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TECHNOLOGY AND WORKFORCE READINESS

Implications for Skills Training and the Economy

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Introduction

How will the growing use of robotics, and especially artificial intelligence (AI), affect the U.S. workforce in the next few decades? Will there be large-scale worker displacements from their jobs, as machines increasingly perform the tasks formerly done by workers? If so, how can we prepare for such a future? What can we learn from the analysis of technical change in the labor market to date? And how can we make our existing system of education and training for the labor market more effective at increasing worker readiness to join the labor market?

Worker fear of automation, and its potential for displacing workers, is not new. The Luddites in 19th-century Britain during the Industrial Revolution are the best known, but not the only, historical example of workers expressing such fears about machines taking all of their jobs. Much more recently, an “automation scare” occurred in the United States during the late 1950s and early 1960s, as awareness of the existence of computers spread through all strata of society. And fears that digital technology would allow enormous numbers of jobs to be offshored to China and India were very widespread about a decade ago (e.g., Blinder, 2006), though the panic surrounding offshoring seems to have diminished since then.

Yet massive displacement and unemployment in the aftermath of major technological breakthroughs have *never* occurred. Indeed, unemployment shows no long-term trend, and average worker earnings have continued to rise over time through all past episodes of growing industrialization and mechanization of the workplace. Even though millions of workers might be personally displaced by technologies over time, many of them and most other workers adapt to these new circumstances and are able to find new employment.

Why is this so? According to economists, the spread of new workplace technologies tends to reduce the costs of production and therefore the prices of goods and services produced; these falling prices tend to raise the real incomes of consumers, who in turn buy more of the cheaper products over time and more of other goods and services as well, creating new jobs in these and other sectors (Levy & Murnane, 2013). Workers might need to obtain new skills, to obtain these newly available jobs, but they have strong incentives to make these adjustments, and generally do so over time.

At the same time, it would be foolish to be completely sanguine about future worker prospects in the United States as automation spreads. For one thing, some workers are permanently displaced by new technologies, and their future employment prospects tend to be dim. Furthermore, many workers do not adapt to new labor market realities by obtaining the requisite education and training for new jobs, or at least well-paying ones. Indeed, since the spread of new digital technologies throughout the economy that began in the 1980s, less-educated workers and especially less-educated men overall have suffered from stagnant or declining wages as well as declining employment (Autor & Wasserman, 2013). Our ability to help workers gain the skills they need to succeed in a “knowledge-based” economy clearly leaves much to be desired.

Finally, there remains an open question regarding robotics and AI going forward: *Is this time different?* In other words, will the economic adjustment processes that have enabled workers of the past to adjust to automation be sufficiently strong to handle what is potentially a much greater wave of workplace innovation—and one that might lead to wholesale displacements of professionals in health care, education, finance, the law, and many other industries as well as those in manufacturing and some services? Might the greater “humanness” of machines with AI—including its ability to learn over time—threaten many more workers, and overwhelm the adjustment processes I’ve outlined above? How should education and training policy respond to these developments?

I try to answer some of these questions below. In the next section, I review the effects of technological change on the labor market, and how they have led to rising labor market inequality since about 1980. Specifically, I discuss how new technologies often change the *demand* for labor—in other words, the types of workers and their mixes of skills by employers, and what they are willing to pay to hire them. Workers on the *supply side* of the labor market then have new incentives to invest in obtaining the skills that the labor market now rewards. But this process can be slow and very incomplete, especially if public policies do not address the many hurdles students and workers face in higher education or the labor market.

In the following section, I specifically address the question of how future automation might change the mix of skills needed for success in the labor market, and the kinds of additional policies and practices that might be needed

to help students and workers adapt to a labor market where machines with AI become increasingly common. I also argue that another type of policy that has been frequently advocated to deal with widespread displacement—the notion of a “universal basic income”—is ill-advised and should not be implemented.

Finally, I conclude with a summary of labor market issues and policy implications in the final section.

Skill-Biased Technical Change: Labor Demand Shifts and Supply Adjustments¹

Skill-Biased Technical Change and the Demand for Labor

The introduction and diffusion of new technologies in workplaces often change the mix of skills that are needed in those workplaces, along with how different skill groups are rewarded in the labor market. This type of technological change is known to economists as “skill-biased” technical change (SBTC), as opposed to “skill-neutral” changes in which all groups of workers by skill category are equally affected by the changes.

