

Learning and Earning in Vacationland: *Promoting Education and Economic Opportunity in Maine*

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Technological innovation, globalization and other economic forces together shape the structure of jobs and the way we work. While such forces have always been at play, they have gained momentum over the last 40 years with the advent of a new economy that is increasingly reliant on skilled workers with a postsecondary education. This trend is evident in all sectors of Maine's economy. In this article, Carnevale and Desrochers show where the jobs are in Maine and how the education attainment of those who hold such jobs has changed over the last 40 years. Then, they look at where the jobs will be in the future and the skills that employers want. They project that the forces fueling the demand for college-educated workers today will continue to grow, along with the income divide between those who have some postsecondary education and those who do not. 🐉

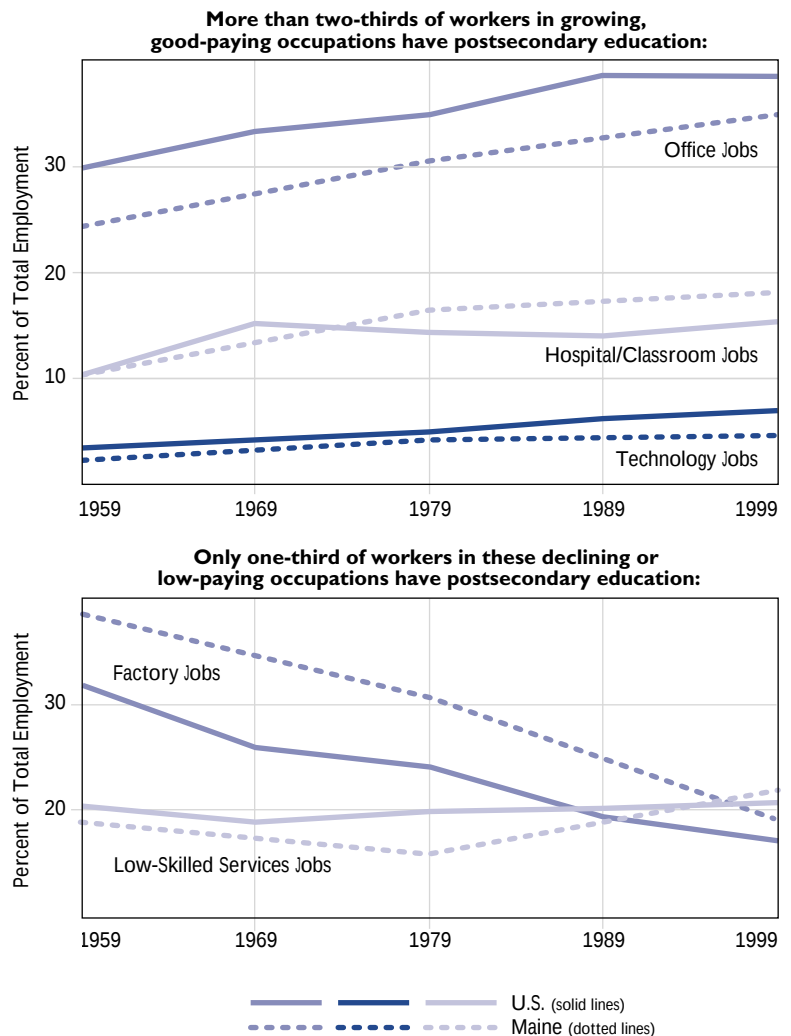
INTRODUCTION

In the latter part of the twentieth century, the U.S. economy underwent dramatic changes. Technological innovation, globalization, and other economic forces affected the structure of jobs and the way we work, fueling increases in educational attainment and the demand for skill. Maine has not been immune to these changes. Changes in education requirements and the structure of jobs in Maine mirror that of the United States. Once prevalent factory and natural resource jobs—such as those found in the Biddeford-Saco mills and the granite quarries of Hancock and Washington counties—have been supplanted by jobs in offices, health care, education, and technology. High school diplomas, once sufficient to access a good Maine job, are increasingly yielding to postsecondary credentials as the best jobs go to those with the most education. And while no one can predict the future, today's economic and demographic realities suggest the opportunities and challenges that will face Maine and the nation in the years to come.

Increased skill requirements, while beneficial for the most educated and skilled workers, are ever more problematic for the least educated and skilled. As employers increasingly turn to workers with at least some college or postsecondary training to fulfill a wide variety of labor-market slots, the least educated workers are left with fewer opportunities to access relatively good-paying jobs.¹ Currently, over one-half of Maine jobs are held by workers with at least some college, a sizable increase from just 16% in 1959. And nationally, the wage premium for college-educated workers, compared with high school-educated workers, has increased by almost 70% since the early 1980s in spite of the fact that the supply of college-educated workers has increased by 60% over the same period.

Looking into the future, there is every reason to believe that the economic and technological forces that fuel the demand for college-educated workers will continue to grow, along with the income divide between those who have some postsecondary education and those who do not. The changes already under way increase the need to create stronger relationships between high schools and colleges, communities, and employers. For Maine to remain economically competi-

Figure 1: Employment and Education, 1959-1999

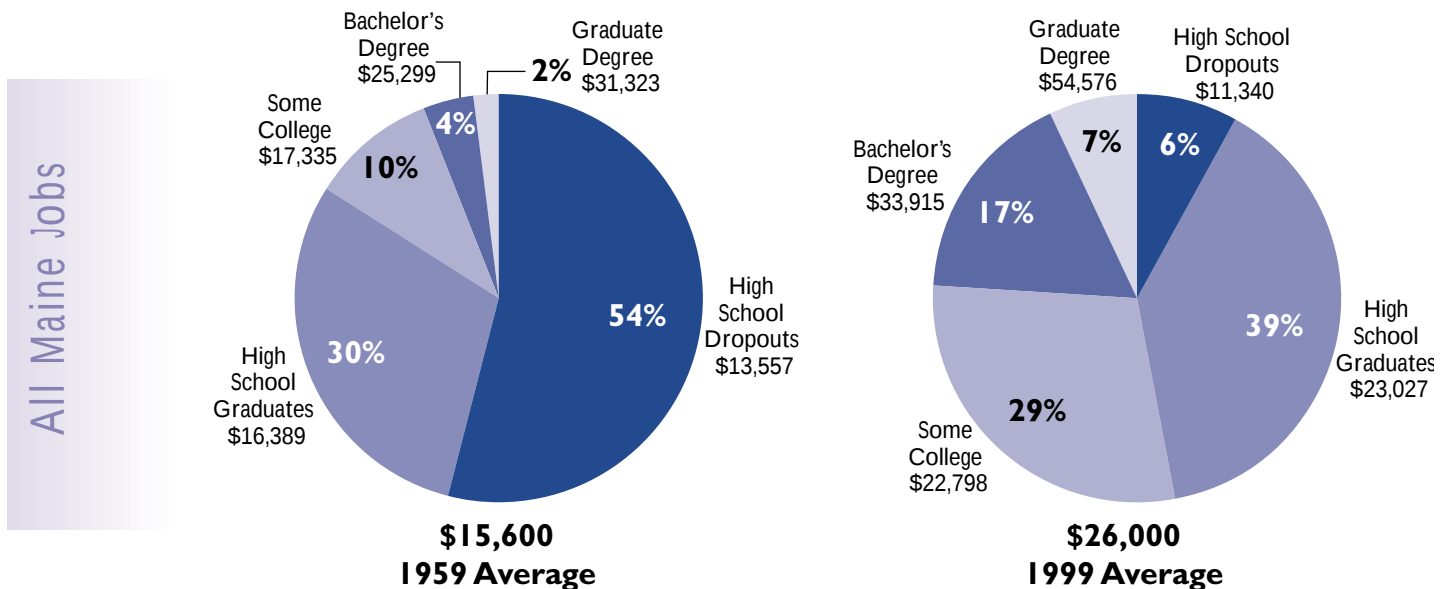


Source: Authors' Analysis of Census Public Use Micro-Sample (1960, 1970, 1980, and 1990), and Current Population Survey (March 1998-2000).

tive, its youth and adults must have increased access to postsecondary education and training opportunities.

Demographic trends will bring added pressures to the economy. Baby boomers with postsecondary education will retire over the next twenty years. At the same time, Maine will begin to feel the economic effects of a two-decades-long decline in its youth population as this cohort reaches working age. The increasing need for skilled labor will likely be exacerbated by these

Figure 2: Distribution of Education in Maine Jobs, 1959-1999
Percent of total employment. Earnings in 1999 dollars.



Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

demographic factors alone, resulting in a diminished supply of workers with postsecondary education.

The growing importance of education in overall economic growth and individual opportunity creates two primary economic challenges for education reformers. The first is to meet the need for a greater quantity and quality of human capital necessary to foster growth in the Maine economy. The second is to reduce the growing differences in family incomes by promoting postsecondary education and training that can alleviate the earnings gap between the state's most and least educated.

