

HELP WANTED: ADVANCED EDUCATION AND THE CHANGING WORKFORCE

by Anthony P. Carnevale

Introduction

Help wanted: College required.

More frequently than ever, this is the message corporate America is sending to the nation's job seekers. More than two-thirds of the jobs being created in the fastest-growing sectors of the U.S. economy — office jobs (including legal, sales and marketing, accounting, managerial and editorial positions), health-care jobs and teaching positions — now require at least some education beyond high school.

The office sector alone is having an enormous impact on the U.S. economy and the skills it demands of its workers. The percentage of U.S. jobs in the office sector has grown to 41% of the nation's 133 million jobs in 1995, up from 30% of all jobs in 1959.

And office jobs are not simply a growing piece of a fixed U.S. jobs "pie"— they also are helping to make the pie grow. By 2006, the number of U.S. office jobs is projected to grow by 4.4 million.

But creating enough college-educated workers to meet the demand will require smarter investment strategies for the dollars we now devote to postsecondary education. The stakes are high. States that do not push enough of their students through college are going to lose jobs, skilled workers and tax revenue to locations that do. In an increasingly global economy, these jobs could as easily go to workers in Tokyo as in Topeka.

Many of these new jobs are in education and health care — jobs associated with the development and maintenance of human capital. Why? Because the new economy requires more education, the demand for health care continues to rise (especially as the population ages) and because productivity is not rising as fast in these education and health-care jobs.

All of us are using more technology on the job, but the proportion of the workforce that uses advanced technical training and systems in doing its work has grown slowly as a share of the total workforce. Instead, shifting demands within the technology workforce — like the shift from pipefitters and welders to technicians — are driving job openings and worker shortages.

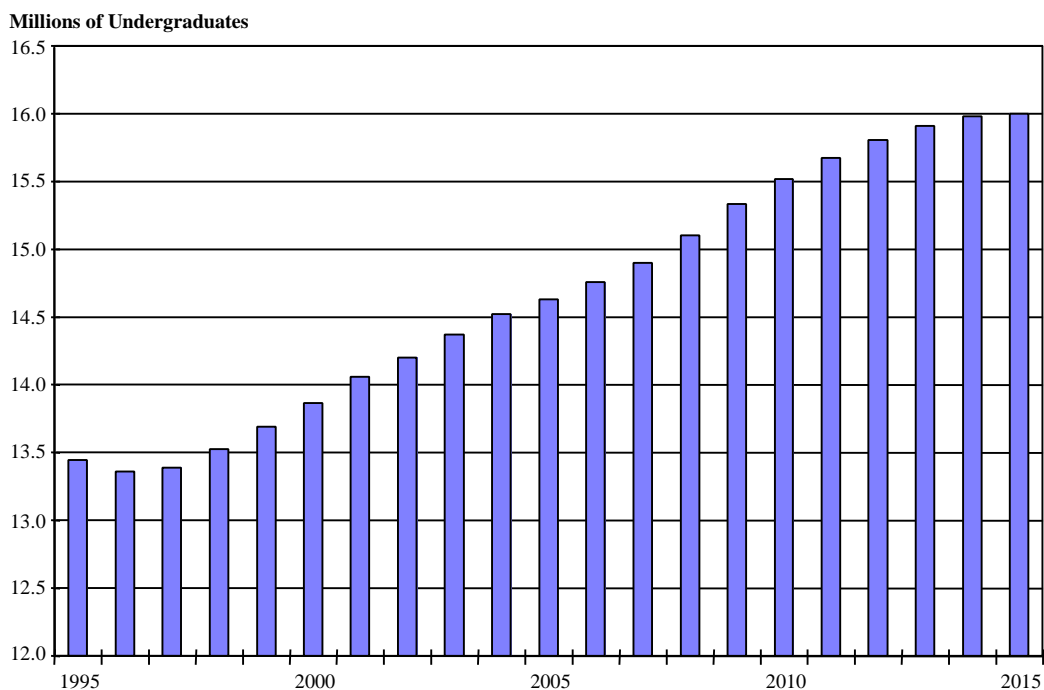
Meanwhile, the number of jobs that do not require a college education is falling. Factory jobs as a percentage of total employment has declined from 33% in 1959 to 19% in 1995, and farm jobs continue to decline. Low-wage services jobs, which constitute about 20% of all U.S. jobs, have held steady since the 1950s and are not expected to increase over time.