The reason for the frequent “skill bias” of technical change is that new technologies *substitute* for some kinds of workers but *complement* other types. For instance, digital technologies introduced into the workplace since about 1980s have often substituted for workers performing quite routine tasks on the job, such as those on assembly lines in manufacturing or clerical workers in offices. At the same time, the need for engineers and technicians to develop, operate, and maintain the new machines has grown; and the need for workers who engage in tasks requiring social/communication skills (e.g., childcare and eldercare) as well as those requiring more complex and abstract analyses (e.g., many professions and managerial jobs) have also risen. Accordingly, the demand for college-educated workers—especially those with technical or analytical skills—has grown while demand for those with high school or less education has shrunk.

The effects of these forces can be illustrated in Figure 8.1. In part A, we see that SBTC shifts out the demand for college-educated labor, causing wages for such labor to rise. At the same time, the demand for high school-educated labor shifts inward, causing wages for these workers to decline. As a result, earnings inequality between more- and less-educated workers rises. In addition, employment rates among the high school-educated workers decline, as their market wages decline and make the labor market less attractive relative to alternative uses of their time.

Indeed, these outcomes are exactly what we’ve observed in labor markets over the past 35–40 years. Specifically, the gap in earnings between those with high school vs. college (four-year) education has roughly doubled since 1980s. Autor (2014) argues that SBTC, along with the rising penetration of imported

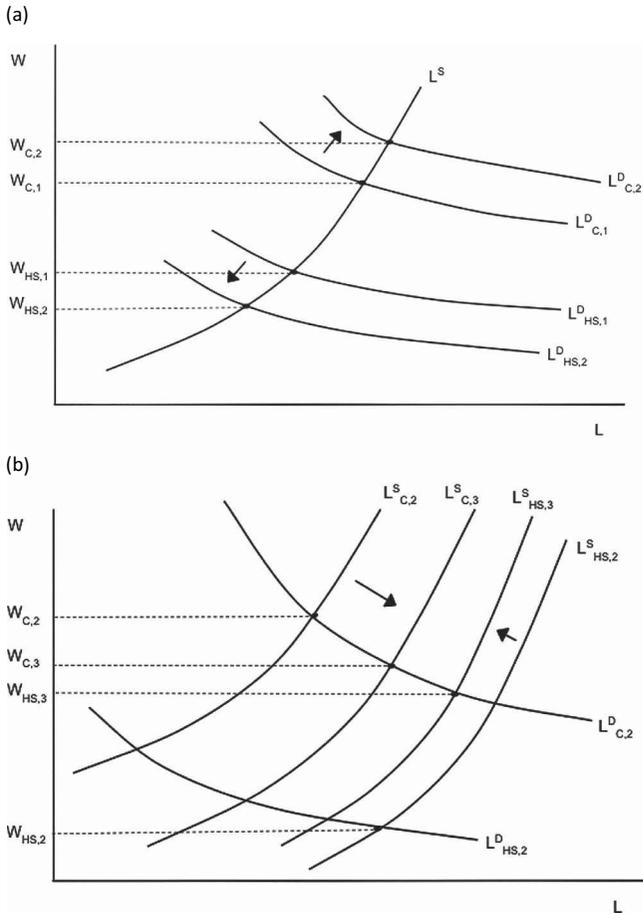


FIGURE 8.1 Labor demand shifts and supply responses for college and high school graduates. (a) Effects of labor demand shifts toward college graduates. (b) Labor supply responses.

Note: To simplify these diagrams, we assume a joint labor supply curve between high school and college graduates in part A, but separate ones in part B. W and L denote wages and employment respectively, while C and HS denote workers with college and high school education, respectively. 1, 2, and 3 refer to initial and subsequent time periods.

goods into the United States, accounts for much of the rising inequality in U.S. labor markets within the bottom 99% of workers.²

In other words, SBTC plus globalization have led to rising inequality in the U.S. labor market. These two forces have particularly reduced the demand for unskilled workers in manufacturing—an industry where less-educated people (typically men) have enjoyed strong earnings premia in earlier decades. More broadly, their wages and employment rates have fallen as well, while their dependence on disability policies and opioids has risen (Krueger, 2017).

But demand has not declined uniformly for all low-wage workers and jobs. Autor (2010) has argued that we have growing “polarization” in the U.S. labor market. Labor demand—measured both by employment rates and wages—has risen in both the top and bottom deciles of the U.S. wage distribution. In the top two or three deciles, earnings among professional and managerial employees who perform more complex analytical tasks which cannot be automated or offshored (at least not yet) have risen; while, in the bottom few deciles, both earnings and employment have also risen a bit as demand for workers performing social and communicative tasks in the low-wage service sectors has increased as well. In contrast, earnings and employment in the middle of the wage distribution have declined, as routine tasks previously performed by relatively less-educated workers in production and clerical jobs have increasingly been done by digital technologies or workers abroad.

