

Higher Education's Contribution to The Knowledge Economy

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Millions of people in the United States have found that earning a college degree has led them to a comfortable, middle-class lifestyle. Viewing higher education primarily as a launching pad for individual economic security and social inclusion, though, has overshadowed higher education's critical role in our economic growth. As the United States has moved from an industrial economy to a post-industrial, knowledge-based economy, American higher education has emerged as the premier system for preparing the highly skilled workers our nation requires. In the twenty-first century, America's ability to produce and disseminate education will increasingly determine its economic competitiveness.

The Changing Structure of Work

The economic landscape of the United States has changed dramatically over the past 30 years. For most of the twentieth century, the United States' economic dominance relied on a solid agricultural and manufacturing base. But by the late 1970s, the United States' industrial economy was eclipsed by a rapidly growing service economy that relied on a more diverse set of skills that favored workers with higher education.

Advances in technology and widespread globalization have contributed to changes in the structure of work. Computing technology has allowed companies to aggressively restructure production processes and employ fewer workers using more sophisticated technology. In some instances, the remaining jobs require fewer skills because technology performs the more complex responsibilities of the job. But more often, modern technologies replace the rote manual tasks performed by less-skilled workers. In the jobs that remain, increasingly sophisticated skills are required to implement and manage the technology.¹

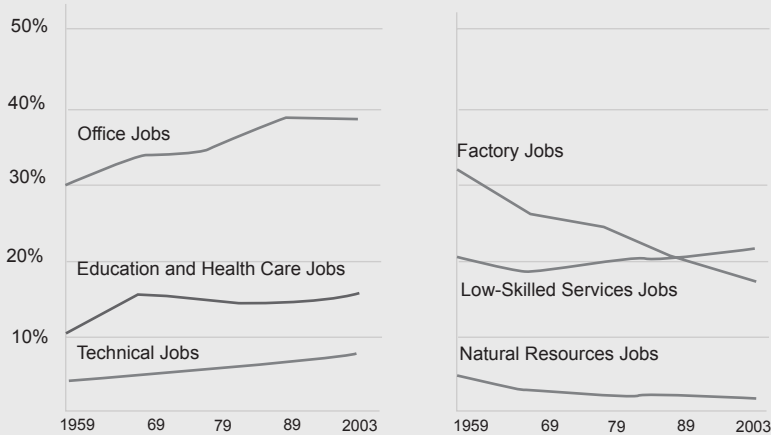
Beyond technology, globalization also has fundamentally altered domestic employment markets. The most recognizable effect is the movement of less-skilled, labor-intensive jobs—for example, in such fields as textile manufacturing—to low-wage competitors abroad. However, jobs are gained from trade as well, and they tend to be more highly skilled as globalization provides new markets for America's technologically advanced goods and services.²

1 Frank Levy and Richard J. Murnane. 2004. *The New Division of Labor: How Computers Are Creating the Next Job Market*. Princeton, NJ: Princeton University Press and Russell Sage Foundation; Peter Cappelli. 1993. "Are Skill Requirements Rising? Evidence from Production and Clerical Jobs." *Industrial and Labor Relations Review* 46, No. 3 (April); Frank Levy and Richard J. Murnane. 1992. "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations." *Journal of Economic Literature* 30 (September); Kevin M. Murphy and Finis Welch. 1993. "Occupation Change and The Demand for Skill, 1940-1990." *AEA Papers and Proceedings* 83, No. 2 (May).

2 Jeffrey D. Sachs. 1998. "Global Competition Drives Growth." In Jerry J. Jasinowski, ed., *The Rising Tide: The Leading Minds of Business and Education Chart a Course Toward Higher Growth and Prosperity*. New York: John Wiley & Sons, Inc..

Employment and Education in the United States

1959-2003, Percent Total Employment



The Demand for Higher Education in the Knowledge Economy

Changes in the structure of work have dramatically increased the demand for higher education. As recently as 30 years ago, only 28% of prime-age workers (age 30 to 59) had at least some postsecondary education. Today, more than 60% of workers in that age group have obtained some education beyond high school, and one-third of workers have baccalaureate or advanced degrees.³

Economic restructuring has created most of the new jobs in occupations dominated by highly skilled managerial and professional workers. Office jobs, the fastest growing segment of the economy, have grown from 30% of all jobs in 1959 to 39% today, while education and health care jobs have grown from 10% to 16% of all jobs (see Figure 1). The share of technical jobs, in which highly skilled workers create and deploy complex technologies--engineers, computer programmers, scientists, health and science technicians, and the like--has doubled since 1959, though it still only accounts for about 7% of all jobs.