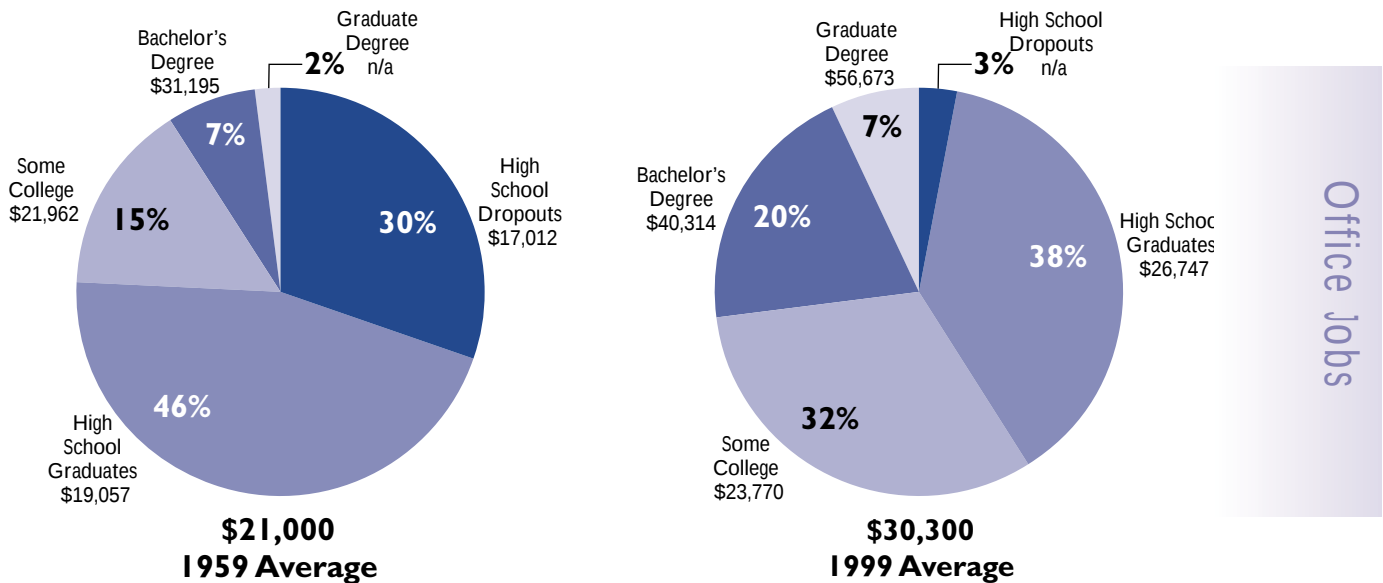
WHERE THE JOBS ARE

Early in this country's history and, in fact, through most of our first 200 years, a job was relatively easy to find—especially an entry-level, low-skilled job. Throughout our history, the American dream, and for many, the American reality, has been that people could start at the bottom and, without much formal educa-

tion, work their way to the top. Even in the modern industrial era beginning in the early twentieth century, when college became a requirement for the growing numbers of professionals, getting through high school and then working hard and playing by the rules were enough to secure good jobs for most of the rest of us. But in the past 40 years, the rules have changed because the nature of the global economy has changed.

The concentration of jobs in the United States today is radically different than it was in 1959. In the new economy, the number of high-paying, blue-collar jobs available to workers with high school diplomas is shrinking, largely as a result of productivity improvements.² As in the nation at large, the shares of Maine factory and natural resource jobs, such as farming, fishing, forestry, and mining, have each declined by at least one-half, while the share of jobs in low-skilled services has remained relatively stable (see Figure 1). Factory and natural resource jobs have not only lost employment shares, but have suffered actual job losses.

Figure 3: Distribution of Education in Maine Office Jobs, 1959-1999
Percent of total employment. Earnings in 1999 dollars.



Note: n/a indicates the sample size was too small to provide reliable earnings estimate.

Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

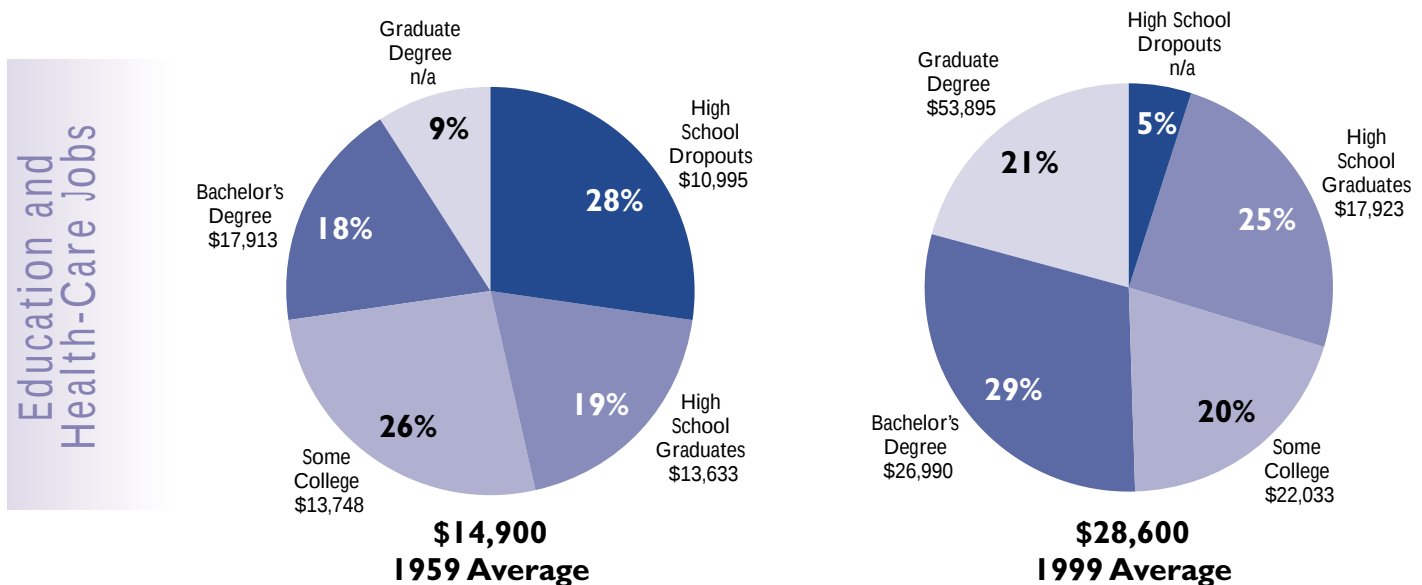
New job creation has been concentrated in “knowledge jobs” rather than in production or natural resource jobs. Tracking the share of total employment shows that while jobs in hospitals and classrooms have grown substantially, white-collar office employment has grown even more, accounting for 35% of all Maine jobs in 1999. The overall number and share of technology jobs also has grown, but the technology sector still does not represent a large share of all jobs.

The changes in the kinds of jobs available and the skills required to get them have been dramatic. These days, if the competition for jobs were a track meet, one might think of entering the job market as competing in the pole vault: The bar is very low for entry-level jobs with low pay; at most, all a person needs is a high school diploma. The bar is set quite a bit higher for jobs in the middle tier of the economy that require at least some college and preferably an associate degree. And for the really good jobs, the bar is far above one's head—and the only way to vault it is with at least an associate degree and preferably a bachelor's degree.

In 1959, only 16% of Maine workers had any postsecondary education (see Figure 2). Today, 53% of workers have attended some type of postsecondary institution. In fact, the proportion of workers with an associate degree, certificate, or some college has almost tripled from 10% to 29% of the workforce. The proportion of workers with bachelor's degrees has increased four-fold from 4% in 1959 to 17% in 1999, while graduate degree holders have increased at a similar pace, increasing from 2% to 7% over the same period.

The educational changes in the skills of workers generally result from two kinds of labor market shifts: 1) a shift in job creation toward occupations that tend to require at least some college; and 2) increasing postsecondary skill requirements in all jobs, many of which only used to require high school or less. In the United States, the largest share (about 72%) of the increase in postsecondary education requirements comes from “upskilling”—higher skills demanded by employers for jobs that previously did not require any college.

Figure 4: Distribution of Education in Maine Education and Health-Care Jobs, 1959-1999
 Percent of total employment. Earnings in 1999 dollars.



Note: n/a indicates the sample size was too small to provide reliable earnings estimate.

Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

A significant but smaller share (about 28%) comes from occupational shifts toward jobs that have always required postsecondary education.³

White-Collar Office Jobs

The greatest increase in Maine jobs has occurred in offices, whether situated in downtown Portland or more suburban and rural office buildings. Office workers—managers, accountants, editors, and marketers among other office jobs—are the largest, fastest-growing, and generally best-paid group of employees. In 1999, there were 223,000 white-collar office jobs in Maine, or 35% of all jobs, up from just 24% in 1959. These office jobs tend to pay more than jobs in other economic sectors, an average of \$30,300 per year.