Two important caveats must be mentioned at this point. First, not all middle-skill or middle-wage jobs have shrunk in number. Holzer (2015), in particular, has argued that a new set of middle-skill jobs in health care, advanced manufacturing, information technology (IT), transportation/logistics, and parts of the service sector have grown in recent years, especially where technical skills are necessary. Their growth has been more than offset by the decline we have observed in production and clerical jobs, though employers seem to have some difficulty finding and retaining workers with the needed skills to perform this work.³

Second, SBTC and globalization are not the only factors that account for rising labor market inequality. In addition to those factors, weakening labor market institutions like collective bargaining and minimum wage laws have reinforced the decline in wages among less-educated workers (Card & Dinardo, 2008). While economists continue to debate the exact magnitudes of the contributions to rising inequality accounted for by each of these forces, there can be no question that SBTC has contributed importantly to these developments, changing the numbers and quality of millions of jobs in the labor market, and the compensation earned by workers filling those different jobs.

Skill Acquisition and the Supply of Labor

The changes in labor demand and also wages by SBTC and other forces raise not only the earnings gaps between more- and less-educated workers but also the incentives of workers to acquire the skills that now draw higher earnings in the labor market.

The rising earnings premia associated with college degrees, caused by SBTC and other forces, will encourage more Americans to invest in higher education, thereby increasing the supply of college-educated labor, while the supply of high school graduates declines, as shown in Figure 8.1b. These forces, in turn, should reduce the gaps in wages between college and high school graduates,

reducing at least some (if not all) of the inequality that arose as a result of SBTC and other forces discussed above.⁴

It is important to note that the high returns to college appear not only in the earnings of those with bachelor's or graduate degrees but also in many credentials earned in the "sub-BA" postsecondary market. These credentials include the associate degree in arts (AA), science (AS), and applied science (AAS) like health care. They also include a range of certificates offered at public two-year as well as for-profit colleges and universities—some of which are "for credit" and some which are not. The certificates are a mix of longer term (up to a year) or shorter term credentials. Individuals who gain multiple for-credit certificates can "stack" them in many states to generate associate degrees, as part of "career pathways" built in those states.

Not all credentials earned in the sub-BA market offer strong earnings (relative to those with high school only). For instance, earnings for those with terminal AA degrees, especially in the humanities, lag substantially behind those with AS and AAS degrees. And earnings rewards for the certificate programs vary as well, with longer term ones or those in more technical areas and in high-demand industries (like health care, advanced manufacturing, IT, etc.) generating the greatest rewards (e.g., Backes, Holzer, & Velez, 2015).

It is often on the not-for-credit and the shorter term certificates that state-level workforce development policies focus, though these efforts can include for-credit certificate and associate programs as well. Many adults returning to college for additional education or training enroll in these programs, though youth can do so too.⁵

Increasingly, "sector-based partnerships" between employer groups, training providers (usually community colleges), and intermediaries help train more workers for jobs and careers in the high-demand sectors where employers have difficulty hiring and training workers on their own. Rigorous research indicates that the best of these programs generates strong earnings improvements for disadvantaged workers. In addition, the earnings gains can last for many years, despite fears among some policy analysts that individuals who leave the sectors for which they have been trained will see the returns to their credentials fade over time.⁶

Sub-BA credentials like these are also being rewarded to individuals engaging in "work-based learning" programs, like apprenticeship. Interest in such programs has grown in the past decade as a vehicle for training workers for the jobs that many employers have the most trouble filling. For that reason, employers tend to value them, while workers are more highly motivated to learn when they are paid to do so. Apprenticeships generate strong earnings for workers in evaluation studies, which do not necessarily fade when employees leave the firm or even the sector in which they have been trained. Increasingly, apprentices

earn sub-BA credentials like certificates or AS degrees while they train, which further improves the portability of their skills over time (Lerman, 2014).

Yet, for all of these potential credentials generating strong earnings for those with BAs and higher and even for those with sub-BA credentials, the outcomes observed for students in higher education have been quite mixed over the past few decades. As a result, earnings inequality has stayed very high. And many students and workers also fail to gain the sub-BA credentials in high-demand fields that could also improve their earnings quite substantially. Indeed, just under half of all Americans earn a postsecondary credential from a higher education institution—and earnings without one remain quite weak in most cases (Holzer, 2017).

