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The importance of middle-skill jobs

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Middle-skill jobs are key for the nation and its workforce. Here is where things stand today and projections for future improvements.

**Note the exploration of both supply and demand issues in this article.**

Globalization and advances in science and technology are transforming nearly every aspect of modern life, including how we communicate with each other, how we shop, how we make things, and how and where we work. In response, US firms are seeking workers with greater proficiency in basic literacy and numeracy as well as more developed interpersonal, technical, and problem-solving skills. For the United States to remain competitive on the world stage while fostering greater innovation and boosting shared prosperity, it needs not only a sufficient number of workers, but also a workforce with the right mix of skills to meet the diverse needs of the economy and to fully engage in civic life.

Yet employer surveys and industry reports have raised concerns that an inadequate supply of skilled workers could hamper future economic growth by creating barriers for firms looking to locate or expand in the United States. Indeed, there has long been a concern that shortages sometimes develop and persist in specific industries or occupations, leading to inefficiencies in the economy. More recently, it has been suggested that the lack of skilled workers has made it difficult to fill jobs that are in high demand during the economic recovery, leading to slower than expected improvement in the labor market—particularly among "middle-skill" jobs that require some postsecondary education and training, but less than a four-year college degree.

Compounding the problem in the middle-skill sector is a demographic shift in which a significant portion of the existing workforce consists of baby boomers nearing retirement, with fewer younger workers to replace them. At Boeing, for example, 28% of the firm's 31,000 machinists are older than 55 and eligible for retirement. The combination of the upward shift in skills on the demand side and the decline in the number of experienced workers on the supply side is likely to give rise to the sorts of labor market anxiety that is reflected in employer surveys, particularly in health care, manufacturing, and production. However, few employers have raised wages in response to the difficulty in hiring skilled workers, although some reports indicate that this may be due to competitive factors in industries where the pressure to limit costs is great and outsourcing is an option.

This potential mismatch in the labor market has important implications for both the economy and the individual worker. For the economy, an insufficient number of middle-skill workers means that the rate at which employment and output can grow is constrained. Slower employment growth means tighter labor markets that may require firms to find innovative ways, such as outsourcing or automation, to increase productivity in the face of rising labor costs, raising concerns about the types of jobs that will be created and the possibility of lost opportunities for workers. It also means slower growth in tax revenues at a time when a greater share of the population will be retiring and drawing support from public programs such as Social Security and Medicare.

**Labor market mismatch issues**

For the individual worker, obtaining a sufficient level of skill is critical to maintaining employment and is associated with a range of better outcomes. A recent international survey of adult skills by the Organisation for Economic Co-operation and Development's Program for the International Assessment of Adult Competencies demonstrates the problem. The survey assessed the proficiency of adults from age 16 to 65 in literacy, numeracy, and problem solving in technology-rich environments. The most recent published report includes survey data on more than 165,000 adults in 22 of the organizations member countries and two partner countries. It revealed that skills have a major impact on life chances: lower-skill individuals are increasingly likely to be left behind, leading to greater inequality in income. Having lower basic skills also impedes the ability of individuals to gain more education or training when demand shifts toward industries or occupations that require additional competencies. Finally, those with lower skill proficiency tend to report poorer health, lower civic engagement, and less trust.

Defining middle-skill workers and jobs

**Note definition of middle skill workers.**

Many scholars and practitioners point to a lack of middle-skill workers, yet one can obtain vastly different estimates of shortages and mismatch based on how this group is defined. To measure the number of middle-skill workers in the labor force, researchers typically rely on the education level of the workforce as a proxy for skill. This is largely due to data limitations as nationally representative demographic surveys that cover work and education experiences do not ask about their other types of training or particular skills acquired.