Even in factories or on the farm, the increasing use of high-technology equipment is demanding workers with more college-level skills. These changes already are limiting job options for some workers, especially Hispanic and African-American workers with few skills.

But as the nature of the U.S. workplace shifts and global competition grows, America faces the challenge of ensuring that supply can meet demand.

The good news is that a growing number of students will come of age as the new century dawns. "Generation Y" (or the "baby-boom echo" generation) will enter college between 2000 and 2015, and promises to be bigger and more racially and culturally diverse than any generation before it. The bad news, however, is that not enough of these students will be going to college.

Figure 1: Undergraduate Enrollment Will Expand by 2.6 Million Students



As a result of our past education successes and our surging demographic changes, by 2015 there should be an additional one million Hispanic undergraduates and an additional 400,000 African-American undergraduates on our nation's campuses. But these gains in diversity will be more apparent than real. The share of Hispanic and African-American youth on our nation's college campuses trails their share of all 18- to 24-year-olds. Even with the dramatic absolute gains in minority undergraduates, unless there are significant increases in minority college participation rates, the shortfall between Hispanic and African-American presence among all youth and their presence on college campuses could widen the gap to 800,000 minority students by 2015.

Improving access to college for students of all races, ages and income backgrounds will require a decisive response from educators and government officials at every level — elementary,

secondary and postsecondary education and local, state and federal governments. Education approaches and financial aid programs need review to ensure students are getting the skills and funding they need to enter college, finish college and secure their place in the new American workforce.

College Degrees: A Must for New-Job Seekers

More than ever before, American employers — whether industries, associations, government agencies, telecommunications firms, schools or hospitals — are making college degrees a prerequisite for new jobs. "Where did you go to college?" has replaced "Did you go to college?" as the question facing applicants in job interviews, online questionnaires and application forms, because many employers already assume their applicants have a diploma.

There are many reasons that most of the new jobs in the U.S. economy now require a college education. For one thing, college-educated Americans are more common than ever: in 1959, only 20% of workers between the ages of 30 and 59 had at least some college, while 56% of workers in that age group do today.

But there are other significant reasons, most having to do with the changing composition of the U.S. occupational structure. Specifically, the demand for college is being driven by a combination of flat growth in low-skilled services jobs, moderate growth in the absolute number of new technology-sector jobs and rapid job expansion in health care, education and what we call the office sector.

Low-Skill Jobs Are Stagnant

First, the number of low-wage, low-skill services jobs in the U.S. economy — jobs that do not require any postsecondary education — is not growing. These jobs, which include restaurant and retail jobs, still account for only 20% of all jobs in the U.S. economy — the same percentage as when Dwight Eisenhower was president.

But while the number of these low-wage jobs has stayed the same, the type of people holding them have changed over the past 20 years. In general, the share of women in such jobs has dropped substantially — from 23% in 1973 to 17% in 1995 (although the share of Hispanic women in these jobs rose from 23% to 26%). In contrast, the share of men in such jobs rose — from 10% in 1973 to 13% in 1995 (see Table 1).

Table 1: Overall, the Percent of Females in Counter Jobs Dropped Between 1973 and 1995. . .

	1973	1995	Percentage Point Change
White	21	16	-5
African American	33	17	-16
Hispanic	23	26	+3
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All Females	23	17	-6

. . . While the Percent of Males in Counter Jobs Rose

	1973	1995	Percentage Point Change
White	10	12	+2
African American	11	16	+5
Hispanic	15	23	+8
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All Males	10	13	+3

The decline in women's dependence on low-wage, low-skill jobs is due to a number of factors, including increased educational opportunities and job growth in the traditionally female sectors of education and health care, as well as expanding managerial and professional opportunities for women in office work. The increase in male participation reflects shrinking job opportunities for less-skilled men who have limited options in an economy with fewer blue-collar jobs.