In an era where the monetary rewards for postsecondary education remain so high, why do too few Americans attain them? For one thing, though college *enrollments* have risen dramatically in the past few decades—especially among minorities or disadvantaged students—*completion* rates have fallen, especially among the disadvantaged. Indeed, associate degree completion rates out of students who enroll in community colleges are about 20%. If one includes those who transfer to four-year institutions and obtain a bachelor's degree, as well as those who attain a certificate, completion rates are still only about 35%. They are also quite low in the for-profit institutions, though certificate completion rates there are higher (Holzer & Baum, 2017).

In addition, many students earn credentials with relatively little labor market reward. At public two-year colleges in at least some states, as many as 40% of students earn AA degrees in the humanities—including fields such as “general studies” or “liberal studies”—which earn virtually no return in the labor market. Those who fail to earn a credential often have accumulated too few credits (or the wrong ones) to gain much labor market reward, on top of their failure to earn what economists call the “sheepskin” effect—in other words, the income boost received purely from attaining the actual degree. These liberal arts concentrations and degrees would not be so bad if these students ultimately obtain BA or BS degrees; but only about 12%–14% of community college students do so. And, in the meantime, many students rack up significant debt while pursuing their degrees, although they fail to achieve a credential that raises their earnings. As a result, defaults on student loans have risen substantially as well among these students (Baum, 2016).

What accounts for these dismal outcomes? A number of factors can be cited—some of which reflect the characteristics and circumstances of *students*, while others are functions of the *institutions*—public community colleges, low-ranked four-year colleges, and the for-profit schools—where most disadvantaged or first-generation college students tend to concentrate (Holzer & Baum, 2017). *Employer* characteristics can also contribute to weak labor market outcomes, as we note below.⁷

On the student side, many attend open-access colleges where they are admitted despite very weak academic preparation in the K–12 years. At the community colleges, many are required to take “developmental education” classes until they can pass math (usually at the level of Algebra I) and English tests before they can enroll in classes for academic credit. But most remedial programs are not effective at improving college completion rates (Bettinger, Boatman, & Long, 2013), and some are even harmful (Clotfelter, Ladd, Muschkin, & Vigdor, 2013).

In addition, students from disadvantaged families often need financial aid that is too complex to fully understand or too limited in what it covers. For instance, Pell grants and other financial aid provided through Title IV of the federal Higher Education Act (HEA) can only be used to finance students in for-credit programs of at least 600 hours per year; shorter term or noncredit workforce development classes cannot be paid for this way. And many students attend for-profit institutions—which very successfully market to low-income individuals—where they pile up very large debts while pursuing programs that may or may not be of higher quality and labor market value and which they often do not complete.

Furthermore, first-generation college students often lack information or “social capital” about where to go and how to succeed once they get there. They often do not know what to study or where to obtain help—especially at the community colleges, where they get very little guidance from counselors. Finally, many youth and even more adults or parents who need to work part time or full time to support their families, making it difficult to attend college full time and complete their programs of study.

On the institutional side, too many disadvantaged students attend institutions—like public community colleges—where both resources and incentives to respond to the labor market are low. For one thing, community colleges receive well under half of the funds per full-time student that the average public four-year colleges obtain, with funding declining over time (in inflation-adjusted dollars) in both places. They receive relatively low funding even though their students often arrive with greater need for counseling and other supports, which the institutions cannot afford to provide.

But, in addition, incentives to respond to market forces are weak. The schools get the same tuition or dollars or state subsidies regardless of whether students finish or what they study; and the costs of instructors as well as equipment in technical, high-demand fields are usually very high. It is little wonder, then, that teaching capacity is often limited in these fields—especially health care—where students have difficulty gaining access to the courses they need to complete credentials in high-demand fields. Adjuncts are often hired to teach in these areas—even in certificate programs—which make them hard to scale up.

Of course, with so little counseling provided about the labor market as well as academics, many students do not know what labor markets reward and often choose to study in nontechnical areas (where many also prefer the material

and are not affected by weak math or science training). The One-Stop offices funded by the Department of Labor to provide such information are usually not located at or near the colleges students attend to gain workforce preparation, generating a fragmentation between labor market information and training that exacerbates these problems.

Furthermore, Thomas Bailey of Columbia University and his colleagues have described many community colleges as “cafeterias” where students wander aimlessly and pick courses randomly, while also staying in fields where they have little chance of completion (Bailey, Jaggars, & Jenkins, 2015). Vastly higher numbers of students take liberal arts classes because they intend to transfer to four-year colleges and obtain BAs than those who successfully do so. Many of these students would be better served in strong associate or certificate programs. On the other hand, at the for-profit colleges, students obtain more guidance but are not protected from predatory practices that leave many without credentials and with much debt.

