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## The Future of Middle-Skill Jobs

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## Abstract

We analyze the likely trends in supply and demand for workers with different levels of education and training over the next decade and beyond. We present data on the current distributions of jobs and wages, and how these distributions have evolved in the recent past; we also review projections from the Bureau of Labor Statistics on future demand by occupation. We compare these demand-side projections with forecasts of the supply of workers with varying levels of education and training. Overall, we conclude that the demand for middle-skill workers will remain quite robust relative to its supply, especially in key sectors of the economy. A range of policies could help low-income workers obtain more education and training for these middle-skill jobs, thereby raising their earnings and their family's living standards.

## Introduction

Are jobs in the middle of the education and earnings distributions really disappearing, as some research and popular reports suggest? Or will the middle of the labor market remain robust? And what does all of this mean for education and training policy?

Over the 1990s, gains in jobs and wages rose more rapidly at the top and bottom of the earnings distribution than in the middle, in part because computers more easily replace jobs in the middle of the market than at the top (where abstract reasoning is required) or the bottom (where social interactions are needed). David Autor of MIT and others have warned of a growing "polarization" between workers with high and low earnings, conveying popular images of a "dumbbell" labor market, or an "hourglass economy."

Given this picture of the labor market, some observers suggest that policy should focus almost exclusively on enhancing cognitive skills and the attainment of college degrees while deemphasizing occupational training for middle-skill jobs. However, if the trends towards labor market polarization are exaggerated and if the demand remains robust for workers to fill jobs requiring less than a B.A. degree, then education and training policies should have a broader focus and should encourage occupational training that targets middle skill jobs as well.

In this paper, we analyze the likely trends in supply and demand for workers with different levels of education and training over the next decade and beyond. We present data on the current distributions of jobs and wages and how these have evolved in the recent past. Next, we draw on data and projections from the Bureau of Labor Statistics to forecast the mix of occupations demanded in the coming decades. We compare these demand-side projections with forecasts of the supply of workers with varying levels of education and training.

Overall, we conclude that the demand for middle-skill workers will remain quite robust relative to its supply, especially in key sectors of the economy. Accordingly, accommodating these demands will require increased U.S. investment in high-quality education and training in the middle as well as the top of the skill distribution. Many current and future low-income workers are likely to take advantage of the added training for middle-skill jobs and thereby raise their earnings and their family's living standards. If such investments are made on behalf of those who are currently poor, this could also lead to higher earnings and lower poverty rates for those currently at the bottom of that distribution.

## What Are Middle-Skill Jobs?

Classifying occupations into a few skill categories is awkward, given the many elements of skill required for most jobs. Under an approach that classifies jobs based on education and training levels, "middle-skill" jobs are those that generally require some education and training beyond high school but less than a bachelor's degree. These postsecondary education or training requirements can include associate's degrees, vocational certificates, significant on-the-job training, previous work experience, or some college, but less than a bachelor's degree.

We divide the broad occupational groups into high-skill, middle-skill, and low-skill categories based on BLS estimates of the educational attainment and training of people in those jobs. Using this information, we define:

