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Job Training Mythologies: Stitching up Labor Markets

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I. INTRODUCTION

Economic history shows repeated instances of "creative destruction" in which new technologies and business methods made complacent firms and entire industries obsolete.[1] The impact on their workforces was profound.[2] Labor markets adapted, of course, but this occurred primarily through replacement of the existing labor force with workers more attuned to the needs of new technologies and business models. Sometimes existing workers found places for themselves in the new technological environment through individual self-improvement efforts. At the margins, employers provided transition training when it was economically efficient to do so, as in times of labor shortage. In times of labor surplus, however, try as they might,

1. *See infra* Part II.
2. As Morse telegraphy was replaced by wired telephony and then by radio communication, the labor market for railroad telegraphers, once accommodating nearly 80,000 young men, collapsed. Jim Thompson, *The Railroad Telegrapher*, OZARKS WATCH (Fall 1993/Winter 1994), https://thelibrary.org/lochist/periodicals/ozarkswatch/ow702h.htm [https://perma.unl.edu/394X-F5LQ] (reporting 78,134 telegraphers on all railroads in 1920). As railroads gradually squeezed out mule-drawn canal barges in the nineteenth century, the labor market for canallers evaporated. Instead, a complex labor market for rail workers grew, with features reflecting the details of railroad operations, track work, maintenance of equipment, supervision, and marketing. By the middle of the twentieth century, it included 1.5 million workers. Now railroad employment is down to about 200,000. *U.S. Railroad Employment and Productivity Statistics*, RAILSERVE, https://www.railserve.com/employment.html [https://perma.unl.edu/2R4D-G286] (last visited Dec. 19, 2019).

state and federal governments could not do much to cushion the transition pain.

It turns out governments do not know how to fine-tune labor markets any more than they know how to steer and fine-tune product markets or capital markets. In particular, the widely popular apprenticeship concept has a poor track record. Seemingly the only apprenticeships that work are those sponsored by craft unions, and those work because they reflect the self-interest of the unions. These unions' control over the apprenticeship programs gives them a powerful mechanism to control the labor supply. It appears the only government employment program that works is unemployment insurance (UI). It works because it does not try to redefine labor markets; rather, it provides a temporary cushion, making it feasible for employees to seek retraining on their own.

Government intervention in labor markets inevitably puts the government in the position of picking winners and losers. The market does a much better job of that than democratically-elected public officials and their agency appointees, who are inevitably biased in favor of interest groups representing the status quo and opposed to the new technologies. Government sponsored retraining programs almost always reflect the future needs of employers poorly.

The Trump Administration has proposed to reform the apprenticeship system, allowing non-governmental entities, such as colleges and industry groups, to certify "Industry-Recognized Apprenticeships," as an alternative to traditional government-defined and supervised "Registered Apprenticeships."[3] It remains to be seen whether the proposal will be implemented and, if it is, whether it will be any more successful than its predecessors. It provides few real incentives for employers to participate.

Two hundred years ago, the law struggled to accommodate the waves of transformative technology after the American Revolution, when water-powered spinning frames and weaving looms replaced home spinning and weaving and sent workers to factories instead of households. Today the law struggles to accommodate the waves of technology that substitute robots and computers networks for blue collar work on manufacturing assembly lines and clerical work in offices. Two hundred years ago, the factory was replacing the household as the workplace; today the gig economy is replacing the factory.

This Article uses the textile and clothing industry—where the American Industrial Revolution began—as a case study to explore adjustments of labor markets to changes in technology and in product

3. *See infra* section III.C.

markets,[4] while occasionally referring to other industries to reinforce a proposition or to acknowledge a difference that might alter the analysis.[5] The case study shows that government-supported and guided training programs played little role in equipping new members of the workforce for the industry and had little success in enabling existing workers to adapt to change.

Creative destruction will continue. It will create many new jobs. Some of the skills that workers already possess will be useful for the new jobs, but some degree of adaptation and re-training will still be necessary. This Article suggests that governments at any level are ill equipped to oversee the re-training.

This Article begins, in Part II, by explaining the concept of creative destruction, which is the engine of prosperity in all market economies. Creative destruction inherently disrupts labor markets and makes the skills of many existing workers obsolete. Part III analyzes the dismal record of government-sponsored retraining programs in facilitating worker adjustment. It explains why employer-sponsored training programs can be more effective but are largely absent during economic downturns, when they are needed most.

Part IV recapitulates the history of the textile industry and shows how labor markets adjusted to several waves of creative destruction. It reviews the technologies that played leapfrog in the textile industry from 1817 to 2017, each creating greater labor productivity.[6] It explores the labor markets that connected workers with the machines and focuses on specific adjustment mechanisms that allowed workers to adapt to new technologies. Few of them were government sponsored.

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4. In terms of employment, the textile industry and the industries that process textile products, such as the apparel industry, were more important in the last decade of the twentieth century than automobile manufacturing, basic steel and iron, and steel foundries. *See* Neil H. Rosenthal, *Is the Middle Class Shrinking?*, MONTHLY LAB. REV. 3, 7 tbl.2 (May 1985), https://www.bls.gov/opub/mlr/1985/03/art1full.pdf [https://perma.unl.edu/5BBF-AHSL] (showing total workers employed in 1983 in various industries, including 758,000 in motor vehicle manufacturing, 343,000 in blast furnace and basic steel products, 141,000 in iron and steel foundries, 744,000 in textile mill products, and 1,164,000 in apparel and other textile products).

5. "Sewbot" sewn T-shirts in Arkansas might be an example. *See* Adele Peters, *This T-Shirt Sewing Robot Could Radically Shift the Apparel Industry*, FASTCOMPANY (Aug. 25, 2017), https://www.fastcompany.com/40454692/this-t-shirt-sewing-robot-could-radically-shift-the-apparel-industry [https://perma.unl.edu/HPN7-TCYD] (reporting on "Sewbot"—which was developed at Georgia Tech and installed in an Arkansas mill, and is capable of making 1.2 million T-shirts per year—and explaining potential difficulties that could arise by automating the sewing process).

6. OFFICE OF TECH. ASSESSMENT, 100TH CONG., S. REP. ON THE U.S. TEXTILE AND APPAREL INDUS. 57 (1987) ("In each 70-year period since 1760, productivity in yarn and fabric formation increased tenfold.").

This Article then shifts its focus to the future, projecting the course of further technological disruption and exploring what public policy should do about it. It concentrates on reshaping the unemployment compensation system to encourage worker mobility, strengthening worker training programs that combine classroom instruction with on-the job experience, and considers the possibility of reforming for profit trade schools to provide some of the training. It recommends a fundamental restructuring of the Labor Department's apprenticeship program, if it is to be continued at all.

II. CREATIVE DESTRUCTION

Creative destruction is the engine of progress in a market economy, but the labor market adjustments it requires are painful. Joseph M. Schumpeter explained how the process of creative destruction is a byproduct of business cycles.[7] Schumpeter's qualitative explanation dovetails nicely with the common understanding of Silicon Valley-fueled innovation and bursting bubbles.

Within Schumpeter's model, excess labor, capital, and other generally slack resources in business cycle troughs (recessions or depressions) eventually attract the attention of a handful of entrepreneurial leaders who have ideas for new combinations of factors of production.[8] They begin innovating, and their success pulls other, slightly less talented, entrepreneurs into the field. Eventually, a "swarm" of entrepreneurs have entered the market and found growing demand for their innovative products. This puts in motion a general "secondary wave" of economic growth.[9]

The surge of entrepreneurial innovation almost always occurs through new firms, alongside and at the expense of established firms.[10] Eventually, the law of diminishing returns means that the marginal level of entrepreneurial talent is less, and the quality of their innovation commands less excitement in the marketplace.[11] The success of the swarm throws many established firms into distress as

7. *See* JOSEPH M. SCHUMPETER, THE THEORY OF ECONOMIC DEVELOPMENT, ch.VI, 212–55 (Redvers Opie trans., Transaction Publishers 2008) (1934).

8. *Id.* at 225 (explaining how the "swarm-like appearance of new enterprises" forms).

9. *Id.* at 226 (explaining dynamics of a "secondary boom").

10. Examples include Southern textile mills employing newer technologies than New England mills; Tesla vis-à-vis the established automobile companies; Spotify vis-a-vis the traditional music labels; Netflix and Amazon movie and TV production vis-à-vis the traditional movie studios; and drone operators vis-à-vis traditional helicopter operators. In every case, the sponsor of the innovation is a new enterprise, just entering the market, not a legacy enterprise.

11. SCHUMPETER, *supra* note 7, at 228 (explaining role of diminishing returns in the talent of entrepreneurs).

consumers switch their allegiances to new products and services.[12] The business cycle reaches its peak and a decline into the next trough begins. The exhaustion of entrepreneurial talent and generally softening economic conditions frighten off investors. The downturn and eventual trough continue until the economy can adjust to the new normal, one in which the firms fueling the last wave of innovation predominate and the old establishment sloughs off labor and capital that must be absorbed elsewhere in the economy.[13]

Crises and depressions are necessary, in Schumpeter's view, to confer the benefits of innovation on society. He explains:

> This economic system cannot do without the *ultima ratio* of the complete destruction of those existences which are irretrievably associated with the hopelessly unadapted . . . . These changes are theoretically and practically, economically and culturally, much more important than the economic stability upon which all analytical attention has been concentrated for so long.[14]

Capital, labor, and land still exist, of course, in their old forms, but they must be adapted to the new uses.

The waves in the business cycle do not lift all boats at the same time or to the same height. As the waves run out, not all boats drop at the same rate or as far. When the economy expands, some enterprises are perfectly positioned because they have already gone through start-up transitions and have established a foothold in the market. Uber and Lyft are examples.[15] Others are on the point of extinction and gain a few more months or years by the upswing. Similarly, when a recession starts, some enterprises fail almost immediately because they were already on life support before the preceding boom temporarily saved them. Others have thought they were doing well, but then realize that more innovative competitors have stolen a march on them from which they may not be able to recover.

As Schumpeter points out, incumbency is a disadvantage in the creative destruction process. Incumbent firms have sunk capital in machinery and a trained workforce. They want this capital to live out its economic life rather than being scrapped in favor of the latest technology. That means that they are not going to be first movers in inno-

12. *Id.* at 232 (noting effect on established businesses).
13. *Id.* at 236 (referring to processes of resorption and liquidation that necessarily occur in a "crisis"). *See also* Clark Nardinelli, *Technology and Unemployment: The Case of the Handloom Weavers*, 53 S. ECON. J. 87, 88 (1986) (arguing that unemployment of British handloom weavers in the eighteenth and nineteenth centuries was cyclical and not structural, due to mechanization).
14. SCHUMPETER, *supra* note 7, at 253–55 (referring to "burdens the economic system with the unadapted and with those firms which are unfit to live"). One thinks of downturns that facilitated the exit of Blockbusters, Borders, JCPenney, and Sears.
15. *See generally* Ippei Takahashi, *Lyft Has Been Around Longer Than Uber. History Lesson.*, RIDEGURU (Apr. 2018), https://ride.guru/lounge/p/lyft-has-been-around-longer-than-uber-history-lesson [https://perma.unl.edu/Z5VL-BKNF].

vating. Also, the inevitable conflicts in economic interests likely have hardened over time into regulations and employment arrangements, including collectively bargained terms that increase costs and reduce labor market flexibility. Capitalists investing in a new location where the activity has not been conducted before can build greenfield plants with the latest technology, start on a clean legislative and regulatory slate, and recruit a workforce that, from the perspective of the capitalist, does not have bad habits.

The adaptations, however, are not frictionless or painless. Iconic economist David Ricardo[16] commented in 1821 that while "an application of machinery to any branch of production, as should have the effect of saving labour, was a general good," it would be "accompanied only with that portion of inconvenience which in most cases attends the removal of capital and labour from one employment to another."[17] Ricardo's "inconvenience" is manifest in the modern U.S. economy.[18]

Each wave of creative destruction requires adjustments in the workforce. In many cases the innovations require less labor for the same level of output, and the new machines do not require the same level or breadth of skills in the workers who operate them. As production technology changes, existing workers must be retrained to use the new technology or new workers must be recruited and given basic familiarity with the new technology. Training is the inevitable companion of creative destruction.

III. THE FAILURE OF GOVERNMENT "ADJUSTMENT ASSISTANCE"

As the Industrial Revolution gained momentum after the Civil War, creative destruction stimulated demands that the government do something about it. Sometimes the "reformers" demanding action sought improved wages and working conditions for employees; sometimes they attacked large corporations because of their effects on markets; by the mid-twentieth century, they were demanding government job retraining.

By and large, all levels of government in the United States have refrained from trying to block innovation. Reversing the Industrial Revolution and going back to the spinning wheel and hand loom is not very alluring—once real analysis punctures romance. Rewinding the Industrial Revolution is picturesque in the mouths of poets and ro-

16. Ricardo was a contemporary of Adam Smith and is the intellectual father of the theory of comparative advantage.

17. DAVID RICARDO, ON THE PRINCIPLES OF POLITICAL ECONOMY AND TAXATION 269 (Prometheus Books 1996) (1821).

18. *See* Lori G. KIetzer, *Job Displacement*, 12 J. ECON. PERSP. 115, 119–20 (1998) (reviewing research on job losses in manufacturing sector).

mantic in the pens of storytellers, maybe, but it involves a life that not many would want to lead.

Instead of trying to block change, governments have actively facilitated labor market adjustment. The obvious solution is training;[19] yet training programs sponsored by governments have had little impact on facilitating labor market adjustment. Training is an important adjustment mechanism, but the market takes care of most of it, and other institutions do not understand how to do it very well.

A. Components of Training

1. Elements of Training

Most people have had experiences with various kinds of training. Almost everyone in the United States had multiple years of classroom training in elementary school, junior high school, high school,[20] and, for many, college. Most people have also had experience with more practical training, sometimes associated with a job, such as simulated customer interactions for a marketing professional, mock arguments for a young lawyer, or simply having a supervisor look over one's shoulder while one navigates the order menu screen in a McDonald's restaurant.

Apart from these job-related possibilities, hands-on training experiences are pervasive for recreational activities: skiing, playing a musical instrument, learning to drive, or learning to fly. Here, the student actually does the activity, while the coach or teacher observes and provides corrective feedback.

Job-oriented training spans a similar spectrum of training activities. Most training programs for work have two components: a technical skills component and a culture socialization component. Depending on the skills of the trainees and the job requirements, the balance between the two components of a good training program varies. Most mill girls in 1820,[21] for example, had relevant technical

19. A Google search for "definition of training" produces the following definition and list of synonyms, apparently generated by Google itself: "Noun: the action of teaching a person or animal a particular skill or type of behavior—teaching, coaching, tutoring, tutelage, schooling, education, drilling."

20. The General Education Development (GED) exam provides a reasonable proxy for what high school graduates should have learned: mathematical reasoning, including basic math, geometry, basic algebra, graphs and functions; language arts, including reading for meaning, identifying and creating arguments, grammar and language; social studies, including reading for meaning in social studies, analyzing historical events and arguments in social studies, using numbers and graphs in social studies; and science, including reading for meaning in science, designing and interpreting science experiments using numbers and graphics in science. *Test Subjects*, GED TESTING SERV., https://ged.com/about_test/test_subjects/ [https://perma.unl.edu/3TA4-BX4G] (last visited Jan. 3, 2020).

21. *See infra* section IV.A.

skills—they had been exposed to spinning at home—but they had no experience working in a mill with dozens of other girls. Accordingly, development goals of the early mill system focused more on socialization for work; group membership for self-improvement components—the lectures and the classes—aimed at fulfilling their desires for self-actualization and their fathers' desires to make them respectable rather than fulfilling the short-term goals of actual work in the mill.[22] Doffer boys in the same mills experienced even more informal training and work practices. They had to work intensively for 15 or 20 minutes of every hour and were free to play with their fellow doffer boys for the rest of the hour.[23] It wasn't a horrible job, and it taught them to accept work structured by the clock instead of by childish whim.[24]

Depending on the skills or knowledge to be imparted, classroom instruction or practical training may be more effective. A textile engineer could learn about the physics of shuttle motion by studying Newtonian mechanics in the classroom. Tying a broken end on a spinning mule, on the other hand, could be done confidently only after practicing it many times on an actual spinning machine. In the twenty-first century, learning computer programming requires actually writing programs and running them on digital computers. Knowledge of computer science theory may be helpful but is not necessary. Preparing people for jobs requiring practical skills appropriately focuses on practical training.

2. Tools for Training

Academic institutions can accomplish some types of practical training, such as where laboratories are proximate to classrooms. Apparel makers could learn how to sew on sewing machines by using relatively inexpensive and completely portable sewing machines owned by a training school. A would-be computer programmer can write programs and run them on inexpensive personal computers owned by a computer training school. But other practical skills training requires large immobile machines owned and operated by potential employers. A mill girl had to go to the mill to get practice on a spinning throstle, and the bobbin boy had to go to the mill to learn how to replenish the bobbins on a power loom.

Industrialization replaced home crafts, for which training took place in the household, with large-scale machinery, for which training could occur only in the mill. The Industrial Revolution largely rede-

22. *See id.* (describing Lowell's program of training and education for mill girls).
23. *See* Emma Skeham, *The Boys Used to Get Away with Murder!*, *in* THE LAST GENERATION: WORK AND LIFE IN THE TEXTILE MILLS OF LOWELL, MASSACHUSETTS, 1910–1960, at 111 (Mary Blewett ed., 1990) [hereinafter THE LAST GENERATION] (describing how "the boys got away with murder").
24. *See infra* section IV.A (describing doffer boys in Lowell's mill).

fined practical training as on-the-job training (OJT) because that was the only way it could occur meaningfully. OJT requires cooperation and participation by the employer to make its machinery available for training. OJT also requires a more experienced operator to perform a training role, and the employer must free up one of its more senior employees to perform that role.

3. Economics of Training

A trainee, no matter how eager and precocious, is not worth much at the beginning. Only as she begins to acquire some skills can she produce output that has economic value to the employer. Compensation practices for beginning mill girls reflected that reality. Usually, they received no pay at all until their tutors told the foreman that they were ready to attend their own spinners. Likewise, the doffer boys and bobbin boys usually began informally in an unpaid status until they learned how to do their jobs, which required little training beyond promptness and attention to duties.

Compensation practices for trainees reflected the cyclicality of supply and demand. When labor markets were slack, many individuals were willing to work for nothing while they got trained, with the expectation of a decent and reasonably secure job afterwards. When labor markets were tight, employers often had to bid to obtain trainees, but still paid them less than fully trained journeyman.

4. Institutions for Training

As trade unionism began to take root in the last quarter of the nineteenth century, unions were interested in OJT for two reasons. First, they could control the labor supply and therefore bid up the wage rate if they controlled the training. That was the craft union apprenticeship model. Second, as collectively bargained wage levels became more common, unions insisted that lower trainee wage rates not undercut the standard rate for a journeyman. They needed to make sure that employers did not replace the journeyman paid union scale with lower paid employees by calling them "trainees."

That presented employers, unions, and employees with a conundrum. Once a trainee was able to perform any kind of useful work, he became a competitor of journeymen. If the trainee was paid less than the journeyman, the employer had an incentive to substitute trainees for journeymen. That was precisely the risk the unions were concerned about. On the other hand, trainees were not as productive as fully trained journeymen; otherwise they would not need training. Requiring that trainees be paid at the journeyman scale presented employers with a disincentive to engage in training.

Offloading training responsibility to someone else—mainly public and private schools—got everyone off the hook. Trainees received no

pay while they were in training, and they did not perform work that competed with work performed in the factories under collective bargaining agreements.

