



# Is the Middle of the U.S. Job Market Really Disappearing?

## A Comment on the “Polarization” Hypothesis

Harry J. Holzer May 11, 2010

Massachusetts Institute of Technology economist David Autor describes an ongoing polarization in the U.S. labor market, with “expanding job opportunity in both high-skill, high-wage occupations and low-skill, low-wage occupations, coupled with contracting opportunities in middle-wage, middle-skill white-collar and blue-collar jobs.”<sup>1</sup> In his recent paper for the Center for American Progress and The Hamilton Project at the Brookings Institution, Autor implies that middle-skill jobs today mostly require the performance of routine manual or clerical tasks for which demand is being replaced by new technology and global forces while nonroutine tasks appear either in high-skill jobs requiring a four-year college degree or higher or low-wage service jobs requiring no postsecondary skills.

In contrast, a few recent papers I have written with Urban Institute economist Robert Lerman suggest that employment in many middle-skill job categories remains robust, with growing demand and opportunities for noncollege graduates in some areas.<sup>2</sup>

Which view is more accurate? Indeed, do they reflect substantively different views of the labor market, or mostly differences in how jobs are defined and categorized? And what do these views suggest about education and workforce policies for the United States?

Below I summarize both sets of arguments and the data on which they are based. Autor is absolutely correct that there has been some shrinkage in middle-skill jobs requiring only the performance of routine tasks, especially production jobs for equipment operators and laborers and office jobs for clerical workers. But other categories of middle-skill jobs, which involve the performance of many nonroutine tasks and often require some postsecondary education or training—among them technician jobs and many service jobs in health care—are not shrinking to any real extent. It is important to acknowledge major employment opportunities for noncollege graduates in these latter categories of middle-skill jobs.

In sum, the notion that we are developing an “hourglass economy” with large top and bottom layers but a vastly shrinking middle, while not without basis, has been overblown.<sup>3</sup> Accordingly, there remains a strong need for more workers with better cognitive and analytical skills and with four-year college degrees, as Autor emphasizes. But the kinds of postsecondary education and training below the level of a four-year bachelor’s degree that still provide satisfactory preparation for many well-paying middle-skill jobs should be supported as well. And other policies to encourage higher job quality, as well as opportunities for workers to develop skills and progress on the job within a range of sectors, can be helpful too.

## Definitions and measurement

How are “middle-skill” jobs defined in each paper? And what results are presented that demonstrate their alleged growth or shrinkage?

Autor categorizes jobs by occupational category. In some cases, he uses the average (or median) wage in detailed occupational categories in 1980 to array them from highest to lowest skill. In other cases, he develops broad occupational categories and looks at wage and employment trends in each, sometimes separately for workers of different education levels. And he relies on earlier work with a range of co-authors to argue that jobs mostly requiring routine tasks are disappearing while those requiring nonroutine task performance are growing both at the high-paying professional or managerial ends of the job market and at the low-paying service ends of the labor market.<sup>4</sup>

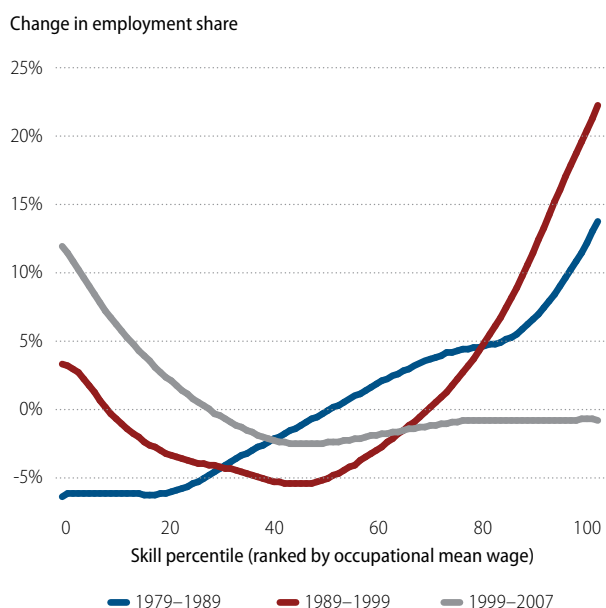
Lerman and I define middle-skill jobs as those that generally require education or training beyond high school but less than a four-year bachelor’s degree. We, too, present data for broad occupational categories, including wage and employment growth over the period 1986 to 2006 as well as occupational projections from the Bureau of Labor Statistics for the coming decade. We also present data on detailed jobs in these categories to give some sense of the range of outcomes around the averages. We consider projections on the likely trends in educational attainment over the next decade, as well as industry- and region-specific descriptive reports on labor market tightness and short-term worker shortages as well.