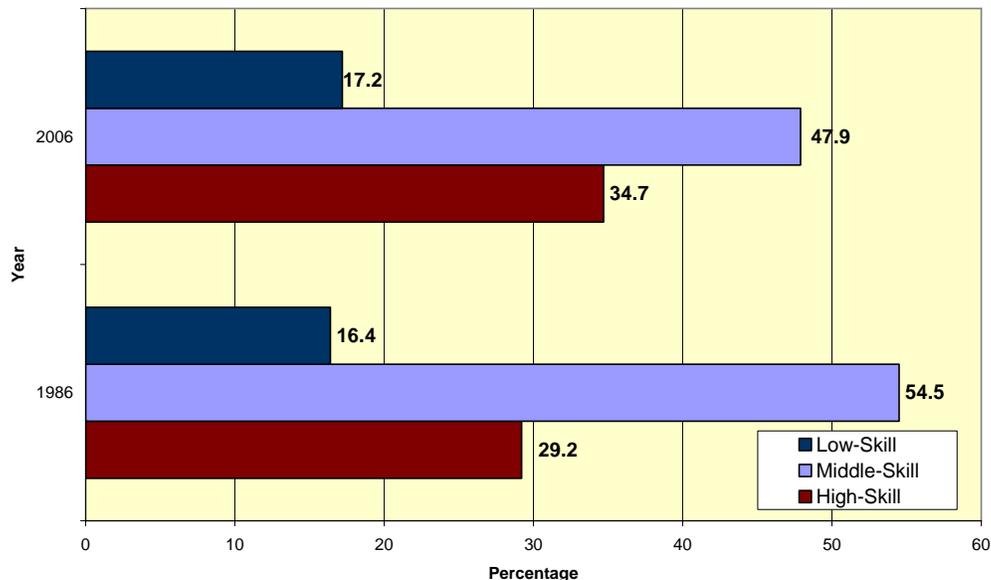
- High-skill occupations as those in the professional/technical and managerial categories.
- Low-skill occupations as those in the service and agricultural categories.
- Middle-skill occupations as all the others, including clerical, sales, construction, installation/repair, production, and transportation/material moving.

This definition is clearly imperfect, since there are many professional/technical and service jobs that are clearly middle-skill while there are jobs in the clerical, sales and other categories that are not; but, on average, these discrepancies tend to cancel out, and trends in these categories roughly capture the ones we want to measure.

<b>Industry/Occupation</b>	<b>Employment (thousands)</b>	<b>Median Annual Earnings</b>
<b>Construction</b>		
First-line Supervisors/Managers	1,219	50.4
Inspectors	94	43.7
Electricians	656	42.3
Plumbers	499	41.3
<b>Engineering</b>		
Technicians	273	48.3
<b>Healthcare Support</b>		
Dental Hygienists	158	58.4
Radiation Therapists	15	57.7
Diagnostic Sonographers	42	52.5
Radiologic Technicians	182	43.4
Respiratory Therapists	94	43.1
Occupational Therapist Assistants	21	38.4
Physical Therapist Assistants	59	37.9
<b>Law</b>		
Detectives/Investigators	91	54.0
Paralegals/Legal Assistants	224	39.1
<b>Manufacturing</b>		
First-line Supervisors/Managers	731	73.0
Machinists	370	34.0
Welders, Cutters, Solderers	377	30.6
<b>Protective Services</b>		
Police Officers	639	45.2
Fire Fighters	282	38.3
Source: Bureau of Labor Statistics		

These skill categories reflect only average skill demands within broad occupational categories. Some occupations within the technical and managerial categories actually require less than a bachelor's degree, while some in the middle categories might require only high school, and some in the service category may require more than high school. Therefore, whenever possible, we supplement our analysis of broad categories with those of detailed occupations. Some prominent examples of these occupations appear in Table 1. As the data indicate, many of these occupations employ hundreds of thousands of workers and their annual earnings reach as high as \$70,000.

**Figure 1**  
**Employment Shares by Occupational Skill Level, 1986 and 2006**



Source: Tabulations by authors from the Bureau of Labor Statistics web site.

Note: High-skill occupational categories are Management and Financial Operations and Professionals and Related Occupations; middle-skill categories are Sales and Related Occupations, Office Administrative Support, Construction, Installation and Repair, Production Occupations, and Transportation and Material Moving; and low-skill categories are Service Occupations and Farming, Fishing, and Forestry.

Data on the last two decades confirm that jobs have expanded faster in both high-skill and low-skill positions than in middle-skill positions. But these trends do not herald a polarized or barbell economy. Middle-skill jobs still make up roughly half of all employment today, even though they decreased their share of total employment from about 55 percent to 48 percent between 1986 and 2006 (Figure 1). What's more, this conclusion is not very sensitive to exactly which occupational categories we include in each broad skill group.

While the share of jobs in the middle category declined, professional and related occupations rose from 17 percent in 1986 to more than 20 percent in 2006 and managerial positions increased from about 12 to 15 percent of total employment. Low-skill (service) jobs barely increased their share from 15 to 16 percent of total employment. Jobs in sales and office occupations fell from about 28 to 25 percent of all jobs. Production positions dropped as well, from 9 to 6.5 percent. Despite these declines, sales, office, and production occupations still accounted for about one-third of all jobs in 2006.