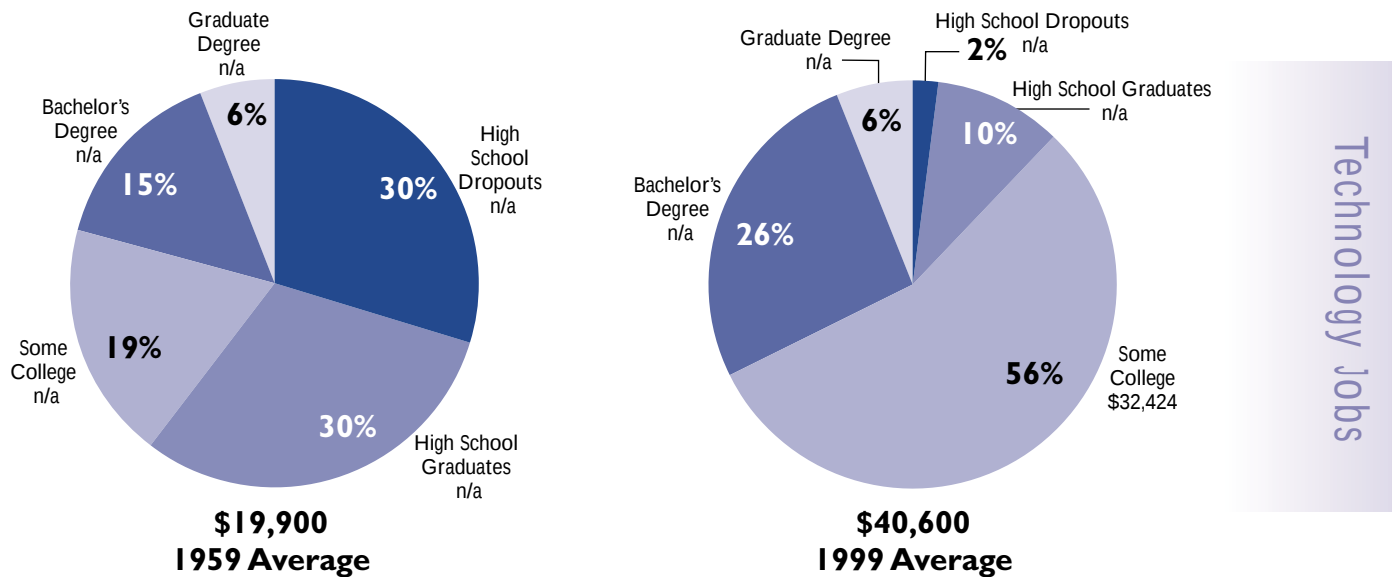
Office workers are on the frontlines of the knowledge economy. They don't create productivity-enhancing technology and do not have specific technical skills, but they are more productive because they are empowered by the information technology that has spread throughout the workplace. In 1959, only 24%

of Maine office workers had some kind of postsecondary education. Today, 59% of office workers have some kind of postsecondary education, while 27% have at least a bachelor's degree, making office work one of the most highly educated job sectors (see Figure 3).

Education and Health-Care Jobs

More Mainers are working in education and health care—jobs associated with the development and maintenance of human capital—because the new economy requires more education and the demand for health care continues to rise, especially as the local Maine population ages and others choose to spend their retirement years on the coast, lakes, and mountains of Maine. Furthermore, across the nation productivity is not rising as fast in education and health-care jobs as it is in manufacturing, so the need for workers remains strong. Because of increased demand and slow productivity growth, health care had grown to 8% of all jobs by 1999. Over the same period and for similar reasons, education jobs had grown to 10% of all jobs.

Figure 5: Distribution of Education in Maine Technology Jobs, 1959-1999
Percent of total employment. Earnings in 1999 dollars.



Note: n/a indicates the sample size was too small to provide reliable earnings estimate.

Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

The health-care and education sectors have always been one of the most postsecondary education intensive in the economy. Even in 1959, more than one-half of workers in schools and health-care institutions across Maine had at least some higher education. In 1999, 70% of education and health-care workers had at least some college—second only to technology jobs (see Figure 4).

Technology Jobs

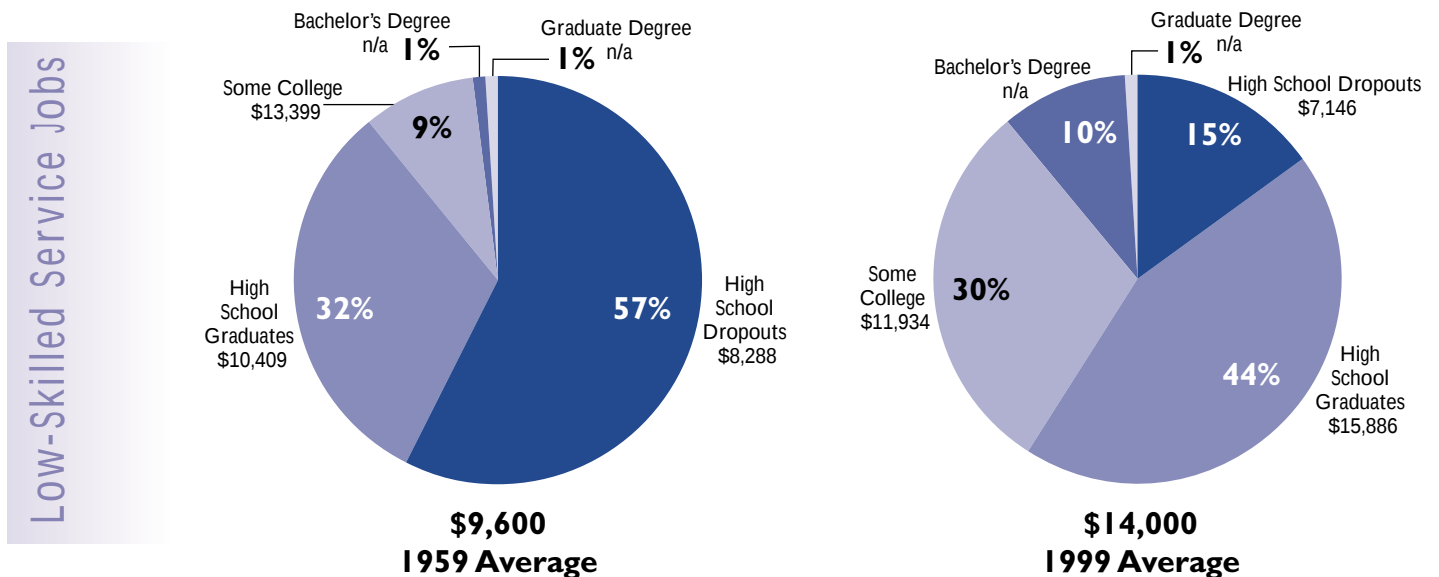
Since the late 1950s, the share of technology jobs has doubled, but they still only account for about 5% of all jobs in the Maine economy and 7% in the U.S. economy.⁴ More and more of us are using technology on the job, but it takes fewer of us to make, maintain, or repair our information technology.⁵ Increasing productivity has held the overall number of jobs in the United States that require technical education to around 10 million, out of the total 138 million jobs in the economy; about 30,000 of these technology-related jobs are in Maine.

However, changing demands within the technical workforce—for instance, the shift in jobs from high-tech crafts workers to computer technicians—do create surpluses in declining occupations as well as openings and worker shortages in growing occupations. While technology jobs have always required highly educated and skilled employees, the demand for these workers has increased. In 1959, four in 10 technology workers in Maine had at least some college and by 1999, 88% had postsecondary education—but less than one-third of those workers held a bachelor's degree or more (see Figure 5).

Low-Wage Services Jobs

Low-wage services jobs are a mixed bag. For some they are dead-end jobs, but for many they are transitional jobs that provide entry-level work that leads to further education or career mobility. Most of these jobs are at the bottom of the earnings and skill hierarchy. They include jobs for cashiers, retail clerks, stockers, restaurant workers, cleaners, and other occu-

Figure 6: Distribution of Education in Maine Low-Skilled Service Jobs, 1959-1999
Percent of total employment. Earnings in 1999 dollars.



Note: n/a indicates the sample size was too small to provide reliable earnings estimate.

Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

pations that typically pay low wages and require low skills. In Maine, many of these jobs support its seasonal tourism industry.

There has not been a significant shift in the share of low-wage service jobs in Maine. After a slight dip, the share of these jobs today is just slightly higher than the share in 1959, increasing from 19% to 22% of all jobs. The majority of these jobs require high school or less. In 1959, 89% of Maine workers in low-wage services jobs had only a high school education or less—with more than one-half being high school dropouts. Today, still nearly 60% of workers in these jobs do not have any postsecondary education, although they are more likely to be high school graduates than dropouts (see Figure 6).