What do the results of each analysis show? Autor’s data (and our own) certainly show some shrinkage during the past two decades in both employment and wage growth in Autor’s middle-wage job categories, relative to other groups. But whether occupational wages in 1980 are the right way to categorize skill levels of jobs today can be debated; I have seen no evidence that middle-skill job categories mostly involve tasks that are routine in nature.<sup>5</sup> Putting aside those concerns for now, a close examination of his data reveals some results that do not fit very clearly within the “polarization” story.

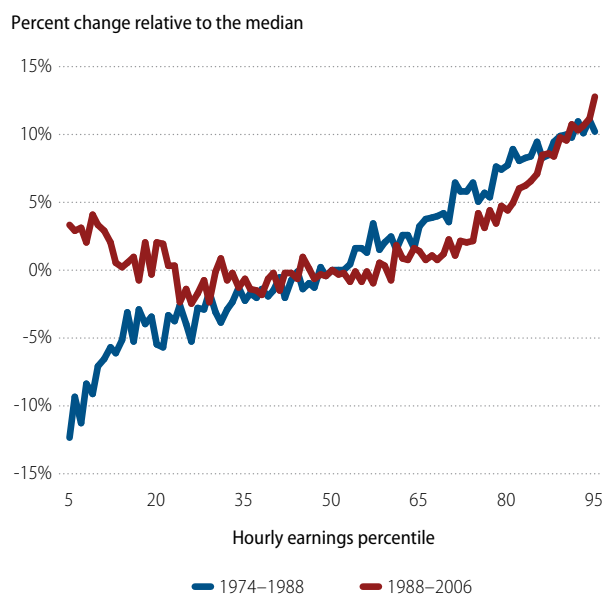
For instance, Autor's data show strong inconsistencies across specific time periods in relative wage and employment growth at the top, middle, and bottom parts of the wage spectrum over the past 30 years. During the 1980s, both employment and wage growth at the bottom of the wage spectrum lagged behind the middle and especially the top. During the 1990s, employment growth overall was robust, but in both the bottom and the middle it was fairly modest relative to the strong growth of jobs at the top of the spectrum. And in the 2000s, employment in the bottom-paying jobs grew most rapidly while the highest-paying jobs grew no faster than those in the middle (see Figure 1).

Moreover, real wage growth between 1988 and 2006 was quite modest for all groups except for the very top few deciles of earners (see Figure 2). Thus, while the occupations at the middle of the wage distribution have lagged somewhat in wage and employment growth since 1989, no consistent "polarization" story emerges at any time during this entire period.