Positive trends in some occupations illustrate the persistence of employment in middle-skilled fields. Since 1986:

- Medical therapists—including middle-skill categories such as respiratory, recreational, and radiation—and their aides have expanded sharply, rising about 30 percent.

- Several blue collar positions rose briskly, including carpenters (by 20 percent), heavy vehicle maintenance specialists (25 percent), and heating and air conditioning positions (21 percent).

These patterns illustrate the diverse occupational patterns of job growth. Only a small part of gains in middle skill occupations—even in construction—reflect short-term factors such as the recent housing “bubble” and “bust.”

## Wage Trends

When wages as well as employment grow faster than average for a given skill group, the implication is that labor market demand is rising more rapidly for workers in that skill category than for other workers. For workers in middle-skill jobs, recent wage patterns paint a complex picture.

The weekly earnings gap between workers with college degrees versus workers with high school diplomas has certainly widened for over 30 years, although it did not increase at all between 2000 and 2006 for full-time workers above age 24. Those with associate degrees now earn, per year of education, a similar wage premium over those with only a high school diploma. In 2006, the median worker with an associate degree earned about 33 percent more than those with only a high school degree, while those with a BA degree and no graduate degree earned 62 percent more.

Turning to occupational differences, several middle-skill occupations have experienced rapid wage increases in recent years. In the eight years between 1997 and 2005, the average American worker had an overall inflation-adjusted wage increase of only about 5 percent. But real increases averaged:

- 10-14 percent for speech and respiratory therapists;
- 23 percent for radiologic technicians;
- 18 percent for electricians; and
- 14 percent for electronic technicians.

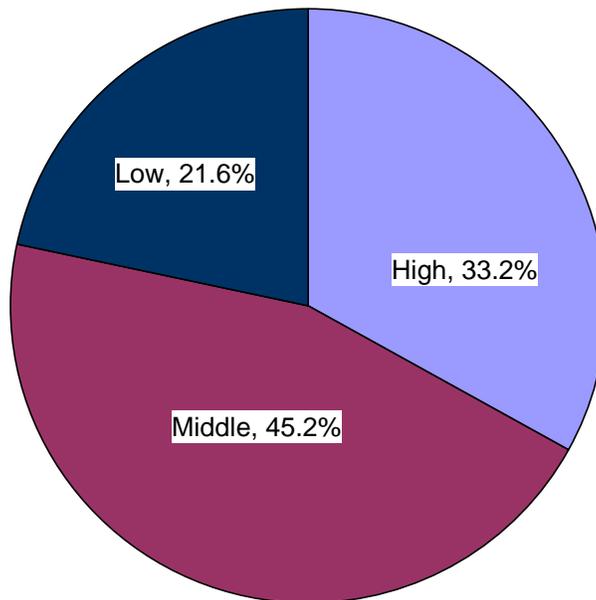
Certainly, not all positions in middle-skill occupations pay well or are well-situated on career paths that promise wage advancement and not all middle-skill positions experienced healthy increases in real wages after the late 1990s. In some categories not requiring postsecondary education or training, wage increases lagged behind the average. But the figures indicate that demand for many middle-skill occupations is rising fast enough to generate not only strong employment growth, but also rapid growth in wages.

## Occupation Projections

Are Bureau of Labor Statistics (BLS) projections over the next decade or so consistent with these recent trends? BLS projects occupational trends as well as educational requirements for the U.S. work force. The projections have their limitations; they mostly reflect anticipated shifts in product demand across industries. One limitation is that the projected occupational demands are unlikely to capture fully the within-industry and within-occupation shifts of work organization and skill requirements.

Still, they are useful as lower bounds to expected growth in demand for skills. BLS projects total (gross) hiring demands in occupations, including replacement demand for retirees, as well as expected net employment changes across categories. Arguably, gross job openings reflect the occupational opportunities available to new cohorts of workers. Using its estimates of educational requirements for jobs, BLS projects that nearly half (about 45 percent) of all job openings in the next 10 years will be in the broad occupational categories that are mostly middle-skill (Figure 2). Another 33 percent will be in the high-skill occupational categories, with the remaining 22 percent in the low-skill (service) occupations.