Using this method, researchers typically define middle-skill workers as individuals with some postsecondary education, but less than a four-year college degree. (Similarly, low-skill workers are defined as those with a high school degree or less and high-skill workers are defined as those with a bachelor's or advanced degree.) Postsecondary education or training requirements can include associate's degrees, vocational certificates, significant on-the-job training, previous work experience, or generally "some college" without having earned a degree. Workers in this category typically hold jobs in the clerical, sales, construction, installation/repair, production, and transportation/material moving occupational groupings. Using this definition, there were 37.7 million middle-skill workers in the labor force as of 2015, according to the US Bureau of Labor Statistics. The share of middle-skill workers in the population has been increasing steadily, rising from 28.7% of the population in 2006 to 33.4% in 2012. This is primarily due to a greater share of individuals having gained some postsecondary education rather than having completed an associate's degree—likely reflecting the low completion rates at community colleges. In comparison, over the same period, the share of low-skill workers decreased by 7.5 percentage points while that of high-skill workers increased by 2.7 percentage points.

To measure the number of middle-skill jobs, researchers have typically used either a relative or absolute ranking to determine skill level based on education or wages. For example, relative rankings classify occupations by skill level from lowest to highest and then use cutoffs at specific percentiles of the distribution to determine what falls into the "middle" (e.g., occupations falling into the 20th to the 80th percentiles). In contrast, absolute rankings of middle-skill jobs use pre-defined skills criteria for specific jobs (e.g., education beyond high school, but less than a four year degree) and then categorize occupations accordingly.

Using the latter method, I identified 272 middle-skill occupations in which more than one-third of the workers have some college or an associate's degree. These include jobs in health care (technicians, EMTs, therapists); education (teacher assistants); information technology (network administrators, computer support specialists); and other growing occupations. Between 2006 and 2012, labor demand decreased for low-skill jobs (down 5.4 percentage points), increased for high-skill jobs (up 6.6 percentage points), and held steady in the middle at just under one-third of all jobs.

Harry Holzer has observed that a sizeable share of these occupations have undergone a shift from high-volume, low-tech jobs to low-volume, high-tech jobs—prime examples of the "new" middle-skill labor market. Although the historical middle of the job market (composed primarily of construction, production, and clerical jobs that require fairly little education) has indeed been declining rapidly, another set of middle-skill jobs (requiring more postsecondary education or training) in health care, mechanical maintenance and repair, and some services is consistently growing, as are the skill needs within traditionally unskilled jobs.

As a result of this shift, some observers have pointed to recent labor market indicators suggesting that a potential mismatch already exists in the short run between the skills of those looking for work and the needs of employers looking to fill vacant jobs. Indeed, the National Governors Association Center for Best Practices estimated in 2011 that of the 48 million job openings projected through

2018, 63% would require some postsecondary education. At the time, only approximately 42% of the current workforce had an associate or higher degree, and the association calculated that the nation would need to increase the current level of middle-skill workers by 3 million by 2018.

However, there is considerable controversy about the nature of labor market shortages and middle-skill gaps or mismatches. On one hand, the persistently high rate of unemployment coupled with a rising share of vacancies would seem to indicate some type of mismatch in the labor market. Indeed, during this period, the share of workers with a college degree increased rapidly within middle-skill occupations. Yet on the other hand, the lack of wage growth observed even within industries and occupations with relatively strong demand would suggest otherwise. As a result, economists have been searching for ways to measure the degree to which the perceived mismatch in the labor market might be due to cyclical (e.g., short-term or temporary adjustments) versus structural (e.g., long-term or sustained trends) forces. Unlike mismatch due to cyclical causes, structural mismatch will persist even as economic conditions improve, possibly warranting a change in labor market policies.

**Contrast cyclical and structural forces**

Setting aside the mismatch debate, significant demographic changes suggest that the supply of skilled workers may not keep pace with demand in the long run. The retirement of the baby boomers—a well-educated group—will result in large numbers of skilled workers leaving the labor force. In addition, the population of native workers who are needed to replace those retiring has been growing more slowly over time such that net international migration is projected to be the dominant component of population growth by 2025. This shift toward greater reliance on immigration as a source of population will alter the composition of the labor force in terms of educational attainment. Although the share of individuals with a bachelor's degree or higher is similar across native and immigrant populations, immigrants are more likely to be high school dropouts or to lack additional postsecondary education beyond high school, such that these individuals often lack the formal education and English language skills that employers require. As a result, some observers suggest that there is likely to be a potential mismatch between the level of education and skill among the population and the needs of employers in the coming decades.