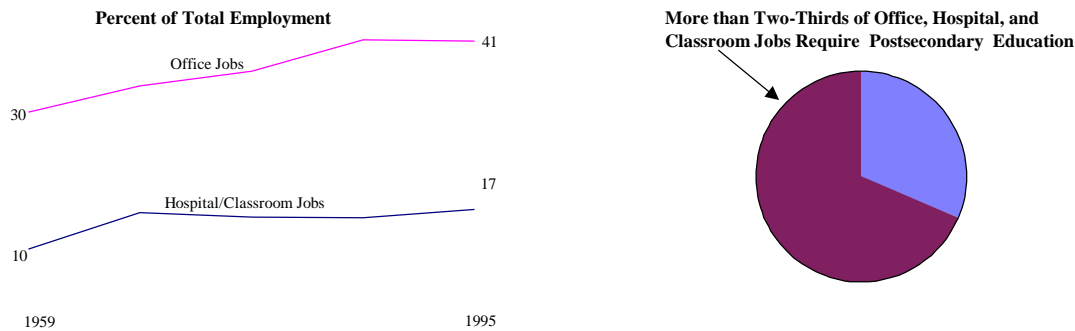
The Impact of Technology

The lightning-speed growth of the high-technology industries — such as computers and fiber-optics, as well as related industries, including telecommunications, software manufacture and design, and Internet service providers — has done two things. It has helped shrink the number of factory jobs, while increasing the skill level necessary for remaining manufacturing positions. And while new high-tech positions are creating employment, that new employment is not offsetting these losses.

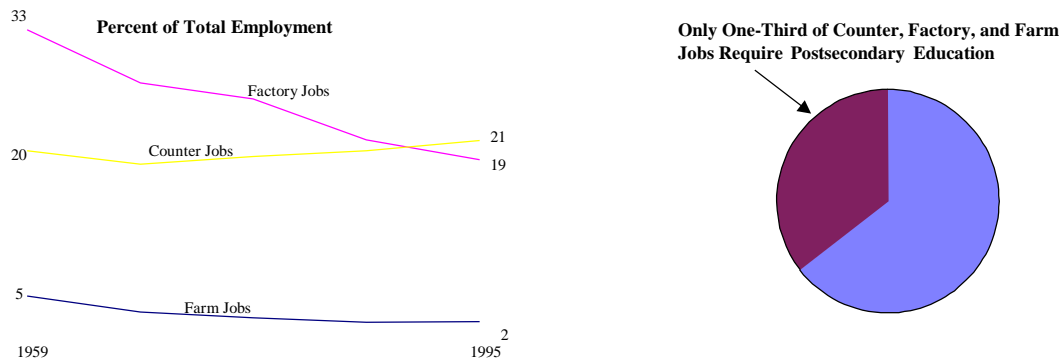
Factory jobs have decreased — from 33% of the workforce in 1959 to 19% in 1995 — in large part because new technological innovations make it possible to make or repair products or components with fewer employees.¹ Moreover, growing productivity among highly skilled factory workers has helped hold the number of high-skill blue-collar jobs to 10 million. In fact, the United States is the most productive economy in the world. It has increased real manufacturing output by

more than \$2 billion annually while cutting by nearly one-half the number of production workers since 1960.

Figure 2: Jobs in Growing, Good-Paying Occupations Require Postsecondary Education. . .



. . . While Jobs in Declining or Low-Paying Occupations Generally Do Not



With the introduction of new technologies and flexible, high-performance work processes, the workers filling factory jobs have more skills — and more education. In 1959, only about 8% of workers on the factory floor had ever attended college. By 1997, more than 34% of factory workers had.

Unskilled Hispanic males, who traditionally have relied on factory jobs to make their way into the middle class, have been hit particularly hard by this shift. In 1973, the first year that the U.S. Census Bureau started collecting data on Hispanic workers as a group, the percentage of Hispanic workers in industrial employment was 43%. By 1995, it had fallen to 28% — a full 15 percentage points. By comparison, the share of African-Americans in factory jobs fell from 34% to 24% over the same period, and the share of white workers in factory jobs fell from 30% to 20%.

