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Job Market Polarization and U.S. Worker Skills: A Tale of Two Middles

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Executive Summary

Views on what is happening to labor demand in the middle of the U.S. labor market are strongly divergent. Many economists argue that the middle is "hollowing out" as a result of digital technologies and globalization that make it easy for employers to replace workers doing routine tasks. But many employers argue they can't fill the middle-skill jobs they have. My own calculations based on Bureau of Labor Statistics data show that the traditional middle of the job market – composed primarily of construction, production and clerical jobs that require fairly little education – has indeed been declining rapidly. But 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 skill needs within traditionally unskilled jobs. Among these are the ones that employers have had trouble filling. While many employers have done little to attract new workers by raising wages or investing in training, some employer reluctance to invest in skill-building on their own makes economic sense; and our educational system has done too little to generate employees with these skills as well. A new set of education and training policies and practices are hopeful in this regard, though policies to more directly expand the numbers of middle-paying jobs might also be needed.

Introduction

Is the middle of the labor market "hollowing out" or even disappearing? If so, is it folly for workers to gain skills and credentials - which are usually short of a Bachelor's (BA) degree - for this segment of the U.S. labor market? Opinions on this very basic and important question are strangely mixed.

On the one hand, many labor economists, such as David Autor (2010), have demonstrated major declines in either wages or employment growth (or both) in the middle of the job market since the end of the 1980s. Maarten Goos and Alan Manning (2007) show similar results for the United Kingdom (and some other EU countries). And Nir Jaimovich and Henry Siu (2012) argue that this polarization gathered steam in the Great Recession, with declining employment in a number of cyclically-sensitive industries like construction and manufacturing further shrinking the availability of middle-wage jobs. Jaimovich and Siu also argue that the recession-based increase in polarization will be at least partially permanent, since employers use periods of labor market downturn to permanent change their production methods and workplace organizations.

Many economists have demonstrated major declines in the middle of the job market, but businesses owners still have difficulty filling them.

On the other hand, we have large numbers of business owners and their trade associations claiming that middle-skill job growth remains substantial - and that, if anything, they have great difficulty filling the vacant middle-skill jobs they now have. Surveys of employers by the National Federation of Independent Businesses and others show a growing tendency of business owners and managers to complain about their inability to hire skilled workers, especially as the labor market recovers from the recent recession (Madigan, 2015). At the same time, some economists scoff at these claims, arguing that the same businesses have been cutting back on their training expenditures and refusing to raise employee wages in order to attract and retain the more skilled employees they seek.

Resolving this apparent paradox is crucially important, if we want to better understand the causes of stagnant earnings for the American middle class. It is also critical if we want to develop a set of policies that have some chance of improving the skills of U.S. workers and their earnings prospects over time.

Polarization: Theory and Evidence

Among the first studies to show growing labor market polarization in the U.S. was an influential paper by David Autor, Lawrence Katz and Melissa Kearney (2006), showing that employment growth since the late 1980s has been greater at both the bottom and top of the occupational wage distribution than in the middle. It also demonstrated that the wage gap has grown between the middle- and top-paying jobs in the United States, while it levelled off or even declined between the bottom- and middle-paying jobs.

More recent evidence since 2000, and especially since the Great Recession started in 2007 (and was followed by a slow job market recovery until last year), suggests that wage gaps between the very top of the earnings distribution and the rest have continued to grow. In this period, even the earnings of those with BA degrees have stagnated, while only those with graduate degrees have enjoyed any real earnings growth. At the same time, employment growth has been stronger at the bottom of the earnings distribution, with jobs in retail trade and the low-wage parts of service sector (e.g., personal services or leisure and hospitality) recovering more quickly from the recession than others.

Why might all of this be occurring? Autor and his colleagues (including Frank Levy and Richard Murnane, 2004) have argued that the declining middle-skill jobs often involve the performance of very routine tasks – such as working on assembly lines or typing manuscripts – that can easily be performed by various forms of digital technology, such as workers with personal computers or robots, either in the United States or abroad. In contrast, the jobs that still pay well increasingly require more complex reasoning or communication skills, while those that pay little in the low-wage services involve personal interactions with customers or clients – such as those provided by elder care or child care workers - that are harder to be provided by smart machines alone. Thus, the nature of technological change and globalization both contribute to the polarization of the U.S. job market that we have observed.

Definitions and Measurement Issues

OImportantly, the exact results one obtains on polarization can be somewhat sensitive to how one defines or measures the "middle" of the labor market. Some writers on this topic tend to equate "middle-skill" jobs with "middle-wage" jobs and routine task performance, but these are not always identical; and decisions on how to define this part of the labor market can affect measured outcomes, with results varying across different points in time.