Trends in the middle-skill labor market

Does the supply of middle-skill workers meet the demand of employers now and in the foreseeable future? To address this question, it is helpful to examine data and analyses on the current supply of and demand for workers, as well as the forces that are likely to affect supply and demand conditions over time. Although it is inherently difficult to measure the imbalance between labor supply and demand, as both forces are changing over time and the movement of one affects the movement of the other, it is still instructive to look at trends over time to detect changes in the magnitude or direction of any potential gap.

Current patterns. One way to measure the current imbalance between supply and demand within groupings is to look at vacancy rates by detailed occupations. Specifically, I examined job vacancy measures to determine which major occupation groups experienced the tightest labor market conditions as of the most recent peak of the business cycle (2006), and whether these conditions persisted through the recovery (2012).

It turns out that those major occupation groups with persistently high vacancy rates employ a relatively high share of both middle- and high-skill workers. These include occupation groups with "critical" vacancies as evidenced by having both a higher than average vacancy rate (number of vacancies as a percent of total employment) and vacancy share (number of vacancies as a percent of total vacancies). Critical vacancies are largely found in management, business and financial operations, computer and mathematical science, architecture and engineering, and health care and technical occupations. Contrary to conventional wisdom, these professional occupations—categories often labeled as high-skill—contain a significant percentage of middle-skill jobs.

Within these major occupation groupings, critical vacancies exist in occupations that primarily employ middle-skill workers. For example, within the health care and technical occupation group, critical vacancies exist in occupations such as medical and clinical laboratory technicians, surgical technologists, licensed practical and licensed vocational nurses, and medical records and health information technicians; these are jobs that employ a high share of workers who possess only some college or an associate's degree. Moreover, most of these middle-skill occupations exhibit high and rising wages as well as projected growth through 2022.

In fact, middle-skill jobs are sprinkled throughout the broad occupation categories, suggesting that such workers are not contained in just a few easily identifiable sectors. Moreover, many of the jobs held by middle-skill workers appear to be complementary to those held by high-skill workers. For example, hospitals need both physicians as well as nursing and other support staff—jobs not easily automated or outsourced. Engineering firms need both engineers as well as technicians. Businesses need both systems analysts as well as computer support specialists. Among all detailed occupations that exhibited critical vacancies, those that employed a greater share of middle- and high-skill workers had higher job vacancy rates both before and after the Great Recession, suggesting that there may be a limited set of jobs that are difficult to fill in key sectors of the economy such as management, business and financial operations, computer and mathematical sciences, and health care.

How will the skills of new market entrants match up with demand? Recent media reports and surveys of job posting data suggest that employer requirements for education within occupations shifted during the Great Recession and subsequent recovery. In particular, it appears that a college degree is now required for a number of middle-skill occupations. For example, according to a survey by CareerBuilder in late 2013, almost one-third of employers said that their educational requirements for employment have increased over the past five years, and, specifically, that they are now hiring more college-educated workers for positions that were previously held by those without a bachelor's degree.

Looking within detailed occupations reveals substantial upskilling for some occupations that have historically been dominated by workers without a college degree, suggesting that entry-level middle-skill workers face an ever-rising bar. For example, a recent report by Burning Glass Technologies found that 65% of online vacancies for executive secretaries and executive assistants now call for a bachelor's degree, but only 19% of individuals currently employed in these roles have such a degree. In other occupations, such as entry-level information technology help desk positions, the skill sets indicated in job postings do not include skills typically taught at the bachelor's level, and there is little difference in skill requirements for jobs requiring a college degree from those that do not. Yet the preference for a bachelor's degree has increased. This suggests that employers may be relying on a bachelor's degree as a broad recruitment filter that may or may not correspond to specific capabilities needed to do the job.