Contrary to popular belief, this loss in factory jobs is not being fully offset by gains in new high-technology jobs.² This is largely because, as with factory jobs themselves, it takes fewer people to make or repair technology. And, as with the growing office, health care and education sectors, more education is expected of these workers: 86% of high-technology jobs require at least some college education, and many require B.A. or graduate degrees.

As a result, the high-technology field is usually not the answer for displaced factory or other workers — unless they have the ways and means to go back to school. Hispanic and African-American workers remain largely underrepresented in the high-technology field. In 1995, 6.7% of white workers held these jobs, compared to 4.1% of African-Americans and 3.5% of Hispanics. The gap widens in high-technology jobs requiring B.A. or graduate degrees, with 3.3% of white workers holding these jobs vs. 1.1% of African-American workers and 1% of Hispanic workers.

Ironically, while high-tech jobs are not growing as fast as jobs in offices, schools or health-care institutions, the transition from a traditional to a high-technology manufacturing base is outpacing the number of American workers qualified for these new high-technology positions. In 1998, Congress, at the urging of the U.S. business community, authorized more than 142,000 additional H-1B visas over the next three years so that companies can recruit more college-educated, high-technology workers from overseas.

Education, Health-Care Professions Are Booming

As the baby-boomer population ages and its children — Generation Y, born between 1982 and 1996 — crowd the nation's schools, demand for workers in both the health-care and education fields has grown rapidly. Unlike factory or high-technology jobs, teaching children or caring for patients are tasks that are more difficult to replace with technology. Technology can make things easier — doctors use virtual reality to prepare for delicate surgeries, and computers now appear in many classrooms. But machines simply cannot replace the human touch: they cannot perform surgery or ensure that a child truly understands how to multiply fractions. As a result, the number of health-care jobs in the United States has grown from 3.7% of all jobs in 1959 to 6.7% of all jobs in 1995. Over the same period, education jobs have grown from 5.6% to 7.9% of all jobs.

Most of these new jobs, however, require some amount of postsecondary education. More than one-half of education and health-care workers are managers or professionals, positions that require a two- or a four-year college education. Overall, 74% of all education and health-care workers have at least some college education.

Hispanic and African-American workers are underrepresented among the better-paying jobs in these fields as well. Only one in three Hispanic workers in the education and health-care fields has a managerial and professional job; they are more likely to be orderlies and cafeteria workers than doctors, nurses, teachers or school administrators. African-Americans actually have a larger representation than whites in the education and health-care fields but, again, are more likely to hold low-skill jobs requiring less education.

Office Jobs: Where the Growth Is

Another for the increase in demand for more highly educated employees is that office jobs demand them. And that is where most of the new jobs are.

The U.S. economy has, in large part, traded its hard hat for a briefcase. The country that made the assembly line famous now employs more office workers than factory workers. Office jobs, a definition that also includes those working in the headquarters of manufacturing companies, now number 54 million, or 41% of the 133 million jobs in the American economy.

By 2006, the number of new office jobs is expected to swell by 4.4 million. In comparison, the information technology field is only expected to add 750,000 new jobs by then. How can this be when every governor in America has his or her state's CEOs beating the drum for new technology jobs and technology training?

As in other economic sectors, when one takes a careful look at what workers in "technology firms" actually do, it turns out that fewer workers than one thinks need or use technical skills.

Consider Intel Corporation, the world's primary silicon-chip producer, with \$30 billion in annual sales and more than 60,000 employees. Surprisingly, only about one in four Intel employees require advanced technical training. So just what do Intel workers do?

About 15% of the company's employees are researchers (see Table 2). An additional 10% represent a small share of the many Intel employees who are involved in chip production and facility maintenance and require advanced skills. The other production and maintenance workers use sophisticated machinery, but perform relatively routine functions. An additional 30% of the Intel workforce are office workers to the core — managers, administrators and sales staff.