Getting everyone off the hook in this way, however, eviscerated practical job training. Shifting training responsibility to vocational schools essentially eliminated OJT. In some cases, a vocational school could acquire relevant machinery so that it could replicate the workplace to some extent, and it could hire faculty that had experience in the factories, but there was an inherent divide between the educational enterprise and the workplace.

That divide made it easy for a gap to develop and grow wider between the skills vocational schools taught and the skills the employers wanted for their workforces. In some early cases—the Lowell Textile School is a good example[25]—employers in the relevant labor market were partners, co-venturers, and funders of the vocational school. But that close relationship withered in most labor markets as the twentieth century progressed.

The account of the four eras of textile industry development explains the evolution of structures for workforce training from the beginning of the Industrial Revolution through the Great Depression in the 1930s. Until the 1960s, Government was absent in retraining of workers displaced by creative destruction.

The Great Depression focused public attention on the problem of unemployment and spawned government employment programs such as the Civilian Conservation Corps, the Works Progress Administration, the Public Works Administration, and the National Youth Administration. It also spawned other programs to deal with the hardships of unemployment and to facilitate reemployment in the private sector, such as the United States Employment Service and state/federal unemployment compensation. The first government involvement under the Fitzgerald (Apprenticeship) Act of 1937[26] sought to limit training rather than expand it. Only after the Second World War did intellectual capital begin to develop suggesting that governments play an active role in providing training directly or providing incentives for labor market participants to do it. Concerned that unemployment would loom after the Second World War, the Congress enacted the Employment Act of 1946, but "for over a decade, the purposes of this Act were more symbolic than real."[27]

25. *See infra* section IV.C.

26. 29 U.S.C. § 50 (2012).

27. Gladys Roth Kremen, *MDTA: The Origins of the Manpower Development and Training Act of 1962*, U.S. DEP'T OF LABOR, https://www.dol.gov/general/aboutdol/history/mono-mdtatext [https://perma.unl.edu/MS25-SHLT] (last visited Apr. 13, 2019).

By the beginning of the Kennedy Administration in 1961, unemployment had risen to 5.7% and manufacturing workers had the highest rate of unemployment. The economics profession was beginning to discover "structural unemployment," pockets of unemployment resulting from a mismatch between workforce skills with skills demanded by employers, owing to technological change. Economists concluded that structural unemployment cannot be eliminated by macroeconomic policies, no matter how aggressive. "Faced with familial responsibilities and community attachments, the majority of the unemployed failed to join the migration to areas of greater job opportunity. Moreover, with the shift in activity from goods to services, most unemployed workers did not have the skills necessary to take advantage of expanding occupations."[28]

The Labor Movement and a "National Manpower Council," established by the Ford Foundation, argued that the Federal Government must take the initiative to meet the challenge of automation and the threat of the Cold War.[29] While most of the public discourse urged action at the community level, Secretary of Labor Mitchell established an Office of Manpower Administration by Secretarial Order No. 63, on August 25, 1954. The Department of Labor (DOL) already had a Bureau of Apprenticeship, an occupation research component within the Bureau of Labor Statistic, and labor exchange functions of the U.S. Employment Service. These were consolidated within the new Manpower office.

Reformers characterized the apprenticeship program as needing a breath of "fresh air into what is a somewhat congealed apprenticeship structure."[30] Despite enthusiasm for reforming apprenticeship programs, no real concrete changes occurred.[31] For example, President Eisenhower twice vetoed bills that would have provided federal government aid, aimed in part at job training, to depressed areas. One of the points of contention was opposition to providing unemployment benefits to those in job training programs.

The AFL-CIO organized a march on Washington in 1959 to force the Congress to act on jobs. New President John F. Kennedy responded, with textile industry unemployment in his home state of Massachusetts in mind and galvanized by his campaigning in depressed West Virginia. His Area Redevelopment Act focused on depressed areas. A subsequent proposal, the "Vocational Retraining Act of 1961 (S. 987), attempted to solve unemployment caused by automation or other technological change, the relocation of industry, shifts in

28. *Id.*
29. *Id.*
30. *Id.* (quoting Eli Ginzburg, Statement to Secretary Mitchell (July 14, 1955), *in* NAT'L ARCHIVES, REC. OF THE OFF. OF THE SEC'Y OF LABOR).
31. *Id.*

market demand, and other changes in the structure of the economy."[32] The bill received criticism for its emphasis on vocational education, however.

> Vocational education was under severe criticism for not meeting current economic needs and relying on archaic methods, and President Kennedy had recently called for a study on that subject. It appeared counterproductive to put money and resources into a suspect structure. In any event, this group favored OJT as more suitable for older workers than classroom training.[33]

A Labor Department committee appointed to review the matter

> warned that any federal training program had to guard against discouraging employers and unions from maintaining their own OJT functions, and might even encourage further OJT work by providing a federally subsidized training allowance. No training program could function without at least a 52 week subsistence allowance, the subcommittee counseled. But it also raised the possibility of allocating moving expenses for workers who migrated from labor surplus areas to places of greater job opportunities.[34]

Educational lobbyists opposed the increased Labor Department role. Most vocational education programs operated through the public schools, and the interest groups were happy with the Department of Health, Education, and Welfare's acceptance of the status quo. Organized Labor generally preferred an emphasis on macroeconomic policy and feared that more Labor Department involvement might disrupt established building trades apprenticeship programs. The resulting Manpower Development and Training Act of 1962 became law on March 15, 1962.[35]

The claim that government had a useful role to play proceeded from three premises. First, the government already operated most pre-university education programs. Housing vocational education in the public schools required government involvement because governments controlled the content of public education programs.

Second, governments have been active since the Great Depression in establishing labor standards that set various floors under the terms of employment that employers may offer. Much OJT will not occur if employers must meet those labor standards for trainees. Whether to permit exceptions to labor standards for trainees is a governmental function.

Third, since the Manpower Development and Training Act of 1962,[36] governments have been active in providing subsidies to shape

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32. *Id.*
33. *Id.*
34. *Id.*
35. Manpower Development and Training Act of 1962, Pub. L. No. 87-415, 76 Stat. 23, 24 (1962).
36. *Id.* (finding that "the skills of many persons have been rendered obsolete by dislocations in the economy arising from automation or other technological developments, foreign competition, relocation of industry, shifts in market demands, and other changes in the structure of the economy; that Government leadership is

educational outcomes, to facilitate labor market and product market transitions and to alleviate poverty, which often coexists with structural unemployment. When legislatures and administrative agencies focus on a new problem, providing a targeted subsidy is a relatively easy way to seem to address it regardless of how well the problem and its possible solutions are understood. And, of course, most everyone is willing to receive a subsidy.

The result is a public policy mess in which a multiplicity of overlapping programs with appealing names like "Job Corps," "Youthbuild," and "Workforce Opportunity and Training Act" are underfunded and ineffective. Study after study reveals their ineffectiveness in making any material difference in facilitating adjustment to creative destruction.[37]

5. Barriers to Private Sector Skills Training

An April 19, 2019 story in the *Wall Street Journal* reported that most employers do not invest much in retraining employees for new technologies and business methods.[38] Rather, they prefer to lay off the employees experienced with old methods and hire new employees who have been trained for the new technologies. The story reported on a number of large corporations who have established retraining programs and are experimenting with them. Notably, however, all of these programs are aspirational. The reporters apparently could find no success stories to report.

It is important to understand why this reluctance to engage in retraining exists, even at the peak of a business cycle when labor shortages are manifest. One possibility is that it costs more to assess the existing skills of a current workforce than to apply uniform instructional templates to younger new entrants to the workforce who can safely be assumed to know nothing about a particular industry. A program that must begin by assessing existing employees on an indi-

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necessary to insure that the benefits of automation do not become burdens of widespread unemployment . . . .").

37. Project Quest, in Texas, may be an exception. The program emphasizes retraining experienced workers for new opportunities. It coordinates training through community colleges, while subsidizing living expenses and providing extensive coaching on work ethic and personal budgeting. Longitudinal studies conducted long after the program's inception suggest that it provides lasting benefits. *See* Nelson D. Schwartz, *Job Training Can Change Lives. See How San Antonio Does It.*, N.Y. TIMES (Aug. 20, 2019), https://www.nytimes.com/2019/08/19/business/economy/worker-training-project.html [https://perma.unl.edu/58M8-ZQ6Y].

38. *Compare* Lauren Webber, *Why Companies Are Failing at Reskilling*, WALL ST. J. (Apr. 19, 2019), on.wsj.com/2Vw56s6 [https://perma.unl.edu/6FCR-GJFM] *with* Ezequiel Minaya, *Companies Seek to Fill Skills Gap by Retraining Their Own Workers*, WALL ST. J. (Mar. 8, 2019), on.wsj.com/32NWcbn [https://perma.unl.edu/NV2H-N6YE] (reporting that 45% of 3,500 employers surveyed in 2018 offer cross training to employees, up 6% since 2014).

vidual basis and matching their skills with new jobs so that gaps can be identified is a more sophisticated and individualized undertaking than simply delivering a mass-produced curriculum designed around a new business model. Vendors are lined up claiming to be able to do the latter. Doing the former requires much deeper knowledge of existing workplace methods.

Wharton's Peter Cappelli argues that the "skills gap" is, to a considerable extent, illusory.[39] Employers routinely inflate the skills required for job openings and underestimate the skills of members of the workforce. The skills actually required to do a new job frequently are a pretty good match to the skills that experienced workers already have—or they can be molded to match the requirements with little effort. An attendant in an automated weaving mill does not need to know how to code in the programming language Python—let alone in the language C++—in order to respond to computer touchscreen images that are presented when an alarm sounds signaling a malfunction such as a broken thread or an inability to catch a thread to tie a knot in it.

On the other hand, a significant part of the population lacks the basic skills and motivation for taking advantage of work opportunities. A 1998 survey of the skills identified as a central by employers[40] showed that 50% to 75% of the lower tiers of the workforce were weak on such things as locating an intersection on a street map, locating two features of information from a sports article, calculating postage and fees for certified mail, locating and entering information on an application for a social security card, interpreting instructions from an appliance warranty, and calculating the total costs of a purchase from an order form.[41] These are not job-specific skills and there is no reason to think that competence in these areas has improved since 1998. The mostly public education system is discharging students into the workforce who can't read, write, or use a computer, many of whom also lack a work ethic.[42]

Another possibility is that existing employees are willing to transition to new technologies and new job requirements only if they receive an increase in compensation for doing so. At least, they are unwilling to make the transition if it involves decreased compensation. Most em-

39. Wharton Magazine, *Cappelli: Why Good People Can't Get Jobs*, WHARTON MAGAZINE, https://magazine.wharton.upenn.edu/issues/summer-2012/cappelli-why-good-people-cant-get-jobs/ [https://perma.unl.edu/397N-EY4A] (last visited Dec. 19, 2019).

40. Larry Mikulecky & Jamie R. Kirkley, *Literacy Instruction for the 21st Century Workplace*, 73 PEABODY J. EDUC. 290 (1998).

41. *Id.* at 304–05.

42. *See generally* JOB START 101, http://www.jobstart101.org [https://perma.unl.edu/F6D3-S7WV] (last visited Oct. 28, 2019) (displaying a video regarding acquisition of practical job skills aimed at college students).

ployees get paid more as they get older and gain experience. It is quite likely, therefore, that new employees can be paid less than existing employees.

A fourth possibility is that employers may believe that experienced employees have lower morale and less enthusiasm for new ways of doing business than fresh-faced youngsters. This is surely not an accurate perception everywhere, but it has a factual basis. Most people dislike change. To a worker comfortable for years doing essentially repetitive tasks, the prospect of having to uproot his work customs is not a welcome proposal. While economic incentives might induce such a worker to accept training for a new job, he may well bring with him disgruntlement about the change and the people who forced it upon him and nostalgia for the familiar. Griping and obstruction of new methods is the likely result. Workers whose boredom threshold is lower and who seek change because it is exciting generally have self-selected out of the rank-and-file and been promoted to supervisory positions, planning positions, or to other positions requiring a greater range of skills and a holistic understanding of the overall production process. A new hire, in contrast, is more likely to be enthusiastic. He will not have nostalgia for practices that never were part of his life.

"Happy" workplaces surely exist, where the existing workforce embraces change with enthusiasm and excitement. This is probably not the norm, however, and one cannot transform a grumpy workplace into a happy and enthusiastic one overnight, even as new technologies and methods are introduced.

B. Weaknesses of Existing Programs

The current set of labor market institutions are not well-equipped to consider the relationship between existing skills and new skills in the context of actual economic conditions in particular industries and regions, in conjunction with workers who ultimately make the decision whether to embark on any form of retraining to take advantage of a specific job opportunity.[43] For intermediaries, "agency costs" loom.[44] Schools are disconnected from labor markets and do not necessarily set training goals that match the needs of employers whose businesses are growing. Schools also are subject to distractions and debate over

43. The problem is not limited to the United States. *See also Reforming Vocational Education: It's Time to End the Exploitation of Vulnerable People*, THE CONVERSATION (Dec. 15, 2015), http://theconversation.com/reforming-vocational-education-its-time-to-end-the-exploitation-of-vulnerable-people-51396 [https://perma.unl.edu/KHN7-G7HX] (reporting that "Australia's vocational education sector is a mess," and exploring the perverse incentives operating on for-profit training entities).

44. Agency costs exist when an intermediary pursues his own interests instead of the interests of two parties whose interaction he is supposed to facilitate.

how strongly their purpose should be vocational education as opposed to more exalted academic or self-realization goals, including college preparation.

Community colleges, the public institutions best suited to provide vocational training, are not very well-connected with the employer community and are confused on whether their chief goal is to train the workforce for available jobs or to prepare students with deficient high-school-level skills for eventual transition to college. State and federal apprenticeship agencies are prisoners of old goals to restrict apprenticeship programs to limit competition in labor markets rather than to promote new kinds of more efficient and quicker training to serve the new economy. The next subsection analyzes apprenticeship programs in greater depth.

The Labor Department's Trade Adjustment Assistance Program dates from the Kennedy Administration's 1962 program to liberalize trade.[45] The current version entitles qualified applicants to supplemental UI and generous training grants. Multiple analyses of the program suggest that it is not effective in facilitating the movement of its beneficiaries into good jobs.[46] The Labor Department itself concluded, "[T]he net benefits of the TAA program as it operated under the 2002 amendments were negative."[47]

1. Janesville, WI: A Case Study

An account of creative destruction in Janesville, Wisconsin, after a General Motors plant there closed, echoes the lament of the textile interests more than fifty years earlier. Amy Goldstein's *Janesville*[48] chronicles the human reaction to the closure. She follows the post-closure lives of a dozen or so factory workers. Most of them clung to the belief that the factories would eventually reopen, as they used up their basic and supplemental unemployment benefits and their COBRA health care coverage. Several took advantage of the generous financial support for retraining that poured in after the plants closed and took

45. Howard Rosen, *Trade Adjustment Assistance: The More We Change the More It Stays the Same*, C. FRED BERGSTEN AND THE WORLD ECON., PETERSON INST. FOR INT'L ECON. 79–105 (Michael Mussa ed., 2006).

46. See Tom DiChristopher, *Sizing up the Trade Adjustment Assistance Program*, CNBC (June 26, 2015), http://www.cnbc.com/2015/06/26/is-aid-to-trade-displaced-workers-worth-the-cost.html [https://perma.unl.edu/2HRN-QNGA] (citing US-DOL Mathematica and other studies).

47. RONALD D'AMICO & PETER Z. SCHOCHET, THE EVALUATION OF THE TRADE ADJUSTMENT ASSISTANT PROGRAM: A SYNTHESIS OF MAJOR FINDINGS iv (2012), https://www.mathematica.org/our-publications-and-findings/publications/the-evaluation-of-the-trade-adjustment-assistance-program-a-synthesis-of-major-findings [https://perma.unl.edu/T5P9-S635] (noting that the study was prepared for the DOL).

48. AMY GOLDSTEIN, JANESVILLE: AN AMERICAN STORY (2017).

classes at the local technical college, which long had focused on vocational training rather than on a more general community college curriculum. In the story, several community and educational leaders stand out for their focus and energy in trying to save their community.

But, for the most part, the workers themselves had only a dim understanding or interest in what other opportunities might be available for them. They were frightened or ashamed by the prospect of going back to school, and most of them dropped out of the training as soon as a rumor of other automobile factory work began to circulate. They also were firmly rooted to the location. Some eventually took jobs at some distance, as their union agreement entitled them to do, but typically did not move their families there. Their ties to parents and grandparents, athletic leagues, and social routines were just too strong.[49]

Janesville reports similar results for the laid-off auto workers who attended training at Blackhawk Technical College. Only one-third of the workers who began the program finished, and those that finished had worse experiences in the job market than those who did not enroll in the training at all—fewer jobs and lower wages.[50]

Part of the problem is that most training programs, at least when they are offered by community colleges and similar institutions, assume a level of academic preparation that is inconsistent with the skills that enrollees actually have. For example, the Blackhawk Technical College instructors were surprised that few of their students knew how to use personal computers—even how to turn them on.[51] Many students dropped out when they learned that longhand assignments would not be accepted.[52]

Virtually all training programs center around school-like experiences, taking place in classrooms. Most of the people working in occupations vulnerable to technological obsolescence self-selected out of classroom education and training as soon as they could. Some did not complete high school. Those that did complete high school decided not to attend college. In many cases their engagement in high school was the minimum necessary to graduate. Further classroom instruction is not something they embrace. They are likely to be anxious and have fragile motivation.[53]

Although it is not politically correct to focus on this characteristic, some of them are not very bright. All the evidence suggests that in-

49. *See generally id.* at 75–81, 115–20.

50. *Id.* at 311–16.

51. *Id.* at 118 (reporting on difficulty with computers).

52. *Id.*

53. *Id.* at 78–81 (summarizing concerns of laid off workers enrolling at Blackhawk).

nate intelligence is normally distributed in the population.[54] Training and education comes hard for those in the lower part of the distribution, and they naturally avoid it as much as they can. Effective training must provide a pathway for those antagonistic to traditional schooling.

OJT and apprenticeship experiences not only make it easier for older workers to be motivated, but also help couple training with employers who actually can put trained graduates into jobs. Unfortunately, as the following subsection observes, the institutionalization of "registered apprenticeships" at the federal and state levels inadequately serves the current needs of labor market adjustment.

2. Registered Apprenticeships Are Not the Answer

Apprenticeship never played as significant a role in the United States as it had in England. In the early days of settlement, it was too easy for apprentices to run off and seek their fortunes in the West, so masters would be very interested in investing in them. Apprenticeship played little role in the early industrialization of the textile industry, with other means of training supplanting decentralized tutelage of apprentices by masters.

The apprenticeship system, which addressed both the technical and the sociological training components, had pretty well died out in the United States by the 1860s. Few economic incentives existed to replicate it.[55] Apprenticeship existed through the remainder of the nineteenth century mainly as a means for craft unions to exert control over labor market entry and thus to limit the supply of labor and increase their bargaining power with employers who used craft labor. The general trend of industrialization, however, was away from traditional crafts and toward less differentiated factory labor, in which apprenticeship never played a role.

In the mid-twentieth century, apprenticeship enjoyed a brief upsurge in popular interest, but the trade union movement, public school bureaucracies, and education interest groups mostly frustrated think-tank and Kennedy Administration proposals to modernize and expand it.[56] In the twenty-first century, the advertised advantages of registered apprenticeships are modest in magnitude, and the bureaucratic impediments to establishing them are large. The Labor Department's

54. *See* Hanna Vock, *Gaussian Distribution of Intelligence*, IHVO (June 12, 2008), http://www.ihvo.de/202/gaussian-distribution-of-intelligence/ [https://perma.unl.edu/2CVQ-AYHD].