Interestingly, upskilling appears to be less likely when there are good alternatives for identifying skill proficiency. For example, many health care and engineering technician jobs, such as respiratory therapists, show little sign of upskilling. It may be the case that these positions are resistant to the use of higher education as a proxy because they are governed by strict licensing or certification standards, well-developed training programs, or measurable skill standards.

**Note future projections**

Future projections. How will the supply of middle-skill workers meet demand in the foreseeable future? To answer this, I analyzed aggregate data on projections for both the supply of and demand for skilled workers by education level. Specifically, I use a cohort component model to project the size and educational attainment of the population in five-year age groups by nativity and race/ethnicity over the coming decade (2012 to 2022) as new cohorts enter the labor force and older ones retire and then aggregate over groups to obtain estimates of the total labor force. I compare these supply simulations to projections of labor demand based on employment growth forecasts made by the Bureau of Labor Statistics through 2022 for each detailed occupation and then aggregate over occupations to the economy-wide level.

On the supply side, the number of middle-skill workers is likely to hold steady, but the composition will change such that it is unlikely to keep pace with demand in the not-so-distant future. Among individuals with middle-skill credentials, the share of labor force participants with some college is projected to increase while those earning an associate's degree will remain stagnant. It is also important to note that these projections may overestimate the supply of middle-skill workers as labor force participation has been declining, particularly for those with less than a college degree.

On the demand side, projections of future employment indicate rapid growth among major occupation groups that employ a high share of middle-skill workers, particularly in health care. Middle-skill occupations in the health care field that are likely to be in high demand include medical and clinical laboratory technicians, surgical technologists, and licensed practical and licensed vocational nurses—almost identical to those where critical job vacancies currently exist. These jobs typically involve tasks that require personal interaction or abstract thinking and are unlikely to be outsourced or automated in the future, unlike other middle-skill jobs, such as telemarketers, clerks, and computer operators.

Will the education/skill levels of future labor force participants stack up against those demanded by firms over the next decade? Prior to the Great Recession, there was a mismatch in the middle of the labor market that abated with the massive job destruction that occurred during the downturn. As the economy strengthens, our projections indicate that by 2022, any future mismatch in the distribution of labor supply versus demand would again be likely to occur in the middle of the distribution. In this category, the percent of middle-skill jobs in the economy is likely to exceed the percent of middle-skill workers in the labor force by roughly 1.3 percentage points. In addition, as baby boomers continue to retire over the coming decade, the absolute number of middle-skill workers is likely to fall short of demand. By 2022, the number of middle-skill jobs is projected to exceed the number of middle-skill workers by 3.4 million. Moreover, these projections are rather conservative and are likely to underestimate any future skill imbalances as they are based on the current educational requirements of jobs and these requirements tend to generally increase over time.

### Note discussion of human capital

Although these projections can indicate where future investments in human capital may be warranted, it is crucial to note that the future path of employment will be determined not only by the demands of employers and the skills of existing workers, but also by future unexpected adaptations. Thus, these forecasts of future labor demand are used only to place bounds on the problem and provide context rather than to pinpoint the exact number of workers that will be demanded in the future. Indeed, there are likely to be some labor market adjustments over the next decade in response to any potential gaps on the part of both workers and employers. Workers may adjust by obtaining more education or training or applying current skills in their existing jobs to growing occupations. Employers may adjust by adopting new technologies, outsourcing, or restructuring jobs.

Overcoming market frictions

### Challenge of market frictions

How can the nation ensure that its workers have the skills to meet these new and changing needs, and how can the match be improved between the demand for and availability of skills? Economic theory suggests that it should be possible to rely on market incentives. In the short run, rising wages will encourage greater labor market participation and in-migration on the part of skilled workers to help alleviate the shortage. In the long run, higher returns to skilled labor will encourage individuals to obtain more education and training and create incentives for firms to find innovative ways to increase labor productivity.

But labor markets in the economy do not function perfectly all of the time. This might occur if wages are constrained by wage controls, pricing regulations, competitive pressures, equity concerns, or imperfect information such that they cannot rise in response to an increase in labor demand. Another possibility is that the pace of technological change will be sufficiently rapid that the demand for skilled workers continually grows more rapidly than the supply.