Office workers — stockbrokers, accountants, managers, lawyers, editors, salespeople and the like — also are America's best-paid group of employees. On average, male office workers with B.A. degrees or more earned \$63,100 a year in 1995, and female office workers with B.A. degrees or more earned an average of \$36,400. (In comparison, annual salaries in the health-care and education fields in 1995 averaged only \$57,400 for males and \$33,500 for females.) Office workers also are well-educated: 66% of office workers today have at least some college education, while 30% have B.A. degrees.

Hispanics, in particular, are not getting their share of these new office jobs. Only one in four Hispanic men and one in three Hispanic women were employed in office work in 1995, compared to almost one-half of white workers and 36% of African-American workers.

**Table 2: Only 25% of Intel Workers
Require Advanced Technical Training**

Work Category/ Job Class	Education/ Training	Percent of Intel Workforce
Research	Bachelor's or advanced degree required	15%
Chip Production and Facility Maintenance		25% of Intel workers <u>require</u> advanced technology training.
Repair and Set-Up	Advanced tech training with some college required	10%
Operators and Packers	High school or some college	45%
		75% of Intel workers <u>do not require</u> advanced technology training.
Management, Administration and Sales	Some college, B.A. or advanced degree	30%
		===
All Intel Workers		100%

Source: Author's calculation from 1998 Intel Annual Report.

Standards Rising for Existing Jobs

Clearly, the number of new jobs requiring college degrees, across virtually every sector, is growing. But growing, too, are the skill and education requirements for existing jobs in the U.S. economy. The largest share of the increase in postsecondary education requirements — about 72% — comes from higher skills required in jobs that previously did not require college-level skills. A smaller, but still significant share — about 28% — comes from occupational shifts toward jobs that traditionally have required postsecondary education.

To put it another way, nearly three-quarters of the demand for workers with higher education comes from educational upgrading within each occupation. The remaining one-quarter is due to a shift in the distribution of occupations to those having historically required higher-education credentials. In other words, the rise in the share of managers and professionals from 17% in 1959

to 29% in 1997 represents the shift between jobs. The increase in the share of managers with a four-year college degree from 40% in 1959 to 57% in 1997 represents educational upgrading.

This is the case at most every level: "elite" jobs, held by managers and professionals; "good" jobs, held by crafts workers, technicians or clerical employees; and low-skill jobs, held by factory workers and retail salespeople.

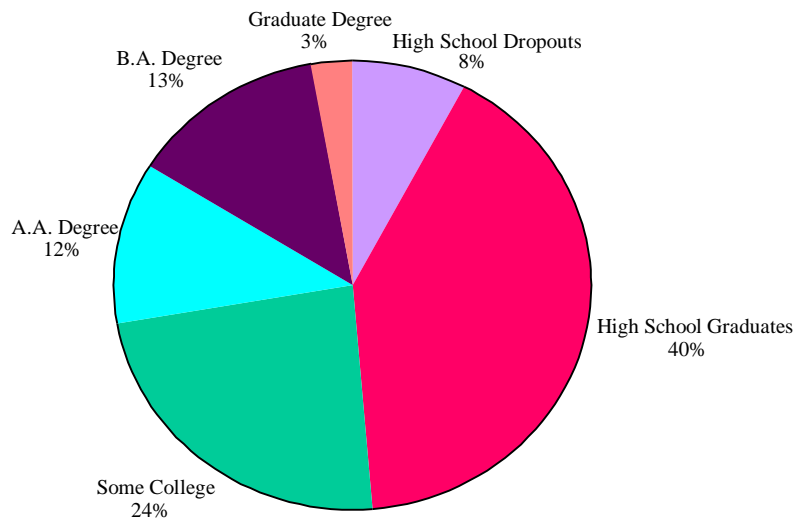
Between 1959 and 1996, the percentage of the nation's managers and professionals holding bachelor's degrees rose dramatically, from 41% to 62%. Over the same period, the percentage of these elite jobs that were awarded to individuals with no college education fell from 22% to 12%, while the percentage awarded to high-school dropouts fell from 15% to 2%.

Today, 34% of the nation's 84 million prime-age workers (those between 30 and 59 years of age) hold high-paying managerial or professional jobs — jobs paying an average annual salary of \$59,000 for men and \$34,000 for women. Of these, more than 85% have at least some postsecondary education.