55. HOLMES BECKWITH, GERMAN INDUSTRIAL EDUCATION AND ITS LESSONS FOR THE UNITED STATES 10–15 (1913). Competitive pressures discouraged employers from assigning experienced employees to train less experienced ones, because that would diminish the productivity of the experienced workers. *Id.* at 16–17.

56. *See* Kremen, *supra* note 27.

apprenticeship program would more accurately be described as an "apprenticeship prevention program" than an apprenticeship enabling program.

The *concept* of apprenticeship is attractive because it purports to link the classroom component of training with the practical component, and it links the training program institutionally with the entities that will employ its graduates. For an apprenticeship to be "registered" under federal law confers a variety of benefits on the participants. Veterans benefits may be available;[57] employers may be able to pay lower wages than required by prevailing-wage or labor standards requirements;[58] federal student assistance may be available;[59] and many states provide tax credits or tuition assistance.[60] Apprentices may be paid less than the federal minimum wage under "special certificates" issued by the Secretary of Labor, specifying the permissible wage, and imposing such limitations as the Secretary determines.[61] Certificates are limited to registered apprenticeships.[62]

The apprenticeship idea, however, is frozen in the past. It is a prisoner of a combination of the social and economic arrangements of the 1800s and the concerns of trade unions in the 1930s about competition from new entrants.[63] The Labor Department itself concluded that the

57. *See* 38 U.S.C. §§ 3672, 3687 (2012 & Supp. V 2018) (approving courses for veterans' benefits).

58. *See* Cal. Div. of Labor Standards Enf't v. Dillingham Constr. N.A. Inc., 519 U.S. 316 (1995) (holding that ERISA did not preempt state prevailing wage law that allowed lower wages to registered apprentices, but not to other apprentices).

59. 20 U.S.C. §§ 1091, 1161(c) (2012 & Supp. V 2018).

60. Many states provide tax credits and other incentives for apprentices and the programs that train them. *See* Office of Apprenticeship, Emp't & Training Admin., U.S. Dep't of Labor, *Learn About Tax Credits* (Mar. 4, 2019), https://www.doleta.gov/oa/taxcredits.cfm [https://perma.unl.edu/3J8P-GLZC] (state-by-state summary of tax credits and tuition support). The state programs typically are limited to registered apprenticeships approved by the DOL. *See* ALA. CODE §§ 40-18-420–40-18-424 (2018).

61. 29 U.S.C. § 214(a) (2012). *See generally* 29 C.F.R. pt. 520 (2019) (DOL regulations for apprenticeship special certificates).

62. 29 C.F.R. § 520.300 (2019) (defining "apprentice").

63. The 1937 National Apprenticeship Act (also known as the Fitzgerald Act) required the Secretary of Labor to establish standards for "registered apprenticeship" programs. The goal was not so much to improve worker access to jobs as to prevent employer exploitation of apprentices. ROBERT LERMAN ET AL., THE URBAN INSTITUTE CENTER ON LABOR, HUMAN SERVICES, AND POPULATION, THE BENEFITS AND CHALLENGES OF REGISTERED APPRENTICESHIP: THE SPONSORS' PERSPECTIVE 5 (2009), http://www.urban.org/sites/default/files/publication/30416/411907-The-Benefits-and-Challenges-of-Registered-Apprenticeship-The-Sponsors-Perspective.PDF [https://perma.unl.edu/6H8Q-2Z6K] (characterizing the goal of government participation). The Fitzgerald Act is only one paragraph long. It authorizes the Secretary of Labor to formulate and promote "labor standards necessary to safeguard the welfare of apprentices . . . ." 29 U.S.C. § 50 (2012).

ERISA preempts state regulation of apprenticeship programs that are financed through a separate fund, but not those that are funded with general em-

Registered Apprenticeship (RA) program offers little benefit: "[I]t is not certain that employers benefit from RA. . . . [S]ome employers cease to participate when the financial incentive is no longer available. This suggests that, for these employers, the incentives encouraged participation beyond the level that would be directly beneficial without incentives."[64]

A 2012 study of the effectiveness of federal apprenticeship programs in ten states[65] claimed to have found them cost-effective, but, remarkably enough, did not examine costs and benefits to sponsoring employers.[66] It merely assumed that they must offer net benefits to employers; otherwise they would not sponsor them.

In 2007, there were 465,000 registered apprentices in the United States[67] under programs administered directly by the federal government in twenty-five states and administered by the states under federal standards in the other twenty-five states.[68] That equated to 0.3% of the labor force, and 6% of the unemployed.[69]

The majority of registered apprenticeships are in the building trades,[70] although apprenticeships in trucking, electrical power distribution, and health care grew during the Great Recession and had begun to grow before it.[71] Of the registered apprenticeships, 26% had

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ployer assets. *Dillingham Constr.*, 519 U.S. at 327 (reversing court of appeals and distinguishing two types of plans).

64. DEBBIE REED ET AL., MATHEMATICA POLICY RESEARCH, INC., AN EFFECTIVE ASSESSMENT AND COST-BENEFIT ANALYSIS OF REGISTERED APPRENTICESHIP IN 10 STATES 12 (2012), https://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_10.pdf [https://perma.unl.edu/PNP4-P3NE].

65. *Id.* at 4.

66. *Id*. at 4–5 (explaining that "collecting information on benefits and costs for employers was outside the scope of our study"). The DOL had sponsored a separate study of employer attitudes in 2007, however. *See* LERMAN ET AL., *supra* note 63.

67. *Id.* at 1.

68. *Id.* at 5. *See* REED ET AL., *supra* note 64, at 57 (concluding that federal and state programs are quite similar).

69. *See* LERMAN ET AL., *supra* note 63, at 4 (noting the modest size of U.S. apprenticeship programs, compared with programs in Europe).

70. John Lonergan, *ApprenticeshipUSA.com*, http://www.apprenticeship-usa.com/ [https://perma.unl.edu/W93J-37GX] (last visited Oct. 22, 2019) ("Formal apprenticeship is most highly established in the Building Construction Industry").

71. DEBBIE REED ET AL., *supra* note 64, at 21, Figure III.4 (showing increases from 2000 to 2010 for heavy and tractor-trailer truck drivers, electrical power-line installers and repairers, childcare workers, home appliance repairers, and nursing aides, orderlies and attendants, and decreases for all other occupations). "[T]he number of registered programs in energy more than doubled from 1995 to 2003 and the number of programs in social services (e.g., child care) almost quadrupled from 1995 to 2003. However, registered apprenticeship programs in health services decreased slightly and information technology remained relatively flat over the 1995–2003 period." LERMAN ET AL., *supra* note 63, at 7 (citation omitted). *See also id.* at 13, tbl.4.1 (showing characteristics of programs by industry).

union participation.[72] The average age of apprentices was less than 30; only about 10% were over 40, although the numbers of older apprentices increased during the Great Recession.[73] Males who completed apprenticeship programs spent 3.6 years in the programs. Those who dropped out spent 1.9 years. The hours spent in OJT far exceeded the hours spent in "related technical instruction."[74]

Features of apprenticeships necessary to serve training purposes are difficult to disentangle from features necessary to protect union interests in controlling the labor market and protecting a floor under wage levels. Craft-union-sponsored apprenticeships in the middle and second half of the nineteenth century were quite different from union-sponsored apprenticeships of the twenty-first century. One obvious and important difference is that they do not occur in family households; they are formally separate as they are spatially, and organizationally, somewhere between the workplace and the school. More significantly the purpose of protecting union control of labor supply and the wages of existing employers now predominate. The goal of providing a pathway into desirable jobs has been eclipsed.

Talk about apprenticeship greatly outruns action. The Obama Administration unveiled an "ApprenticeshipUSA" initiative in 2016 with great fanfare,[75] although apprenticeship was only number three on the list of job creation initiatives recommended by the vice president's Job-Driven Training review.[76] Earlier, in 2001, the Labor Department

72. LERMAN ET AL., *supra* note 63, at 12.

73. DEBBIE REED ET AL., *supra* note 64, at 19, Figure III.3 (showing increase from 2000 to 2010 in relative participation by those over 40).

74. *Id.* at 24 (analyzing the length of time spent by completers and dropouts).

75. Press Release, White House, Fact Sheet: Investing $90 Million Through ApprenticeshipUSA to Expand Proven Pathways into the Middle Class (Apr. 21, 2016), https://obamawhitehouse.archives.gov/the-press-office/2016/04/21/fact-sheet-investing-90-million-through-apprenticeshipusa-expand-proven [https://perma.unl.edu/QR4L-X7YZ]; US Dep't of Labor, *Apprenticeship.gov*, https://www.dol.gov/featured/apprenticeship/ [https://perma.unl.edu/9EC9-QCTS] (last visited Oct. 25, 2019). The list of apprenticeable occupations does not include anything into which an unmanned aerial system remote pilot would fit. *Available Occupations*, U.S. DEP'T OF LABOR EMP'T AND TRAINING ADMIN., https://www.doleta.gov/OA/occupations.cfm [https://perma.unl.edu/B9MW-RUKT] (last visited Oct. 25, 2019). The toolkit contains links to a number of moderately useful guides but does not allow registration or application online. The link to Illinois provides only a postal address and email address to the regional DOL office and does not provide a link to a website for registration. *See State Offices of Apprenticeship*, U.S. DEP'T OF LABOR EMP'T AND TRAINING ADMIN., https://www.doleta.gov/oa/stateoffices.cfm#IL [https://perma.unl.edu/TCF5-AK64] (last visited Oct. 25, 2019). The author sent an email to the listed email address on September 3, 2017 asking for assistance in setting up a registered apprenticeship program.

76. Press Release, White House, Office of the Press Sec'y, Fact Sheet: Progress Update on Job Driven Training and Apprenticeships (Apr. 21, 2016), https://obamawhitehouse.archives.gov/sites/default/files/docs/job-driven_training_and_apprenticeship_progress_report.pdf [https://perma.unl.edu/XGK4-ZMNJ].

launched the Advancing Apprenticeship Initiative (AAI) to develop more apprenticeship programs in growth industries such as nursing, information technology, geospatial technology, advanced manufacturing, and maritime occupations.[77] The Trump Administration includes apprenticeship training as one of the initiatives of Jared Kushner's Office of American Innovation in the White House.[78] A Google search on January 8, 2018, however, found almost no references to the office after March or June of 2017. Google searches for "Office of American Innovation apprenticeship," and on "Kushner apprenticeship" produces no hits except the article referenced above noting that the subject came up in the pre-Office-establishment discussions.[79] So it appears that the Trump administration, so far, is all talk and no action, as well.

The Trump Administration has a website sponsored by the DOL,[80] but it does not link to actual apprenticeship programs. The website simply extols the virtues of apprenticeship and offers vaguely defined coordination assistance to potential sponsors in the state and local government sector and in the private sector. The ApprenticeshipUSA website brags that the federal government allocated $90 million in FY 2016 to apprenticeships.[81] That amount is less than 1% of the Labor Department 2016 budget—hardly a major federal commitment.[82]

A search for Chicago apprenticeship programs produces a thin list of specific employers. One might expect the level of interest in job retraining programs to be highest in Rust Belt states like Michigan, Illinois, Wisconsin, Ohio, and Pennsylvania. State labor agencies in all the states had websites, but a visit to the websites produces little in terms of leads to actual opportunities.

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77. LERMAN ET AL., *supra* note 63, at 7. The Department's website has a "toolkit" for businesses wishing to establish a registered apprentice program. U.S. DEP'T OF LABOR, A QUICK-START TOOLKIT: BUILDING REGISTERED APPRENTICESHIP PROGRAMS, https://www.doleta.gov/oa/employers/apprenticeship_toolkit.pdf [https://perma.unl.edu/H7UV-F2J2] (last visited Oct 23, 2019).

78. Presidential Memoranda, White House, Memorandum on the White House Office of American Innovation (Mar. 27, 2017), https://www.whitehouse.gov/the-press-office/2017/03/27/presidential-memorandum-white-house-office-american-innovation [https://perma.unl.edu/VFE3-HTYD]. Matthew Nussbaum, *Trump, Top Officials and CEOs Talk 'Workforce of the Future*,' POLITICO (Feb.23, 2017, 12:23 PM), http://www.politico.com/blogs/donald-trump-administration/2017/02/trump-ceos-workplace-of-future-235309 [https://perma.unl.edu/7XDX-5S9E] (reporting that one working group praised European-style apprenticeships in a conference that led to the Office of American Innovations announcement).

79. *See id.*

80. *Apprenticeship*, U.S. DEP'T OF LABOR, https://www.dol.gov/apprenticeship/ [https://perma.unl.edu/8EXU-SM7D] (last visited Oct. 24, 2019).

81. *See* Press Release, White House, *supra* note 76.

82. *Department of Labor—FY 2016 Budget Fact Sheet*, DEP'T OF LABOR, bit.ly/2T9Vqlt [https://perma.unl.edu/SZ2A-LMMY] (last visited Jan. 1, 2020).

North Carolina is touted as having an unusually active and effective workforce training program, including apprenticeships involving community colleges. A web search revealed a thin set of web resources, referring mainly to North Carolina's efforts to comply with federal statutory mandates for training. The apprenticeship link had no resources, required follow up through a contact with a state resource officer, and listed only a handful of occupations in the building trades as examples of apprenticeships.[83]

Apprenticeship always suffered from a kind of schizophrenia. It was, on the one hand, an excellent way to teach a neophyte a new set of skills. On the other hand, it also was an excellent way to limit the flow of new entrants into the labor market. When one sees apprenticeships two to four years or more in duration, one suspects that this amount of time was considerably greater than necessary for skill acquisition and acts only to restrict the supply of new journeymen. The DOL programs reflect this schizophrenia. Their emphasis on standards, and the articulation of those standards, evidences an intent to restrict apprenticeship programs, as much as to expand them.

The author tested the effectiveness of the existing apprenticeship infrastructure by having one of his small businesses, Modovolate Aviation, LLC (the LLC), apply for a registered apprenticeship program to train remote pilots for unmanned aircraft systems—civilian drone pilots. The LLC had already developed training materials for the relatively new Federal Aviation Administration (FAA) remote pilot certificate, which requires an examination on FAA rules. The LLC also had put together a small network of qualified drone pilots to support drone operating companies that lacked qualified drone pilots of their own to fly their aircraft.

The author was frustrated at not being able to take the first steps online but received a prompt response to his email inquiry to the regional contact listed on the national DOL website. That led to another email contact, followed by a telephone conversation with a regional Employment and Training Administration (ETA) specialist. The initial barrier was that "remote pilot–small unmanned aircraft system"—the official FAA terminology—did not appear as an apprenticeable occupation. That might be because of the relative recency of the FAA regulation. But there was no other occupation that might cover it—no "helicopter pilot" or "remote camera operator."

Also, the ETA specialist said that she had never heard of an application being approved for an apprenticeship program that lasted less

83. *See Apprenticeship Programs*, N.C. DEP'T OF COM., http://nccommerce.com/workforce/businesses/apprenticeship [https://perma.unl.edu/63QZ-UKSU] (last visited Oct. 24, 2019).

than one year; more often their duration is two to three years.[84] In the author's experience,[85] a year or more is grossly excessive for training a drone pilot. A candidate can obtain proficiency in the necessary flying skills in less than six weeks and achieve mastery of all the related subject matter, electronics, economics, safety, and new applications in six months. Requirements for longer duration may be appropriate when the object is to restrict the flow of apprentices because they represent new competition in labor markets; shorter duration is appropriate if the object is to retrain laid off employees for new types of jobs and to put them to work as quickly as possible.

The case for federal action to facilitate the creation or operation of a partnership programs is thin:

> [I]t is conceivable that we would find substantial effects of [registered apprenticeships] on earnings due to private apprenticeship programs even without the government investment. Although there are reasons to believe that the government investment contributes to the overall benefits of [registered apprenticeships] through outreach to attract candidates and partners, technical assistance to the sponsors, and quality assurance, the full benefit of the program should not be attributed to the public investment.[86]

"Reforming" the DOL apprenticeship program is a dead end. Reforming it to perform what function? At present it functions as a kind of gatekeeper to limit the number of registered apprenticeships. The benefits of being a registered apprenticeship program are opaque.[87] If

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84. The DOL list of apprenticeable occupations lists no occupation with less than 2,000 hours required, and some require 8,000 to 10,000 hours. *Available Occupations*, *supra* note 75. Simple arithmetic shows that 2,000 hours is equivalent to roughly a year of 40-hour weeks, and that 10,000 hours is equivalent to five years.

85. *See* HENRY H. PERRITT, JR. & ELIOT O. SPRAGUE, DOMESTICATING DRONES: THE TECHNOLOGY, LAW, AND ECONOMICS OF UNMANNED AIRCRAFT (2017). The author is a commercial helicopter and private instrument airplane pilot. His co-author is a certificated helicopter flight instruction. Both are remote drone pilots.

86. REED ET AL., *supra* note 64, at 13; PAHL GUNN & LALITH DE SILVA, PH.D., PLANMATICS, INC., REGISTERED APPRENTICESHIP: FINDINGS FROM SITE VISITS TO FIVE STATES (2008), bit.ly/39cUQZQ [https://perma.unl.edu/CDZ9-T26H].

87. The DOL website lists benefits. *Apprenticeship: Frequently Asked Questions*, U.S. DEP'T OF LABOR, https://www.dol.gov/apprenticeship/toolkit/toolkitfaq.htm#2a [https://perma.unl.edu/2VUV-F8K9] (last visited Oct. 24, 2019). All of them are available from any apprenticeship program, registered or not, except that "businesses may qualify for state tax credits available for apprenticeship program sponsors. Workforce systems and other community partners may also choose to contribute funding for training, supplies or other aspects of apprenticeship programs. These benefits reduce an employer's investment in apprenticeship training costs." *Id.* Only 12 states offer tax credits, and they are quite modest in magnitude, ranging from either 30% of training costs at a community college or $100 for private school training (Virginia), to 10% of apprentice wages, capped at $1,000 (Alabama), to 50% of wages, capped at $4,800 (Rhode Island and Connecticut). *Learn About Tax Credits*, U.S. DEP'T OF LABOR EMP'T AND TRAINING ADMIN. (Mar. 27, 2014), https://www.doleta.gov/oa/taxcredits.cfm [https://perma.unl.edu/U46B-PX42]. The Connecticut credit is available only for apprenticeships lasting

potential employers, existing employers, or intermediaries, such as trade unions or educational institutions, have connections with young people just entering the workforce, they can make their own bargains to satisfy their own needs. Absent a system of large-scale governmental subsidies, it is not clear what the federal government has to add to this.

Viewed objectively, the federal apprenticeship statutes and DOL regulations are meant to discourage apprenticeships, not promote them. It is no wonder that the evidence suggests government-approved apprenticeship programs are not very effective at facilitating transition to work adjustment technologies. The bureaucratic and interest group barriers to changing the existing program may be so great that it is not worth bothering.

C. Labor Department Proposed Rule for Industry-Recognized Apprenticeships

In 2019, the DOL proposed to restructure federally approved apprenticeship programs by establishing a new pathway for certifying them. It allows industry groups, profit-seeking and non-profit entities, and education institutions to develop industry programs as an alternative pathway to traditional DOL registration.[88] The proposal was initiated by an industry-labor task force appointed by the President in 2017.[89] Several members of the task force argued that "registered programs were too restrictive and included too much administrative red tape, which has kept many companies from offering such formal work-based training."[90]

Under the proposal, Standards Recognition Entities (SREs) would set industry consensus standards for apprenticeships.[91] The DOL pro-

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at least 4,000 hours. *Manufacturing Apprenticeship Tax Credit*, CONN. DEP'T OF LABOR, http://www.ctdol.state.ct.us/progsupt/appren/taxcr1.htm [https://perma.unl.edu/UW2Y-A8HX] (last visited Oct. 24, 2019).