For instance, using the 1980 occupational wage distribu-

tion as the base year in one's calculations will result in large declines in the middle-wage job categories, because of declining numbers of clerical and blue-collar jobs that paid relatively well at that time well but were held by (what we now consider to be) quite unskilled workers (with high school or less education). And decisions on how to categorize certain occupations - such as technicians without BA degrees - can generate smaller declines in the numbers of middle-skill jobs when lumped with those jobs or larger declines when they are counted as professionals.

If we use the educational and training requirements of jobs rather than wages to define the middle, the results are also more mixed. Some analysts (such as those at the National Skills Coalition) define "middle-skill jobs" as those requiring any education, training or experience beyond high school but less than a bachelor's (BA) degree. But the wages of workers with "some college" do not exceed those of high school graduates by very much, especially if the former have not finished any programs and earned a real credential – which (as I note later) most American college students have not.

Jobs that still pay well increasingly require more complex reasoning or communication skills.

Also, the earnings of workers with AA degrees or even vocational certificates are extremely heterogeneous (Owen and Sawhill, 2013). For instance, those with more technical credentials have relatively high wages well and those in other fields often earn little. In my own recent analysis of administrative data from Florida (with Ben Backes and Erin Velez, 2014), I find that a range of technical certificates and AA degrees are quite well-compensated, while they have also enjoyed considerable employment growth over time. But a majority of AA enrollees in recent years have concentrated in "liberal studies" or "general studies" with virtually no labor market return. Treating all of these credentials as "middle-skill" reduces their average earnings, and further shrinks the measured the number of middle-*wage* (as opposed to middle-skill) jobs.

Additionally, nearly 60 percent of community college enrollees are assigned to "developmental" (or remedial) education before they can take classes for credit (Bailey and Cho, 2011) – and most of them do not successfully emerge from these assignments. For them, the classes they take beyond high school will generate virtually no earnings gain at all. On the other hand, workers who take a class or two in some technical field, and who successfully upgrade a particular skill (for instance by learning a new programming language) might actually find some labor market reward for their investment.

Evidence of Two Middles: The "Old" and the "New"

To illustrate the varying employment growth rates of different occupational categories among middle-wage jobs, I present data from the Occupational Employment Statistics program of the Bureau of Labor Statistics. Specifically, I have divided occupations into "middle-wage" v. other jobs, where the former are those with hourly wages between 75 and 150 percent of the median wage in 2000. I measure changes in the shares of employment accounted for by these jobs in the periods 2000-07 (the last two peak years in the business cycle) and in 2007-13 (which mark the most recent years for which we have data on the Great Recession and recovery). I also distinguish between those in "older middle" jobs, comprised of production, clerical and construction – the sectors where the employment of less-educated workers whose employment been greatly reduced, either by the use of technology and globalization over the past few decades or by the recession more recently;[1] and those in a "newer middle" that include all other detailed occupational categories that fall within that range of wages.

What, in fact, are these newer middle-wage job categories? I list them in Table 1, presenting both broader and more specific job categories. The broader categories include health care and health technicians, other technicians, installation/maintenance/repair of mechanical systems, and various jobs at the lower end (in terms of education and pay) of management or the higher end of services. The more specific categories include the entire range of health technicians (such as phlebotomists, X-ray technicians, and the like), paralegals, protective service, chefs and managers of eating/drinking establishments, retail managers, and sales representatives. Unlike the "older" middle, most of these jobs require some higher education, training or experience; and they generally involve the performance of more skilled technical, administrative or communicative tasks.

It is noteworthy that some of the "newer" middle jobs can be considered "STEM" (or Science, Technology, Engineering and Math) jobs while others are not; as Brookings' Jonathan Rothwell (2013) has recently pointed out, many sub-BA job categories have "hidden" STEM requirements, though this is by no means true of all of them. But even some specific jobs in older job categories - like machinists

1. Holzer (2010) also shows that employment declines in production and clerical job categories can fully account for all of the observed job market polarization during the 1990s and 2000s up until the Great Recession.

Table 1.

Newer middle-wage job categories

Broad occupational groups	Specific occupational groups
Health	Health technicians and aides
Construction	Paralegals
Installation/Maintenance/Repair	Protective service
Managerial (Low-end)	Chefs and eating/drinking managers
Services (High-end)	"New retail" and retail managers
	Sales reps

Table 2.