The story is the same among people who hold "good" jobs, such as crafts workers, technicians and clerical workers. In 1959, 57% of the men and 30% of the women holding such jobs were high-school dropouts. By 1996, only 10% of the men and 5% of the women holding these same jobs were high-school dropouts. Instead, more than one-half of the workers in these jobs in 1996 had two-year degrees or some college coursework. In 1959, only 14% of the men and 19% of the women holding these jobs had two-year degrees or less.

Today, 37% of the nation's prime-age workers hold these "good" jobs, which pay an average annual salary of \$36,000 for men and \$21,000 for women. Of these, more than one-half have attended some college, more than one-third have two-year degrees and more than 15% have four-year degrees or better.

Figure 5: Over One-Half of Good Technician and Skilled Jobs Have Postsecondary Education. The Average Pay for Good Jobs Is \$36,000 for Men and \$22,000 for Women.



Campus, Workplace Diversity Are Increasing, But Not Fast Enough

From a diversity standpoint, there is good news: the percentage of Hispanic and African-American undergraduates in America's colleges and universities has grown, and their participation in the economy's better jobs has grown along with it.

As both minority and majority populations increase their college enrollment and graduation rates, the opportunity gap is closing slowly. But the gap persists, especially in attainment of B.A.s. In general, minority women are making more progress than minority men, especially Hispanic men. As a group, Hispanics are farthest behind.

Between 1973 and 1996, the share of Hispanics with some college education rose from 9.2% to 18.4% for men and from 7.5% to 24.4% for women. The percentage of Hispanics with four-year degrees rose over the same period, from 3.7% to 7.5% for men and from 3.8% to 10.4% for women. For African-Americans, by 1995, 43% of males and 52% of females had some postsecondary education.

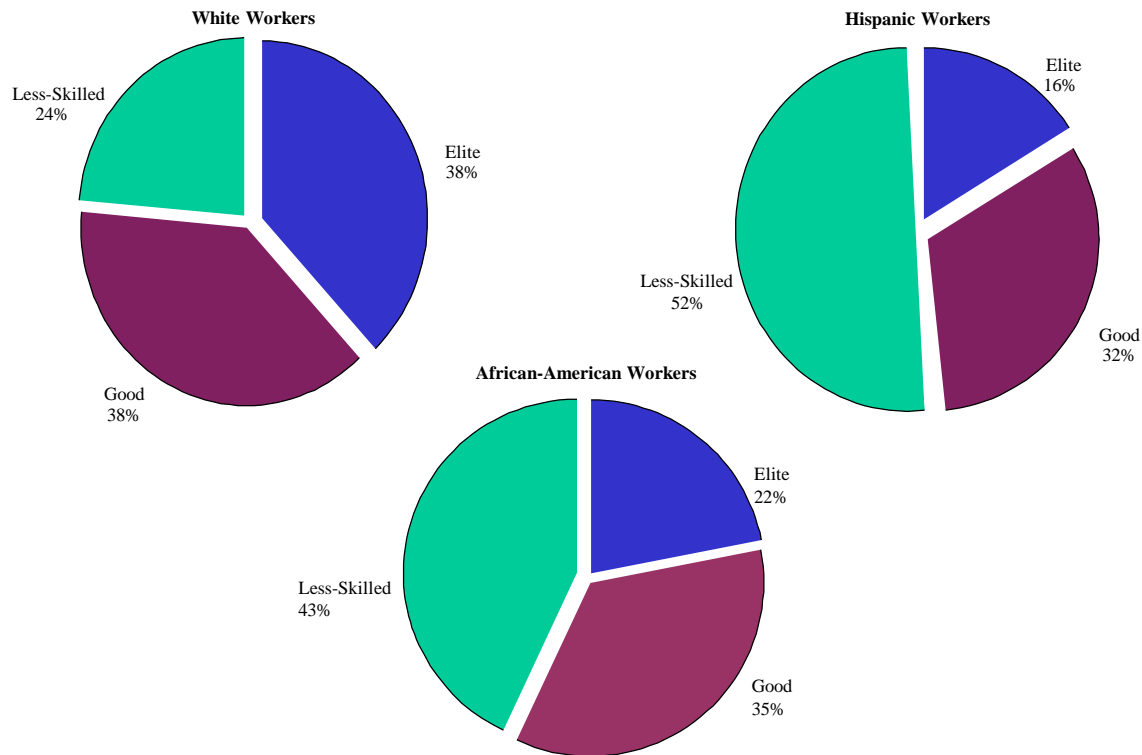
The number of Hispanics and African-Americans holding better jobs has risen, too. From 1979 to 1997, the number of Hispanics employed in the economy's professional and managerial jobs rose by 3%, with a higher proportion of Hispanic women (19.8%) holding these jobs than men (13.3%). In 1995, 16.5% of African-American males and 23.4% of African-American females