88. Apprenticeship Programs, Labor Standards for Registration, Amendment of Regulations, 84 Fed. Reg. 29970, 29972 (June 25, 2019) (to be codified at 29 C.F.R. pt. 29) (summarizing proposal).

89. *See* Exec. Order No. 13,801, 82 Fed. Reg. 28,229 (June 15, 2017) (creating the Task Force on Apprenticeship Expansion with representatives of business, labor, educational institutions). The Task Force's recommendations were transmitted to the President on May 10, 2018. TASK FORCE ON APPRENTICESHIP EXPANSION, FINAL REPORT TO: THE PRESIDENT OF THE UNITED STATES (2018), https://www.dol.gov/apprenticeship/docs/task-force-apprenticeship-expansion-report.pdf [https://perma.unl.edu/W8ME-RYKF] [hereinafter TASK FORCE REPORT].

90. *Building Trades Sounds Alarm on DOL Apprenticeship Proposal*, NWLABORPRESS (Aug. 16, 2019), https://nwlaborpress.org/2019/08/building-trades-sounds-alarm-on-dol-apprenticeship-proposal/ [https://perma.unl.edu/JD6D-9UHT].

91. *See* Eric Morath, *Apprentice Plans Face Retooling*, WALL ST. J., June 25, 2019, at A3 (noting that principal change is to allow programs to be run by business groups, colleges, and other non-governmental entities).

poses that it would only recognize SREs that seek to recognize industry programs in sectors without significant registered apprenticeship opportunities. It says that the new system should not undercut registered apprenticeships where they currently exist.[92]

The proposed rule creates a new "Industry-Recognized Apprenticeship Program" (IRAP) category, separate from the traditional registered apprenticeship.[93] Such programs are those recognized by an SRE.[94] It sets minimum requirements that SREs must enforce, including training that requires specialized knowledge and experience, that involves the performance of complex tasks, and includes structured work experiences.[95] The new apprenticeships would involve employment relationships,[96] result in industry-recognized credentials,[97] and include payment at least at the federal, state, or local minimum wage.[98]

Section 29.25 of the proposed regulation provides for conversion of a new industry-recognized apprenticeship into a registered apprenticeship, thereby entitling the program to the economic benefits associated with the traditional apprenticeships.[99] Organized labor has criticized the proposal, defending existing arrangements in the construction industry.[100]

Simultaneously with release of the Notice of Proposed Rule Making, the Administration awarded $183.8 million in grants to fund private-public apprenticeship partnerships at twenty-three institutions to support training of 85,000 apprentices. The announcement promises an additional $100 million for other efforts to expand apprenticeships.[101] The total amount of new funding is considerably greater than the $90 million committed by the Obama Administration.

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92. Apprenticeship Programs, Labor Standards for Registration, Amendment Regulations, 84 Fed. Reg. 29,970, 29,980 (June 25, 2019) (to be codified at 29 C.F.R. pt. 29).
93. *Id.* at 30,012 (to be codified at 29 C.F.R. § 29.20(b)).
94. *Id.*
95. *Id.* (to be codified at § 29.22(a)(4)(i)).
96. *Id.* (to be codified at § 29.22(a)(4)(ii)).
97. *Id.* (to be codified at § 29.22(a)(4)(iv)).
98. *Id.* (to be codified at § 29.22(a)(4)(vii)).
99. *Id.* at 29,977–78.
100. International Brotherhood of Electrical Workers, *Trump's Watered-Down Apprenticeship Program*, UCOMMBLOG (July 22, 2019), https://ucommblog.com/section/national-politics/trumps-watered-down-apprenticeship-program [https://perma.unl.edu/KXJ3-N9XR] (posting by a union claiming that the proposal "would let businesses run shoddy apprenticeships with minimal standards, oversight and pay").
101. Press Release, Emp't and Training Admin., U.S. Dep't of Labor, U.S. Department of Labor Makes Major Announcements on Apprenticeship Expansion (June 24, 2019), https://www.dol.gov/newsroom/releases/eta/eta20190624 [https://perma.unl.edu/A9LC-V45N].

The Task Force noted difficulties in attracting young people to apprenticeships[102] and difficulties in persuading employers to participate in apprenticeship programs.[103] The Task Force created a Subcommittee on Attracting Business to Apprenticeship to provide recommendations to incentivize employer participation.[104] The recommendations to overcome employer reluctance were vague, however, focusing on "streamlining" requirements and "centralizing resources."[105]

It is not clear why an employer would participate in an IRAP. State and federal subsidies for registered apprenticeships would disappear, as would the privilege of paying a subminimum wage. The incentives for community colleges and other non-employer entities to establish IRAPs presumably arise from the possibility of earning tuition income from the new types of apprentices. Whether the graduates of these new programs will obtain employment depends entirely on labor market conditions. When labor markets are tight, graduates of IRAPs will have attractive opportunities, but these opportunities will disappear as labor markets become slack. Then, the usual evils of job-training programs that overpromise and extract tuition revenue from unwitting enrollees will appear.

IV. TEXTILE INDUSTRY: A CASE STUDY

The history of the textile industry is very much America's industrial history. Schumpeter drew examples to support his model of creative destruction from the textile industry because it was the leader of the Industrial Revolution.[106] Integrated spinning and weaving mills in Massachusetts and Rhode Island began the American Industrial Revolution. After flourishing during the Civil War, the textile industry and those who worked in it experienced shocks when production moved to the American South in the last quarter of the nineteenth century and the first quarter of the twentieth century. The shocks continued when the industry moved to Europe and Japan after World War II, and then to less developed countries such as China, India, and Bangladesh as the twenty-first century approached. The textile industry was the first major industry to experience "deindustrialization."[107] When demand was growing, industrialists figured out how to train workers so they could be productive. When demand was falling, em-

102. TASK FORCE REPORT, *supra* note 89, at 18–19.
103. *Id.* at 19.
104. *See id.* at 26.
105. *Id.* at 26–30.
106. *See* SCHUMPETER, *supra* note 7, at 129–33 (using water looms as an example of the dynamics of innovation as prices of input factors and finished product adjust).
107. TIMOTHY J. MINCHIN, EMPTY MILLS: THE FIGHT AGAINST IMPORTS AND THE DECLINE OF THE U.S. TEXTILE INDUSTRY 5–7 (2013).

ployers lacked the necessary incentive, and governments could not figure out how to retrain workers to facilitate adjustment.

The following subsections consider technology, labor markets, and adaptive means for four eras: the initial mechanization era; the "speedup" and "stretch-out" era, in which immigrants became the workforce; the "South rises again" era, in which production moved South and used a sharecropper workforce; and the "Global" era, in which production moved to Asia. Put differently, each section considers (1) creative, (2) destruction, and (3) adjustment. Disaggregating 200 years of industrial history into four discrete chronological eras is not a perfect analytical exercise, of course. In most cases, the phenomena identified with one era began in an earlier or extended to a later one.

A. Mechanizing the Basics: Teaching in Surrogate Families (1800–1840)

In the initial mechanization era, employers provided training and education in communities of workers organized and supervised by the employers.

Textile manufacturing involves four basic steps: harvesting the fiber, transforming it into usable thread or yarn, making the cloth from the yarn, and sewing and fabricating the garment from the cloth. Harvesting comprises picking cotton or shearing sheep and removing impurities from the aggregation of fiber that results. Producing yarn or thread[108] involves steps referred to in the aggregate as "spinning." Spinning includes cleaning, aligning, elongating, and twisting the fiber. Manufactured fibers involve extruding filaments of material like nylon, replacing some or all of the spinning steps. Turning the yarn into cloth involves weaving or, alternatively, knitting. Fabricating clothing apparel from the cloth involves sewing. Before the Industrial Revolution each of these steps was a distinct process, performed by different people in different places.

Mechanization of the cotton industry[109] in the first decades of the nineteenth century was the first step in the American Industrial

108. The terms "thread" and "yarn" are interchangeable; thread is used more commonly for smaller diameter yarn.

109. The cotton gin greatly influenced textile production's shift from wool to cotton as the Industrial Revolution took root in America. Eli Whitney's invention improved labor productivity by at least a factor of two. The popular notion that the cotton gin revolutionized Southern agriculture in 1893 is misleading, however. Cotton production thrived in the South even when workers handpicked the cotton seeds, and earlier deseeding machines were in wide use before Whitney went to work. Whitney's prototype eliminated the existing technology's shortcomings. More importantly, the cotton gin made it feasible to gin upland, short staple cotton and lowland, long staple cotton. Lowland cotton has large, black seeds to which the fibers do not adhere tightly, making it easier to pick by hand than upland cotton.

Revolution.[110] Innovations in fiber-preparation, spinning, and weaving technologies[111] increased economies of scale, dramatically increased labor productivity, and revolutionized the organization of work. Mechanization of spinning came before mechanization of weaving,[112] and the earliest water-powered spinning mills produced yarn for hand weavers who worked from home. The earliest factories in rural parts of New England concentrated on those tasks that were most difficult for homeworkers to do: fulling[113] and carding.[114] The farmers delivered their fleeces to the mill, and the mills returned roving which the farmers used for hand spinning into yarn, which then was used to create cloth on hand looms at home.[115]

Francis Cabot Lowell erected the first integrated spinning and weaving mill in Waltham, Massachusetts in 1814.[116] Locating spin-

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Upland cotton has small, green seeds tightly bound to the fiber, taking it longer to pick and making it considerably more difficult to process with existing machinery. Lowland cotton grew on the fringes of the Gulf of Mexico and southern Atlantic coasts; upland cotton grew everywhere else. *See* Charles S. Aiken, *The Evolution of Cotton Ginning in the Southeastern United States*, 63 GEOGRAPHICAL REV. 196, 196–99 (1973) (reviewing early efforts to mechanize seed picking from upland and lowland cotton).

110. HANNAH JOSEPHSON, THE GOLDEN THREADS: NEW ENGLAND'S MILL GIRLS AND MAGNATES 3–8 (1949) (describing international acclaim afforded New England textile mills).

111. For spinning, the innovator's goal was to increase the number of threads spun by a single spinner. For weaving, the innovator's goal was to raise and lower the harnesses and throw the shuttle faster than a human weaver could. As a result, Arkwright's water frame and throstle differed from a hand spinning wheel, while a power loom looked almost exactly like a hand loom. *See* HAROLD CATLING, THE SPINNING MULE 13–51 (1970) (reporting early developments in spinning technology).

Spinning and weaving are not the only activities in textile and apparel production where technology advances enhance productivity. Fiber preparation steps, such as cotton ginning to separate the cotton fiber from the seed and carding to straighten fibers before they go into the spinning process, exhibited similar phenomena as they were mechanized. New technologies increased labor productivity. Likewise, finishing steps, such as dying, experienced improvement.

112. THOMAS GRIES, ET AL., TEXTILE TECHNOLOGY: AN INTRODUCTION 5–8 (2d ed. 2015) (summarizing the evolution of textile technology).

113. Fulling is the process of pounding on wool fleece so that its fibers "felt," or become more attached to each other. *See* SARA J. KADOLPH, TEXTILES 407, 347 (11th ed. 2010) (explaining "fulling," "felting," and their application in textile manufacturing).

114. Carding is the process of aligning wool fibers with each other to make them spin easier. *See id.* at 221.

115. Interview with John J. Colony, Chairman, Historic Harrisville, Inc. (Aug. 11, 2019).

116. Samuel Slater and his partners built spinning mills in Rhode Island before the turn of the century, leaving weaving to handlooms, through a system of putting out. *See* Barbara M. Tucker, *The Merchant, the Manufacturer, and the Factory Manager: The Case of Samuel Slater*, 55 BUS. HIST. REV. 297, 299 (1981); GEORGE S. WHITE, MEMOIR OF SAMUEL SLATER 41 (1836). Slater was twenty-two years old

ning machinery, weaving machinery, and the machine shops to make it under the same roof significantly reduced inventory and transportation costs. The Lowell revolution improved and integrated several technological innovations that had preceded him.

Designing practical machines to perform spinning and weaving required adapting the steps previously done by hand. The purpose of the three most basic steps comprising spinning is to take a roughly parallel collection of fibers, reduce their diameter to that of thread or yarn suitable for weaving or knitting (the drafting step), and then to twist these smaller diameter fibers so they have tensile strength (the spinning step).[117] The inventive challenge in mechanizing spinning was not the twisting function or the collection of the spun yarn on a bobbin. That already occurred on a hand spinning wheel in a manner that only required the substitution of a nonhuman rotary motive force. The challenges were in substituting machinery for the fingers of a spinner to draft the fiber—to elongate it so that its density was reduced to a relatively small number of individual fibers aligned with each other so that they could be twisted to give them strength as a small-diameter thread—and to increase the number of spindles that could be operated simultaneously.[118] The important productivity enhancing feature of

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when Providence merchants William Almy and Smith Brown recruited him as a mechanic to perfect their spinning machines. *See* WHITE, *supra,* at 41 (giving dates); Tucker, *supra*, at 298–301 (describing the relationship among William Almy, Smith Brown, Moses Brown, and Samuel Slater); *Who Made America: Francis Cabot Lowell*, PBS, https://www.pbs.org/wgbh/theymadeamerica/whomade/lowell_hi.html [https://perma.unl.edu/GC7M-HY9R] (last visited Oct. 27, 2019).

117. *Ring Frames, Cotton Mules, Twisters, Spoolers, Beam Warpers, Slashers, Chain Warping*, 77 INT'L LIBR. OF TECH. § 38, 2 (1906) (describing the three steps required in any spinning operation).

118. James Hargreaves invented a solution in 1764. He installed multiple spindles on a movable frame, known as a "mule" or a "jenny." C.A. Lawrence, *Overview of Developments in Yarn Spinning Technology*, in ADVANCES IN YARN SPINNING TECHNOLOGY 3, 9 (C.A. Lawrence ed., 2010). A typical nineteenth century mule contained 1,320 spindles. William Strutt, son of Jedidiah Strutt, to whom Samuel Slater was apprenticed, described the "spinning mule" thus:

> Mules have been constructed, which do not require the manual aid of a spinner, the mechanism being so contrived as to roll the spindle-carriage out and in at the proper speed, without a hand touching it; and the only manual labour employed in these machines, which are called 'self-acting mules,' is that of the children who join the broken threads.

WHITE, *supra* note 116, at 46 (quoting letter from William Strutt).

Five years later, Richard Arkwright incorporated a different method of drafting into his water frame: roller drafting patented by Lewis Paul in 1738. This involved mounting two sets of rollers, with each set operating at different speeds. As fibers from the roving passed from a pair of slower rotating rotors to a pair of faster rotating ones, it would be stretched. The ratio of roller speed determined the amount of draft. The only remaining problem was to gear the rollers to the flyer and bobbin so that they rotated at appropriate speeds, to harness the whole to a horse walking in a circle or to a water wheel, and to mount several of these

the machinery was the ability to place multiple spindles on a single frame operated by a spinner, not the speed of the spindles. A single throstle frame could have 100 to 300 spindles,[119] enabling the worker operating it to spin 1,000% to 3,000% as much thread as a hand spinner.[120]

Mechanizing weaving presented a greater challenge than mechanizing spinning, although the individual steps performed by a hand weaver were simpler than those performed by a hand spinner.[121] The weaving process involves more discrete steps than the spinning process. First a weaver must dress or warp the loom by passing individual warp[122] threads through heddles, eyes on strings or wires that permit each thread to be raised or lowered separately from other threads,[123] and passing each through a dent (a narrow slot) in a reed, which keeps the threads separate. Part of the dressing process requires winding individual threads on a "warp beam" so that they can move through the heddles without tangling as the weaving progresses. The other ends of the warp threads are attached to a "cloth beam," onto which the cloth is wound as more of it is weaved.

After dressing the loom, the next step involves winding a bobbin of weft[124] thread and inserting it into a shuttle that passes between the warp threads as the heddles are raised and lowered. The raising of some warp threads while lowering other threads creates a "shed." The shed is the space between the raised and lowered threads. Plain weav-

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units to a frame so that multiple bobbins of yarn could be spun simultaneously. Roving is a rope of fiber in which the fibers have been combed to be nearly parallel, making drafting feasible. Lawrence, *supra*, at 14–16.

119. *See* ANTHONY F. C. WALLACE, ROCKDALE: THE GROWTH OF AN AMERICAN VILLAGE IN THE EARLY INDUSTRIAL REVOLUTION 140–42 (1978) (reporting numbers of spindles on throstles and mules).

120. *Id.* at 143. The mills mechanized the spinning process first with wool and then with cotton. Cotton presented greater challenges because of its shorter fibers. The shorter fibers pull apart more easily, resulting in broken ends.

121. *See id.* at 144 (explaining that power looms duplicated the movements of hand looms).

122. The warp is the collection of threads that run the long way (vertically) through the fabric.

123. A series of heddles—maybe several hundred on a mechanical loom—is attached to frames or harnesses—at least two, and as many as six or eight harnesses on each loom. The harnesses, in turn, are attached to treadles or cams so that they can be raised according to the intended structure of the weaving. Two harnesses are sufficient for a plain weave of material like muslin or denim in long runs because no pattern is woven into the cloth. United States Tariff Commission, *Loom Harness, Healds, and Collets*, 10 TARIFF INFO. SURV. 59 (1925).

124. The weft is the collection of threads that run back and forth, horizontally, through the cloth. Melvin T. Copeland, *Technical Development in Cotton Manufacturing Since 1860*, 24 Q.J. ECON. 109, 111–12 (1909) [hereinafter *Cotton Manufacturing*].

ing[125] involves raising every other thread so that the weft thread passes between them on one pass of the shuttle[126] and then reversing the positions of the threads as the shuttle passes back in the other direction, thus trapping each weft thread between the warp threads.[127] The weaver then forces each new weft thread against the preceding weft threads through an action called "beating."[128] The power looms installed by Lowell applied waterpower to perform these steps on an apparatus that looked much like a hand loom, but it had specialized devices to perform each of the steps.

Workers had to be trained to operate the new machines, but the economic and social environment mattered in determining what training was feasible. Apprenticeship[129] never flourished in the Americas as much as it did in England,[130] where economic and social conditions were quite different.[131] Labor markets in America were tight. Opening up the frontier took lots of male labor, and there was never enough. There surely was no surplus to allow youngsters to spend five or six years working as weaving apprentices. Persistent labor shortages meant that farmers and craftsman were willing to hire almost anyone as a journeyman craftsman instead of insisting on a credential like a completed apprenticeship. These same labor shortages ratcheted up opportunity costs for an apprentice who served out his apprenticeship rather than leaving early for a better opportunity.[132]

125. Other structures, such as twill, may involve raising one thread, while the next two are lowered then raising the next, lowering the next two, and so on. This would be a one-to-two twill. BILLIE J. COLLIER, ET AL., UNDERSTANDING TEXTILES 296 (7th ed. 2009).

126. Each pass of the shuttle is called a "pick."

127. Each traverse by the shuttle, carrying the weft thread through the shed, was a pick.

128. The position of the last beaten weft thread is called the *fell* of the cloth.

129. Apprenticeship was a bargained-for exchange. Its terms were defined, not by the law, but by the apprenticeship agreement. Samuel Slater's agreement with Jedediah Strutt was typical. Strutt was a partner of Richard Arkwright. *See* WHITE, *supra* note 109, at 32–33 (reproducing apprenticeship indenture dated Jan. 23, 1783).

130. Bernard Elbaum, *Why Apprenticeship Persisted in Britain but Not in the United States*, 49 J. ECON. HIST. 337, 338, 343 (1989). The English system was codified in the Statute of Artificers of 1563. *See* Donald Woodward, *The Background to the Statute of Artificers: The Genesis of Labour Policy, 1558–63*, 33 ECON. HIST. REV. 32 (1980); Patrick Wallis, *Apprenticeship and Training in Premodern England*, 68 J. ECON. HIST. 832, 849–51 (2008) (explaining that masters were likely indifferent about apprentices leaving their apprenticeship early because the training, combined with the completion of menial tasks, was low cost and quickly profitable for masters).