**FIGURE 1**  
Smoothed changes in employment by occupational skill percentile, 1979–2007



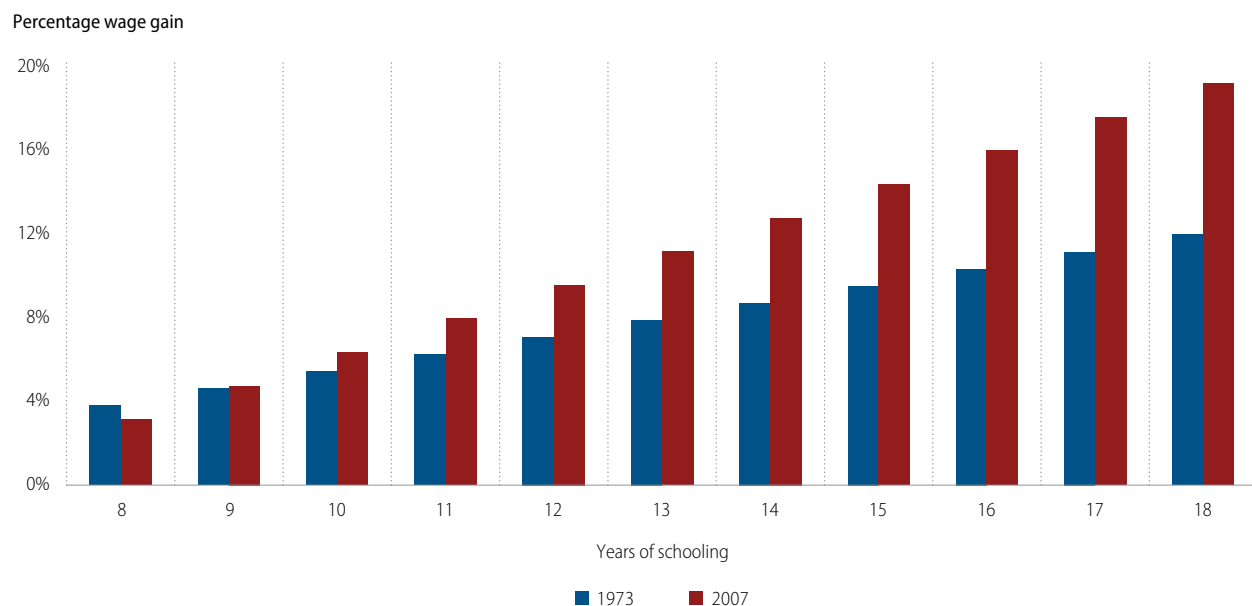
**FIGURE 2**  
Percent changes in male and female hourly wages relative to the median



Source: Data are Census IPUMS 5 percent samples for years 1980, 1990, and 2000, and U.S. Census American Community Survey 2008. All occupation and earnings measures in these samples refer to prior year's employment. The figure plots log changes in employment shares by 1980 occupational skill percentile rank using a locally weighted smoothing regression (bandwidth 0.8 with 100 observations), where skill percentiles are measured as the employment-weighted percentile rank of an occupation's mean log wage in the Census IPUMS 1980 5 percent extract. Mean education in each occupation is calculated using workers' hours of annual labor supply times the Census sampling weight. Consistent occupation codes for Census years 1980, 1990, and 2000, and 2008 are from Autor and Dorn (2009a).

May/ORG CPS data for earnings years 1973–2009. Each year comprises a three-year moving average (e.g. 1974 contains May/ORG data from 1973, 1974, and 1975), with years equally weighted. The real log hourly wage is computed by year for each percentile between the 5th and 95th percentiles. In every year, real log hourly wages are adjusted such that they equal zero at the respective year's median (50th percentile). The percent change represents the difference in the log wages values (relative to the median) at each percentile between the relevant years.

**FIGURE 3**  
**Median hourly wage gain by years of schooling, 1973 and 2007**



Source: May/ORG CPS data for earnings years 1973-2009. For each year, a quantile regression of the median real log hourly wage is estimated. Log hourly wages for all workers, excluding the self-employed and those employed by the military, are regressed on a quadratic in education (eight categories), a quartic in experience, a female dummy, and interactions of the female dummy and the quartic in experience. Predicted real log hourly wages from the median quantile regression are computed in 1973 and 2007 for each of the years of schooling presented. See Data Appendix for more details on treatment of May/ORG CPS data.

Indeed, Autor’s own results later in the paper—when real earnings growth over time is presented for workers with different levels of education—show quite substantial (and increasing) wage returns to each additional year of education above grade 12, even for workers who finish one to three years of college but do not go on to obtain a bachelor’s degree (see Figure 3). In fact, the “polarization” hypothesis would imply that, all else being equal, returns to schooling in these years should be flattening (relative to those in grades 12 and below) while for those with four or more years of college they should be sharply accelerating. Autor’s data, however, show a more linear pattern of increasing returns for each year.

