use. For example, those living in urban areas were much more likely to have access to broadband Internet connections relative to rural consumers (see figure 1.6).

Figure 1.6
Computer and Internet Use by Urban and Rural Location, 2010



Source: Economics and Statistics Administration and National Telecommunications and Information Administration. *Exploring the Digital Nation: Computer and Internet Use at Home*. Washington, D.C.: U.S. Department of Commerce, November 2011.

Addressing the Alarms

So, yes, the world has changed. The competition for jobs is real. But this shouldn't discourage us. It should challenge us. Remember—for all the hits we've taken these last few years, for all the naysayers predicting our decline, America still has the largest, most prosperous economy in the world. No workers—no workers are more productive than ours. No country has more successful companies, or grants more patents to inventors and entrepreneurs. We're the home to the world's best colleges and universities, where more students come to study than any place on Earth.

—President Barack Obama, *State of the Union Address, January 2011*

Tough problems need to be tackled in order for the United States to improve its competitiveness and increase good-paying jobs. To address these issues, Chapter 2, “Keys to Innovation, Competitiveness, and Jobs” delves into what made the economy competitive in the past and demonstrates that the Federal government played a key role in research, education, and infrastructure, three components that greatly contributed to the economic vitality of the United States in the 20th century. Put another way, the government (Federal, state, and local) made investments into the building blocks of our economic growth, and these investments allowed the private sector to flourish. Chapters 3, 4, and 5 go into greater detail for each of these broad areas (research, education, and infrastructure), discussing the challenges faced in each and proposed policies to keep the United States at the innovation and competitiveness frontier.

In addition to these key areas, there are other avenues by which the competitiveness of the United States can be increased. For instance, a strong manufacturing sector is crucial, as this sector conducts the majority of industrial research and development, and there are strong links between the location of production and the location of research activity.²⁰ Given the importance of manufacturing and some of its unique properties, Chapter 6 focuses on manufacturing solely.

Although improving research, education, infrastructure, and the manufacturing sector are essential to increasing innovation and competitiveness, many other factors also contribute to economic success. Perhaps chief among them is ensuring that both established firms and entrepreneurs in the private sector have the best possible environment in which to innovate. Chapter 7 touches upon some of

the additional areas where the government can assist the private sector, including aid to regional clusters, promoting entrepreneurship, creating an effective intellectual property regime (domestically and abroad), and reforming corporate taxes.

This report touches upon some of the key policy areas needed to make the U.S. economy more innovative and competitive. Drawing upon the other chapters in this report, the last chapter, “Moving Forward”, highlights 10 areas that deserve special attention. Implementing these recommendations will better prepare the United States to meet the economic challenges of the 21st century and provide a better future for our children.

Endnotes

1. International Monetary Fund, World Economic Outlook database, September 2011.
2. U.S. Bureau of Economic Analysis 2010, Table 678. Note: In chained 2005 dollars.
3. National Center for Health Statistics 2011, 134.
4. Economic Research Service 2011.
5. Nobelprize.org, *Nobel Prize Facts* www.nobelprize.org/nobel_prizes/nobelprize_facts.html.
6. Thomson Reuters 2011.
7. See, for example, National Academy of Sciences 2007.
8. Charlton Research Company 2011.
9. Peter D. Hart Research Associates, Inc. and The Winston Group 2006, 2.
10. Manyika et al. 2011, 1.
11. Based on research by Atkinson, Piketty, and Saez 2011 and Piketty and Saez 2003.
12. Much has been written on the subject of the forces behind changes in wages and relative wages over the past several decades. Reasons offered for the various wage trends include the decline in the fraction of workers covered by collective bargaining, increased international competition, technological change, immigration, minimum wages, among others. See, for example, Sachdev 2007 for tables updated to 2008.
13. U.S. Census Bureau, Foreign Trade Division, U.S. International Trade in Goods and Services (FT900) www.census.gov/foreign-trade.
14. For the complete definition of this sector, see U.S. Census Bureau, Foreign Trade Division 2011.
15. The manufacturing sector is not the only part of the economy that is exposed to international competition, as documented by Jensen (2011). The U.S. has run a trade surplus in services, and we export about \$500 billion a year in services (compared with \$565 billion in manufactured goods), and increasingly the service sector will be open to international competition which may create additional opportunities of U.S. service exports. Jensen estimates that roughly a third of the service sector is subject to international competition.
16. *The Atlantic Century* 2009.
17. National Academy of Sciences 2007.
18. National Academy of Sciences 2010.
19. Fleischman, H.L., Hopstock, P.J., Pelczar, M.P., and Shelley, B.E. 2010.
20. Delgado, Porter, and Stern 2011.