131. Elbaum, *supra* note 130, at 339 (summarizing labor conditions in America for young workers).

132. The most serious problem with apprenticeship, from the master's perspective, was that an apprentice could get the benefits of training, while shirking the duty to provide services in return by running away. *See* Wallis, *supra* note 130, at 833

The chance to migrate westward was a pervasive and enduring temptation. Once a runaway apprentice had left the state, it was almost impossible to find him and force him to come back.[133]

Added to these clear economic and physical circumstances was the revolutionary ideology of freedom and individual liberty. Being tied to a master for multiple years as an apprentice was inconsistent with the life of a free man.[134]

Francis Cabot Lowell's mill system made seminal technology contributions, but it also involved equally important labor market innovations that provided a different context for training. He borrowed a relatively unique idea from Scotland: recruit a workforce of young women from surrounding agricultural communities, build them pleasant and secure housing, serve them good food, provide them opportunities for church and education, and supervise their morals.[135] Older girls taught the younger girls the skills they needed, much as if they were a family.

When these "mill girls" comprised the labor force, skills training was not the responsibility of the mill but of the friends of the new girl. The familial character of the workplace encouraged dormitory matrons, more experienced girls, and overseers to take new girls under their wings and teach them what they needed to know. The expectation was that a new girl would get her own spinning frame or loom in about six months.[136]

(explaining and questioning conventional wisdom about rationality of running away). Indentured servants were even more likely to run away than apprentices. When an apprentice an away, he was forfeiting a certain amount of additional training and a credential at the end of his apprenticeship. When an indentured servant ran away, he lost nothing; he had already received his benefit. He only deprived the lender of his continued service. The open West beckoned to both.

133. *See generally* Elbaum, *supra* note 130 (explaining why apprenticeship flourished in Britain but failed in America). *See also Indentured Servants and Apprentice Records Master's Index 1724–1850*, CHESTER CTY. ARCHIVES AND REC. SERV., http://www.chesco.org/DocumentCenter/View/4132 [https://perma.unl.edu/TF72-KWE2] (last visited Oct. 24, 2019) (displaying an index of legal actions involving apprentices in Chester County, PA, that shows a significant number of claims against apprentices for running away and a few claims by apprentices for "poor conditions" or other breaches of contract).

134. *See* Elbaum, *supra* note 130, at 346 (referring to "ideology of personal liberty" as a factor in discouraging apprenticeships in the U.S.).

135. *See* JOSEPHSON, *supra* note 110, at 8–9, 23–24 (describing arrangements for workers and praise for them—the "factory girls"); *see also id.* at 69–71 (detailing the mill's housing layout and its applicable rules); CHAIM M. ROSENBERG, THE LIFE AND TIMES OF FRANCIS CABOT LOWELL, 1775–1817, 250 (2011) (discussing recruitment of factory girls and motivation of girls to work in the mills).

136. HARRIET ROBINSON, LOOM AND SPINDLE: OR, LIFE AMONG THE EARLY MILL GIRLS 42 (2011) (characterizing work in the mill as "a sort of manual training or industrial school"); *id.* at 72 (noting the interest that overseers took in the girls).

Before the supervisors would put her to work and pay her, someone in the workforce had to vouch for and represent that she had trained the newcomer. Pairing an experienced worker with a neophyte occurred informally, not as part of a formal apprenticeship or other training program. A handing-up girl inevitably watched the more highly skilled drawing-in girl she was assisting. If the relationship was cordial, the beginner would ask questions about the work and receive an answer.[137]

A contrasting "Rhode Island system" for staffing the mills recruited entire families to leave the farm and come to work in the mill.[138] This was a logical recruiting concept because the family unit on a farm was also a work unit. Farm families parceled out the tasks in raising livestock, growing crops, feeding the household, and clothing the household to every member of the family, no matter how young, according to each member's abilities. The fathers and older sons could operate the power looms, and the mothers and older daughters could superintend the spinning jennys. Additionally, the younger children performed simple tasks under their parents' direction, such as doffing[139] bobbins, tying broken threads, and cleaning the machinery.

The mechanization of knitting[140] occurred at roughly the same time as the mechanization of spinning and weaving. By the beginning

137. Narcissa Fantini Hodges, *I Knew My Job and I Knew My Place*, *in* THE LAST GENERATION, *supra* note 23, at 81, 82 (reporting the ease with which a friend could be found to train a new employee; the company did not do it). "You go in, ask for a job. The boss says, Okay, we'll take her. Take her to this machine and that machine and learn her how do it. That was it. I could sew at home. It helped but it's altogether different." Lucie Cordeau, *You Had to Be on Your Toes, All the Time*, *in* THE LAST GENERATION, *supra* note 23, at 73.

138. *See* Tucker, *supra* note 116 at 310 (noting Samuel Slater's reliance on family labor and quoting advertisement aimed at recruiting families).

139. ROBINSON, *supra* note 136, at 30 (describing life as a doffer).

140. Knitting is an alternative to weaving as a means of turning yarn into cloth. Knitting existed in antiquity, and machines for improving knitting productivity were invented as early as the sixteenth century. Some types of garments, such as socks and stockings, always were knitted instead of being woven. *History of Knitting*, MAKERS' MERCANTILE, https://www.makersmercantile.com/history-of-knitting-a-resource-guide.htm [https://perma.unl.edu/NW3E-TNMY] (last visited Oct. 25, 2019) (describing William Lee's 1589 "stocking frame" and much earlier hand knitting).

> By one estimate, the demand for stockings in England in the seventeenth century was 10 million pair per year. Men as well as women wore stockings because the fashion was for men to wear short trousers or pantaloons. The same estimate says that an experienced knitter could knit 6 pair per day. That means 1.6 million knitter days were necessary to meet the annual demand. If one assumes an average workweek of six days, that's 266,000 knitter weeks, or about 13,300 hand knitters to meet the demand. Queen Elizabeth I was right in her apprehension that unrest would result from supporting William Lee's sock-making machine because it might throw more than ten thousand people out of work.

of the Civil War, there were large water powered knitting mills scattered throughout New England. They integrated spinning and knitting activities and were similar in scale to the integrated spinning and weaving mills. Many of them also integrated the sewing operations necessary to produce finished garments, although some outsourced this finishing work to seamstresses working in their homes.

The populations from which knitting mill labor was drawn were essentially the same populations that supplied labor for spinning and weaving mills. Workers in knitting mills during the early parts of the nineteenth century, like workers in spinning and weaving mills, lived in dormitories and tenements erected and managed by the mills.

B. The Speedup and Stretchout—Rings and Draper Looms: Informal Worker-Level Tutelage (1840–1880)

Two creative and destructive technological changes—ring spinning and the Draper loom—defined the second era. These technologies gradually grew to dominate the industry, and they enabled workers to supervise substantially more machines and thus become more productive. The mill girls and other domestic workers drawn from the farms were supplanted by waves of immigrants from Ireland, France, and, towards the end of the period, southern and eastern Europe. In the second period, employers began to distance themselves from organized

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Weaving crisscrosses warp and weft yarn at right angles; knitting loops a single length of yarn on itself. Like weaving, knitting produces satisfactory results with any type of fiber, including wool, cotton, linen, and manufactured fibers. *See* COLLIER, *supra* note 125, at 273, 321. At almost all levels of mechanization, knitting resulted in higher capital and labor productivity because a knitting machine, unlike a loom, did not require the time-consuming and intricate warping process. In addition, knitting's looping motions do not require the reciprocating motions of a shuttle, with the speed-limiting effects of its inertia.

Knitting permits the integration of cloth manufacture with sewing the final garment; the sock making machine not only knitted the fabric for the sock; it made the actual sock in the appropriate shape at the same time. The resulting cloth differs as between the two processes. Knits are inherently stretchable in all directions; weaves are resistant to stretch except on the diagonal (the "bias"). The different characteristics of the cloth make knits more attractive for some types of clothing and weaves more attractive for other types. The inherent elasticity or stretch of knits make them attractive for socks, stockings, underwear including tee shirts, and other items of apparel that are intended to fit closely to the skin and to take on the shape of different bodies. Weaves are preferred for clothing, like formal suits and dresses and blouses that are intended to drape—and often to conceal the actual shape of the body.

Weaves are inherently less dense—puffier—because of the larger amounts of space in the interstices of the loops that comprise them. As inner garments, such as sweaters worn under outer coats, they are excellent insulators. Their greater porosity, however, makes them poor insulators in wind and precipitation when they are the outer garment. *See* SARA J. KADOLPH, TEXTILES 312–20 (11th ed. 2010) (comparing knitting with weaving manufacturing processes and characteristics of resulting cloth); *see* COLLIER, *supra* note 125, at 321–41 (same).

training and socialization. Instead, employers relied more on informal family and ethnic networks to recruit and train workers. Craft unions began to involve themselves in formal training activities, but these programs trained only higher skilled occupations such as loom fixers and mule spinners. Mill owners provided fewer training, education, and moral enlightenment opportunities. Training of the mill's workforce occurred informally through ethnic and family networks, supplemented by a new institution: correspondence schools.

During this period, ring spinning displaced the spinning mule.[141] Ring spinning's capital productivity was 1.45 times the productivity of mule spinning.[142] Its labor productivity improvements were even more dramatic: a single operative could oversee ten to sixteen frames rather than five or six, and women and older children could do the work, while men typically supervised mules.[143]

Draper looms increased weaving labor productivity by a factor of three. The shuttle magazine technology of the Draper loom[144] began to diffuse through the industry in the last decade of the nineteenth century.[145] Draper looms required the stronger ring-spun

141. *See* FREDERICK H. ABERNATHY, ET AL., A STITCH IN TIME 187–88 (1999) (quoting HERBERT J. LAHNE, THE COTTON MILL WORKER 153–56 (1944) (listing the move to ring spinning as a key advance)). While the ring frame was more suitable for coarser threads, the mule initially remained better for finer threads. A mule replicated a human spinner's movements. It drafted the fiber by expanding a frame, stopped the frame while it spun the fiber, and then wound it up on cops. *See* WALLACE, *supra* note 119, at 140–41 (explaining the spinning mule's operation and showing a diagram). A ring frame drafts by running the fiber through pairs of rollers that are turning at different speeds. This process stretches the aligned fibers and feeds the drafted fibers to rotors that revolve rapidly over spindles, twisting the fibers as they are wrapped around the bobbins. The last part of the process resembles the action of a flyer around the spindle of a hand spinning wheel. *See id.* at 139–40 (explaining the throstle spinning frame's operation—essentially similar to ring spinning). The rings and rollers continuously spin while the motion of the mule was reciprocating; the ring spinning frame's design was much simpler, reducing the cost and downtime for repairs. *Cotton Manufacturing*, *supra* note 124, at 123–25 (explaining functioning and identifying advantages of ring spinning).

142. Timothy Leunig, *New Answers to Old Questions: Explaining the Slow Adoption of Ring Spinning in Lancashire, 1880–1913*, 61 J. ECON. HIST. 439, 442 n.6, 462 (2001) (noting that the ring produces more output per hour but treats fibers more harshly than a mule).

143. *Cotton Manufacturing*, *supra* note 124, at 122–32 (analyzing functions, advantages, and disadvantages of mule spinning compared to ring spinning). *See also id.* at 127 (noting that men were always employed as mule spinners, while women and children operated ring frames).

144. Terminology differs. "Automatic looms," "Northrop looms," and "Draper looms" all refer to the same technology—a machine that equips looms with magazines that automatically change bobbins in shuttles when the weft thread runs out.

145. Melvin T. Copeland, *Progress of the Automatic Loom*, 25 Q.J. ECON. 746, 746–47 (1911) [hereinafter *Automatic Loom*] (reporting the popularity of the Northrop loom technology).

yarn,[146] so the migration to ring spinning complemented the migration to Draper looms.

Draper looms eliminated the need to stop each loom every seven to eight minutes to replace the bobbin in the shuttle,[147] and it used mechanisms to detect broken threads automatically and to stop the loom when it detected a broken thread. Draper looms permitted one attendant to manage sixteen looms instead of only six under previous technology[148]—a labor productivity increase of roughly 150%.[149]

The magnitude of technological revolution was far less dramatic in apparel production than in textile manufacturing. Changes in apparel production were chiefly limited to the replacement of hand sewing by sewing machines after the invention of the sewing machine in about 1850.[150]

Meanwhile, product market changes were forcing changes in workforce recruitment, training, and compensation.[151] Gradually,

146. Leunig, *supra* note 142, at 442–43 tbl.1.

147. *Automatic Loom*, *supra* note 145, at 746 (noting that "a fresh bobbin must be supplied every seven or eight minutes; hence stops are frequent."). *See* George W. Foster, *Winding as Related to the Textile Industry*, 43 MECH. ENG'G 595 (1921) (estimating that 8-loom assignments stop 2240 times weekly; each stop requires 8–16 seconds to change the bobbin).

148. *Automatic Loom*, *supra* note 145, at 749 (reporting number of looms that could be tended by one worker); *Cotton Manufacturing*, *supra* note 124, at 146 (estimating that workers can tend 14 to 30 Northrop looms compared to 6 to 8 common looms). By one estimate, automatic Draper or Northrop looms saved 100 stops per day. *Id.* at 145. Mills could reduce labor costs by utilizing devices that detect faults automatically, but these devices increase capital costs. For example, the Draper automatic loom cost three times as much as a power loom, but it increased labor productivity by a factor of 2 to 3. *See id.* at 144 ("[T]he number of looms per weaver, and consequently the output per weaver, has become greater. Weavers who formerly tended six to eight looms now tend from ten to fourteen."); Irwin Feller, *The Diffusion and Location of Technological Change in the American Cotton-Textile Industry, 1890–1970*, 15 TECH. & CULTURE 569, 573 (stating higher cost of a Draper loom by a factor of three). United States' labor costs were higher than in Britain, thus American textile manufacturers undertook the capital investment with greater enthusiasm than their competitors in Britain. *See generally Cotton Manufacturing*, *supra* note 124, at 147 (noting slower adoption of Draper looms in the North than in the South because of capital cost).

149. After installation of bobbin magazines, a child could refill the magazine every hour or so. *See Letters from Susan: Letter Second*, *in* THE LOWELL OFFERING: WRITINGS BY NEW ENGLAND MILL WOMEN (1840–1845) 51 (Benita Eisler ed., 1977) (explaining that girls in spinning room can "take charge of three of four looms, instead of the one pair which is the allotment").

150. Barthelemy Thimonnier, a French tailor invented the first practical machine in 1829. He was followed by Englishman John Fisher in 1844 and American Elias Howe in 1845. Isaac Singer brought these inventions together in 1851 and won various patent battles with them. *See* Singer Mfg. Co. v. June Mfg. Co., 163 U.S. 169, 171–73 (1896) (reviewing the history of sewing machine technology in claim for trademark infringement).

151. JOSEPHSON, *supra* note 110, at 9–10 (remarking on dramatically worsened conditions in thirty years). Because mechanization of spinning predated mechaniza-

mill operators decreased the amount they were willing to spend on food, lodging, education, and moral guidance.[152] Chaperoning and teaching the factory girls faded as the factory system spread and the girls were replaced by immigrants.[153] Continued downward pressure on labor costs caused mill owners to look overseas for a future, more pliable, workforce.[154]

The labor market proved resilient, however. The mill girls did not want to be retrained for other jobs; they just left the labor force and got married. Their desire to work in the more formal, faster, and more ruthlessly efficient mills weakened, and they had their farms, fami-

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tion of weaving by nearly a generation, yarn prices fell dramatically before cloth prices. The result was a significant increase in profitability for weavers, who enjoyed relatively stable prices and much lower factor costs. *See* C. Knick Harley, *Prices and Profits in Cotton Textiles During the Industrial Revolution*, UNIV. OF OXFORD DISCUSSION PAPERS IN ECONOMIC AND SOCIAL HISTORY, NO. 81 (May 2010), http://www.nuff.ox.ac.uk/economics/history/Paper81/harley81.pdf [https://perma.unl.edu/752C-8C83] (last visited Oct. 28, 2019) (providing data on cotton yarn and cotton cloth prices from late eighteenth century to 1830). By the 1830s however, mechanization of weaving had spread, causing the price of cloth to decline dramatically and squeezing the new entrants to weaving. *Id.*; *see* SCHUMPETER, *supra* note 7, at 129–33 (using water looms as an example of dynamics of innovation as prices of input factors and finished product adjust).

152. ROBINSON, *supra* note 136, at 17 n.1 (reporting elimination of room and board fee in the dormitories, which the mill owners originally had paid directly to the matrons, but now shifted to the mill girls). The title of this section refers to speedups and stretchouts. Requiring employees to work faster was a speedup. Requiring them to tend more machines was a stretchout. Disentangling allegations of speedups, stretchouts, and wage cuts is challenging. Nineteenth century employers regularly reduced wage rates when they fell on hard times. Such wage reductions were certainly a common provocation for strikes or unionization. Overbuilding by investors, coupled with saturation of the market, put pressure on prices and rewarded mill owners who found ways to cut costs by reducing the quality of the lodging, food, and social experience they provided their workforce, by increasing the pace of work and by occasionally cutting wages. JOSEPHSON, *supra* note 110, at 74 (reporting on evolution of "rules" to involve longer hours, larger number of machines per worker, increased pace, lower piece rates, and insistence that the girls not protest or seek better conditions).

153. *See* Tucker, *supra* note 116, at 311 (noting that immigration of French-Canadian and Irish textile mill workers eased labor shortages beginning in the late 1830s). The mill girls were losing their enthusiasm, anyway. The factory girls organized strikes in 1834 and 1836, astonishing almost everyone. *See* SUSAN CAMPBELL BARTOLETTI, KIDS ON STRIKE! 17–19 (1999) (describing strikes that took thousands of factory girls out for New England mills, but ultimately were unsuccessful). The 1834 factory girls strike protested a 15% wage reduction. Management imposed the wage because of falling prices for product, occasioned by increased competition in the industry. *See* Nardinelli, *supra* note 13, at 91 (1986) (providing a table showing cotton piece rates peaking in 1814 and declining to troughs in 1830 and 1841).

154. *See* LAURENCE F. GROSS, THE COURSE OF INDUSTRIAL DECLINE: THE BOOTT COTTON MILLS OF LOWELL, MASSACHUSETTS 1835–1955 at 24 (1993) (providing a generally Marxist description of the gradual replacement of mill girls with immigrants between 1836 and 1860).

lies, and future husbands to go back to. The men continued to feel the lure of the West and were happy to yield to it. Rapidly expanding markets dramatically expanded employment opportunities throughout this period. Business cycles resulted in temporary layoffs, pressure to increase efficiency, and engendered conflict, but, over the longer period, labor shortages predominated. Replacement of native mill girls by immigrants was gradual; there was no cataclysmic event in which mills closed, threw all the girls out of work, and then reopened with unwashed immigrants speaking broken English and a foreign language. Immigration was modest after the Revolution until 1830, but it accelerated thereafter, driven by unrest in Europe[155] and U.S. labor shortages during the Civil War.[156]

Immigrants often came to the mills as family units. Work would be assigned to the family as a unit. Then, mills organized the family's productive activity as if the family were still at home, modified only as necessary to accommodate factory schedules. The immigrants often brought their families with them, and, as a result, mill-girl style housing provided by the mill did not work as well as it had for the girls.