In addition, earnings for women with some college education but no bachelor’s degree grew quite handsomely over the past three decades, as Autor also demonstrates (see Figure 4). And any negative results over this period for men with some college would likely disappear if we were better able to measure inflation correctly.<sup>6</sup>

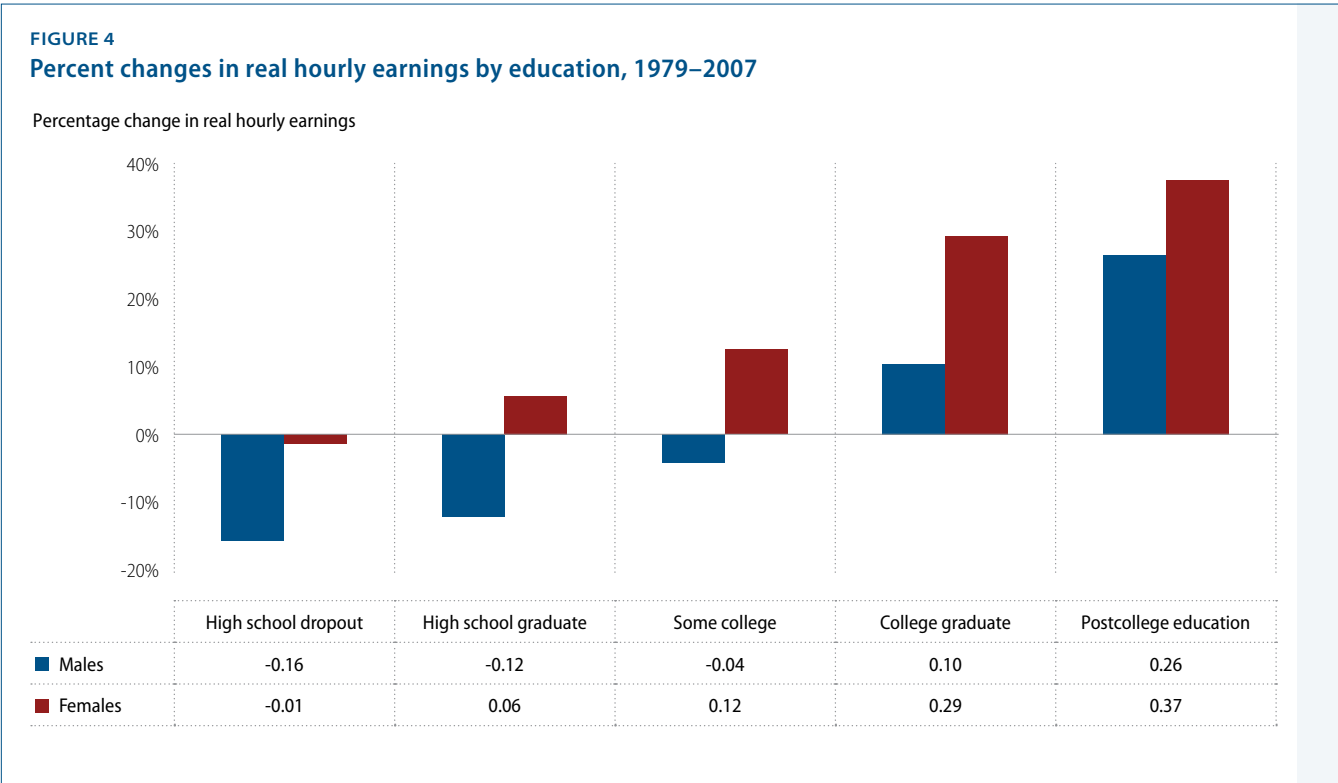
Of course, men and women with bachelor’s degrees or higher fared even better over this same period, but the potential for those who can manage to get only some postsecondary training short of the bachelor’s level is very noteworthy in Autor’s own results.