Figure 2  
Job Openings by Skill Level, 2004-2014



Another measure of occupational demand is net job growth, the change in number of jobs in an occupational field over time. BLS projects that net growth in professional and managerial jobs as well as in service jobs will exceed net growth in middle occupational categories. But substantial growth in the middle categories is still expected. For example, net job growth in the broad fields of transportation, construction, and maintenance/repair is projected at 11 to 12 percent over the next decade, only slightly below expected average growth for all jobs (12.9 percent).

The projections for detailed occupations point to average or above-average growth in several high-wage job categories that require education and training at the middle level. For instance, expected net growth is:

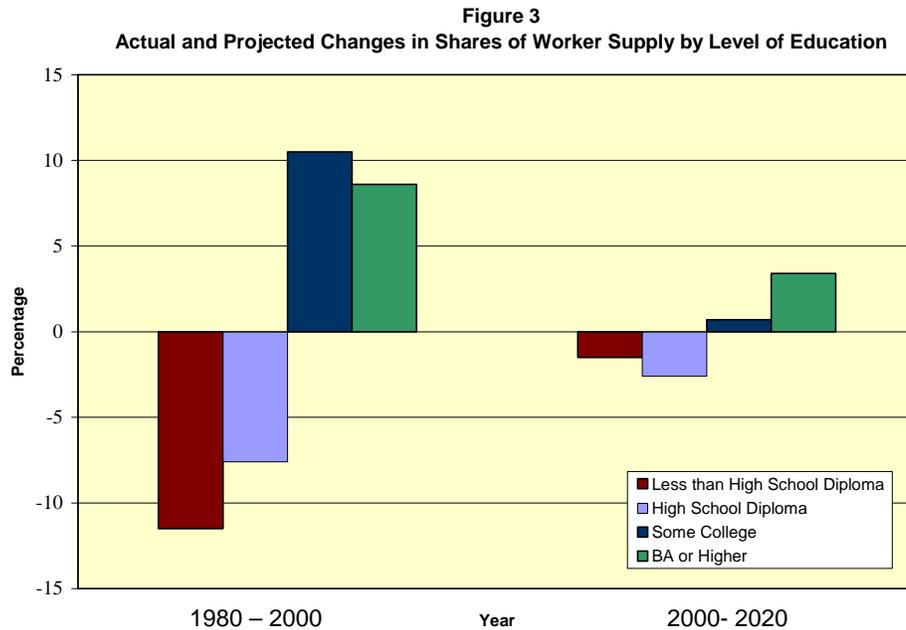
- About 20 percent in computer specialist jobs (generating more than 1 million job openings);
- 20 to 40 percent in a range of health care jobs with sub-baccalaureate education requirements (generating over 1.5 million job openings);
- 10 to 15 percent in the skilled construction trades (providing 4.6 million job openings); and
- 10 to 15 percent in installation/maintenance/repair and transportation (also generating more than 4 million job openings).

All in all, these projections clearly demonstrate that ample employment opportunities will remain in a variety of good-paying jobs in the middle of the labor market over the next decade and beyond.

## The Future Supply of Skills

How do these projections of future demand for workers at varying levels of education and training stack up against expectations of the distribution of the supply of workers? A 2003 report by the Aspen Institute, using projections generated by David Ellwood of Harvard, offers a good starting point for expected levels of educational attainment over the two decades beginning in 2000 (Figure 3). Using education as a proxy for skills, the projections indicate a dramatic slowdown in the growth of skills over the next two decades, at both the top and middle of the labor market. In

fact, the slowdown in growth among workers with some college exceeds the slowdown among workers with a bachelor's degree or more.



Source: Sources: U.S. Bureau of Labor Statistics, Occupational Projections and Training Data, February 2006; and Aspen Institute, *Growing Together or Growing Apart*, 2003.