The introduction of ring spinning, and its eventual dominance over mule spinning, significantly changed gender roles in spinning rooms. Mule spinning was universally men's work because it was more dan-

155. Immigration from Great Britain and Ireland increased because labor surpluses caused the British government to relax limits on emigration. The British Passenger Vessels Act of 1803 roughly tripled the cost of ocean passage to North America. The politics of its enactment make it clear that British landlords intended the legislation to erect a barrier to tenants' leaving their manors to go to the United States. The Act erected a barrier to emigration. It was repealed in 1826. The Irish potato famine in 1845–1852 greatly accelerated immigration from Ireland, which continued throughout the 1850s. This reinforced an initial wave of immigration from continental Europe caused by the revolutions of 1848. *See generally* David Barratt, *British Immigrants*, IMMIGRATION TO THE UNITED STATES, https://immigrationtounitedstates.org/393-british-immigrants.html [https://perma.unl.edu/JH8J-6JWU] (last visted Dec. 19, 2019) (summarizing waves of British immigration to U.S.); Peter Dunkley, *Emigration and the State, 1803–1842: The Nineteenth-Century Revolution in Government Reconsidered*, 23 HIST. J. 353, 357–66 (1980) (describing the history of the 1803 Act and its aftermath).

156. Labor shortages during the Civil War caused Congress to enact the 1864 Act to Encourage Immigration, which encouraged potential employers to provide incentives for additional immigrants. Jason Silverman, *Lincoln's 'Forgotten' Act to Encourage Immigration* (Curtis Harris ed., July 1, 2016), http://www.lincolncottage.org/lincolns-forgotten-act-to-encourage-immigration/ [https://perma.unl.edu/NK55-W4GL] (last visited Oct. 28, 2019) (describing history of act). Abraham Lincoln called for the legislation because of a "great deficiency of laborers in every field of industry . . . ." *Id.* Representative Donnelly, supporting the resulting bill, noted that private enterprise already had established "societies" in Boston and elsewhere to encourage immigration. *Id.*

gerous and required strong legs.[157] Ring spinning was simpler and safer. All the operator had to do was to watch for broken threads or for bobbin exhaustion. When men were assigned ring spinning machines, they didn't like the work.[158] Finding it too simple and not manly enough, they maneuvered to escape to a more desirable job as quickly as possible. This attitude naturally led mule spinners, among the more organized crafts, to discourage mills from upgrading their spinning technology.

The locus of responsibility for training and education shifted during the second era. Mule spinners worked in teams of two or three; ring spinners worked alone, assisted by doffers who "belonged" to everyone.[159] Mule spinning naturally provided an apprenticeship-like opportunity for little piecers and big piecers to gain skills that would enable them to graduate to mule spinner positions. No such opportunity accompanied the organization of work for ring spinners.

In the middle part of the century as an immigrant workforce replaced the mill girls, industrialists relied on immigrant families and ethnic ties for informal training. A father, an uncle, a mother, an aunt, or a sister would take a youngster under his or her wing and teach the youngster the craft of operating a mule, a power loom, or a ring spinner. In a few cases, the immigrants had already learned the craft in Europe, and thus were ready to teach others. Sometimes, a foreman or overseer would single out a promising youngster and suggest that he

157. Charles Costello, *You Had to Go to Work Early and Get Some Money*, *in* THE LAST GENERATION, *supra* note 23, at 167 ("You had to have pretty good legs."). "Good legs" were necessary because the spinner walked in and out as the mule moved on its rollers. Mule spinning involved a hierarchy of jobs that facilitated instruction. A mule spinner typically was assisted by three subordinates: a big piecer, a little piecer, and a doffer. The big piecer typically was a young man between 16 and 21 years old, qualified to be a spinner, and just waiting for his own mule. The little piecer was younger—typically about 16. The doffer was a young boy, often below the age of 12. One started out as a sweeper, not usually assigned to a particular spinner, and then moved up the ranks to doffer, little piecer, big piecer, and, finally, mule spinner. *See also* GROSS, *supra* note 154, at 62 (describing mule spinning; because of the heat and humidity, mule spinners worked barechested and barefoot, supervising helpers, piecers, and doffers); WALLACE, *supra* note 119, at 143 (1978) ("All of the workers in the mule room were barefoot."). Even before widespread replacement of spinning mules with ring spinners, mill owners had begun to replace the two piecers with just one backboy.

158. Costello, *supra* note 157, at 171 ("I just couldn't handle it.").

159. L.H.C. Tippett & P.D. Vincent, *Statistical Investigations of Labour Productivity in Cotton Spinning*, 116 J. ROYAL STAT. SOC'Y 256, 263 (1953) (stating that "each team of doffers serves several spinners" in the ring room, increasing productivity of both spinners and doffers); William H. Lazonick, *Production Relations, Labor Productivity, and Choice of Technique: British and U.S. Cotton Spinning*, 41 J. ECON. HIST. 491, 500 (1981) (describing the roles of doffer and little piecer on spinning mule); *id.* at 507 (reporting trends in employment of backboys and doffers in spinning rooms); *id.* at 514–16 (describing incentives to replace spinning mules with ring spinners).

transfer to a more responsible position, but the training itself, and much of the encouragement and motivation, took place entirely within the lowest levels of the workforce.

As the mill girl system atrophied, mill owners began to delegate the responsibility of educating workers. The rise of free public schools invited employers, potential employees, and labor unions to back off from conducting the training themselves because of the expectation that the public school system would do it. Some of the strongest supporters of free public education were industrial interests and labor unions.[160] Horace Mann, as president of the Massachusetts state senate and before he became secretary of the state board of education, identified primarily with the promotion of railroads and industrialization.[161] The push for free public education followed the support of it in the earliest mill towns like Lowell. Tension had begun to grow over who was going to pay for it—the mill owners or the newly incorporated towns.[162] Immigration increased the need for public education.[163] Action by the Massachusetts legislature to establish a state system of public education coincided with the strategy of replacing the mill girls with immigrants. Public education was promoted as instilling knowledge and discipline that would produce a good workforce.[164]

Outside New England, low population densities and low funding for public schools meant that the schools were small and scattered. Few could afford any formal vocational education. Where schools existed, basic literacy in reading, writing, and arithmetic was the extent of the education provided. As the complexity of textile machinery grew, would-be employees for the higher skilled jobs looked to correspondence schools to provide the requisite knowledge.

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160. *See* Frederick Dean McClustky, *Introduction of Grading into the Public Schools of New England*, 21 ELEMENTARY SCH. J. 34, 45–46 (1920) (reporting that Edmund Dwight's advocacy was key in persuading the Massachusetts legislature to establish a state board of education and the first normal school and to hire Horace Mann in 1837). Dwight was treasurer of the Boston Manufacturing Company, which Frances Cabot Lowell founded.

161. *See generally Horace Mann Biography*, BIOGRAPHY, https://www.biography.com/scholar/horace-mann [https://perma.unl.edu/SSJ6-XUP5] (last updated Apr. 16, 2019) ("During these years, Mann aimed his sights at infrastructure improvements via the construction of railroads and canals, and established an asylum for the insane at Worcester.").

162. JOSEPHSON, *supra* note 110, at 52–53 (the alienation was increased by the absence of any business offices in Lowell).

163. *Id.* at 62 (noting that originally, the factory girls were of the same ethnicity and nationality as the overseers and mills owners).

164. *See* Andrew Dawson, *The Workshop and the Classroom: Philadelphia Engineering, the Decline of Apprenticeship, and the Rise of Industrial Training, 1878–1900*, 39 HIST. EDUC. Q. 143, 144–45 (1999) (describing the move of training from apprenticeship to public schools, motivated in part my concern about unrest attributable to idle young men).

The West continued to beckon to those unhappy with their factory life, although dependence of many immigrant workers on their immigrant mill communities made workers reluctant to relocate.

The claim by some commentators, such as Laurence F. Gross,[165] that entrepreneurs consciously sought to reduce the skills required in the mills in order to blunt labor organization is exaggerated and fueled mainly by ideology. It was technology, not anti-labor sentiment in the management class, that reduced and fragmented skill requirements. For example, the bobbin magazine reduced the need for doffers and other spinning machinery attendants to dart back-and-forth to remove full bobbins from spinning frames and to replace them with empty ones.[166] The mill owners were glad to deploy the new technology and to enjoy the lower labor costs that resulted, but their motivation was directly economic and not centered on subverting collective-bargaining.

Training organized and run by the mill operators was never a feature of the industry after the mill girl system faded away.[167] Not much training was required for the unskilled jobs; a new worker could show up and get some brief tutelage by a member of his family or ethnic group. The supervisor would say, "Stand here. When this has no more thread on it call for a doffer boy." When something else went wrong, the operator simply raised a yellow stick to summon a loom fixer.

The more highly skilled jobs required more formal training, but this was left to the one who aspired to those jobs. He might attend

165. *See* GROSS, *supra* note 154, at 18 (1993) (interpreting developments as reflecting desire by owners to subjugate labor). Gross is an Associate Professor at the University of Massachusetts in Lowell and has been active as a curator of textile museums.

166. *See generally* B. Pourdeyhimi et al., *The Development of Weaving Using Automatic Looms*, 4 ARS TEXTRINA 107 (1985) (detailing the development of bobbin magazines for power looms, which increased the number of looms that could be supervised by one operator).

167. Mary H. Blewett, *Introduction*, *in* THE LAST GENERATION, *supra* note 23, at 148 (explaining that an ambitious doffer boy might persuade older operator to teach him how to spin and might attend free night classes at Lowell Textile School). Some type of formal training persisted in about half of the mills, but it was much shorter in duration and much more focused on a narrow range of tasks immediately useful in the short run than under the apprenticeship system. BECKWITH, *supra* note 55, at 18 (discussing roles of "helper" and "junior workmen"). And an increasing number of employers did not train at all, assured that they could meet their employment needs adequately from the fugitives from other employers' training programs and from others looking to switch jobs. This set off a vicious cycle, with more and more employers asking themselves, "Why should I incur the expense of training for my competitors?" *Id.* at 20 (summarizing survey of 1118 New York employers, about half of which had trained their own workers).

night classes or take correspondence courses.[168] This training could allow one holding a lower-level job to learn weaving or loom fixing.

Work skill was an obvious subject for conversation to pass the time while their hands were working. A good deal of camaraderie existed among the men working in a particular room.[169] A more experienced weaver might take an interest in a doffer boy who showed enthusiasm and curiosity about the machinery and teach him some part of the process, like how to tie a knot between a new warp thread and the broken one.[170] Family and ethnic connections mattered.[171] When they existed, skills might begin to be acquired around the dinner table[172] and then be expanded in the mill.[173]

Craft unions operated at the margins, and industrial unions were just beginning to organize.[174] Craft unions were active only for a few of the most highly skilled occupations, such as loom fixers. Where craft unions were active in the labor market in New England, the unions—like most craft unions—controlled the labor supply for their crafts. By the end of the century, the unions were organizing schools to provide necessary job-oriented training and to help match job vacancies with job applicants. For example, the Loom Fixers Union was a leader in establishing textile schools in New England, and it controlled entry to the school tightly.[175]

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168. *See supra* subsection III.A.4. (describing the emergence of third-party training institutions).

169. Blewett, *supra* note 167, at 148 (explaining how male camaraderie on the weaving floor led youngsters to connect with older men who treated them like sons); Costello, *supra* note 157, at 168 ("Some guy will take a liking to you, and you'll take a liking to a certain spinner.").

170. Blewett, *supra* note 167, at 148 (noting that a weaver might teach a doffer boy how to tie a knot).

171. *Id.* at 147 (stating young men without family connections had trouble escaping unskilled doffer boy or sweeper positions).

172. *Id.* (noting that some boys could name the parts of a loom, learned around the dinner table).

173. *Id.* (explaining how an aspiration for a youngster to acquire a skill was met by fathers and brothers instructing in weaving, slashing, fixing).

174. Until the 1870s, the leaders of the American trade union movement were craft unionists. *See* JULIE GREEN, PURE AND SIMPLE POLITICS: THE AMERICAN FEDERATION OF LABOR AND POLITICAL ACTIVIST, 1881–1917 36–39 (1998) (reporting the triumph of craft unionism over industrial unionism).

175. In 1898, the Loom Fixers Union, through its Textile School Committee, formally opened its textile school in Fall River. MASSACHUSETTS BUREAU OF LABOR, TWENTY-NINTH ANNUAL REPORT OF THE BUREAU OF STATISTICS OF LABOR (1899) at 604 [hereinafter TWENTY-NINTH ANNUAL REPORT]. It expressed gratitude to Crompton & Knowles Loom Company for giving a Stafford dobby head for use in the union's textile school, to the Draper Company for two Northrop looms given to the school, and to the Mason Machine Works for a loom sent to the textile school. *Id.* at 602–03. The same report noted that two applications for "permission to learn the trade" were received and approved. *Id.* at 602. The Lawrence local asked the Fall River local for information on how to establish a school. *Id.* at 603.

Textile trade unionism was badly fragmented until well into the twentieth century.[176] It was easier to organize skilled workers, who shared pride in their craft, on a purely local basis. Some of them were considering affiliation with national or regional organizations in their craft, however, to gain access to greater pools of striker benefits.[177]

The craft unions could retrain people already in the industry for a new technology, but they were poorly positioned and hesitated to train people to move out of their industry into another. The weavers' union Textile School in Lawrence,[178] for example, trained its members on new types of looms such as the Draper loom but did not re-train them to operate spinning machines unless the union intended to claim spinning as its own work.

The shift from craft to industrial unionism had implications for adjustment to technology's shocks. Industrial unionism arose and became dominant in basic industries without any particular focus on apprenticeship programs or hiring halls.[179] The move away from craft unionism and the focus on the working conditions of the workforce already employed weakened union concern with job training. Though skills acquisition might require a period of OJT, the period did not have to be very long, and the factory owners controlled the machines on which such training necessarily would occur.

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176. *See id.* at 604. The report mentioned activities by the Weavers Union, the Web-Drawers, Warpers & Spoolers Unions, the Woollen Spinners Unions, the Slasher Tenders and Drawing-in-Girls Unions, the Loom Fixers Unions, the Cotton Mill Operatives, Cotton Spinners Union, and the Carders Union. *Id.* at 591, 601, 615, 620–24. The minutes of Cotton Spinners Unions reports on some locals designated "Ring Spinners Union" and some designated "Mule Spinners Union," and the Carders Union. *Id.* at 594. The minutes of Cotton Spinners Unions reports on some locals designated "Ring Spinners Union" and some designated "Mule Spinners Union." *Id.* The Carders Unions and the Spinners Unions were in federation. *Id.* A 1911 Massachusetts state labor report showed the following national unions in the textile industry. The number of accredited locals nationally is shown in parentheses: Card Machine Operators Union of America (2), Card Room Operatives of America, Amalgamated (2), Loomfixers International Union (16), International Spinners Union (22), Textile Workers, National Industrial Union of (13), and Textile Workers of America, United (133), Weavers, National Federation of (7), Weavers, Amalgamated Association of the United States of America, Elastic Goring (2). By comparison, the Order of Railway Conductors had 593 locals. MASSACHUSETTS BUREAU OF LABOR, FORTY-SECOND ANNUAL REPORT ON THE STATISTICS OF LABOR FOR THE YEAR 1911, 101–03 tbl.I (1913).

177. TWENTY-NINTH ANNUAL REPORT, *supra* note 175, at 620 (mentioning the Weavers Union's request to the Federation of Textile Operatives for striker benefits and a discussion of possible affiliation with the New England Federation of Weavers).

178. *See supra* note 175 (describing Lawrence school).

179. Then the backlash against trade unionism in the Taft Hartley Act prohibited closed shops. Taft Hartley Act, Pub. L. 80–101, 61 Stat. 136 (1947) (codified at 29 U.S.C. § 158(a)(3) (2012)). Now-illegal closed-shop agreements required one to be a member of the union to be hired in the first place. That was how hiring halls worked in their heyday.

C. The South Rises: Meeting the Need for Institutionalized Education (1880–1930)

The defining characteristic of the third era was the dramatic movement of textile production from New England to the American South. This movement was fueled not so much by new textile technology as it was by workforce difficulties in the North and the availability of a fresh, cheap, and docile workforce in the South. The movement was also spurred on by the spread of railroad technologies in that region. The most significant limitation on labor force adjustment was the unwillingness of skilled Northern workers who had lost their jobs to move south. In the third period, employers and unions alike began to encourage governments to provide basic education, especially in the South, where the hill country whites being recruited for the textile mills lacked basic literacy.[180]

The creative technological changes that defined the era mainly occurred in areas other than textile machinery. The building of railroads, which had begun in earnest before the Civil War, resulted in fragments of mostly disconnected rail enterprises during the War. After the War, English capital poured into a frenzy of railroad building and integration, which connected existing and potential production centers with markets and suppliers in a way that had never been seen before.[181] The timing was perfect for a South trying to find its way after Reconstruction. Calls for a "New South" by *Atlanta Constitution* publisher Henry Grady and others singled out railroads and textile manufacturing as the engines of the future for this new South.[182] Furthermore, improvements in stationary steam engine technology meant that Southern mills could be located anywhere and were no longer tied to the fall lines on Southern rivers, which tended to be much further from coastal shipping transportation than the fall lines in New England.

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180. *See generally* Jacquelyn Down Hall, et al., *Cotton Mill People: Work, Communication, and Protest in the Textile South, 1880–1940*, 91 AM. HIST. REV. 245, 247–61 (1986) (analyzing the sociology of hill-country whites recruited to the mills).

181. MICHAEL W. FITZGERALD, RECONSTRUCTION IN ALABAMA: FROM CIVIL WAR TO REDEMPTION IN THE COTTON SOUTH 205–28 (2017) (describing state subsidy of railroads); *id.* at 254–56 (describing post-default conflict with bondholders over Alabama and Chattanooga Railroad); MARK W. SUMMERS, RAILROADS, RECONSTRUCTION, AND THE GOSPEL OF PROSPERITY 213–36 (1984) (discussing the "Alabama and Chattanooga Catastrophe"); *see also* State v. Cobb, 64 Ala. 127, 140 (1879) (referring to English bondholders in a suit for writ of mandamus to governor to endorse bonds); Stanton v. Alabama & C.R. Co., 22 F. Cas. 1070 (Cir. Ct., S.D. Ala. 1875) (describing claims by railroad bondholders).

182. RAYMOND B. NIXON, HENRY W. GRADY: SPOKESMAN OF THE NEW SOUTH (1943) (describing calls for cotton manufacturing in the South); *id.* at 241–50 (reporting Grady's speech to New England Society in New York urging Northern capitalists, predominantly from the textile industry, to invest in the South).

Technology's destructive impact on labor markets and workers harmed New England and benefitted the South. As the era progressed, labor markets grew slack in New England and were tight in the South, until the third decade of the twentieth century. The move from the farm to textile mill occurred in the South fifty years later than the similar migration in New England.[183] High cotton prices after the Civil War—the result of pent-up demand after wartime interruptions to cotton commerce were lifted—and the growing demand as ever-more productive textile machinery was installed in mills caused a scramble to bring plantation land back into production.[184] The planters, meanwhile, whose larger plots of land offered more efficient production, did everything they could think of to attract a labor force. However, they lacked capital to pay cash wages. The end result was sharecropping, with most croppers being white.[185]

Poor whites, on the other hand, were returning in the thousands from service in the Confederate Army. They found their society destroyed; whatever places they had occupied as overseers and craftsmen on the plantations had disappeared.[186] They wanted to take up farming because that's what most people did, and that is what

183. Compare section IV.A with this subsection (revealing dates of migration).

184. *See generally* Joseph D. Reid, Jr., *Sharecropping in History and Theory*, 49 AGRIC. HIST. 426, 426–27 (1975) (analyzing origins and organization of sharecropping).