Finally, we note that employers might also contribute to insufficient skill formation by failing to provide their workers with opportunities for work-based learning and on-the-job training. These failures could be caused by a range of factors such as imperfect employer information about the benefits of training, liquidity constraints on these employers (especially in public companies that face short-term pressure to generate profits), or inability of employers to coordinate with one another and thereby address the fixed costs of setting up such programs (Holzer, 2016).

A wide range of policy efforts is needed to seriously deal with these problems, and we outline them in the concluding section below.

Future Automation: How Should It Change Workforce Preparation Efforts?

SBTC has been a form of technical change which has already created incentives for workers to invest in skills that complement the new technologies, rather than remaining substitutes for them. Yet, as the above discussion indicates, the ability of many workers to do so, and to attain postsecondary credentials that are in high demand in the labor market, remains limited.

What does all of this imply for automation and AI moving forward, given that the displacements they cause in the future could potentially be much greater than what we’ve seen to date?

One potential implication of AI, and our uncertainty about who will be displaced in the future, is that workers should not invest much in credentials and skills *specific* to occupations or industries that are in high demand today but might not remain so tomorrow. For instance, if one believes that *all* young workers face high-displacement risks in the future, then they should not invest heavily today in high-demand sectors and fields—since there is no way

to know whether today's good-paying, sub-BA jobs in health care, advanced manufacturing, IT, transportation/logistics, and the like will remain in high demand tomorrow.

Instead, many analysts argue that we should focus only on the *general* skill development of these workers, rather than those specific to high-demand occupations and industries. This would make them more adaptable to different occupations and sectors over time where high demand might exist only temporarily. Indeed, scholars focus on "21st-century skills," such as communication, teamwork, and critical thinking (or problem-solving), that would make them trainable in specific contexts.

While I think providing students these skills in the K-12 years and even in college is very important, I find the argument against expanding specific training in currently high-demand fields unpersuasive. Providing the relevant postsecondary education and training to enable disadvantaged workers to obtain good-paying jobs today makes sense while such demand still exists. If the specificity of the skills they obtain puts them at some greater risk of displacement tomorrow, then we should consider ways of minimizing their exposure to such risks, while maximizing their abilities to adjust if/when these displacements occurs.

Then how should we proceed? As I suggest above, a solid foundation in general skills in the K-12 years is critical. Even when students take career and technical education classes and programs—which I support when they are high in quality and closely related to labor market skill needs, and when they create good "pathways" into college or careers—they should still be given strong analytical and communication skills, with heavy emphasis on critical thinking and problem-solving as well (Gormley, 2017).

When workers gain sector-specific training through sector partnerships and apprenticeships, it is important for them to also attain somewhat broader credentials that have portability beyond their current job. Combining apprenticeships or sector-based training with AS or AAS attainment is one important way of doing this.

In addition, an important recent report by McKinsey (2017) suggests that automation is not likely to completely eliminate many jobs in the future; instead, it will enable machines to be responsible for more but not all tasks that workers usually perform on their jobs. Accordingly, it will make sense for workers to pivot toward more of the tasks that the machines cannot do—in other words, those that complement the robots as much as possible (Kirby & Davenport, 2016). It will sometimes be in the interests of employers to help them do so—in other words, to help them retrain for other duties on the job, rather than undertaking the costs of recruiting, hiring, and training completely new employees. But, since the avoidance of displacement, whenever possible, constitutes something of a public good, it might also make sense for public efforts to help employers do so, perhaps through tax credits or technical assistance for such training.

In addition, if we believe the frequency and seriousness of worker displacements will rise over time, we should begin now to create “lifelong learning” systems to help workers more easily retrain under those circumstances. For instance, how will workers finance such new education or training? The states of Maine and Washington have created Lifelong Learning Accounts for each worker where a small percentage is deducted from their payrolls each period and added to the fund for such eventual training. We might consider reforms in programs like Unemployment Insurance to encourage more such training. And making such training more accessible to adults with family responsibilities—perhaps through greater use of online education plus workplace learning—will be important as well.

Of course, some analysts fear that there will be too few jobs remaining in the future, relative to workers, and that we will therefore need to plan for “universal basic income” support for the millions who will not be able to find work (e.g., Avent, 2016). I do not share this point of view. I think the adjustment processes that economists have always stressed regarding automation—wherein lower costs and prices of goods and services generate higher real incomes and spending that will, in turn, create new jobs—will continue to create new jobs. Not all of them will be of the same quality as those eliminated, and we might need to supplement low worker earnings with expansions of tax credits (like the Earned Income Tax Credit) and subsidized health insurance or childcare.