Yet Autor’s results based on broad occupational categories come to more pessimistic conclusions. His results suggest employment shrinkage over time in several middle-skill occupational categories, including sales and “production, craft, and repair” as well as machine

operators and office/administrative workers. Problem is, Autor treats the “technicians” and “protective service” occupational categories—where employment growth has been quite substantial in each case—as high skill and low skill, respectively, even though Bureau of Labor Statistics data indicate that most jobs in both categories require some postsecondary education below a bachelor’s degree and pay relatively well.<sup>7</sup> And his lumping together of “production” with “craft and repair” obscures the fact that the latter category (now known as “installation, maintenance, and repair” jobs) has seen fairly steady employment growth along with relatively high wages over the past two decades and is projected to continue doing so by BLS.<sup>8</sup>

Thus, the uniformly negative views of employment and earnings trends in middle-skill jobs that Autor finds are fairly sensitive to exactly how jobs are categorized. And an exclusive reliance on percent employment growth over time without regards to employment levels also reinforces that negative impression.

In my work with Lerman, we find that the middle-skill occupations shrank from a bit more than half of the workforce (55 percent) in 1986 to just under half (48 percent) in 2006, with production-transportation and clerical jobs accounting for virtually the entire decline.<sup>9</sup>



Source: May/ORG CPS data for earnings years 1973–2009. The data are sorted into sex-race-age-education groups of two sexes (male/female), three race categories (white, black, nonwhite other), four age groups (16–24, 25–39, 40–54, 55–64), and five education groups (high school dropout, high school graduate, some college, college graduate, and greater than college). The mean log wage for each gender-education group presented in the figure is the weighted average of the relevant cells using a fixed set of weights equal to the average employment share of each group. The percent change is calculated using exponentiated mean log wages for 1979 and 2007.

Indeed, the sales and installation-repair categories, as well as the “technician” jobs buried within the “professional and related” category, either maintained their shares of the workforce or grew in this period.<sup>10</sup> In construction, employment maintained most of its share of all jobs, even before the housing “bubble” of the mid-2000s and certainly grew afterwards.<sup>11</sup>

And, by most definitions we use, the broad middle-skill occupations will continue to account for 40 percent to 45 percent or more of all hiring over the current decade.<sup>12</sup> Stories of dramatic polarization, along with “hourglass” or “dumbbell” metaphors used in popular interpretations of this work, seem inconsistent with these facts.

Some other findings in our work reinforce the notion that some parts of the middle-skill job market will remain robust over the coming years. For instance, average earnings growth in broad occupational categories clearly obscures a wide range of growth rates in more specific occupations in each group. Lerman and I emphasize that both employment and earnings growth over the past 20 years have been very substantial in certain large but more detailed occupational categories of middle-skill jobs. These include technicians, licensed practical nurses, and therapists in health care, as well as a range of technicians and craft workers in construction and elsewhere.<sup>13</sup> And BLS projects similar employment growth in the decade beyond in most of these categories.

Lerman and I also note that labor-market trends in future years will depend both on the growth of labor demand and labor supply in these various skill categories. Projections by economist David Ellwood for the Aspen Institute suggest a dramatic slowdown in labor supply growth at the top and especially the middle of the skills distribution as Baby Boomers retire and are replaced by immigrants.<sup>14</sup> Indeed, our view that “replacement demand” will likely contribute to labor-market tightness in middle-skill jobs is based on these projections, and not on the occupations in which these retirees are currently found, as Autor suggests in endnote 20 of his paper.<sup>15</sup> Our projections and those by Ellwood may prove inaccurate if retirements are greatly postponed or immigrant education improves, but these projections certainly imply a plausible scenario in which middle-skill job markets will tighten.<sup>16</sup>

Finally, we include references to many state- and industry-specific reports of high job vacancy rates and hiring difficulties by employers in a range of middle-skill occupations.<sup>17</sup> Among them are all kinds of nursing positions and those for machinists. While these reports generally precede the current economic downturn, Louis Uchitelle of *The New York Times* reports difficulties identifying qualified applicants even among employers seeking to hire in the traditional blue-collar occupation of welders in the past year or so.<sup>18</sup>

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## Conclusion and implications for policy

In the end, I share Autor’s conclusion that there has been some shrinkage in middle-wage and middle-skill jobs over time, especially in jobs requiring the performance of routine production or clerical tasks. But many important middle-skill jobs involve nonroutine

tasks and require some postsecondary education and training short of a bachelor's degree. These jobs are not shrinking in the labor market, and will offer substantial opportunities for earnings improvements to many youth and adults for whom a bachelor's degree might be out of reach.