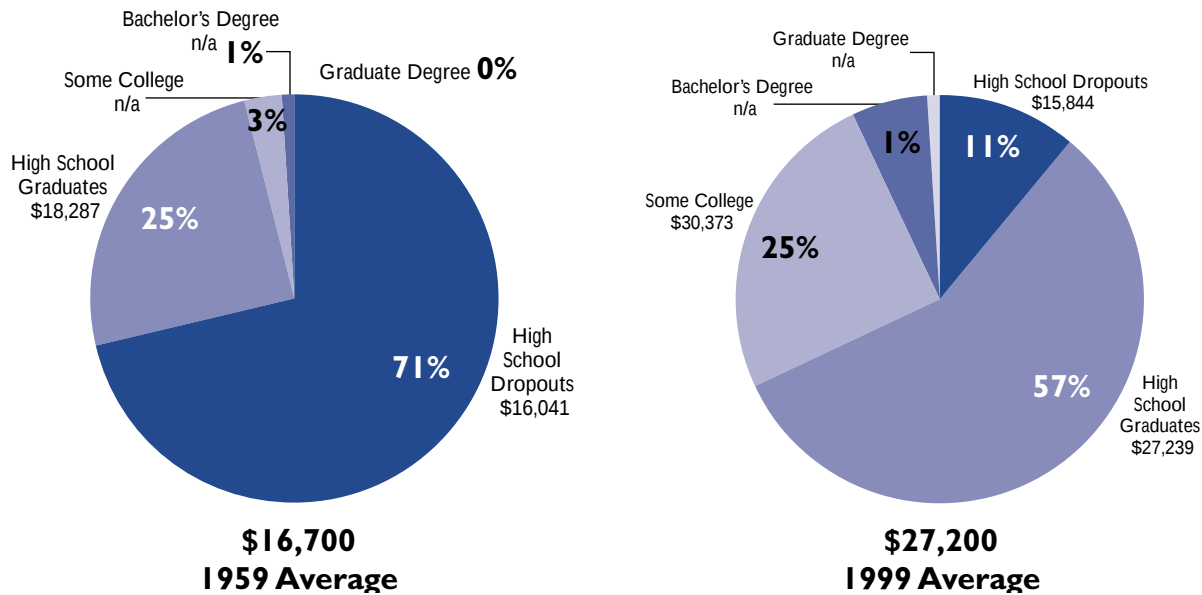
Low-wage service jobs are easy to get but they do not pay well and carry few or no benefits. Among those workers with postsecondary education who are employed in these types of jobs, many are students who are working seasonally or temporarily until they complete their education. This is especially true for workers under the age of 25, who nationally comprise

about 30% of employment in this sector and will likely move on to better jobs when they complete their education. Low wages and no benefits are not a long-term concern for people such as students, part-time workers, retirees, and others who do not want or are not ready for better jobs. At the same time, those stuck in these jobs for the long-term do struggle to meet basic living standards.

Factory Jobs

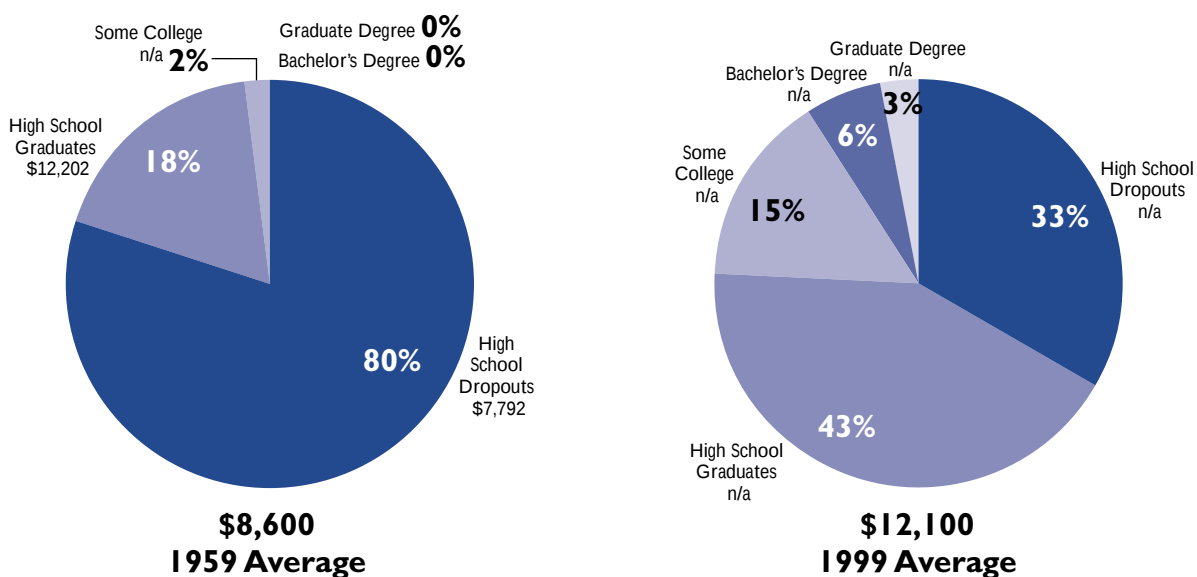
Factory jobs, once the stronghold of the Maine economy, are shrinking both proportionally and in absolute numbers. In 1959, the share of Maine jobs that were factory jobs exceeded the share of office jobs found in Maine today. Between 1959 and 1999, the share of factory jobs fell from 38% to 19% of all jobs. That translates to 122,000 fewer factory jobs in 1999 than would have existed had the 1959 share of employment continued.

Workers who have skills beyond high school are increasingly filling the declining number of factory

Figure 7: Distribution of Education in Maine Factory Jobs, 1959-1999*Percent of total employment. Earnings in 1999 dollars.*

Note: n/a indicates the sample size was too small to provide reliable earnings estimate.

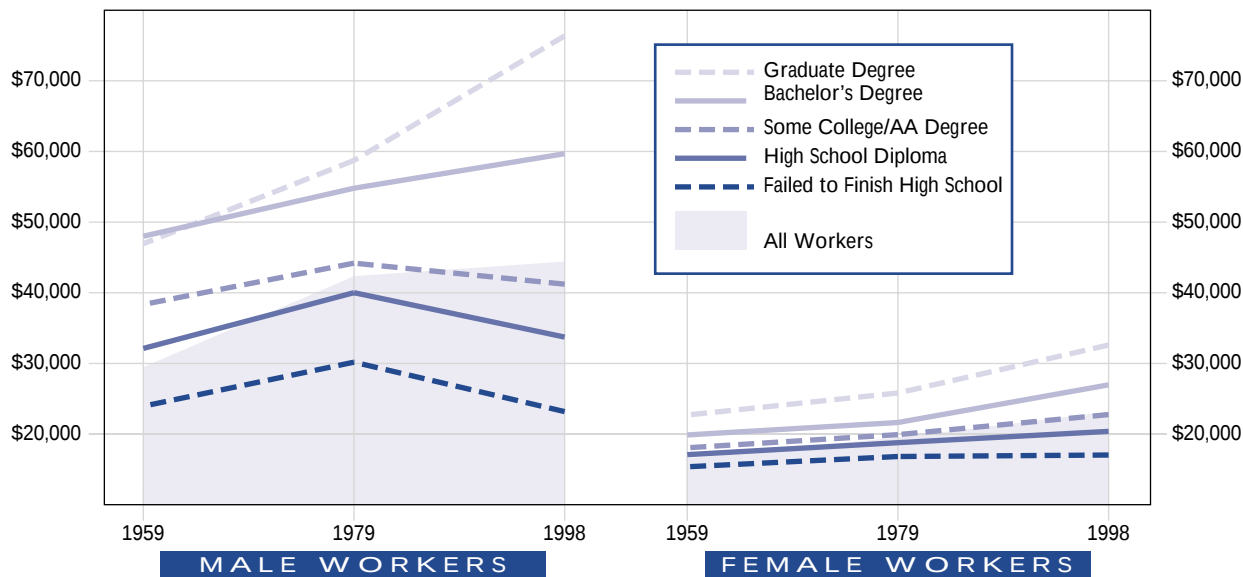
Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

Figure 8: Distribution of Education in Maine Natural Resource¹ Jobs, 1959-1999*Percent of total employment. Earnings in 1999 dollars.*¹ Includes farm, fishing, forestry, and extractive occupations.

Note: n/a indicates the sample size was too small to provide reliable earnings estimate.

Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1998-2000).

Figure 9: Earnings Depend Increasingly on Educational Attainment
Earnings of prime-age (30-59 year-old) workers in 2000 dollars.



Source: Authors' Analysis of Census Public Use Micro-Sample (1960) and Current Population Survey (March 1980, 1999).

jobs that remain; today, nearly one-third of Maine factory workers have some postsecondary education. But more remarkable is the extent to which high school graduates have displaced high school dropouts as the dominant factory worker. In 1959, fully 71% of Maine factory workers were high school dropouts and another 25% were high school graduates. By 1999, only about one in 10 workers had not completed high school and 57% were high school graduates (see Figure 7). In spite of the sizable increase in college-educated workers in factory jobs, they are still a minority of frontline workers.

Natural Resource Jobs

Like its factory jobs, Maine's natural resource jobs, including farming, fishing, forestry, and mining, are in decline both as a share of the Maine economy and in actual jobs. Even in a rural state such as Maine, natural resource jobs only accounted for about 6% of the state's jobs back in 1959. By 1999, these jobs had declined by more than two-thirds and only accounted for between 1% and 1.5% of all jobs in the economy.