But a program of universal basic income would encourage many workers not to accept available jobs, and it will be extremely hard to finance—especially in a world where we already face daunting challenges funding the Social Security and Medicare needed by Baby Boomers as they retire. Creating one more very expensive income transfer program should therefore not be high on our current list of priorities.

Conclusion

The discussion above indicates that major changes have occurred on the demand side of the labor market (i.e., among employers), partly induced by automation and technical change, but also reflecting growing globalization and weakening institutions and policies (like unions or minimum wages). We also note the sluggish responses to the changes noted above on the supply side of the market (i.e., among students and workers), where low college completion rates among enrollees and pursuit of credentials without labor market value impede worker readiness to adjust to the demand changes. These problems especially plague disadvantaged or first-generation college students.

And future automation, embodying AI and other characteristics of “smart” machines, could potentially generate a much larger wave of displacements of workers and jobs, if we do not find a way to enhance worker responses to these developments. In the past, most workers have been able to adjust to these

developments, by developing skills enabling them to be complements to the new technology rather than substitutes; whether workers will be able to do so in the future remains to be seen.

All of this suggests a broad policy agenda is needed, to help reduce labor market inequality, of which workforce policy is a key component.⁸ Changes in higher education and workforce programs and policy should occur at federal, state, and local levels; they should target both students and the institutions they attend; and they should involve employers and take labor demand into account, whenever possible.

Regarding workforce policy, the Workforce Innovation and Opportunity Act (WIOA) was reauthorized in 2014; large additional changes in the federal law, or its implementation at the state and local levels, will not take place in the foreseeable future. In addition, its funding levels are too low, reflecting decades of declines, to greatly affect the market.⁹ Workforce efforts appear in several other federal programs, primarily in income support programs for the poor (like Temporary Assistance to Needy Families and Supplemental Nutrition Assistance Programs), but these are also not where broader workforce and education programs will be reformed.

Instead, I focus here on higher education programs at the federal level—including the HEA, and in particular Title IV funding (for Pell and other grants, loans, and work-study programs) for students—which has grown dramatically over time and dwarfs all other federal sources of support for both academic and workforce education. Federal regulations and oversight, especially of the growing for-profit college sector, are important too. And state subsidies of public colleges and universities remain very important as well and will be discussed below.

For Students: Improve Supports and Services for the Disadvantaged

Students who struggle to complete degree or certificate programs in higher education—and also to choose the right schools to attend and programs to study—could benefit from a range of better supports and services.

More and better academic and labor market counseling are sorely needed. This should begin before students first arrive in college. For high school students, these could be available through their guidance counselors; but for the many adults and independent students who now return to college for workforce as well as higher education, that option is not available. One possibility is to improve student access to the One-Stop offices (now called American Job Centers) funded by WIOA and to locate more of them (or at least satellite offices) on or near college campuses.

But, once there, students should receive a range of such supports and services that extend beyond counseling. A few models of student supports have shown strong impacts on completion rates in rigorous evaluation: Accelerated Studies in Associate Programs (ASAP) and Stay the Course. Cost-effective ways of delivering these services should be further explored.¹⁰

Two other crucial areas where reforms in supports and services are needed are developmental education and financial aid.

As noted earlier, completion rates in developmental education for underperforming students are very low, and evidence suggests such programs are mostly ineffective (or even harmful) in their current form. A number of colleges and states are now implementing reforms. For instance, much of the remediation is becoming “co-requisite” rather than prerequisite, so students are not prevented from taking for-credit classes before passing the required tests. Many colleges are moving away from traditional tests that have been stumbling blocks and are putting more weight on more fundamental numerical and statistical skills rather than more abstract ones like algebra and calculus.¹¹ And some states are learning to embed remediation within skills training classes—as done in the I-BEST program in the state of Washington—so that remediation is provided directly when students need it to understand a concept in the applied courses they are taking.¹² In addition, some states are seeking to identify gaps in basic readiness among like college students while they are still in high school, or at least before they arrive on campus, and to provide remediation well before students arrive on campus.¹³

Reforms in financial aid should be (and are) being considered at a number of levels. It is widely recognized that Pell grants and student loans need to become more accessible to students, with simplified application processes wherever possible, but also need to have stronger academic performance standards and incentives. Income-based loan repayment options need to be expanded and strengthened, though it is not clear that all reform proposals will do so (Blagg, 2017).