185. Blacks participated in the new wage economy but were suspicious of the terms of work with their old masters, and they thought they had more attractive alternatives. The Freedmen's Bureau encouraged them to believe that they should wait out wage work because the government would give them forty acres and a mule. Henry Louis Gates, Jr., *The Truth Behind '40 Acres and a Mule*,' http://www.pbs.org/wnet/african-americans-many-rivers-to-cross/history/the-truth-behind-40-acres-and-a-mule/ [https://perma.unl.edu/4XPE-XRYE] (tracing slogan to General William T. Sherman's Soeciuak Field Order No. 15, Jan 16, 1865 as a model for post-war land redistribution). Section 4 of the Freedmen's Bureau Act authorized a three-year grant of land not to exceed 40 acres to "refugees" and "freedmen"). *See generally* CLAUDE F. OUBRE, FORTY ACRES AND A MULE: THE FREEDMEN'S BUREAU AND BLACK LAND OWNERSHIP 31 (1978); Walter L. Fleming, *"Forty Acres and a Mule*," 182 N. AM. REV. 721 (May 1906). Blacks were in no hurry voluntarily to restrict their newfound freedom and were, for about a decade after the Civil War, not a significant workforce for cotton production.

186. Some 76% of the white population before the Civil War did not own slaves. *Wealth Culture in the South*, LUMENLEARNING.COM, https://courses.lumenlearning.com/ushistory1os2xmaster/chapter/wealth-and-culture-in-the-south/ [https://perma.unl.edu/2JUK-9BA3] (last visited Oct. 28, 2019).

> Below the wealthy planters were the yeoman farmers, or small landowners. Below yeomen were poor, landless whites, who made up the majority of whites in the South. These landless white men dreamed of owning land and slaves and served as slave overseers, drivers, and traders in the southern economy. In fact, owning land and slaves provided one of the only opportunities for upward social and economic mobility. In the South, living the American dream meant possessing slaves, producing cotton, and owning land.

Id.

they had done before.[187] Hill country farmers, mostly white, who had historically engaged in subsistence farming of a variety of crops, shifted into cotton to help satisfy the demand. Lenders were more willing to lend money on a cash crops like cotton than to lend against other crops intended mainly for home consumption. The high cotton prices induced many poor whites to buy plots so small they were sustainable only with supra-normal cotton prices. Those who could not afford their own land right away became sharecroppers, motivated by the dream of someday owning their own land.[188]

The unsettled labor market conditions, especially for the whites, induced another phenomenon: the realization that the South never could be economically successful unless it reduced its dependence on agriculture and a single crop. As Reconstruction ended, and as railroad building in the South boomed, more voices were calling on the leadership in the deep South to embrace manufacturing.[189] Cotton textile manufacturing was a logical initiative: process the cotton near where it grows. To do so, however, the South had to attract capital. Appeals for investors in the North and abroad to invest in Southern mills emphasized the proximity of the raw material,[190] the availability of convenient water power,[191] and—most of all—the availability of

187. Lee J. Alston & Robert Higgs, *Contractual Mix in Southern Agriculture Since the Civil War: Facts, Hypotheses, and Tests*, 42 J. ECON. HIST. 327, 337 (describing market conditions immediately after war).

188. By 1909, more than 70% of the land was worked by croppers and tenants. *Id.* (describing market conditions immediately after war). A well-defined status hierarchy existed, in which laborers aspired to rise from wage hand, to cropper on shares, to share tenant, to fixed payment renter, to owner-operator. *Id.* at 334 (describing the "ladder" of progression). But dreams were hard to realize. More and more, white sharecroppers sought refuge from a marginal and worsening existence on the hill-country farms. The incentive was greater autonomy. The possibilities depended on amassing greater capital and expertise. The text's discussion of Southern industrialization uses the term "sharecropper" as a shorthand, not only for actual sharecroppers, but also for subsistence farmers who may have owned their land or farmed under other economic arrangements. *See* Stephen V. Ash, *Poor Whites in the Occupied South, 1861–1865*, 57 J. S. HIST. 39, 41–44 (1991) (describing poor whites and their economic conditions).

189. The best known of these was Henry Grady, editor and part owner of the Atlanta Constitution. He regularly preached his New South vision to northern as well as southern audiences, one including financier J.P. Morgan, between 1880 and 1889. See NIXON, *supra* note 182, at 181–82, 242.

190. Objectively, savings in freight costs for raw materials were less than they might have seemed, because long-staple cotton had to be shipped from Mississippi. Savings did result, however, from being able to deliver local cotton to the mills in loosely packed ginnery bales rather than in compressed form. Sometimes the gin was integrated with other stages of manufacturing. Most important, however, was that the output of Southern mills still was shipped north for finishing, so that the fiber had to make a trip north anyway—just at a later stage of production. MELVIN THOMAS COPELAND, THE COTTON MANUFACTURING INDUSTRY OF THE UNITED STATES 36–38 (1912) (evaluating the claim of lower freight charges).

191. A dubious claim. 67% of the Southern mills were powered by steam. *Id.* at 38 n.1.

surplus labor in the form of underemployed hill country farmers.[192] Investors from outside the region heeded the call, including many New England mill owners.[193] Local merchants and bankers invested as well. Poor white farm families were eager to go to work in the new mills and earn cash wages. By 1890, the level of cotton manufacturing in the South was such that Southern boosters talked about their cotton mills putting a nail in the coffin of Northern mills, turning the tables on Samuel Webster who had remarked before the Civil War that Northern manufacturing would be the nail in the coffin of the South.

By 1910, Southern mills had 11.2 million spindles and 2,942 looms, 90% of them in the Carolinas, Georgia, and Alabama.[194] Northern mill owners could not ignore the accelerating loss of market share to Southern mills. They jumped at the chance to blame it on their higher cost structure, resulting in large part, they concluded, from labor law reform in the North. They perceived legislators in Massachusetts, and elsewhere in New England, as antagonistic to manufacturers. Southern promoters were eager to re-enforce this idea and explicitly compared their business-friendly politics with political hostility in the North. Southern promoters also made effective use of racist and nativist concerns, emphasizing that the workforce of the South was not only placid and willing to work for low wages; it also was white, English speaking, and native born.[195]

Dwight Manufacturing, one of the leading New England manufacturers, responded favorably to the invitations from the governor of Alabama and the mayor of Guntersville to set up a mill in northern Alabama. Dwight subsequently shut down its New England facilities and moved all production to the South.[196]

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192. *Id.* at 39 ("[T]he corner-stone of the structure has been the supply of cheap and tractable labor.").

193. J.P. Stevens, for example, began in Andover, Massachusetts, expanded to Haverhill in 1854 on the Merrimack Rivers, and then moved south. The Stephens family had been in banking from its earliest days in textile manufacturing. AMERICAN WOOD AND COTTON REPORTER, HISTORY OF AMERICAN TEXTILES: WITH KINDRED AND AUXILIARY INDUSTRIES 300 (1922).

194. COPELAND, *supra* note 190, at 35.

195. *See* BROADUS MITCHELL, THE RISE OF COTTON MILLS IN THE SOUTH 169–73, 171 n.20 (2001) (extolling virtues of poor white Southern labor, compared with Northern labor); David Brian Robertson, CAPITAL, LABOR & STATE: THE BATTLE FOR AMERICAN LABOR MARKETS FROM THE CIVIL WAR TO THE NEW DEAL 18 (2000) (summarizing labor-force arguments to pull Northern textile industry to the South); BETH ENGLISH, A COMMON THREAD: LABOR, POLITICS, AND CAPITAL MOBILITY IN THE TEXTILE INDUSTRY 14–17 (2006) (reporting on efforts to use characteristics of poor-white Southerners as textile mill workers to attract capital to the South).

196. ENGLISH, *supra* note 195, at 46 (reporting on successful efforts by Alabama officials to lure Dwight to Alabama).

An obvious mechanism for adjusting to the labor market displacement caused by textile production moving out of New England into the South was for the New England workforce to follow and migrate to the South.[197] This did not occur to any significant degree. Northerners migrated west in significant numbers after the Civil War, and black and white Southerners migrated north, but few Northerners in the laboring classes went South.[198] Migration into the South from the North was limited to entrepreneurs and speculators who made up the "carpetbagger" population.[199] The South experienced a considerable outflow of population to the North and West, accelerating in the twentieth century.[200]

Several factors explain the lack of labor mobility in response to the interregional capital mobility. First, the New England textile industrialists were trying to escape their workforces as much as their state legislatures. Unionization was growing, protests of compensation practices and working conditions were militant, and the state legislatures were merely responding. Capitalists perceived that much of the unrest was due to foreign ideologies infecting their workforce. The last thing they wanted was for their, by now, largely immigrant workforce to follow them south. Only a handful of supervisors were needed to teach the necessary skills to the hill country whites in the South.

Second, political and business leadership in the South did not want them. The central theme of the promoters of the New South was that Northern industrialists, if they built plants in the South, could find a hard-working, English-speaking, native-born, and pliable workforce who would be delighted with the jobs regardless of the terms of-

197. *See* George Winston Smith, *Some Northern Wartime Attitudes Toward the Post-Civil War South*, 10 J.S. HIST. 253, 255 (1944) (describing unsuccessful pre-War plans to colonize the south with Northern migrants). The fantasies continued during the War. "Oh, for a thousand yankees to enter and make a paradise of this magnificent region!" *Id.* at 256–57; *id.* at 259–61 (describing a boom in Southern real estate sales to Northern buyers); *id.* at 261 (describing the belief that an influx of free labor from the north would solve the post-war labor shortage); *id.* at 263 (describing calls for European immigration to the South).

198. A chart of migration patterns in the United States shows that in 1900, almost no one in the South was born in New England, while substantial numbers of residents of western states were. *Mapping Migration in the United States*, N.Y. TIMES (Aug. 15, 2014), https://www.nytimes.com/2014/08/16/upshot/mapping-migration-in-the-united-states-since-1900.html [https://perma.unl.edu/K9DK-ZB7Y].

199. Smith, *supra* note 197, at 257 (referring to border states during the war as "magnets" of interest for the more adventurous Northern investors).

200. *America's Great Migrations*, UNIV. OF WASH., http://depts.washington.edu/moving1/ [https://perma.unl.edu/BTQ7-BQ4C] (last visited Oct. 23, 2019) ("More than 20 million whites left the South during the 20th century, vastly outnumbering the 7-8 African Americans who left.").

fered.[201] The Southern population generally resented what they perceived as exploitation by the carpetbaggers, and they were no friendlier to laborers and speculators from New England, New York, or Pennsylvania.

Third, the New England textile workers did not want to go south. After the war, the Northern press played up the savagery of the Ku Klux Klan, the struggles of reconstruction governments to suppress the Klan and other examples of racial and sectional hatred, and the eventual abandonment of the effort to contain this hatred after the election of 1876. A New Englander was not likely to want to take himself or his family into such a dangerous place where he likely would become a target. Why go south and get murdered if you could take your family and start a farm with government support in Kansas?

No retraining of a migrating Northern workforce would have been necessary because the Southern mills, for the first couple of decades, were equipped with machinery already installed in the Northern mills. In the absence of migration, however, training of an entirely new workforce drawn from the poor hill country whites was necessary.

While Southern political and business leaders were eager to welcome New England textile capitalists, Southern hill-country sharecroppers were not well prepared to work productively. Illiteracy was high. Even if they knew how to farm effectively, they had no experience with machinery. Thus, the Southern textile factory owners faced a training challenge for their new workforce. In the hill country whites, they had the potential labor force who would work cheaply. But no one in the labor force knew anything about spinning or weaving; neither did the industrialists themselves. They had to meet their workforce training needs by importing a critical mass of experienced personnel from New England or Britain, who already had established textile industries. An explicit part of the assignment of such recruits was to provide training. Once the first round of training was complete, the system relied on family units in the mills to transfer the skills intergenerationally. "Another mill employee began work at the age of fourteen. Her mother trained her on the job, and together they put in a very long day. I went to the mill when I was fourteen years old, and my mother learnt me to reel."[202] By hiring entire families, mill owners

201. Grady, "New South" Speech (Dec. 22, 1886), https://georgiainfo.galileo.usg.edu/topics/history/article/late-nineteenth-century-1878-1900/henry-gradys-new-south-speech-dec.-22-1886 [https://perma.unl.edu/MB8J-TV9J] ("We have fallen in love with work.").

202. Bennett M. Judkins & Dorothy Lodge, *The Evolution of Textile Mill Villages*, TAR HEEL JUNIOR HISTORIAN (Fall 1986), *reprinted in* Bennett M. Judkins & Dorothy Lodge, *The Evolution of Textile Mill Villages*, NCPEDIA, https://www.ncpedia.org/textiles/mill-villages [https://perma.unl.edu/RU2K-F4HD] (last visited Oct. 23, 2019).

could shift some of the training responsibility to parents and older siblings.[203]

The mill families initially worked under a set of informal arrangements that came to be known as the "customary rules."[204] These rules allowed workers considerable flexibility to take care of non-mill-related activities even during their shifts. Females frequently went home to fix a meal, check on their youngest children, or rest. Male workers took off to take care of farm tasks and sometimes hunt and fish. Children drifted in and out of the unfenced mills to play with each other or take meals at home.[205] In some cases, mill managers hired an extra 25% of the workforce just to fill in for the absentees.[206] It was common for workers to cover for each other and later make up for production lost when they were absent.[207] One worker was quoted as saying that he was pretty regular in attendance, taking only one day a week off.[208] All of this was acceptable to the mill owners because the labor rates were so much lower in the South than in the Northern mills that they were able to earn a handsome return on investment.[209]

Southern mill owners emphasized their "social consciousness," which began as an inducement for families to leave their farms and work in the mills and continued to attract workers in times of labor shortages after the basic workforce was in place. Increasing output as more and more production moved south out of New England created an intense labor shortage. More successful mill owners intensified their efforts to build a sense of community with their workforces, promoting fathers to overseer positions and advertising improvements in millworker housing, schools, and churches.[210]

Southern textile mill owners were even more involved than their New England counterparts in establishing, operating, and financing schools because the public education system was so weak.[211] Government per pupil expenditures in Massachusetts in 1907 were $43.12. During the same time period, per pupil expenditures were $9.06 in North Carolina and $6.90 in South Carolina.[212] The mill owners established schools to attract the best workers,[213] to impart literacy and

203. *See generally* CATHY L. MCHUGH, MILL FAMILY: THE LABOR SYSTEM IN THE SOUTHERN COTTON TEXTILE INDUSTRY 1880–1915 (1988).
204. JANET IRONS, TESTING THE NEW DEAL: THE GENERAL TEXTILE STRIKE OF 1934 IN THE AMERICAN SOUTH 15 (2000) (explaining the "customary rules").
205. *Id.* at 15 (giving examples).
206. *Id.* at 16.
207. *Id.* at 19 (summarizing practices).
208. *Id.* at 16 (quoting the worker).
209. *Id.* at 24 (reporting that wages in the south were 40% lower).
210. *Id.* at 18 (describing efforts to deal with labor shortage).
211. Cathy L. McHugh, *Schooling in the Post-Bellum Southern Cotton Mill Villages*, 20 J. SOC. HIST. 149 (1986).
212. *Id.* at 150.
213. *Id.* at 151.

basic arithmetic skills to an ignorant population,[214] to socialize children to a good work ethic,[215] and to provide a kind of buffer—a surplus labor force that could be called upon in times of high demand.[216]

The mill owners avoided the problems of premature exit that undermined the economic incentives for masters to take in apprentices.[217] The owners embedded school attendees in a family-oriented work system in which the parents of children who did not come to work in the mills that schooled them might lose their jobs and their housing.[218] The schools usually limited their instruction to the basic "Three R's" out of a concern that children afforded a secondary education would be more likely to leave.[219]

Despite the availability of this training, many parents were unenthusiastic because they needed their children's income and because they thought the training was too academic, as opposed to vocational, to benefit the children.[220] Although 92% of elementary school graduates at the turn of the twentieth century earned a living with manual labor, only 5% received any direct preparation in the public schools.[221] Employers favored industrial schools and night programs to train potential workers.[222] The National Association of Manufacturers established a committee in 1904 that recommended evening trade schools at the high school level as a better alternative to employer OJT programs in the form of apprenticeships or otherwise.[223] Unions opposed the schools, though their opposition moderated somewhat by 1910.[224]

Trade schools—mostly private and mostly separate from the public school system—had begun to spring up in a few places in the United States just before the Civil War, and the pace accelerated after the war.[225]

At the turn of the twentieth century, formal textile education programs were limited.[226] The Massachusetts Institute of Technology's

214. *Id.* at 154.
215. *Id.* at 153.
216. *Id.* at 154.
217. *See supra* section IV.A.
218. McHugh, *supra* note 211, at 152.
219. *Id.* at 152.
220. *Id.* at 155–57.
221. BECKWITH, *supra* note 55, at 29 (reporting on a YMCA survey).
222. *Id.* at 22.
223. *Id.* at 22–23 (characterizing NAM efforts and summarizing arguments in favor of trade schools).
224. *Id.* at 24–26 (reporting union opposition).
225. *Id.* at 27–28 (describing the history of trade schools).
226. *See* Christopher P. Brooks, *A Review of Recent Progress in Textile Education in the United States*, TEXTILE WORLD REC. (1906), at 76, 77 [hereinafter *Textile Education*] (reporting only two textile schools, the Philadelphia Textile School and the Lowell Textile School, and one correspondence school, the Correspondence

original mechanical engineering department had a branch in 1883 known as "mill engineering," subsequently renamed "textile engineering."[227] The Lowell Technical School was established in 1897.[228] The Georgia School of Technology (Georgia Tech) established a textile engineering program in 1897, modelled on the Lowell Technical School. The Georgia Tech program had financial and in-kind support from Fulton Bag & Cotton Company, as well as a number of New England manufacturers.[229] North Carolina established a textile school in 1899 as part of the newly formed North Carolina Agricultural and Mechanical College (now North Carolina State University) in Raleigh.[230] The program offered courses in cotton manufacturing, carding and spinning, weaving, textile design, and textile chemistry and dyeing. An early instructor was Thomas Nelson, a graduate of Preston Technical School in England and formerly an instructor at the Lowell Textile School.[231]

Within ten years, however, the number of regular programs increased, including college level programs, and correspondence schools proliferated.[232]

School of Textiles (later the Textile Department of the International Correspondence Schools) in 1899).

227. *History of the Department of Mechanical Engineering*, MASS. INST. TECH. DEP'T MECHANICAL ENGINEERING, http://meche.mit.edu/meche-history-and-timeline [https://perma.unl.edu/ASG3-GUGW] (last visited Oct. 23, 2019) (noting that the Massachusetts Institute of Technology Department of Mechanical Engineering became a formal department in 1883, offering a specialization in mill engineering).

228. Christopher P. Brooks, TRANSACTIONS OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS 170, 174 (1897) ("The object of the school is to give instruction in the practical knowledge necessary in the cotton, woolen, worsted and other textile industries, in science and art, as applied to these industries, and in the processes and methods for the purpose of improving any special trade, or of introducing new branches of industry. It is essentially a trade school, and the whole plan provides for such instruction only as will be found useful in textile trades.").

229. *School of Textile Engineering Notebook: Overview*, GEORGIA TECH LIBRARY, https://finding-aids.library.gatech.edu/repositories/2/resources/52 [https://perma.unl.edu/RWW6-CSCC] (last visited Dec. 19, 2019); *Splendid Growth: The Textile Education Enterprise at Georgia Tech*, GA. TECH LIBR., https://exhibit-archive.library.gatech.edu/gtbuildings/french/growth.htm [https://perma.unl.edu/QPM7-JG8T] (last visited Dec. 19, 2019).

230. *Historical State Timelines: College of Textiles*, N.C. ST. U. LIBR., https://historical-state.lib.ncsu.edu/timelines/college-of-textiles [https://perma.unl.edu/3CR4-PJ4X] (last visited Oct. 24, 2019).