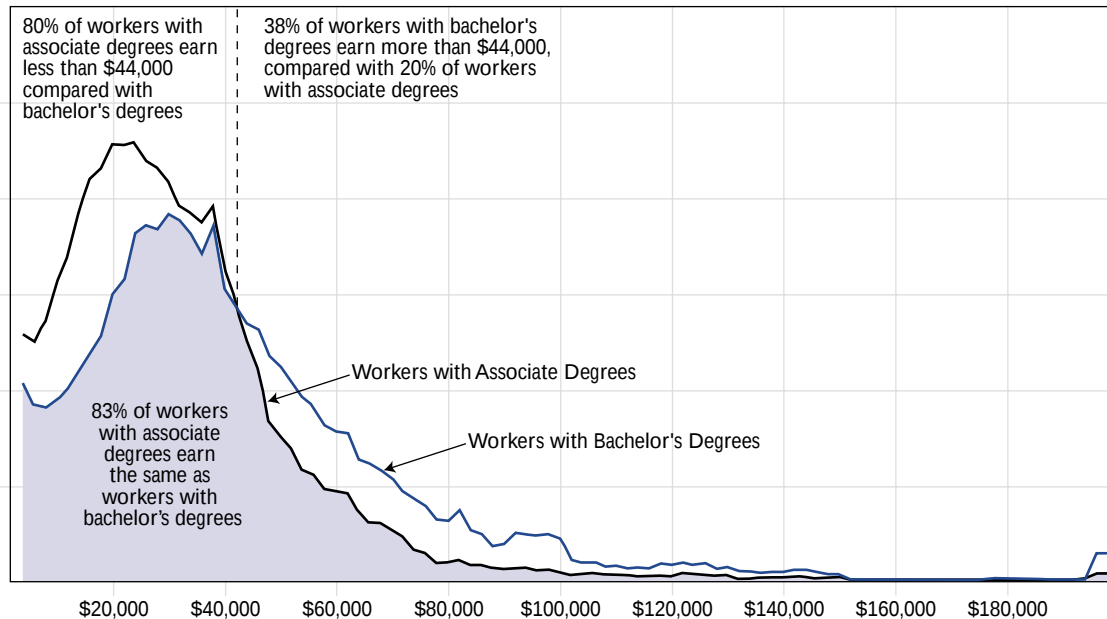
Today, the share of technology jobs in Maine is greater than its share of natural resource jobs in 1959.

Maine's natural resource jobs traditionally have been those most accessible to workers with a high school education or less, but such jobs have had the lowest earnings. In 1959, 80% of these workers were high school dropouts. In 1999, high school dropouts still held one-third of natural resource jobs, but 43% were high school graduates, and workers with at least some college held about one-quarter of the jobs (see Figure 8).

EDUCATION AND WAGES

National wage trends also suggest an increase in demand for skilled labor. Among prime-age⁶ women, earnings at all levels of education attainment have risen, but the earnings of those at the top of the education ladder have risen the most (see Figure 9). The earnings of prime-age men with at least a bachelor's degree also have increased, but at a slightly slower rate. In contrast, the earnings of men with some college or less have seen declines in their inflation-adjusted earnings.

Figure 10: 83% of Workers with Associate Degrees Earn the Same as Workers with Bachelor's Degrees
Share of workers, by education and 1997 earnings.



Source: Authors' Analysis of Census Current Population Survey (March 1998).

The increase in the wages of college graduates relative to high school graduates is the most telling sign that the economy is demanding highly skilled workers. As the share of workers with postsecondary education has increased, the wage advantages of college-educated workers also have continued to increase. For an increase to occur simultaneously in both the supply and the wages of more-skilled workers, the demand for skilled workers must be rising faster than the supply. Furthermore, among workers with the same credentials, the highest earnings go to those with the highest assessed skills, suggesting that employers are buying skills, not degrees (Levy and Murnane 1992; Levy 1998).

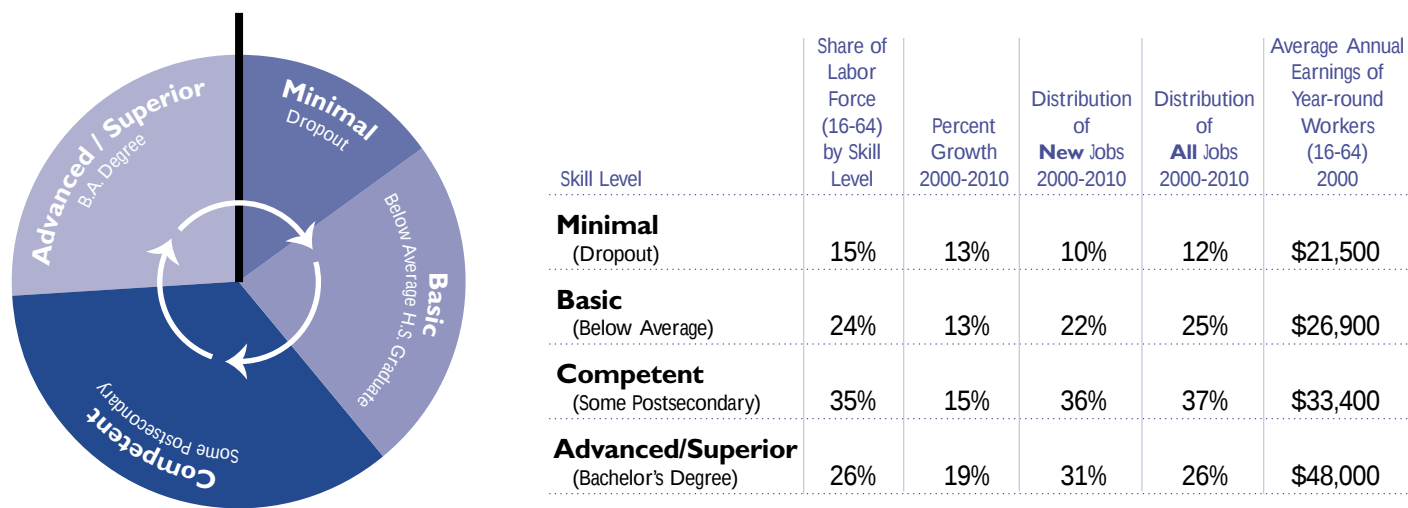
On average, workers with associate degrees earn less than those with bachelor's degrees, but 83% of workers with associate degrees earn the same as workers with bachelor's degrees, depending on their major and what they do after they graduate (see Figure 10).

The returns to obtaining a credential are more clearly observed by examining workers' earnings after

separating the contributing effects of their different characteristics such as their gender, race, occupation, experience, and geographic location. All other things being equal, an associate degree generally provides workers with a wage boost of about 20% to 30% over a high school diploma; the returns for women are generally higher than for men. Workers with bachelor's degrees usually earn another 10% to 20%, bringing the returns for men to about 20% to 40% above high school graduates, and for women, 30% to 40% more (Grubb 1999; Pascarella 1999).

Obtaining a credential typically pays off for those who have some course hours invested. While Maine does not have a community college system, a year's worth of credits at a community or technical college has proven to boost the earnings of workers by 5% to 11%, but earning the credential provides additional returns. Meanwhile, the benefits of less than a year's worth of courses are generally zero or small enough to be insignificant (Grubb 1999).

Figure 11: The Labor Force Spans All Skill Levels, But Projected Job Growth Favors High Skill Levels



Source: Authors' Analysis of National Adult Literacy Survey 1992; Census Current Population Survey 2001; BLS Employment Projections 2000-2010.

For people already working, there are probably positive benefits to earning college credits even without completing a degree. However, we do not know the extent of the earnings effects upon those students who already have a job or a degree and are in search of the specific skills they need to advance in their current job. For many students, it is likely that a select number of courses provides just enough training to improve their skills, enabling them to either keep up with skill demands on the job or to move on to better employment opportunities. Furthermore, earnings returns resulting from professional, industry, or vendor certification are difficult to quantify (Carnevale and Desrochers 2001).

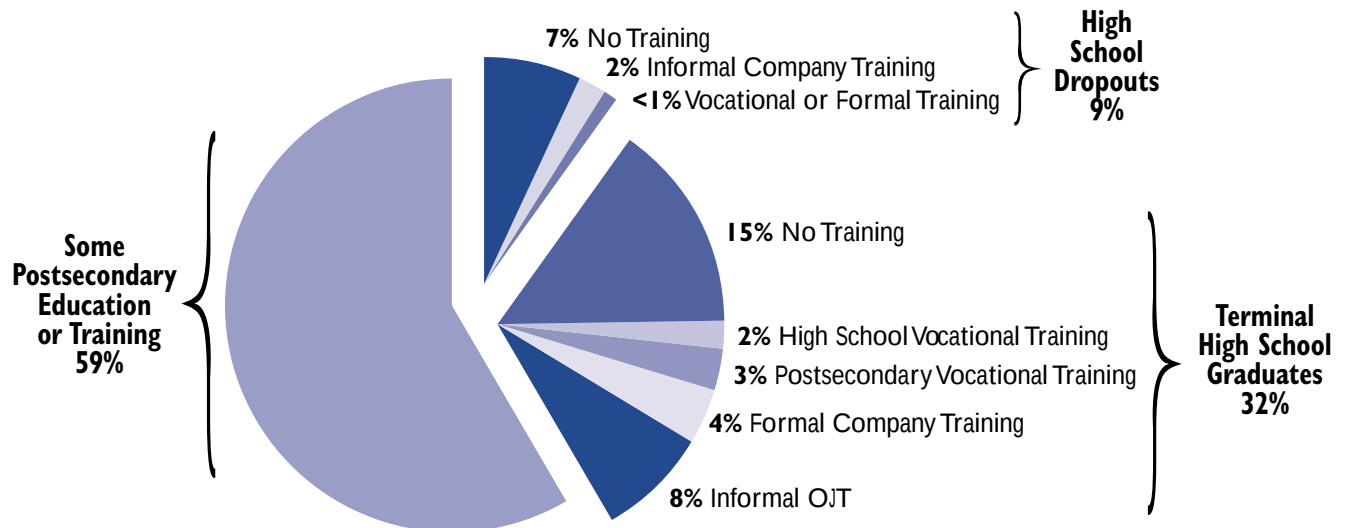
In community and technical college degree and certificate programs, the earnings returns attributed to a degree or a certificate depend greatly on the field of study. Workers with certificates in the health field, and women who complete certificates in a business or technical field, may see earnings advantages that are 17% to 29%. In general, associate degrees in academic subjects do not produce the more consistent earnings returns of occupational programs, such as engineering/computers, business, and health (Grubb 1996). But academic as

well as occupational program completers benefit by transferring to a four-year college or university. While bachelor's degree holders tend to have significant earnings returns regardless of their fields of study, those students who also specialized in more technically-oriented occupational fields such as engineering/computers, business, and health generally have higher returns than those workers with degrees in education, social sciences, and humanities (Grubb 1996).