held the nation's elite jobs, and 33% of African-American males and 34.7% of African-American females held "good "jobs.

But again, from a diversity perspective, there remains cause for concern. While African-American and Hispanic students are entering and staying in college in greater numbers — and thus landing the jobs that only a college degree can bring — so is the rest of the population. From 1973 to 1996, the number of white students with some college education grew from 13.3% to 27.2% for men, and from 11.9% to 29.4% for women. Over the same period, the number of white students awarded four-year degrees rose from 9.6% to 18.6% for men, and from 7.3% to 18.2% for women. And, on average, white students who enter college are more likely than either Hispanic or African-American students to finish college with a four-year degree.

Although more good and elite jobs are held by African-American and Hispanic workers than ever before, white workers continue to hold a larger percentage of the nation's elite and good jobs, while African-American and Hispanic workers hold substantially greater shares of the nation's less-skilled jobs.

Figure 6: Hispanic and African-American Workers Are More Likely than White Workers To Be Employed in Less-Skilled Jobs



What Impact Would True Educational Equity Have on America's Economy?

These trend lines reveal a stubborn, troubling pattern. Right now, it appears that not enough members of Generation Y will go to college. Projections show that by 2006, low-skilled workers in the U.S. economy will outnumber low-skill jobs.

But imagine an alternative scenario — one in which the African-American and Hispanic communities had the same distribution of college education as the white community.

First of all, we would fill more of those college jobs that might otherwise go begging, go to underskilled American workers or go to foreign workers. Second, the difference in national wealth that would result from this infusion of human capital would be startling. If African-Americans and Hispanics had the same education as the white majority, African-Americans would add \$113 billion annually in new wealth, and Hispanics would add another \$118 billion to the nation's annual economic output. Together, that is \$231 billion a year, an amount equivalent to 6.8% of all Americans' earnings.³ Moreover, assuming an average federal, state and local tax rate of 35%, the new wealth created by this new human capital would result in more than \$80 billion in additional public revenues.

Increasing human capital among the African-American and Hispanic communities also would substantially benefit minority families. This new earning power from enhancements in human capital would reduce the proportion of Hispanic families with "inadequate" incomes from 41% to 21% and the proportion of African-American families with "inadequate" incomes from 33% to 24%.⁴

In sum, boosting the education and income of African-Americans and Hispanics would have numerous economic benefits. First, it would help ensure an adequate supply of skilled workers. Second, it would substantially increase national wealth. Third, the revenue from higher employment and earnings could be used for critical public purposes or to reduce taxes. Fourth, and finally, higher incomes would substantially raise the standard of living of minority families and increase the quality of their lives in countless ways that cannot be measured.

College: Now More Than Ever

More than ever, college is a must. As noted above, more new jobs require college education, and more existing jobs are raising their skill requirements to college levels. As a result, postsecondary education has become this country's worker training and retraining system.

And though a bumper crop of young talent is moving through the nation's school system, we must redouble our efforts to ensure that these students enroll in college — and graduate. More Hispanic and African-American students are entering U.S. colleges and universities, but not enough. Many are limiting their college experience to two-year programs or just some college instead of finishing four-year programs. Meanwhile, the rising cost of a college degree is likely to have an impact even on those students who plan to attend college.