Middle-Wage Employment as Share of Total

Occupational Employment Statistics

Middle-Wage Shares (%)	2000	2007	2013	Δ2000-2007	Δ2007-2013	Δ2000-2013
Total	39.1	38.7	36.6	-0.4	-2.1	-2.5
Construction	3.6	3.8	2.9	0.2	-0.9	-0.7
Production	6.0	5.0	4.5	-1.0	-0.5	-1.5
Clerical	14.7	14.7	13.6	0.0	-1.1	-1.1
Subtotal: Older Middle	24.3	23.5	21.0	-0.8	-2.5	-3.3
Others: Newer Middle	14.8	15.2	15.6	0.4	0.4	0.8

and precision welders in the broader "production" jobs - can require highly-skilled workers with STEM training who are often in relatively short supply.

Using both middle-wage categories, my calculations of changes in middle-skill employment shares since 2000 appear in Table 2. We find that the share of employment accounted for by "middle-wage" jobs overall has indeed fallen since 2000, from 39.1 to 36.6 percent. This is a fairly sharp decline for just a 13-year period, especially since it follows on the heels of those occurring in the 1990s (and documented by Autor and others). But their share of overall employment held fairly constant in the peak-to-peak comparison of 2000 and 2007, while falling quite sharply in the Great Recession and recovery.[2]

Furthermore, employment growth in the "older" and "newer" middles differs from each other in both periods. During the years 2000-07, the employment share accounted for by the "older middle" jobs fell by 0.8 percentage points, though a small increase in construction jobs (fueled by the housing boom) partially offset a larger decrease in production jobs (driven by rising manufacturing imports from China). During the Great Recession and recovery years, job shares fell sharply in all three of the older middle categories. In contrast, the shares of employment accounted for by the "newer" middle-wage jobs increased a bit during each period and by comparable amounts, adding almost a percentage point to (or increasing by 5%) the share of all employment in middle-wage jobs.

2. These results are very similar to what we found when we used education, training and experience requirements on jobs rather than average wages to measure middle-skill jobs. Cross-tabulations show that about 70 percent of middle-wage jobs are also middle-skill by this definition, and vice versa.

Of course, this growth of the "newer middle" jobs has been fairly modest in size, while the declines to date in the "older middle" have been larger, generating an overall decline in middle-wage employment. But as the recovery from the recession proceeds, we should observe more growth occurring in the middle-wage categories - since low-wage jobs dominated net job creation in the earlier period of the recovery, while job growth has been more broadly based in the last few years. The notable recent tendency of employers to start requiring BA degrees for middle-skill jobs should also soon be ending, as they will have to once again start paying the large BA premium for these workers in a tighter job market.[3] Assuming that a further recovery in housing will occur as we continue to recover from the Great Recession, we should expect some more rebounding in the share of employment in construction jobs, thus reducing the magnitude of the middle-wage job shrinkage that we observe in this period.[4]

Of course, the increases in tasks required of workers *within* many occupational categories are not included in these computations, and these are found especially in those segments of the market where the relative wages of workers have been maintained over time (Autor and Handel, 2009). For instance, it is not uncommon now for auto mechanics to perform computerized diagnostic tests or for truck drivers to use computerized tracking systems, while many production workers in manufacturing must operate numerically-controlled machines and computerized systems and robotics. The modest demand increase we observe in the middle-wage job categories is thus strongly biased downwards as a measure of overall increased demand for middle-skilled work.

And, as Baby Boomers begin to retire in larger numbers, replacement demand in these jobs will grow, even in occupations and industries that do not exhibit overall net growth. Of course, such demand can potentially occur in any sectors that currently employ the Boomers. But finding replacements for them might be most challenging for employers in some of the growing "middle-wage" categories, especially if the immigrants that will largely replace the Boomers in the labor market continue to be concentrated in both at the lowest and highest educational categories rather than the middle of the educational or occupational spectrum.[5]

What About the Supply of Middle-Skilled Labor?

The example of retiring Baby Boomers and who will replace them raises a broader point: what is relevant for employment growth in in middle- or high-skill jobs is not just the observed growth in *demand* in the middle-wage job category, but also the *supply* of workers with the appropriate skills in any particular occupation or sector. And, in a dynamic labor market, labor demand growth in specific occupations, industries or regions will sometimes outstrip the supply of new workers in these sectors, thus creating tight labor markets or even worker shortages in specific sectors and regions.

But, if and when any skilled labor shortages occur, they should be temporary - since employers have incentives to make a range of adjustments in their employment practices. These adjustments include stronger recruitment, more training, and wage increases by employers, as well as worker adjustments, such as greater education and training for well-paying occupations and migrations towards regions of greater job growth.