References

- Atkinson, Robert D., and Scott M. Andes. 2009. *The Atlantic Century: Benchmarking EU and U.S. Innovation and Competitiveness*. The Information Technology & Innovation Foundation; www.itif.org/publications/atlantic-century-benchmarking-eu-and-us-innovation-and-competitiveness.
- Atkinson, Anthony B., Thomas Piketty, and Emmanuel Saez. 2011. "Top Incomes in the Long Run of History." *Journal of Economic Literature* 49, no 1: 3–71. 2011.
- Bureau of Labor Statistics. Establishment Data. Table B–1. Employees on nonfarm payrolls by industry sector and selected industry detail. www.bls.gov/webapps/legacy/cesbtb1.htm
- Charlton Research Company for Research!America. *Your Congress – Your Health Survey*, March 2011. www.yourcongressyourhealth.org/where_america.php?qq=509
- Delgado, Mercedes, Michael E. Porter, and Scott Stern. 2011. *Clusters, Convergence, and Economic Performance*. March; www.isc.hbs.edu/pdf/DPS_Clusters_Performance_2011-0311.pdf.
- Economic Research Service. 2011. *Agricultural Productivity in the United States: Overview*. Washington, DC: U.S. Department of Agriculture, May; www.ers.usda.gov/Data/AgProductivity/.
- Fleischman, H.L., Hopstock, P.J., Pelczar, M.P., and Shelley, B.E. 2010. *Highlights From PISA 2009: Performance of U.S. 15-Year-Old Students in Reading, Mathematics, and Science Literacy in an International Context* (NCES 2011–004). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- International Monetary Fund. 2011. World Economic Outlook Database. September 2011; www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx.
- Jensen, J. Bradford. 2011. *Global Trade in Services: Fear, Facts, and Offshoring*. Washington, DC: Peterson Institute for International Economics.
- Manyika, James, Susan Lund, Byron Auguste, Lenny Mendonca, Tim Welsh and Sreenivas Ramiswamy. 2011. *An Economy that Works: Job Creation and America's Future*. McKinsey Global Institute, 1; www.mckinsey.com/mgi/publications/us_jobs/pdfs/MGI_us_jobs_full_report.pdf.

National Academy of Sciences. 2010. *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*. Washington, DC: National Academies Press.

National Academy of Sciences. 2007. *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. Washington, DC: National Academies Press; www.nap.edu/catalog/11463.html.

National Center for Education Statistics, Mathematics Age 15, 2009 OECD PISA Data, International Data Explorer, nces.ed.gov/surveys/international/ide/.

National Center for Health Statistics. 2011. "Table 22. Life expectancy at birth, at 65 years of age, and at 75 years of age, by race and sex, 1900–2007" in *Health, United States, 2010: With Special Feature on Death and Dying*. Washington, DC: U.S. Government Printing Office; www.cdc.gov/nchs/data/hus/hus10.pdf#022.

Nobel Prize Facts. Accessed on November 30, 2011; www.nobelprize.org/nobel_prizes/nobelprize_facts.html.

Peter D. Hart Research Associates, Inc. and The Winston Group. 2006. *Keeping Our Edge: Americans Speak on Education and Competitiveness*. 2006. Washington, DC: Hart/Winston; www.ets.org/Media/Education_Topics/pdf/HW_KeepingOurEdge2006.pdf.

Piketty, Thomas, and Emmanuel Saez. 2003. "Income Inequality in the United States, 1913–1998." *Quarterly Journal of Economics* 118 (February): 1–41.

Sachdev, Nikhil. 2007. "An Examination of the Wage Productivity Gap." Working Paper. Stanford University.

Thomson Reuters. 2011. *Top 100 Global Innovators*; www.top100innovators.com/home.

United States Nobel Prize Winners. Accessed on November 30, 2011; www.jinfo.org/US_Nobel_Prizes.html.

U.S. Bureau of Economic Analysis. 2010. *Survey of Current Business*. Accessed 14 November 2011; April.

U.S. Census Bureau, Foreign Trade Division. Accessed November 29, 2011. "Advanced Technology Product Definitions" in *Foreign Trade Statistics*; www.census.gov/foreign-trade/reference/glossary/a/atp.html#general.