One important issue that is currently under much discussion is whether Title IV funding requirements under HEA should be loosened, so that more students in short-term or not-for-credit workforce programs with labor market value become eligible for assistance. I tend to support some movement in this direction, though slowly and carefully, as we explore ways to enforce quality control and labor market value.¹⁴

For Institutions: Strengthen Resources, Incentives, and Accountability

As noted above, many colleges that prepare students for the labor market—particularly public two-year colleges and the lower tiers of the four-year system—are both under-resourced and underincentivized to raise completion rates and respond to the labor market. In addition, the for-profit colleges tend to not always protect the financial interests of low-income students, whom they heavily recruit.

I thus believe that these colleges need both more resources, stronger performance incentives, and more regulation and accountability.

Regarding resources, I favor very carefully targeted injections of new federal or state funds into community (and perhaps the lower-tier four-year) colleges.

I believe such funds should pay only for expanding teaching capacity in high-demand degree and certificate programs, plus whatever supports and services students need to more frequently complete these programs (Holzer, 2018).

But I also believe that state funding for higher education should be more closely tied to performance. Indeed, most states are already moving toward “performance-based funding” of public higher education, though in very different ways (National Conference of State Legislatures, 2017). States need to be very careful in generating such performance incentives, so as not to create negative unanticipated consequences (like raising the selectivity bar for students in the admissions process, or lowering standards for program completion). My own view is that states should put more weight on subsequent student earnings and not just credit attainment and program completion—and to especially emphasize these outcomes for disadvantaged, minority, and/or first-generation students. Special care must be taken to “risk-adjust” any such performance measures, so as not to encourage colleges to diminish the presence of at-risk students on their campuses.

With both stronger funding and stronger incentives, colleges would presumably be more interested in expanding sector-based training, career pathway, and stackable credential programs. Indeed, a major challenge facing these institutions is how to replicate and scale the best models noted by researchers without sacrificing quality. Other innovations that would strengthen attainment of credentials with labor market value—such as competency-based credential awards—would likely be expanded as well. And experimentation with new models of community college structure and curriculum delivery—such as Tom Bailey’s “guided pathways” (Bailey et al., 2015)—would be encouraged as well.

One new approach about which I am not too enthused is the recent move toward making community college completely free, supported by President Obama and now being implemented by at least a few states (such as Tennessee, Oregon, and New York). While free community college might improve student access, too many resources will likely be squandered on middle-class students who do not need financial assistance, and some student outcomes could actually worsen.¹⁵

Regarding the for-profit colleges, I strongly believe they need to be publicly regulated. Whether the current “gainful employment” federal regulations are the best way to do so can be debated; but I strongly oppose efforts by the Trump Administration and others to dilute and eliminate any such approaches.

A Few More Issues

A few more issues on workforce development merit more comment. Though space is not available here to go into any of these in depth, at least a few words on each is appropriate in any treatment of workforce readiness among workers.

There is currently a great deal of interest in apprenticeship and other models of work-based learning.¹⁶ But the question remains about how to encourage

more employers to offer them. States differ greatly in their efforts to promote apprenticeship; South Carolina, for instance, offers employers a \$1,000 tax credit for every new apprentice, and the state markets these very heavily to individual employers. In states such as Georgia and Wisconsin, public schools play a greater role in recruiting students and connecting them to apprenticeships. In Kentucky, the Federation for Advanced Manufacturing Education has developed an apprenticeship system by private companies with some encouragement from the state.

In addition, some employers feel that “registered” apprenticeship, in its current form, is too heavily regulated and too costly for small firms to undertake. These costs are sometimes exaggerated, by rumors that each apprentice costs the firm \$100,000 or more—a notion that is widely off the mark.¹⁷ Many employers associate registered apprenticeship with unions whom they strongly oppose, especially in construction. Still, it is worth exploring whether a more lightly regulated model of apprenticeship should be developed and evaluated, alongside other evaluations of the registered model, as we consider which approach best serves employers as well as students over time.

How to encourage employers more broadly to create well-paying jobs, and to invest more in skills training to fill such jobs, remains an important question beyond just the creation of apprenticeships. Encouraging more employers to engage in sector partnerships and at larger scale would be valuable. Small- and medium-sized employers, in particular, may know too little about how to set up training, and their startup costs may be high. Exploring a variety of ways of engaging with such employers, and encouraging them to join partnerships with training providers like community colleges, should be high on the research and policy agenda.