Of course, it might take years for the adjustments to actually occur.[6] Sectors facing strong and ongoing demand growth, like health and elder care; or those with specific technical skill needs, such as advanced manufacturing and information technologies (IT); are more likely to experience shortages, and longer-lasting ones as well. Accordingly, employers in these and other sectors complain the most about their inability to hire appropriately skilled workers, and worry greatly about the upcoming retirements of their incumbent mid-skilled Baby Boomer employees.[7]

3. Modestino et al. (2015) show that demand for BAs has risen in many jobs that did not formerly require them, at least partly due to the availability of many such workers for low wages during the Great Recession.

4. In early 2007, construction employment reached its peak (at 7.7 million) before falling in early 2011 by about 30 percent (to 5.4 million). Since then it has rebounded to about 6.4 million, despite the ongoing softness of the housing market.

5. The extent of replacement demand will depend not only on where the Boomers have been working but also on any changes in labor demand in those sectors that might be caused by new technologies and globalization. Autor and Dorn (2009) show that Baby Boomer retirements have been relatively concentrated in the declining middle-wage sectors. But at least some will also occur in the growing middle-wage sectors, especially in regions (like New England) where the native-born population has been aging (Dennett and Modestino, 2011). Also, Borjas (2007) shows that immigrants in the United States have been relatively concentrated in groups with BA or higher education as well as those with less than high school.

6. The lags involved in the generation of more educated or trained workers can be long, and often cause economists to argue that longer-term skilled labor supply is much more elastic (or responsive to market incentives) than shorter-term.

7. See, for instance, the report by Deloitte and the Manufacturing Institute (2011) that raised alarms about the current and expected future future skill gap in manufacturing, though Osterman and Weaver (2014) find some claims overblown. Interestingly, Barnow et al. (2013) argue that, even in sectors like health care where shortages likely occur and persist, it can be difficult to measure them accurately and devise appropriate policy responses.

The fact that more employers than before now complain about their inability to hire skilled workers should be expected as we recover from a steep recession. But many employers made these claims throughout the recession, as they have done for decades. Their critics, especially among economists, correctly point out that these employers are not powerless to attract, create or retain more such workers, by offering higher wages and investing more in their own job training. And, in the past several years, we have seen very few wage increases while on-the-job training actually seems to be declining.[8] Claims that the aggregate unemployment rate has remained high at least partly because of structural imbalances between labor demand and supply have also not been consistently supported by the evidence.[9]

At the same time, at least some of the employers also have a point. Raising wages and labor costs in very competitive product markets, especially those facing international pressure (like advanced manufacturing) can be difficult; the same is true of sectors like health care, which now face policy pressures to rein in costs. Investing funds in on-the-job training can be unprofitable if the skills generated by such training are quite general (relative to other jobs in the region) or the workers are young, since these workers might leave the firms at any time and make it impossible for employers to recoup their training expenditures (Becker, 1964). If U.S. workers have weak basic skills (as several skill surveys have clearly documented) they will not be good candidates for training investments, especially of a more technical nature.[10]

In addition, relatively small employers often lack information about training and face high costs in setting it up; and the larger institutions that used to administer training systems, such as unions in construction and manufacturing, have shrunken dramatically over time. Even the migration of workers across geographic regions is in decline, reducing one more route through which employers have traditionally gained skilled workers.[11] And, in a dynamic and uncertain labor market, occupations facing high demand today may not face them in the future, thus limiting the confidence with which firms or regions can make the needed longer-term training investments. [12]

Job creation by employers for middle-skilled workers likely depends partly on their perceived costs of finding and generating workers.

Under these circumstances, it is perhaps not surprising that employers create fewer middle-skilled jobs to begin with, at least of the kind that require them to provide the training and internal pathways. In other words, job-creation by employers for *middle-skilled workers likely depends partly on their perceived costs of finding and generating such workers,* which are relatively high in the United States. Accordingly, American employers might prefer to offshore or outsource such work (Weil, 2015), and might increasingly be opting for cost-minimization in their human resource practices rather than competing through "high-road" or high-performance policies that generate productive workers (Appelbaum et al., 2003; Osterman and Shulman, 2011).

This stands in sharp contrast to many employers in Germany, for example, who create more mid-skilled and better-paying jobs in manufacturing and elsewhere, at least partly because they have greater confidence that their non-college-educated employees will have strong cognitive and analytic skills. When German manufacturers build plants in the United States – as they have done in great numbers in the past several years – they often insist on stronger skill-creation practices for technicians (and engineers) than what they often find in the United States (Schwartz, 2013).