Yet without that college experience, these young people will find it difficult to form stable families, and too many could spend time on the welfare roll, not a payroll. The relative number of jobs that pay a family wage available to unskilled workers in the U.S. economy continues to drop.

Help is needed to ensure that the maximum number of Generation Y students make it into college and stay on to finish their degrees. This will take skill-building at every level of the nation's education system. And it will take some family-building as well: students who would be the first in their families to attend college must learn that, yes, college is for them, too.

The nation's postsecondary education institutions will need to handle the new wave of 18-to 24-year-old students from Generation Y, while maintaining their commitment to nontraditional students — those who are often older, have families and may be working or looking for work. Already, 42% of all college students are over the age of 24. Among Hispanics, more than one-half are above the age of 24.

Nontraditional students rely on two-year and four-year institutions for retraining or a second chance. For instance, more than 75,000 dislocated workers used Pell grants, and 48% of them also used college loans to restart their careers in 1990-91, the most recent year for which these data are available. In 1996-97, 357,400 welfare recipients and 119,400 of their dependents used Pell grants to improve their prospects. Our own assessments suggest that 32% of women on welfare are ready to do postsecondary work and, with a boost from 200 hours of basic-skills preparation, another 37% would be ready.

If more is not done for the workforce of the future, the U.S. economy of the new century may face rough waters. Keeping the U.S. workforce well-educated is critical to filling the economy's jobs. This is crucial if America is to compete with its overseas competitors. This, in turn, is crucial to ensuring that America's high-wage, high-skill jobs are filled by Americans, in America. Without an educated workforce, companies may relocate or, as they did in 1998, bring in more overseas talent.

Better skill-building, more funding, greater access to a college education — an all-hands-on-deck approach to the education challenges of America's new century is required. The time for it is now.

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Endnotes

¹International trade is another factor that can both create and eliminate jobs, particularly in the manufacturing sector. It is believed that two million of the 15 million jobs "lost" in manufacturing since 1959 (jobs that might exist today if manufacturing jobs accounted for the same percentage of U.S. jobs that they did in 1959) have been lost because of international trade, either as a result of increased foreign competition or the movement of a U.S.-based job to an overseas location. In general, U.S. jobs lost to international trade tend to be low-wage, low-skill jobs, while jobs gained through trade tend to be high-skill, higher-paying positions.

²For purposes of this discussion, "high-technology jobs" refers only to those jobs that are heavily science-based or use specialized machinery and equipment. These jobs generally require a bachelor's degree or more (such as engineers, chemists, computer systems analysts) or some specialized postsecondary education (such as computer programmers, medical technicians or cad-cam operators).

³In 1995, the 12 million Hispanic workers earned, on average, \$18,300 for a total of \$220 billion. If their earnings per worker equaled that of white workers (average earnings of \$28,200), then total Hispanics' earnings would have been \$338 billion or \$118 billion more. In 1995, the 14 million African-American workers earned more per worker than Hispanics (\$20,200), accounting for \$287 billion. If their earnings had been equivalent to that of white workers, then their total earnings would have risen to \$400 billion or \$113 billion more.

⁴When all reported incomes are adjusted for family size, 41% of Hispanics, 33% of African-Americans, and 14% of whites are living in families below the "minimum but adequate" level, as defined by the U.S. Bureau of Labor Statistics. If, however, Hispanics and African-Americans had the same education level and commensurate earnings as whites, the earnings of Hispanic men would increase by 71%, Hispanic women by 34%, African-American men by 53% and African-American women by 15%. The resulting household income distribution would leave 21% of Hispanic families and 24% of African-American families in households with incomes below the "minimum but adequate" level. It is noteworthy that even after equalizing education attainment, the proportion of African-American and Hispanic families with incomes below the "minimum but adequate" level is still substantially above the proportion of white families below the "minimum but adequate" income level (seven percentage points for Hispanics and 10 percentage points for African Americans). This remaining difference is due to many factors, but principally because, compared to whites, both Hispanics and African-Americans have larger families, a younger age and earnings profile, and more single female-parent households.