Much of the increased demand for college-educated workers comes from rising skill requirements within existing jobs. While education and health care jobs always employed large numbers of college-educated workers, the share of those workers with at least some college has grown from 50% to 76% over the past 30 years. Technical jobs employ the most educated workers; roughly 86 percent have at least some college education.

The transition to the knowledge economy hit hardest among less-skilled workers in the factories that once served as the powerhouses of the U.S. economy. Well-paid manufacturing jobs that once provided a middle-class lifestyle for high-school-educated workers suffered the most devastating job losses, declining from 32% to 17% of all jobs between 1959 and 2003. Although there was concern that a decline in our manufacturing economy would result in a nation of low-paid, low-skilled hamburger flippers, that development has not materialized. Low-skilled service jobs accounted for 20% of jobs in the economy in 1959, and they still account for 20% today.

³ Anthony P. Carnevale and Donna M. Desrochers. 2003. *Standards for What? The Economic and Demographic Roots of Standards Based Reform*. Princeton, NJ: Educational Testing Service.

Along with increased educational requirements, new skill requirements have also emerged. General reasoning, problem solving, and interpersonal skills have all become more important in today's workplaces because most new positions are being created in education, health care, and office settings, where there are higher levels of human interaction. In manufacturing, as technology takes over more of the manual processing tasks, employees spend more time interacting with each other to effectively manage the new technologies. Most employers associate reasoning, problem solving, and interpersonal skills with educational attainment, especially college-level attainment.

Solid cognitive and applied skills also are still needed to complement general skill requirements. As jobs change and skill requirements increase, workers need sufficient cognitive abilities to learn new tasks and apply what they already know in new ways. Workers also still need occupational and professional competencies that provide the applied skills to get the job done.

The Future of the Knowledge Economy

With advances in technology and increases in globalization expected to persist, there is reason to believe that the demand for college-educated workers will continue. The most recent employment projections from the U.S. Bureau of Labor Statistics (BLS) indicate that jobs requiring higher education will grow by 22% between 2002 and 2012, nearly double the rate of growth in jobs not requiring college.⁴

Those skeptical that the economy will continue to demand large numbers of college-educated workers point out that over the next decade, the *number* of new jobs not requiring college is expected to be almost twice as large as the 7.7 million new college-level jobs projected to be created.⁵ But past projections of college-level jobs have proven conservative because they do not reflect rising skill requirements within jobs; such changes have contributed to more than three-quarters of the increase in educational attainment since 1959.

Projecting the number of new jobs requiring college is also difficult because defining these jobs is not always a clear-cut process. While only 29% of jobs in the BLS projections are considered college-level jobs, roughly 60% of the labor force has at least some college. However, college-educated workers are not necessarily underemployed—or over-educated—if they are working in a job that has not been classified as a college-level job. Job requirements can vary within occupations, and educational requirements may differ across employers, industries, and geographic locations in ways that are not accounted for by the broad BLS categories.

Wages provide the strongest evidence on the value of a college degree. Within so-called non-college jobs, those workers with college degrees earned higher salaries than their less-educated coworkers, suggesting their education makes them more productive employees.⁶ And employers are not just buying degrees. Even among workers with similar credentials, those with the highest skill levels have the highest earnings.⁷

4 Author's tabulation of the Bureau of Labor Statistics occupational projections by education. Accessed July 25, 2005 at: ftp://ftp.bls.gov/pub/special_requests/ep/optddata/.

5 Some analysts use job openings to gauge employment opportunities and educational requirements. Projections of job openings, which include net job replacements in addition to new jobs, show a greater number of opportunities for less-educated workers than do projections of new jobs. However, job openings give a much greater weight to lower-skilled occupations because those are the occupations that experience the highest rates of employee turnover. Each time a worker moves to a different occupation or leaves the labor force a new job opening is created. As a result, the large number of job openings in less-skilled jobs reflect, to some extent, greater employee turnover in these jobs. Thus, the measure of net new jobs is the best indicator of whether the economy is actually creating jobs that require high or low skills.

6 John Tyler, Richard J. Murnane, and Frank Levy. 1995. "Are More College Graduates Really Taking 'High School' Jobs?" *Monthly Labor Review* 118, No. 12 (December).

7 Peter Gottschalk and Michael Hansen. 2003. "Is the Proportion of College Workers in Noncollege Jobs Increasing?" *Journal of Labor Economics* 21, No. 2 (April).