We certainly can and should try to improve cognitive skill attainment and four-year college attendance and completion in the United States.<sup>19</sup> But an exclusive focus on “college prep” curricula and bachelor's degree attainment for all would be a mistake, in my view. Currently, roughly a fourth of our youth still do not finish high school.<sup>20</sup> Perhaps another fourth (or a third of all high school graduates) obtain little or no postsecondary education, while dropout rates without the completion of any certificate or degree are simply enormous for those who do enroll.<sup>21</sup>

Under these circumstances, improving the rates at which young people and adults attain the many kinds of postsecondary certifications that the labor market rewards would constitute an enormous improvement over current circumstances. Given these findings, hoping for the perfect should indeed not become the enemy of the good.

We are developing some better understanding of the causes of poor postsecondary completion rates—even when incentives are so positive—and generating evidence of appropriate policy remedies, such as performance-based financial aid and supports for community college students as well as “sectoral” training for low-income adults.<sup>22</sup> We also have rigorous evidence of strong returns to high-quality career and technical education at the secondary and postsecondary levels, and to some kinds of technical training at community colleges for disadvantaged youth and displaced adults.<sup>23</sup> Given the apparently high variance in returns to such postsecondary education and training across fields, it seems appropriate to target job training to areas where we have some evidence of strong ongoing demand, as the “sectoral” programs have clearly done.

Finally, there are additional policies that can directly target the demand-side of the labor market, and generate improvements in the quality of jobs within the sectors we describe here, as well as in the workers to fill them. Of course, higher levels of minimum wages and more prevalent collective bargaining can play such a role, at least to some extent.<sup>24</sup>

But tax incentives and technical assistance, as part of both economic development and related job-training policies, can also be used to bolster the rates at which employers provide training and advancement opportunities to their workers in “high-road” establishments, for instance as the Center on Wisconsin Strategy does through the Wisconsin Regional Training Partnership or as California does with its Employment Training Panel for incumbent workers.<sup>25</sup> Experimentation with and evaluation of such programs and policies should proceed as well.