Indeed, there are certain conditions that can create persistent labor market imbalances, particularly for middle-skill markets where demand can change rapidly and the incentives for adjustment on the supply side are weak. On the demand side, structural changes associated with advances in science and technology and competitive forces have been shown to accelerate middle-skill job creation and destruction over the course of the business cycle. In addition, the cost of finding, hiring, and developing middle-skill workers can act as a disincentive for firms, creating additional frictions. A 2014 survey by Accenture of human resource professionals, indicated that employers use higher levels of education as a proxy for employability rather than hiring workers based on demonstrable competencies that are directly related to job tasks. Indeed, my research shows that employers chose to raise credential requirements quite suddenly during the Great Recession, at least in part because more educated workers were in greater supply and could be hired "on the cheap."

On the supply side, there are additional frictions present that make it difficult for middle-skill workers to obtain the necessary credentials on their own. For example, lack of information about job requirements can make it difficult for workers to develop requisite skills. Moreover, if certifications or experience do not easily transfer across jobs, occupations, sectors, or geographic areas, then workers have less incentive to invest in such training. In addition, required training that is lengthy or costly might mean that workers cannot capture the value of their educational investment.

Finally, the efficacy of education and training programs and their ability to adapt to changing skill requirements has also been identified as a potential source of friction in middle-skill labor markets. Institutions that provide education and training for middle-skill workers, particularly community colleges, often have inadequate resources and weak incentives to expand capacity in their technical workforce courses or to boost completion rates. Moreover, inadequate development of basic skills in the K-12 system, especially in science and mathematics, can limit the ability of individuals to invest in technical middle-skill postsecondary training down the road in occupations such as health care. Finally, inaccurate or outdated perceptions of certain occupations, such as manufacturing, can also reduce incentives for individuals to invest in training notwithstanding the strong job prospects in those sectors.

Despite the difficulties in measuring skill shortages and mismatches, there is sufficient evidence that middle-skill markets may not be clearing as efficiently as they could and these frictions are likely to be exacerbated by business cycles and global trends. As a result, the nation's approach to workforce development and skills acquisition must acknowledge and overcome these frictions in the labor market. Whereas older middle-skill jobs in occupations such as production and transportation are being eliminated through automation and outsourcing, newer middle-skill jobs that require the ability to use technology are in high demand in growing occupations such as health care, high-tech manufacturing, and information technology. Many of the newer middle-skill jobs require only secondary degrees or certificates while offering salaries and benefits packages as well as the opportunity to advance to better positions. If sufficient information and resources about these jobs are generally available, they can potentially be filled by people with high-quality education and training provided by community colleges, vocational and career technical education programs, apprenticeships, and a growing number of web-based educational programs.

### Note policy considerations.

Developing and sustaining skills proficiency is essential to sustaining US leadership in innovation, manufacturing, and competitiveness and to creating and retaining high-value employment. As policy makers work to tackle the challenges of social and economic development at local, state, and national levels, they must consider whether they are creating the conditions that will prepare citizens for middle-skill jobs that provide a pathway to sustainable employment at a living wage. With the implementation of the recently re-authorized Workforce Innovation and Opportunity Act of 2014, policy makers at all levels have an obligation to make the workforce development system more demand-driven and accountable to better support the middle-skill workforce. For example, sector-based partnerships between employers and postsecondary institutions can provide curriculum tailored to employer skill requirements so that students acquire a set of skills that are in high demand, often leading directly to a job upon graduation.

Regardless of the policy response, it is important to keep in mind that interventions should be assessed for their effectiveness and efficiency, as well as for their distributional effects. Initiatives to encourage high-quality education and workforce development programs need to keep employers engaged while maintaining a focus on serving less-skilled populations lest administrators be tempted to engage only those students who can produce the best results. Finally, it must be recognized that the nation needs to balance general and specific skill-development needs. Although sector-based or occupation-specific programs may deliver the biggest bang for the buck in the short term, if these are not balanced with general skill development, workers may find themselves back at square one when demand shifts.

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Recommended reading

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