WHERE JOB GROWTH WILL OCCUR

National data suggest that employment shifts experienced in the United States during the latter half of the twentieth century are expected to continue to increase throughout the decade. Jobs that require an associate degree are expected to grow the fastest, increasing by 32% through 2010, followed by jobs that require a bachelor's degree, growing by 24% (Hecker 2001). Apart from education requirements, jobs that require the highest levels of assessed cognitive skills also are expected to grow the fastest. About six in 10 workers already have skills similar to those

Figure 12: Training Among High School Dropouts and High School Graduates, 2000
Percent of prime-age (30-59) employment.



Source: Authors' Analysis of Census Current Population Survey 2000; adaptations from Eck 1993.

demonstrated by people with at least some postsecondary education and access to jobs that pay at least \$33,400, on average, per year. Jobs that require skills typically demonstrated by four-year degree holders will likely grow by nearly 20%, while those requiring skills similar to those with a sub-baccalaureate education will likely grow by 15% (see Figure 11).

Although the most robust job growth will occur within skilled jobs, more moderate job growth and creation will occur at the lower end of the education and skill continuum. Less-skilled jobs, those employing workers whose skills are similar to below-average high school graduates or high school dropouts, are expected to grow slower than average, by 13%. Similarly, employment projections by education level correspond to those by skill level, showing that jobs requiring apprenticeship or other work-based training greater than a year's duration are only expected to grow 8% by 2010. Jobs that require less than a year of customized training beyond high school also are expected to grow slower than average at 13%.

While not growing as fast as high-skilled jobs, there will still be a sizable number of job openings for

less-skilled workers. But because workers in these occupations change jobs more often, these occupations are more likely to have openings created through greater job turnover rather than new job creation. Only one-third of total job openings in less-skilled jobs are a result of new job creation, compared to 47% in the highest-skilled jobs.

Maine employment projections through 2008 suggest that the fastest growing jobs will be those in the high-skilled computer, business, and health-care sectors, such as computer support specialists, systems analysts, desktop publishers, bill and account collectors, medical assistants, respiratory therapists, and physician assistants. However, the greatest number of job openings will be mixed among low-skilled, low-paid occupations such as home health aides, cashiers, retail salespersons, nursing aides, and janitors, and high-paid, business-related occupations such as truck drivers, general managers, marketing and sales supervisors, and computer support specialists. In the health field, registered nurses also will see a sizable number of new job opportunities.

While more and more workers need skill on the job, not all workers need to go to college to prepare for work. About one-half of those who terminate their education with a high school diploma need and get training from various sources, but principally from their employers (see Figure 12). Three-quarters of high school dropouts get jobs for which they do not need any training at all. Overall, just over 20% of all workers are in jobs that do not require training but a substantial number of those jobs are transitional. Although these less-skilled workers may be able to find jobs, the almost 40% of the current U.S. workforce whose skills are similar to workers in low-paying jobs typically earned no more than an average of \$26,900 per year.

THE SKILLS EMPLOYERS WANT

As the structure of the economy has shifted, both in Maine and across the nation, so have the kinds of skills required. While we can easily quantify changes in the economy using information on education and cognitive skill levels, the skill requirements in modern workplaces encompass more broad, and often less measurable, general skills. The demand for specific vocational skills has been augmented with a growing need for general skills, including reasoning abilities, general problem-solving skills, and behavioral skills. Cognitive styles such as how workers handle success and failure on the job also are important in determining success on the job. And while general skills are becoming increasingly important, occupational and professional competencies are still needed to complement these more general skills.

General Skills: Reasoning, Problem-Solving, and Behavioral Skills

Little is known about how to develop and assess general problem-solving and behavioral skills in students and workers, but most employers associate them with educational attainment, especially college-level attainment. Educational attainment also is used as a proxy for reasoning ability. As a result, American employers use education and training attainment as the most reliable standard by which to screen job applicants.

The new applied skill requirements have emerged, in part, as a result of the changing occupational structure of the economy. Increasing productivity in manufacturing and other technology-intensive industries means that fewer workers with specific technical skills are needed to do the same amount of work. And because most of the new positions are being created in business services, education, health care, and office jobs, fewer technical skills and more general skills typical of these jobs are required. Broader and more general skills also are required because of the spread of “high-performance work systems” that place broader responsibilities on work teams at the point of production and service delivery.

The new office, education, and health-care jobs that are growing in the Maine economy and elsewhere, require higher levels of interpersonal and problem-solving skills because the work entails higher levels of human interaction and personalized responses to people’s wants and needs. These same behavioral skills are required in high-technology and manufacturing jobs as well, because the technology itself takes on more of the rote, manual processing tasks, allowing employees to spend more time interacting with each other in order to exploit the new flexible technologies capable of providing higher quality, variety, and speed of operation.

In both manufacturing and services, these new problem-solving and behavioral skills are also required in order to create new kinds of value added. Unlike the old manufacturing-based economy, where simple productivity—high volume at low cost—was paramount, the new economy demands new kinds of value, measured by a more complex set of performance standards, and workers with the broad skills to meet them. These new kinds of value include quality, variety, customization, customer focus, speed of innovation, and the ability to add novelty and entertainment to products and services.

For instance, companies that make or sell quality products or deliver quality service need workers with solid academic and occupational preparation. But good academic basics do not guarantee quality. Companies that meet quality standards require conscientious employees who are able to take responsibility for the

final product or service—regardless of their position in the company. Variety and customization require workers who are creative and good at problem solving.

Continuous innovation requires a general ability to learn and work in groups. Adding novelty and entertainment value requires creativity. The growing consumer demand for customization and variety requires workers with problem-solving skills that emphasize the flexible application of reasoning abilities in multifaceted work contexts. To continuously improve products and services, institutions require employees up and down the line to have leadership and learning skills. Successful teamwork and good customer service require interpersonal and communication skills.

Positive Cognitive Style

The fast-paced and unforgiving global economy results in constant change in skills required for specific jobs. Constant economic and technological change also discourages growth in job tenure and increases the overall rate of job creation and job destruction. The subtlest behavioral asset in managing school, work, and life in the constant flux of modern times is a positive cognitive style (Seligman 1998).

The notion of “positive cognitive style” is more than “self-esteem” or “the power of positive thinking.” “Self-esteem” and “positive thinking” are internal attitudes that persist irrespective of external experiences of success or failure. Cognitive styles are the various ways people process information gained from experience. Cognitive psychologists tend to agree that the way people explain events to themselves, or their cognitive style, is a key determinant of success and failure. Those with a negative cognitive style tend to see failure as a result of causes that are “permanent, pervasive, and personal.” They tend to discount successes as temporary, limited in scope, and unrelated to personal merit (Seligman 1998). People with a negative cognitive style tend to be less successful because they cede control over the choices in their lives to their circumstances, reducing their ability to act and persevere. Cognitive style helps explain why some succeed against the odds and others fail in spite of their advantages.

Occupational and Professional Competencies

General reasoning, problem-solving, and behavioral skills as well as a positive cognitive style are critical for lifelong learning and success in modern labor markets but, at some point, everyone has to put an occupational point on his or her educational pencil. There is a general consensus that occupational preparation—or college-level coursework leading toward such preparation—should begin some time in high school. Some students begin to receive occupational preparation in high school through vocational programs and other applied curricula. For the most part, these programs survive as an alternative applied pedagogy to meet statewide academic performance standards and as preparation for further postsecondary education. Among those who terminate their education with high school, the half that need training get it primarily from their employers.

For most students, occupational preparation continues or begins after high school with enrollment in occupationally-oriented programs in degree and non-degree granting postsecondary programs. A much smaller share continues their education past the first four years of college and gets their occupational or professional credentials in graduate or professional schools.

Increases in general education requirements on the job are the driving force behind complementary increases in job-specific certificates, certifications, and customized job training. The most highly educated get the most initial job training and retraining. In addition, there is an increasing share of employment in fields such as information technology, public safety, and health care, occupations that support or require regulated proficiency standards (Carnevale and Desrochers 2001).

THE DEMOGRAPHIC TWIST

Although future economic realities favor higher levels of education and a more broad array of skills, a reversal in two long-standing demographic trends may make it especially difficult for Maine to fulfill these needs. The most powerful of these trends, and not unique to Maine, is the retirement of the baby boom workforce. The U.S. workforce, which has

increased by almost 40% over the past 20 years, will slow its growth by one-half over the next several decades, creating a growing need for youth with postsecondary education or training to replace college-educated retirees (Ellwood 2001). The Maine population, already the fourth oldest in the nation (up from eighth in 1990) with 14% of its residents age 65 or over in 1998, will continue to age. The elderly population will grow only slightly through 2010, still comprising 14% of the population, before growing by 57% between 2010 and 2025, when more than one in five Maine residents will then be age 65 or over (Mageean, AvRuskin, and Sherwood 2000).