Broader wage trends also indicate that higher education is providing workers with the skills that employers value. The wage-advantage of college-educated workers compared to high-school educated workers has nearly doubled since the late 1970s. Moreover, the rising wage premium accompanied increases in the share of college-educated workers, suggesting that higher education was not producing enough workers to meet employers' demands.

The Demographic Landscape

Past economic changes that increased the demand for college-educated workers coincided with two favorable demographic trends. First, the sizable baby-boom generation entered the workforce, and second, women joined the ranks of the employed in record numbers. As a result of these demographic changes, the U.S. workforce increased by almost 50% over the past 20 years.⁸

But members of the highly educated baby-boom generation already have begun to retire, and those retirements are expected to pick up sharply in 2011 when the first wave of boomers reaches age 65. By 2029, 44 percent of today's workforce, or 62 million working baby boomers, will have reached retirement age. Labor force growth is expected to slow to only 16% over the next two decades.⁹ Furthermore, projections suggest that minorities will account for the largest population increases in the coming years, meaning labor force growth will come primarily from workers who tend to have lower levels of educational attainment.

Baby boom workers are better educated than any prior generation, but increases in the rate of educational attainment have slowed considerably. A significant slowdown in the growth of college-educated labor is expected over the next two decades. The college-educated labor force, which increased by 107% between 1980 and 2000, will likely grow by less than one-third over the next 20 years.¹⁰ The demographic shifts already well under way will make it increasingly difficult to maintain a skilled workforce without engaging more students in higher education.

Higher Education and Economic Competitiveness

To maintain our economic competitiveness, higher education must continue to play the lead role in educating our workforce. Thus far, education has been our "ace in the hole," allowing continued investments in the development and exploitation of new technologies that increase productivity growth, and ultimately, economic growth. But competitive pressures are already mounting as countries with formerly low rates of college participation and graduation have been making gains on the United States.

Education has been a major source of productivity growth in the United States during the post-war era, and because education increases productive human capital, it contributes to overall increases in economic growth. During the postwar years from 1948 to 1973, it is estimated that education and the innovation that arose from it accounted for two-thirds of the increase in U.S. economic growth.¹¹ The economic benefits from continued expansion in access to higher education could be substantial. Increasing the country's average level of schooling by one year could increase economic growth by 6% to 15%—adding between \$600 billion and \$1.5 trillion to U.S. economic output.¹²

8 David T. Ellwood. 2001. "The Sputtering Labor Force of the Twenty-First Century: Can Social Policy Help?" in Alan B. Krueger and Robert M. Solow, eds., *The Roaring Nineties: Can Full Employment be Sustained?* New York: The Russell Sage Foundation.

9 Ellwood, "The Sputtering Labor Force."

10 Ellwood, "The Sputtering Labor Force."

11 Edward F. Denison. 1984. *Trends in American Economic Growth, 1929-1982*. Washington, DC: Brookings Institution Press; Robert J. Shapiro. 1998. "The Economic Power of Ideas." In Jerry J. Jasinowski, ed., *The Rising Tide: The Leading Minds of Business and Education Chart a Course Toward Higher Growth and Prosperity*. New York: John Wiley & Sons, Inc..

12 Steve Dowrick. 2003. "Ideas and Education: Level or Growth Effects?" NBER Working Paper 9709. Cambridge, MA: National Bureau of Economic Research; Alan B. Krueger and Mikael Lindahl. 1999. "Education for Growth in Sweden and the World." NBER Working Paper 7190. Cambridge, MA: National Bureau for Economic Research.

But if the growth of the college-educated labor force slows, as is expected in the coming decades, U.S. productivity growth will also increase more slowly. Declines in labor force quality could cut the rate of productivity growth attributed to education by one-half or more over the next 20 years, limiting wage growth and fiscal revenues, and ultimately our standard of living.¹³

The prevailing view that higher education is primarily a purveyor of individual economic opportunity rather than an engine for national economic growth provides too narrow a perspective on higher education. And without consideration of its broader economic benefits, higher education is in danger of losing public support amid arguments that those individuals who benefit should pay. But in a knowledge economy, higher education benefits more than just those who attend. A strong economy benefits us all.

13 James J. Heckman and Dimitriy V. Masterov. 2004. "The Productivity Argument for Investing in Young Children." Working Paper No. 5. Washington, DC: Committee for Economic Development, Invest in Kids Working Group (October); Bradford DeLong, Claudia Goldin, and Lawrence Katz. 2003. "Sustaining U.S. Economic Growth," in Henry Aaron, et al., eds., *Agenda for the Nation*. Washington, DC: The Brookings Institution.