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## Endnotes

- 1 David Autor, "The Polarization of Job Opportunities in the U.S. Labor Market" (Washington: Center for American Progress and Hamilton Project, 2010).
- 2 Harry J. Holzer and Robert I. Lerman, "America's Forgotten Middle-Skill Jobs: Education and Training Requirements in the Next Decade and Beyond" (Washington: The Workforce Alliance, 2007); Harry J. Holzer and Robert I. Lerman, "The Future of Middle-Skill Jobs" (Washington: The Brookings Institution, 2009).
- 3 See, for instance, Craig Torres and Alexandre Tanzi, "Hourglass Economy Divides Americans and Defines US Politics," Bloomberg News, August 3 2006, available at <http://www.bloomberg.com/apps/news?pid=20601103&sid=a5FkS3h6EfeM&refer=us>.
- 4 These earlier papers include David Autor and David Dorn, "This Job Is 'Getting Old': Measuring Changes in Job Opportunities using Occupational Age Structure," *American Economic Review Papers and Proceedings* 99 (2) (2009):45-51; David Autor, Lawrence Katz, and Melissa Kearney, "The Polarization of the Labor Market," Working Paper (National Bureau of Economic Research, 2005); David Autor, Frank Levy, and Richard Murnane, "The Skill Content of Recent Technological Change: An Empirical Exploration," *The Quarterly Journal of Economics* 118 (4) (2003): 1279-1334.
- 5 Average wages in some occupational categories like production operatives, especially as of 1980, will reflect industry wage premia for manufacturing, transportation, and other sectors as well as skills, to some extent. See Alan Krueger and Lawrence Summers, "Reflections on the Interindustry Wage Structure," in K. Lang and J. Leonard, eds., *Unemployment and the Structure of Labor Markets* (New York: Basil Blackwell, 1987). Regarding the extent to which middle-skill jobs require nonroutine tasks, Autor and Dorn (2009) split the nonroutine jobs into high-skill and low-skill categories without considering a middle-skill category or the extent to which middle-skill jobs overall are distributed between the routine and nonroutine jobs.
- 6 Figure 4 shows real wage growth of .04 and .12 respectively for males and females with some college between 1979 and 2007. Regarding inflation, Autor uses the personal consumption expenditure component of the Gross Domestic Product (GDP) Deflator to adjust for inflation over time; this method of adjustment is probably the most accurate we have, but it likely still overstates inflation a bit (though by less than does the Consumer Price Index). This, in turn, implies an understatement of real wage growth by several percent points for both groups over these 28 years.
- 7 Bureau of Labor Statistics. *Occupational Projections and Training Data*. (U.S. Department of Labor, 2006).
- 8 Holzer and Lerman (2007) show that employment in this category fluctuated between 3.5 and 3.8 percent of all jobs between 1986 and 2006, excluding those in construction. BLS projects roughly 8 percent growth in this category between 2008 and 2018 v. 10 percent for employment overall. See Bureau of Labor Statistics, "Occupational Employment and Job Openings Data and Worker Characteristics," available at [http://www.bls.gov/emp/ep\\_table\\_106.htm](http://www.bls.gov/emp/ep_table_106.htm).
- 9 Specifically, the shares of all employment accounted clerical jobs fell by 3 percentage points (16.4 to 13.5 percent), production occupations by nearly 3 points (9.1 to 6.5 percent) and transportation/material moving by 1 point (7.2 to 6.1 percent).
- 10 Technicians are included among "professional and related jobs" in these data, though we break them out separately in some other calculations described below. The share of all jobs accounted for by this important middle-skill job category grew by about 3 percentage points between 1970 and 2000. See Frank Levy and Richard Murnane, *The New Division of Labor* (New York: Russell Sage Foundation, 2004).
- 11 Data in Holzer and Lerman (2007) show construction accounting for 6.4 percent of all jobs in 1986, 5.6 percent in 2000, and 6.6 percent in 2006.
- 12 Using broad (1-digit) occupational categories, we report BLS projections through 2014 in which middle-skill occupations will account for 45 percent of all new hiring. Using BLS education and training requirements, and considering all occupations that require more than short-term training but less than a bachelor's degree as middle skill, we report projections in which these jobs will account for about 40 percent of all hiring between 2004 and 2014. Projections that now cover 2008-18 are qualitatively similar to those we report for the 2004-14 period in our 2007 paper.
- 13 See Table 5 of Holzer and Lerman (2007) for a wide range of large middle-skill occupations in computer support, health care, construction, installation and repair, transportation and services (including chefs, claims adjusters, legal secretaries and paralegals) that are projected to show significant growth over the current decade.
- 14 See the Aspen Institute, *Grow Faster Together or Grow Slowly Apart: How will America Work in the 21st Century?* (Boulder CO: Domestic Strategy Group, 2003). The growth rate of college graduates in the labor force is projected to slow from 8.6 percent during 1980-2000 to 3.4 percent during 2000-2020; the comparable rates of actual and expected growth for those with some college are 10.5 percent and 0.7 percent.