We know that retirements begin aggressively after age 55, especially for men, and retirement ages have been declining steadily. The only debate among labor economists is whether they will continue to decline or will stabilize. We also know that by 2020 there will be about 46 million baby boomers in the United States with at least some college who will be over 55 years of age (Carnevale and Fry 2001). These boomers are working today, but they will age beyond 55 years from here on out. Over the same period, if we maintain current attainment rates in postsecondary education, there will likely be about 49 million new adults with at least some college—a net gain of about three million (Carnevale and Fry 2001). If the Bureau of Labor Statistics projections of a 22% increase in jobs that will require at least some college by 2010 continue through 2020, roughly 15 million new jobs that require college-educated workers will be created. This far exceeds the small net increase expected in the college-educated population, resulting in a net deficit in workers with at least some college of about 12 million workers by 2020.

The United States also will experience a second demographic reversal as the diminutive “Generation X” gives way to the larger “Generation Y.” As the baby boom leaves the labor force, taking their experience, education, and training with them, there will be a surge in the number of 18- to 24-year-olds. But on balance, the increase in the number of 18- to 24-year-olds will be far short of the number of youth necessary to replace the education and experience of the retiring baby boomers.

Maine may face particularly difficult circumstances as the baby boom retires because it does not have a large “Generation Y” upon which to rely. While Maine’s population has been growing modestly since the 1980s, its youth population age 15 to 29 has declined rapidly. A falling birthrate, increased youth out-migration, and decreased youth in-migration has led to a loss of 67,000 youth since 1980, a 25% decrease (Heminway 2002). Maine loses some of its highest-skilled youth as a result of educational out-migration. Maine is the sixth highest exporter of college students with roughly one-half of college-bound high school seniors leaving the state, a large proportion of whom will not return anytime soon (Heminway 2002; Silvernail 2000).

In addition, the present economic slowdown may actually accelerate longer-term trends toward shortages of educated and skilled labor in Maine and the United States. During the 1990-91 recession, companies aggressively used the pause to restructure production processes and to shift toward fewer workers using more sophisticated technology. These productivity-enhancing retrenchments require higher skill levels in the remaining job slots. It is conceivable that the present economic pause will encourage a further reorganization of production and service delivery processes, accelerating the increase in demand for skilled labor.

In the face of sharply reduced labor force growth rates and possible skill shortages, education and training policies will have to play the lead role. We know that a plethora of policies underlying the social safety net has effects on individuals’ decisions to work. While changes in social policies might increase the size of the labor force, only expensive and politically difficult policy changes are likely to increase the available numbers of highly skilled workers (Ellwood 2001).

Increasing retirement ages, for instance, will sustain labor force participation most among those most dependent on social security payments for retirement. These tend to be the lowest paid and least-skilled workers. Further increases in the labor force participation of married women by expanding child care assistance to the middle class may be the best bet for bringing more-skilled workers, but would be extremely expensive (Ellwood 2001). Large-scale, skill-based

immigration policies would be effective but politically sensitive. Sizable in-migration from other states, as occurred in Maine during the 1970s and 1980s, could help to alleviate skill shortages. But with skill shortages expected across the United States, Maine could face stiff competition in trying to recruit workers from other states, where they may well be equally in demand.

MEETING SKILL NEEDS

If we are unable rise to the challenge of meeting increasing skill demands, there will be broad and diverse impacts on the economy that will be both economically and socially costly. A stabilization or decline in productivity gains, or a slowdown in growth, may be the primary negative economic impacts. In addition, neglecting to raise the achievement of youth will put these new workers at a disadvantage in the labor market. High school graduates without a solid set of skills are less likely to have access to technology and on-the-job training, both factors that increase earnings. They also are more likely to remain in low-wage, low-opportunity jobs that provide few career path options. Those high school students who do not graduate with a solid base of skills will have curtailed their options for obtaining additional postsecondary education and training and the wage increases that accompany them. They also may stimulate broader social problems, particularly continued increases in wage inequality as employers pay increasingly high wage premiums to skilled workers who are in short supply.

With education increasingly taking the lead role in economic growth and individual opportunity, both Maine and the nation will need to continue to develop a more efficient, effective, and seamless education system. To foster broad economic growth, we will need to increase the quantity and quality of human capital. At the same time, increasing human capital can help to alleviate the growing differences in family income among the state's most and least educated.

Maine already has an excellent elementary/secondary school system, touting the highest graduation rates in the country, and ranking near the top on national statewide academic assessments. When it comes to educating our children, we can always strive higher.

But the primary avenues for increasing Maine's human capital include encouraging more youth to attend some type of postsecondary institution, and providing opportunities for adults already in the labor force to continue to upgrade and learn new skills.

While Maine already has an extensive four-year college system across the state, continued expansion of the current technical colleges into a community college system will bridge an important education gap for many Mainers. Across the country, community colleges increase access to postsecondary education by providing an array of services to communities with varying needs. Community colleges provide youth and adults with a variety of education and training options to improve their skills, including short-term certificate programs, two-year associate degree programs, and individual courses that allow students to refresh their skills or to explore career options before transferring to a more expensive four-year institution. Community colleges also are a favorite of employers who need customized training programs that they themselves cannot or do not want to provide (Carnevale and Desrochers 2001). The addition of the Associate in Arts to the degree program in the Maine technical college system, and the articulation agreements implemented to facilitate transfers to other postsecondary institutions, are an excellent start toward broadening access. Further expanding liberal arts course offerings and corresponding articulation agreements will provide even more students and adults with low-cost options to access postsecondary education and training.

Even with the continued expansion of a community college system making postsecondary education more accessible, the cost of postsecondary education in Maine is still out of reach for many families. Maine has the thirteenth highest in-state tuition among public four-year universities in the country—22% higher than the U.S. average. And although Maine's in-state tuition is lower or roughly equal to tuition in other New England states, the share of adults that hold bachelor's degrees (23%) is well below the shares elsewhere in New England⁷ (Census 2000; U.S. Department of Education 2002). The key factor could be related to state income levels. Maine's per capita personal income, low relative to the other New England states, suggests

that it may be much more difficult for Maine residents to afford postsecondary education than their New England neighbors.

Maine's exemplary high school graduation rate contrasts sharply with its low college enrollment rate, a conundrum that also suggests high tuition costs, in addition to other factors, may be limiting access to postsecondary education. However, recent research indicates that using state enrollment rates to gauge access to postsecondary education for Maine youth may be misleading and, in fact, Maine students continue on to college at rates only slightly below the U.S. average (Kipp 2000). While that alone allows room for improvement, more troubling is that many Maine youth attending college choose to go out of state, making them less likely to return once they are college graduates. Some youth may seek less expensive out-of-state options, but given the high cost of other New England colleges and universities, students may decide that the in-state tuition savings are not sufficiently large enough to convince them to stay at home—particularly if they must take on debt to finance either an in-state or out-of-state education.

In addition to cost, parental and community expectations also may dampen the desire for postsecondary education. Counseling students and workers on the value of an education can help remove social barriers to attending college or other postsecondary training institutions (Mitchell Institute 2002). As access to college becomes more important in allocating economic opportunity, the large gaps in access between youth from high- and low-socioeconomic status families become a greater threat to upward mobility. Families with the highest incomes are likely to be parents with the highest level of educational attainment. Parental education and income are strong threads in the complex weave of social and economic forces that influence academic readiness for college and college enrollments. Many are concerned that access to college, especially highly selective ones, and career opportunity are becoming more concentrated among families with high incomes and high levels of parental education.

Thus far, the available evidence on opportunity is mixed. Educational performance and attending college have improved among all income classes and racial and

ethnic groups since the early 1970s, when policy, especially federal policy, began funding targeted assistance for disadvantaged students throughout the education pipeline. This has continued in spite of the widening income distribution. But at the same time, the gap in educational performance and access to college has not narrowed in spite of those same policies.

Reducing geographic, financial, and social barriers will go a long way toward encouraging more youth and adults to engage in postsecondary education. But if Maine is going to keep its high-skill jobs and workers, as well as compete for more, it will need to reevaluate its investment in complementary capacities and strategies, such as research and development, infrastructure, and tax policies. Improving the research and development capabilities in Maine is critically important. Currently, Maine ranks near the bottom in R&D expenditures among the 50 states. Increasing expenditures on R&D can serve a two-fold purpose: to foster a more rigorous academic environment in the state's university system, and to stimulate business incubators. The nexus between academic research and business incubators can increase both the supply of and demand for high-skilled workers.

As incubators increase in scope and scale, their effects can be exponential. It is generally assumed that globalization and new technology allow companies to locate wherever it is most cost effective. In fact, while companies increasingly compete regionally, nationally, or globally, they tend to be organized locally into clusters of interconnected competitive networks. For example, furniture companies are attracted to North Carolina and bio-technology companies are attracted to Boston because there are suppliers, necessary technologies, university research and development, and a workforce customized to meet the needs of the competitive cluster (Kanter 1997; Porter 1998). When a niche industry gains a stronghold in an area, it can develop the surrounding region into a dominant industry sector, creating a boon for the local economy.