Finally, given the likely but unknown effects of automation in future years and decades, it would be worthwhile for more states to set up Lifelong Learning Accounts, as Maine and Washington have done. Some encouragement and maybe assistance from the federal government would be valuable here, along with other reform efforts to encourage more currently (or soon-to-be) unemployed workers to participating.¹⁸ Encouraging and assisting employers to help more potentially displaced workers retrain for newer responsibilities after new technology is implemented, and making such training as accessible as possible, should also be high on the policy agenda in this realm for years to come.¹⁹ And more research from better data on exactly who becomes displaced over time, and what kinds of retraining are cost-effective for which groups of displaced workers, will be needed as well.²⁰

Notes

- 1 The discussion below borrows heavily from the important work of Goldin and Katz (2008).
- 2 Inequality associated with the top 1% reflects additional factors, such as executive compensation trends and enormous rewards to financial managers.

- 3 Economists continue to debate whether a “skills mismatch” exists in the labor market, and why it might persist. Many argue that such mismatch, and key shortages of workers, should generate more wage growth than we have seen to date (Holzer, 2016).
- 4 If the academic quality of students attending college declines as enrollments rise, this could also lower the average earnings of college graduates, assuming they complete their programs and attain degrees. The absolute and relative wages of high school graduates might also adjust in this scenario, depending on the average skills of the marginal students now enrolling in college versus those who remain high school graduates only.
- 5 A range of other industry-based certificates, micro-credentials and badges, are also growing in number. The number of these credentials is growing so large that some new efforts to document and describe them all, such as Credential Engine, are beginning to emerge.
- 6 While most evaluations of sector-based training measure impact only two years after training begins, Schaberg (2017) and Elliott and Roder (2017) find large impacts three and six years later, respectively.
- 7 The weak responses to labor market incentives reflect a mix of *market failures*, such as imperfect information and institutional barriers, as well as *inequities* that limit responses among disadvantaged students and workers even in well-functioning markets.
- 8 Much of the discussion below appears in more extensive form in Holzer and Baum (2017).
- 9 By several estimates (e.g., Holzer, 2009), public funding of WIOA has declined by over 80%, relative to its earliest predecessor—the Comprehensive Employment and Training Act—in 1980.
- 10 See Gupta (2017) and Evans, Kearney, Perry, and Sullivan (2017). Per student costs of ASAP in New York averaged about \$14,000 and about \$9,000 in Ohio. In contrast, Stay the Course has cost only about \$5,000 per student.
- 11 As Bailey et al. (2015) note, promising remedial math programs like Quantway and Statway emphasize such practical numerical and statistical skills.
- 12 Other states are also implementing the Accelerated Opportunity model of career pathways that begin with embedded remediation into other skills training classes.
- 13 The Florida College and Career Readiness Initiative is an effort to identify major shortfalls in academic skills needed for college by the 11th grade, while the LaGuardia Bridge program in New York is an example of an effective program to begin remediating skill gaps after high school but before students attend college.
- 14 Since there are some clear advantages to certificates with credit—like the facts that credits generally earn labor market rewards, and for-credit certificates can be stacked to obtain associate degrees—we should limit any potential movements from for-credit to not-for-credit certificates.
- 15 Some students will now attend two-year colleges with hopes of transfer, instead of going straight to the four-year colleges, but will fail to transfer successfully. Also, due to capacity constraints in the community colleges, many students might now be squeezed out of courses and programs that they badly need to be successful.
- 16 High-quality career and technical education and “pathways” from high school to college are more broadly discussed in Hoffman and Schwartz (2017). See also Rosenbaum, Ahearn, Rosenbaum, and Rosenbaum (2017) for a good discussion of effective CTE programs in community colleges.
- 17 These high-cost figures include wages paid to workers over three years or more, in return for worker provision of goods and services to the firm. If firms cannot recoup all of their wage costs in this time period, then they can pay apprentices submarket wages until they are productive enough to justify full wage payments.

- 18 “Rapid response” efforts by the U.S. Department of Labor in response to displacements that have been announced could initiate some such training processes, though they could also begin much earlier when employers know they are about to introduce major new automation into production.
- 19 Indeed, Helper, Martins, and Seamans (2017) argue that employers can choose different modes of implementation that will allow their workers to complement the new technologies to greater or lesser degrees.
- 20 Andersson, Holzer, Lane, Rosenblum, and Smith (2013), among others, find that dislocated worker training is generally not very cost-effective when funded through existing federal programs. But Jacobson, LaLonde, and Sullivan (2005) find stronger results among those training at community colleges, especially in high-demand or technical fields.

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