- 15 In that endnote, Autor writes, "A recent study by Holzer and Lerman (2009) observes that middle-skill jobs are disproportionately occupied by workers who are relatively close to retirement. The study concludes that this fact augurs auspicious news about coming job opportunities in these occupations since pending retirements will lead to replacement hiring. A contemporaneous study by Autor and Dorn (2009) offers a different perspective on these same facts. These authors observe that the disproportionate representation of older workers in middle-skill occupations reflects the reality that firms are not hiring into these jobs as incumbent workers exit...."
- 16 See Richard Freeman, "Is a Great Labor Shortage Coming? Replacement Demand in the Global Economy," in H. Holzer and D. Nightingale, eds., *Reshaping the American Workforce in a Changing Economy* (Washington: Urban Institute Press, 2007). He argues that demand for all groups of workers will slow over the next few decades due to offshoring and trade, and that these trends will swamp any on the supply side. But, so far, these arguments remain speculative.
- 17 See, for instance, the U.S. Chamber of Commerce, *Rising to the Challenge* (Washington DC: Center for Workforce Preparation, 2003); and the West Central Initiative, *Study of Skilled Labor Shortages in West Central Minnesota*. (Fergus Falls, MN: 2002).
- 18 Louis Uchitelle, "Despite Recession, High Demand for Skilled Labor," *The New York Times*, June 23, 2009.
- 19 Ron Haskins, Harry Holzer, and Robert Lerman, "Promoting Economic Mobility by Increasing Postsecondary Education" (Washington: Economic Mobility Project, Pew Charitable Trusts, 2009).
- 20 James Heckman and Paul Lafontaine. "The American High School Graduation Rate: Trends and Levels," Working Paper (National Bureau of Economic Research, 2007).
- 21 For very high estimates of noncompletion rates of students at community colleges, see Thomas Bailey, Davis Jenkins, and Timothy Leinbach, "What We Know about Community College Low-Income and Minority Student Outcomes: Descriptive Statistics from National Surveys" (New York: Community College Research Center, Columbia University, 2005).
- 22 See results for the Opening Doors demonstration projects that have been evaluated by MDRC in Thomas Brock, "Young Adults and Higher Education: Barriers and Breakthroughs to Success," *The Future of Children* 20 (1) (2010): 109-132.
- 23 For instance, the Career Academies in high schools have generated strong impacts on earnings, especially for at-risk young men, without discouraging postsecondary school attendance. See James Kemple with Cynthia J. Willner, "Career Academies: Long-Term Impacts on Labor Market Outcomes, Educational Attainment, and Transitions to Adulthood" (New York: MDRC, 2008); Louis Jacobson and Christine Mokher, "Pathways to Boosting the Earnings of Low-Income Workers by Increasing their Educational Attainment" (Washington: CNA, 2009) show strong returns to lower-income youth who attain some community college certificates. And Louis Jacobson, Robert Lalonde, and Daniel Sullivan, "Should We Teach Old Dogs New Tricks? The Impact of Community College Retraining on Older Displaced Workers," Working Paper (Federal Reserve Bank of Chicago, 2003) show strong impacts on dislocated workers of technical community college training. Finally, Sheila Maguire, Joshua Freely, Carol Clymer, and Maureen Conway, *Job Training That Works: Findings from the Sectoral Employment Impact Study* (Philadelphia: PPV, 2009) also show large impacts of "sectoral" job training for disadvantaged adult workers at three sites in a random assignment evaluation.
- 24 Higher minimum wages tend to raise low earnings for the bottom decile of workers, though perhaps at the risk of some modest employment loss; see David Neumark and William Wascher, *Minimum Wages* (Cambridge MA: MIT Press, 2009). Unions also tend to raise wages for a broader range of occupations; see Richard Freeman, *America Works* (New York: Russell Sage Foundation, 2007). But they may be more constrained today by growing product market competition than in earlier years, according to Barry Hirsch, "Sluggish Institutions in a Dynamic World: Can Unions and Industrial Competition Coexist?" *Journal of Economic Perspectives* 22 (1) (2008): 143-157.
- 25 See Eileen Appelbaum, Annette Bernhardt, and Richard Murnane, eds., *Low-Wage America* (New York: Russell Sage Foundation, 2003) for a review of human resource practices in a range of sectors that generate higher levels of compensation and rates of advancement for workers of given skill levels. For reviews of policies that might encourage the development of higher-wage and higher-skill jobs within firms, along with training for workers to fill those jobs, see Richard McGahey and Jennifer Vey, eds., *Retooling for Growth: Building a 21st Century Economy in America's Older Industrial Areas* (Washington: Brookings Institution, 2008); and Timothy Bartik, "The Revitalization of Older Cities: A Review Essay of 'Retooling for Growth.'" *Growth and Change* 40 (1) (2009).

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