This slowdown might not fully materialize, especially if more educated workers choose to retire later (perhaps motivated by their improved health and meager savings), if more young people or adults choose to attend college or participate in long-term training, or if more highly educated immigrants enter the United States (perhaps due to changing immigration laws). But some slowdown in educational growth is almost certain to occur.

Furthermore, if some of these changes alter the educational trends, the changes are more likely to shrink the pool of skilled labor in the middle than at the top of the education ladder. Delays in retirement are more likely among the most educated (BA and above) than among those with some college or postsecondary training but less than a BA. Middle-skill workers who have worked in physically demanding blue-collar jobs are especially unlikely to delay retirement. And, as George Borjas of Harvard notes, immigration disproportionately increases the work force at the top and bottom of the education distribution.

Another consideration is that educational attainment patterns may understate skill mismatches because of the limited numbers who qualify for specific occupations in high demand. Openings for registered nurses, for example, are expected to jump dramatically over the next 10 to 15 years. Having enough workers with general education at the BA or sub-BA level will do little to meet the increasing demand for nurses unless enough workers obtain the relevant occupational qualifications. Without initiatives to better link the emerging occupational requirements with the education and training obtained by current and future workers, employers will have to import workers or alter their production strategy in ways that may eliminate potentially good jobs.

Some labor market analysts predict that labor markets in the United States at all levels will be fairly slack in the coming decades, as workers in China, India and elsewhere increasingly compete with American workers. This conclusion might be true for some fields. But many of the jobs we identify—in sectors such as health care, construction, public safety and law enforcement—cannot be offshored and often cannot be filled by less-educated immigrant workers. And, given the specific nature of the skills these jobs require, middle-skill occupations will continue to provide well-paying jobs for the workers who fill them—even if the broader labor markets around them are sluggish.

Overall, we conclude that demand for both middle-level and high-level skills is likely to grow more rapidly than the supply of these services over the next decade and beyond—both overall and within key sectors.

## Policy Implications

What does all of this mean for policy? Employers will adjust to tight labor markets in a variety of ways—such as with higher wages, more aggressive recruitment, and more selective screening. They will likely also invest more in training. But these investments take time and significant resources.

Furthermore, private sector training investments by firms are often limited by a variety of market failures that lead to suboptimal investments, especially among less-educated workers. These market failures include imperfect or asymmetric information between employers and employees, liquidity constraints in capital markets, and wage rigidities that prevent employers from financing training partly through lower wages. Another reason for underinvestment is that employers who train workers fear they will be unable to recoup their investment if other firms hire workers away once they are trained. Underinvestments in employer-led training seem to plague less-educated workers.

These market failures might lead to lowered worker performance and productivity in some sectors in the absence of sound policy responses. And the education and earnings levels of disadvantaged workers will also remain below the levels that could have been achieved with appropriate policy measures. The likely short supply of workers in several key sectors offers opportunities to improve the earnings of disadvantaged workers. In particular, low-income youth or adults can raise their earnings substantially and fill many middle-level jobs by undertaking training and postsecondary education. The result will be to improve efficiency and equity in the labor market.

How might this be accomplished? For at-risk youth—especially those in school—it means expanding opportunities for high-quality career and technical education. Options include career academies, which have demonstrated positive impacts on the earnings of youth and especially at-risk young men. Other options include Tech Prep and “Career Pathway” models, which provide ladders into certain well-paying occupational clusters based on school curricula and work experience, beginning in secondary school (or earlier) and continuing into postsecondary education.

For adults, effective approaches involve supplementing education or training, with enhanced links to employers in sectors with strong growth in middle-skill jobs. These approaches should include job search and follow-up services. Often, community or technical colleges, as well as for-profit career colleges, can deliver the relevant education and training. Labor market intermediaries can play a useful role in coordinating these components and developing connections with employers through “sectoral” training or “career ladders” that attach disadvantaged adults to these sectors and provide pathways of instruction qualifying them for specific occupations and industries. To be effective, intermediaries sometimes must offer stipends during the period of study, as well as child care, transportation, and job placement services. Financial enhancements afterwards might still be needed to incent these workers to remain attached to the labor market.