Ensuring that infrastructure—such as roads, airports, and housing stock—are adequate is an additional complementary component of economic competitiveness. But Maine is already a relatively high-tax state, and infrastructure improvements should not be

financed solely on the backs of Maine families. Tax incentive policies used to lure business into states can ultimately result in a race to the bottom. Investing in high road strategies such as postsecondary education will not alone create jobs, but coupled with smart fiscal policies, it is a key component in keeping Maine economically competitive.

CONCLUSION

Providing all youth with sufficient skill necessary to access good jobs that tend to require at least some education or training after high school is costly, but not providing such opportunities is perhaps even more expensive. At stake are Maine's economic competitiveness and its ability to sustain high levels of growth and productivity gains. The number of youth coming through the education pipeline will not offset impending demographic changes as the baby boom retires, and social policies show little promise of alleviating skill needs. Education is the best bet to help the state and its workers maintain a competitive edge. At the same time, failure to serve the educationally disadvantaged population is a lost opportunity in a time when more and more skilled workers are needed. Failure to take advantage of the unmet demand for skilled labor will move us further away from our egalitarian goals as low-skilled workers are blocked off from access to good-paying jobs, further increasing earnings inequality between the most and least educated.

In our work-based society, failure to give people the knowledge and the skills they need to get and keep good jobs can also have disastrous personal consequences. Those with the least education are much more likely to experience violence, addiction, poverty, illness, incarceration, and other forms of abuse. And those who can't get and keep jobs often drop out of the political system, withdraw from community life, and in some cases, create alternative economies, cultures, or political structures that are even more damaging to the mainstream. 🐸



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Please turn the page for end notes and references.

ENDNOTES

1. The phrase, "at least some college," as well as the term, "college-educated," include all those who have had coursework that leads to two- or four-year degrees, including those who attain a degree as well as those who pursue college coursework but do not attain a degree.
2. Trade is another factor that eliminates and creates jobs both on the production line and in managerial and professional jobs in manufacturing. Of the 20 million jobs lost to trade in the United States, about 3 million were probably lost to trade and the other 17 million were lost to productivity improvements. Jobs lost to trade tend to be low-skilled, low-wage jobs, while jobs gained from trade tend to be more highly skilled and highly paid, both in manufacturing and in the economy on the whole. Ultimately, however, trade affects wages more than the number of jobs. Trade tends to drive down the earnings of low-skilled labor and increase the relative earnings of skilled workers in manufacturing and in the economy on the whole.
3. A debate exists over the extent to which skills and skill requirements have increased in the economy. Different measures of skills, direct measurement, wage inequality, and skills gaps often result in different outcomes (see Cappelli 1993 and 1996 for a review of this literature). However, the balance of the literature that examines wage inequality and supply-and-demand shifts concludes there has been an increase in skill requirements in the economy (Autor, Katz and Krueger 1997; Katz and Autor 1999; Katz and Murphy 1992; Levy and Murnane 1992; Murphy and Welch 1993). The literature that emphasizes skill measurement concedes that there has been an increase in skill requirements, although some argue the changes are not exceedingly large and have slowed dramatically since 1960 (Judy and D'Amico 1997; Mishel and Teixeira 1991; Mangum 1990). The evidence on upskilling within specific occupations is mixed with some evidence to support the thesis and additional evidence that upskilling in some occupations is offset by deskilling in others (Cappelli 1993; Mishel and Teixeira 1993).
4. Although there is much discussion about the importance of technology employment, it is rarely carefully defined. This document defines technology jobs to include only those jobs that are heavily science-based and/or utilize specialized machinery

and equipment. These jobs either require at least a bachelor's degree (e.g., engineers, chemists, architects, computer system analysts, etc.) or some specialized postsecondary education or training (e.g., computer programmers, medical and other technicians, cad-cam operators, etc.). Virtually all workers today have some contact with technology, especially information technology, but the definition of high-technology workers used in this paper limits their number to those with some special expertise, education, and training.

5. The powerful impact of the new information technology comes from its pervasive use by non-technical workers and consumers, not from the increasing employment in the production and maintenance of the technology itself. The effects of the new information technology as the core of the new information economy are consistent with past trends in economic development. For instance, electricity was the core technology in building the urban industrial economy that began in the early twentieth century, but very few of us needed to become electricians.
6. Prime-age workers include those age 30-59.

REFERENCES

- Autor, David H., Lawrence F. Katz and Alan Krueger. "Computing Inequality: Have Computers Changed the Labor Market?" NBER Working Paper 5956. Cambridge: National Bureau of Economic Research, 1997.
- Cappelli, Peter. "Are Skill Requirements Rising? Evidence From Production and Clerical Jobs." *Industrial and Labor Relations Review*. 46.3 (April 1993).
- Carnevale, Anthony P., and Stephen J. Rose. *Education for What? The New Office Economy*. Princeton: Educational Testing Service, 1998.
- Carnevale, Anthony P., and Donna M. Desrochers. *Help Wanted... Credentials Required: Community Colleges in the Knowledge Economy*. Princeton: Educational Testing Service, 2001.
- Carnevale, Anthony P. and Richard A. Fry. "The Economic and Demographic Roots of Education and Training," in Center for Workforce Success *What's Working* Newsletter. 11 (November/December 2001). Washington: The Manufacturing Institute, National Association of

- Manufacturers. <http://www.nam.org/workforce>.
- U.S. Census Bureau, U.S. Department of Commerce. *Profile of Selected Social Characteristics: 2000* (Table DP-2). <http://www.census.gov>. 2000.
- Eck, Alan. "Job-Related Education and Training: Their Impact on Earnings." *Monthly Labor Review*. 16.10 (October 1993).
- Ellwood, David T. "The Sputtering Labor Force of the 21st Century: Can Social Policy Help?" in *The Roaring Nineties: Can Full Employment Be Sustained?* Eds. Alan B. Krueger and Robert Solow. New York: The Russell Sage Foundation and The Century Foundation, 2001.
- Grubb, W. N. "Learning and Earning in the Middle: The Economic Benefits of Sub-baccalaureate Education." Community College Research Center, Teacher's College, Columbia University, April 1999.
- Grubb, W. N. *Working in the Middle: Strengthening Education and Training for the Mid-skilled Labor Force*. San Francisco: Jossey-Bass Publishers, 1996.
- Hecker, Daniel E. "Occupational Employment Projections to 2010." *Monthly Labor Review*. 124.11 (November 2001).
- Heminway, Merritt T. "Maine's Disappearing Youth: Implications of a Declining Youth Population." Briefing Paper for the Maine Leadership Consortium, Augusta, ME, May 2002.
- Judy, Richard W. and Carol D'Amico (Eds). *Workforce 2020: Work and Workers in the 21st Century*. Indianapolis: Hudson Institute, 1997.
- Kanter, Rosabeth M. *World Class: Thriving Locally in the Global Economy*. New York: Touchstone Books, 1997.
- Katz, Lawrence F. and David H. Autor. "Changes in the Wage Structure and Earnings Inequality," in *Handbook of Labor Economics* 3A. Eds. Orley Ashenfelter and David Card. Amsterdam, The Netherlands: Elsevier Science B.V., 1999.
- Katz, Lawrence F. and Kevin M. Murphy. "Changes in Relative Wages, 1963-1987: Supply and Demand Factors." *Quarterly Journal of Economics*. (February 1992).
- Kipp, Samuel. "A Fresh Look at College-going Rates in Maine." Finance Authority of Maine, 2000.
- Levy, Frank. *The New Dollars and Dreams: American Incomes and Economic Change*. New York: The Russell Sage Foundation, 1998.
- Levy, Frank and Richard J. Murnane. "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations." *Journal of Economic Literature*. 30 (September 1992).
- Mageean, Deirdre M., Gillian AvRuskin and Richard Sherwood. "Whither Maine's Population." *Maine Policy Review*. (Winter 2000).
- Mangum, Stephen L. "Impending Skill Shortages: Where is the Crisis?" Challenge. (September/October 1990).
- Mishel, Lawrence and Ruy A. Teixeira. *The Myth of the Coming Labor Shortage: Jobs, Skills, and Incomes of America's Workforce 2000*. Washington: Economic Policy Institute, 1991.
- Mishel, Lawrence and Ruy A. Teixeira. "Whose Skills Shortage—Workers or Management?" *Issues in Science and Technology*. (Summer 1993).
- Mitchell Institute. *Barriers to Postsecondary Education in Maine: Making College the Obvious and Attainable Next Step for More Maine Students*. Portland, ME: Mitchell Institute, 2002.
- Murphy, Kevin M. and Finis Welch. "Occupation Change and the Demand for Skill, 1940-1990." *AEA Papers and Proceedings*. 83.2 (May 1993).
- National Center for Education Statistics, U.S. Department of Education. *Digest of Education Statistics, 2001*. Washington: U.S. Government Printing Office, 2002.
- Pascarella, E. T. "New Studies Track Community College Effects on College Students." *Community College Journal*. (June/July 1999).
- Porter, Michael E. "Clusters and Competition: New Agendas for Companies, Governments, and Institutions," in *On Competition*. Ed. Michael E. Porter. Boston: Harvard Business School P, 1998.
- Seligman, Martin E. P. *Learned Optimism: How to Change Your Mind and Your Life*. New York: Pocket Books, 1998.
- Silvernail, David. "Maine's Ranking in the Age of High School Seniors Enrolling in Universities and Colleges." Maine Education Policy Research Institute. MEG-08 (June 2000).