In contrast, many U.S. employers look to our higher education system to fully generate well-trained employees. In Germany and other EU countries, workers gain such skills in secondary school, through apprenticeships or other kinds of high-quality career and technical education (Lerman, 2014).[13] But these schooling models in the United

8. Rothstein (2014) has found virtually no evidence of wage real increases in any major sector up 2013, while Cappelli (2014) provides some descriptive evidence of declining on-the-job training by U.S. firms over time.

9. The aggregate vacancy rate has appeared somewhat elevated in the recession and recovery, leading some economists to argue that structural unemployment has risen (Daly et al., 2012). But many indices of mismatch (Sahin et al. 2014) have declined with the recovery, while the elevated vacancy rate seems more driven by declining employer recruiting intensity (Davis et al., 2013).

10. The results of the Program for International Student Assessment (PISA) have long showed relatively low cognitive skills of U.S. students compared to others, and the more recent Program for International Assessment of Adult Competencies (PIAAC) have shown the same for adults. Heckman (2008) has repeatedly argued that there are "dynamic complementarities" in skill creation – or, more simply, that "skill begets skill" and that investments in training youth or adults with weak basic skills will have limited success.

11. Blanchard and Katz (1992) clearly document the traditional importance of regional migration in helping to offset regional imbalances in demand, though Bound and Holzer (2000) argue that this mechanism has always been used more by younger and more-educated workers than others. But declining geographic migration might be a function of declining efforts by employers to compensate worker moves (Molloy et al., 2014) as well as a cause.

12. Most U.S. employers often spend a great deal on private sector training, it is very disproportionately concentrated among their professional and managerial employees (Lynch,1992; Lerman et al., 2001).

13. See Symonds et al. (2011) and Hoffman (2011) for reviews of successful vocational education programs in Europe, and for calls to replicate such efforts

States have languished, in part because of a reaction that began in the 1960s against the tracking of low-income or minority students away from college. Public funding of job training began around that time, and has always been focused on disadvantaged or displaced workers; but it has generally been too limited in funding, too distrusted by private employers and not sufficiently effective to generate the needed skills, evens among those target populations.[14]

Instead, in the United States, higher education at the sub-BA and BA levels is expected to play this role. But here, too, our ability to generate an adequate supply of skilled workers has been limited.[15] Though we send more students to college (including the 2-year and for-profit kinds) than most other countries in the world, our dropout rates are extremely high. And, for a variety of reasons, too few students who complete their programs of study choose majors in fields where there is strong market demand – partly due to their own tastes and abilities in the STEM areas, or their lack of information about the job market, or because U.S. colleges do not always invest in sufficient teaching capacity in the high-demand labor market areas.[16]

Changing Policies

Fortunately, as a result of the many concerns expressed by U.S. employers and also evidence of stagnating American living standards, our education and training policies and practices are starting to change. Increasingly, community colleges are entering into "partnerships" with employers and industry associations to provide "sector-based" or "job-driven" training in health care, advanced manufacturing, IT and other fields to expand training (Conway and Giloty, 2014). These efforts are at least partly based on the strong impacts of such training on worker earnings estimated in rigorous evaluation (Maguire et al., 2010). Many states are encouraging that process through their higher education and workforce policies (National Governors' Association, 2013), as is the federal government (White House, 2014). Apprenticeships and work-based learning models appear to be expanding as well, especially in key states like South Carolina, Georgia and Wisconsin (Holzer and Lerman, 2014), making it easier for students there to gain on-the-job training and work experience as well as a general postsecondary credential. Models of high-quality CTE (like Career Academies), also based on rigorous evaluation (Kemple, 2008), are expanding as well.

Public policies that further assist and incentivize these developments among workers, employers and educational institutions are still important, if we are to continue generating opportunities for those who want to join and remain in the middle class. If successful, these will make it easier for employers to create more middle-skilled jobs, as it will be less difficult costly to generate skilled workers to fill them. And additional policies to directly encourage American employers to create more such jobs, through public tax credits or grants plus technical assistance, might be needed as well. (I explore all of these policy approaches in an accompanying policy brief.)

here in the United States.

14. For a review of the history and evidence of publicly financed training for disadvantaged workers in the United States see Holzer (2013).

15. Goldin and Katz (2008) document that, despite high returns, the supply of college-educated labor in the United States lagged behind growing demand for at least the last few decades of the 20th century. But Autor (2014) now argues that the supply has caught up, generating a flattening of the earnings premia to those with BAs since 2000.

16. See Backes et al. (2014) or Holzer (2014).

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