Expanding apprenticeships is a particularly attractive option for upgrading the careers of both young and experienced workers. Apprenticeship training culminates in career-related and portable credentials that are recognized and respected by employers. It relies mostly on learning in context, an effective method for teaching technical and broader skills, such as communication and problem-solving. Workers earn salaries during their training, which is particularly appealing to disadvantaged adults and youth. Although the U.S. apprenticeship system is small relative to systems in other countries, nearly 500,000 American workers are in the registered apprenticeship system and at least another 500,000 are in other apprenticeship programs. Nonexperimental evidence suggests very high earnings gains, while public spending is low (since employers finance the wages and instruction for apprentices). Doubling the Office of Apprenticeship budget

within the U.S. Department of Labor in order to generate more employer use of apprenticeship training would only require about \$20 million.

How might these and other education and training efforts be financed? Expansions of Pell grants would be an important first step. Currently, Pell grants cover occupational training at accredited colleges only for disadvantaged workers attending at least half-time and without any felony convictions. One approach would be to allow Pell grants to extend to shorter term training programs and to finance the classroom instruction used in registered apprenticeship programs. Another option is to use federal funds from the Temporary Assistance for Needy Families (TANF) to finance training, an approach that may require changes in how occupational training counts towards the TANF program's work requirements.

Expanded funding for Title I of the Workforce Investment Act is another way to help finance these programs for disadvantaged adults. This expanded funding could be accomplished through formula funding or through a new competitive grants program like the one outlined in a recent report by Harry Holzer for the Hamilton Project at Brookings. In this proposal, grants would be awarded to states to build comprehensive "advancement systems" for the poor that focus on education and training, pathways that link private employers to training providers and workers, and appropriate financial supports and services. The grants would match new state and local expenditures and require a great deal of rigorous evaluation. Financial incentives would also be provided for strong performance and for taking programs to scale at the state level (that is, making them large enough to affect earnings outcomes of a substantial share of workers). Whatever exact paths are taken, the labor market data reviewed here suggest that demand for workers in the middle of the skill distribution will remain quite strong for the foreseeable future, and that policies designed to train more disadvantaged youth and adults for these jobs are a good bet.

## Authors

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## Additional Reading

Aspen Institute Domestic Strategy Group, "Grow Faster Together or Grow Slowly Apart: How Will America Work in the 21<sup>st</sup> Century?," (Washington, D.C.: Author, 2002).

David Autor, Lawrence Katz and Melissa Kearney, "The Polarization of the U.S. Labor Market," (Working Paper, National Bureau of Economic Research, Cambridge, MA, 2006).

George Borjas, "Immigration Policy and Human Capital," in *Reshaping the American Workforce in a Changing Economy*, eds. Harry Holzer and Demetra Nightingale (Washington D.C.: Urban Institute Press, 2007).

David Ellwood, "The Sputtering 21<sup>st</sup> Century Workforce: Can Social Policy Help?" in *The Roaring Nineties*, eds. Alan Krueger and Robert Solow (New York: Russell Sage Foundation, 2001).

Harry Holzer, "Better Workers for Better Jobs: Improving Worker Advancement in the Low-Wage Labor Market," The Hamilton Project, Brookings Institution (December 2007).

Harry Holzer and Robert Lerman, "America's Forgotten Middle-Skill Jobs: Education and Training Requirements in the Next Decade and Beyond," The Workforce Alliance (2007).

James J. Kemple and Cynthia J. Willner, "Career Academies: Long-Term Impacts on Labor Market Outcomes, Educational Attainment, and Transitions to Adulthood," (New York: MDRC, June 2008).

Robert Lerman, "Career-Focused Education and Training for Youth," in *Reshaping the American Workforce in a Changing Economy*, eds. Harry Holzer and Demetra Nightingale (Washington, D.C.: Urban Institute Press, 2007).

Dixie Sommers, "Overview of Occupational Projections to 2014," Presentation at the National Academy of Sciences, Workshop in Future Skill Demands, Washington D.C., May 31 2007.

U.S. Department of Labor, *Occupational Projections and Training Data: 2006-07 Edition*, (Washington, D.C.: U.S. Government Printing Office, 2006).