231. *Id.*; *Textile Prize Essays*, 26 AM. WOOL & COTTON REP. 843 (1912) (providing a biographic summary for Thomas Nelson).

232. *Textile Education*, *supra* note 226, at 77 (reporting thousands of enrollees at textile correspondence schools; the author was a proprietor of a correspondence school).

D. Global markets: Trying to Shift the Responsibility to the Government (1930–2000)

The fourth era was one in which foreign competition blindsided American industry, which responded by hiding behind trade barriers and ceding innovation to foreign engineers and equipment manufacturers. The fourth era was the first in which groups interested in the textile industry began to call for overt federal government action to train and retrain workers to facilitate adjustment to creative destruction.

The center of gravity of creative technological change passed from the United States to other countries during this period.[233] Without intending to marginalize the effect of political revolutions, wars, postwar reconstruction, and economic development theory, the rise of Asia as the center of textile production was facilitated by two technological revolutions. As significant as the power loom, the water frame, the ring spinner, and the Draper loom were in the first two eras, global trade in textiles and apparel would not be what it is without revolutions in ocean shipping, airfreight, and telecommunications.

The containership revolution in the last quarter of the twentieth century dramatically lowered shipping costs and reduced delays for both shipping raw materials to Asian centers of production and shipping their product back to markets in the developed economies of North America and Europe.[234] Containerization also sharply reduced loading and unloading times. This significantly increased the competitiveness of the global textile industry.

The Lockheed C-5 and Boeing 747 wide-bodied aircraft, and their successors, put the cost of airfreight within the reach of the shippers and consignees of any good that required urgent handling.[235]

Earlier revolutions in transoceanic communications made it feasible for the first time to coordinate closely linked steps in the produc-

233. *See* JOHN SINGLETON, THE WORLD TEXTILE INDUSTRY 45–47 (1997) (reporting extremely low levels of research and development investment by the U.S. textile industry compared with other U.S. industries and with the textile industry in other countries).

234. *See* MARC LEVINSON, THE BOX: HOW THE SHIPPING CONTAINER MADE THE WORLD SMALLER AND THE WORLD ECONOMY BIGGER 218 (2006) (noting how reductions in ocean shipping costs revitalized the Japanese apparel industry in 1967); *id.* at 272–73 (noting establishment of major container ports in countries of large textile and apparel exports).

235. OFFICE OF TECH. ASSESSMENT, 97TH CONG., REP. ON IMPACT OF ADVANCED AIR TRANSPORT TECHNOLOGY: PART 2—THE AIR CARGO SYSTEM 21 (1982) (discussing the impact of the B-747 on the average cost of air freight); Stephen Dowling, *The Boeing 747: The Plane that Shrank the World*, BBC (Sept. 28, 2018), https://www.bbc.com/future/article/20180927-the-boeing-747-the-plane-that-shrank-the-world [https://perma.unl.edu/CG5P-9DKJ] (describing the history of the 747 and its relationship to the C-5).

tion and marketing processes. The diffusion of wireless communication technology and the laying of the transpacific telegraph cable in the first part of the century[236] put Asia, Europe, and America in real-time communication.

Textile-driven Southern prosperity was not to last. Japan was ramping up its textile technologies and opening its borders to foreign trade, even as fragmentation of industry structure in the South made periodic overproduction and collapse of prices inevitable. Virtually all the mills in the South were small, relatively isolated rural enterprises. No single mill had the capacity to monitor the overall levels of industry production of thread or cloth. When overproduction occurred and prices began to fall as a result, the only responsive strategy was to produce even more and to cut costs so that increased volumes would make the lower price sustainable.[237]

In the 1920s, "Taylorism"[238] took hold. Efficiency experts were everywhere. Now managers responded to their recommendations and subdivided jobs to create more narrowly specialized jobs that were more efficient. They sought new productivity enhancing machinery and did "speedups" and "stretch-outs" to get more out of their existing workforce, thereby reducing per-unit labor costs further. Maintaining the customary rules was entirely inconsistent with these new practices.[239]

Part of the productivity improvement campaign was a loss of interest in the family system. Children were increasingly replaced by adult men who had greater skills and could work faster, although they commanded higher wage rates.[240] The children left the mills and went back home. The women either had to stay home to care for them or hire childcare workers, which reduced the economic benefit of working in the mills.[241]

The interest in scientific management coincided with a growing labor surplus. The labor surplus was fueled by increasing farm produc-

236. *See* Marcel Brown, *The First Transpacific Telegraph Cable*, THIS DAY IN TECH HIST., http://thisdayintechhistory.com/12/14/the-first-transpacific-telegraph-cable/ [https://perma.unl.edu/LL23-5K7A] (last visited Oct. 24, 2019).

237. IRONS, *supra* note 204, at 24–25 (noting industry structure and effect on microeconomics of industry).

238. *See* Jill Lepore, *Not So Fast*, NEW YORKER (Oct. 5, 2009), https://www.newyorker.com/magazine/2009/10/12/not-so-fast [https://perma.unl.edu/2YYT-F7U6] (describing Frederick Winslow Taylor's industrial engineering doctrines, which came to be known as "Taylorism"); *Idea: Scientific Management*, ECONOMIST (Feb. 9, 2009), https://www.economist.com/news/2009/02/09/scientific-management [https://perma.unl.edu/W4S4-Z7CZ] (reporting on Frederick Winslow Taylor's "scientific management").

239. *Id.* at 22–23 (describing efficiency experts and the resulting disruption of worker culture).

240. *Id.* at 23–24.

241. *Id.*

tivity mixed with crop failures, significantly crop failures caused by the boll weevil.[242] Now bargaining power shifted toward the employers and, although the workers were unhappy with the demise of the customary rules and with the speedups and stretch-outs, there was a little they could do about it. The power of the wildcat strike, so great only a decade before, now was minimized because there was always a "barefoot boy" at the door, ready to take a striker's job.[243] Tensions built towards the 1934 Southern textile workers strike.

As foreign competition increased through the balance of the twentieth century, innovative energy passed from the United States to overseas. The basic functions of spinning and weaving have not changed since before the Industrial Revolution. Fiber are still separated from foreign matter, combed, drafted, and twisted into thread of the desired diameter and tensile strength. Then, the threads are turned into cloth by interleaving threads running in one direction with threads running in another direction. For weaving, heddles still raise or lower warp threads, and a device passes the weft reed through the shed created by the heddles. Then each of these new "picks" are beaten. The changes in mechanization and automation in the last 200 years have involved speeding things up, controlling individual heddles with computer-controlled servomechanisms attached to each, and replacing shuttles and bobbins with rapiers and air jets.

Spinning technologies at the end of the twentieth and beginning of the twenty-first centuries are migrating from hundred-year-old ring spinning to rotary, vortex, open-end, or air-jet spinning.[244] The emphasis on loom innovation in the late twentieth and early twenty-first centuries relate to the elimination of the shuttle passing the weft thread back and forth through the warp.[245]

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242. *Id.* at 25 (describing the labor surplus that developed in the mid-1920s).

243. *Id.* (quoting an older worker).

244. In the new technologies, a mechanical wheel resembling a small card separates a small number of fibers from the sliver. Suction pulls the fibers into a spinning cone, where centrifugal force causes them to aggregate in a groove. More intense suction pulls the collected fibers out through an orifice, which imparts a twist as they are pulled out. *See Vortex Spinning Process: Principle of Vortex Spinning System*, TEXTILE LEARNER, http://textilelearner.blogspot.com/2013/01/vortex-spinning-process-principle-of.html [https://perma.unl.edu/6WG5-PVEE] (last visited Oct. 24, 2019).

245. Their characteristics, combined with the laws of Newtonian physics, limit the potential for further speed improvement. The mass of the empty shuttle, combined with the mass of an empty bobbin, and with the mass of the weft thread wound around it are substantial. The speed of a pick is directly proportional to the velocity of the shuttle as it traverses the warp. The amount of force needed on each side to stop the shuttle and send it on its way in the other direction was proportional to its total mass and to the square of its velocity and inversely proportional to the amount of space used to stop it and reverse its direction of motion.

A certain amount of human involvement is still required to doff bobbins, to detect and mend broken warp threads, to operate cranes and forklifts to move rolls of warp and cloth around, and to prepare new warps for installation on the looms. The frontier of automation is to extend computerized control of the whole process and to replace the remaining human attendants with robots.

Twenty-first century looms and preparation machines need no attendants. They detect faults such as broken threads, often repair them automatically, and sound alarms if they need human assistance. A single attendant can effectively monitor dozens of machines. Similar advances were occurring in the apparel industry at the turn of the twenty-first century.[246]

Sakachi Toyda, the founder of Toyota, is credited with inventing advanced stop mechanisms in 1896.[247] This technology is an example of innovations that significantly improved the productivity of labor[248] and symbolized the Japanese inventiveness that would overtake New England's.

The market share of knits increased in the twentieth century as the popularity of less formal clothing grew, and everyone wanted T-shirts after the Second World War, not only as underwear, but also as sportswear. In 2019, roughly 50% of clothing was knitwear and roughly 50% weaves.

As weaving speeds increase, so do the forces, and their reciprocating nature puts stress on the overall frame of the loom. This stress creates hazards when a shuttle occasionally breaks through the arresting apparatus at the sides of the loom, escapes into free flight, and becomes a missile. The problems could be mitigated somewhat by decreasing the size of the shuttle and the bobbin, but then the bobbin would have to be changed more often, eliminating any benefit from faster shuttle speed.

The basic solution is to redesign the loom so that a bobbin need not carry the spool of weft thread through the shed. Instead, the spool of thread, now generally known as the pirn, would remain stationary just outside the edges of the warp and only a new piece of weft thread would be inserted in the shed. Four basic ways of doing this developed: air jets, water jets, rapiers, and projectiles. One observer picturesquely calls these "cough" (air-jet), "spit" (water jet), "stab" (rapier), and "shoot" (projectile) looms. *See* Royston Millmore, *Yet the Shuttle Flies*, 71 NEW SCIENTIST 138, 138–39 (1976). Rapiers and projectiles have much less mass than shuttles, and thus the amount of force needed to insert and withdraw them is far less.

246. *See* Meenu Srivastava, *An Overview of Apparel Design and Production Technology in Garment Sector*, FIBRE2FASHION, http://images.fibre2fashion.com/ArticleResources/PdfFiles/53/5205.pdf [https://perma.unl.edu/K5W4-KQ99] (last visited Oct. 24, 2019) (providing an overview of apparel technology, with pictures of industrial sewing machines). *See* Peters, *supra* note 5.

247. *Toyota Production System*, TOYOTA, bit.ly/2Ijyryt [https://perma.unl.edu/M3GV-M69U] (last visited Oct. 24, 2019).

248. Unless a loom was stopped quickly when an end broke, many yards of cloth could be ruined, decreasing the number of yards per worker that would be woven. Yards per worker is a basic measure of labor productivity.

Half a century later, textile production moved out of the American South and predominately to Asia and the workforce felt the pain acutely. Poisonous labor–management relations, which had marked Southern institutions even more acutely and viciously than it had New England industry, made it difficult for labor and management to work together to explore solutions. For whatever reasons of failure of entrepreneurial energy and imagination, the Southern mill owners were slow to recognize the foreign threat, or, if they did recognize it, to do anything about it. They invested in new technologies only sluggishly and generally expended their competitive energies on mills across the street rather than those in Bangladesh or Korea. They assumed that their political muscle would ensure trade barriers that would deal with the problem.

It was not clear what U.S. mill owners could do about the threat. Trade barriers to foreign textiles had remained high, even as barriers fell for the output of other industries. Still, the American market share was eroding. Part of the problem was the unenforceability of the barriers; another was the realization that much of the capital historically facing only domestic investment opportunities now could be invested overseas. The entrepreneurs who saw that possibility did not want barriers to earning returns on such capital.

By the election of 1960, trade adjustment assistance was on the national political agenda. Democratic presidential candidate John Kennedy, after all, was from Massachusetts. His "Get America moving again" slogan embraced the plight of New England textile workers. His proposals for trade adjustment assistance mollified labor because economists assured labor interests that trade adjustment assistance would be effective in cushioning the adverse effect of innovation in the industry. No contrary evidence existed, yet. The debate over international trade distracted textile industry participants from acknowledging that, up to that point, the most ruinous competition had come, not from abroad, but from the American South.[249] Employers saw no advantage in re-training their workforces for any other trade, so they just laid them off, even when they were seeking more workers at their other mills.

Political efforts fell short due to divisions within the industry and because policymakers had other things on their mind, such as the Cold War, the Civil Rights Revolution, the Vietnam war protests, and Nixon's near-impeachment and subsequent resignation. Market orientation gradually replaced notions of the regulated state throughout the 1980s, and the Republican administrations of the 1990s were not

249. ENGLISH, *supra* note 195, at 129–52 (summarizing the competitive threat from Southern mills).

ones where proposals for trade barriers and protection of textile workers would fall on fertile soil.

A number of American institutional and cultural features of the era made adjustment more difficult—in particular, trade barriers and immigration restrictions. The textile industry in the United States evolved under constant protection from import barriers. Throughout the succeeding 200 years, every initiative to reduce trade barriers was met with screams of protest from the industry—and increasingly by unions as well—and every reversal in economic fortunes was blamed as much as possible on foreign trade. The competitive threat came, not from abroad but from the American South from about 1880 to 1930 or so, but the industry made every effort to keep the rhetoric focused on foreign, rather than domestic, threats.[250]

The rhetoric of unfair trade was almost never expressed in the form of, "They have superior technology." It was always in the form of, "They don't pay a living wage but we do, and therefore we can't compete." Admitting to being laggards in technology would not resonate nearly as well with legislators and the public as a claim that fellow citizens were being threatened by slave-like conditions abroad.

Even after trade barriers dropped for almost everything else, in the last quarter of the twentieth century,[251] they remained high for textiles and apparel under the Multi-Fiber Agreement (MFA),[252] which lasted until 2005.[253]

Southern textile workers proved just as unwilling to relocate to chase new job opportunities as had their New England brothers and sisters a generation before. Americans are less likely to consider working abroad than other nationalities.[254] As American textile mills gradually closed their doors, their employees, if they wanted to continue to work, had to look to different industries. They received little help from

250. MINCHIN, *supra* note 107, at 31 (noting efforts to mute talk of Southern competition, even when data showed that was what threatened New England mills).

251. *See U.S. Average Tariff Rates (1821– 2016)*, U.S. DEPT OF COMMERCE, BUREAU OF THE CENSUS, https://upload.wikimedia.org/wikipedia/commons/a/ad/Average_Tariff_Rates_in_USA_%281821-2016%29.png [https://perma.unl.edu/XJR2-KVV4] (last visited Oct. 25, 2019) (graphing tariff rates and dutiable imports); Peter Walkenhorst, *Quantitative Assessments of Textiles Trade Liberalization: A Survey*, 20 J. ECON. INTEGRATION 139, 139–40 (2005).

252. *See* MINCHIN, *supra* note 107, at 79 (explaining that the MFA was an exception to the General Agreement on Tariffs and Trade and the WTO Agreements).

253. *Id.* at 195–97 (discussing the phase-out of MFA).

254. Emmie Martin, *59% of Millennials in the US Would Move to Another Country for a Job*, BUS. INSIDER (Oct. 7, 2014, 3:46 PM), http://www.businessinsider.com/millennials-moving-abroad-for-jobs-2014-10 [https://perma.unl.edu/VK4N-UCPD] (reporting that Americans have historically been less likely than others to consider working in foreign countries).

their former employers and little effective help from their governments.[255]

V. OTHER ADJUSTMENT MECHANISMS

The foregoing recapitulation of the 200-year history of the American textile history shows Joseph M. Schumpeter's creative destruction at work. It is not only the history of innovations in technology and work organization; it also is the history of disruption of worker lives. The early paternalism for the mill girls faded away, unraveling the cocoons in which they enjoyed early parts of their young lives. Workers perceived increased work for the same amount of pay as speedups and stretch-outs, even when the cause was the implementation of new technologies rather than an effort to make them work harder. Technology that permitted employees with lower levels of narrower skills to operate the machines threatened the status of more experienced craftsmen. Then, the move south in search of a more hospitable business climate devastated entire communities in New England as the mills there closed. Fifty years later the process of creative destruction continued, but the stimulus had shifted from Southern efficiencies to Asian ones.

Efforts to mitigate the pain of worker adjustment were uneven in their effect. That the result was not a political upheaval is due to several escape valves: opportunity in the American West, willingness of workers to move geographically, and UI.

A. Go West, Young Man!

Westward expansion throughout the nineteenth century and into the twentieth century mitigated labor surpluses that were likely results of major technological innovations. The relief valve—the default choice for those who could not find work in industry, transportation, or merchandising—was to go west and farm. Small plots of land were available until the latter part of the twentieth century under the Homestead Acts.[256] The existence of the frontier meant that male workers, in whatever trade, always experienced the lure of going west, setting up their own farm, and maybe striking it rich.

255. *See supra* Part III (marshaling evidence of failure of government "adjustment" and training programs).

256. The "Homestead Acts" were a series of federal laws, beginning with the Homestead Act of 1862, ch.75, 12 Stat. 392, that gave away federal land to those who wished to settle on it. Homesteading did not end until 1976, with enactment of the Federal Land Policy and Management Act. Even before the 1862 Act, people could acquire ownership of land by settling on it. *See* Roger D. Billings, *The Homestead Act, Pacific Railroad Act and Morrill Act*, 39 N. KY. L. REV. 699, 711–12, 736 (2012) (describing the history of Homesteading Acts, including the practice of homesteading before enactment of the 1862 Act).

Successful farming requires skills—and lots of luck—but the skills are not hard to learn, and character traits, such as resilience and stamina, matter as much as technical knowledge. Most farmers led a marginal existence, and some starved, but the perceived causes of failure were the weather or crop or animal disease. Most everyone accepted that the government cannot control those sources of disappointment.

B. Markets and Mobility

For the most part, adjustment to creative destruction occurs as millions of individual workers and their potential employers make decisions in response to the incentives, monetary and otherwise, that operate on them. Most adjustment through these pathways is largely invisible to policymakers and analysts. A worker gets laid off. He looks around, using his own resources, to find out what else is available, decides for himself whether he is likely to be an attractive applicant, and uses his personal network of friends, family members, and former coworkers to attract a new employer's favorable attention. If he feels, or if someone tells him, that he's under qualified, then he seeks out his own means for improving his qualifications.

Markets are imperfect, however; they reveal their failures. When the labor market leaves job openings that cannot be filled or workers who want work but cannot find it, some aspect of the market has failed. Organizing any kind of program to cushion market adjustments confronts the perils of picking winners and losers. This is a high-risk undertaking because the loudest calls for government intervention usually come from sectors of the economy where job loss has been greatest, and those are likely to be the sectors least likely to offer employment opportunities in the future. Any program launched in 2008 to train people for brick-and-mortar retail jobs, taxi driver jobs, and conventional assembly-line auto-worker jobs would have trained people for vanishing opportunities. It would have been difficult to predict with any confidence from that vantage point how completely Amazon and other e-commerce vendors would weaken brick-and-mortar stores or the robustness of the market for jobs associated with wind turbines and industrial robots.

Moreover, even modest, common-sense governmental initiatives to improve the functioning of markets often do not produce the intended results. Despite their intuitive appeals, beginning before there was an unemployment compensation system, government-run job clearing houses are not very effective.[257] In recruiting trainees, employers rely

257. *See* Abe Bortz, *Unemployment Insurance: Early History*, VA. COMMONWEALTH UNIV., https://socialwelfare.library.vcu.edu/programs/unemployment-insurance-early-history/ [https://perma.unl.edu/XP4V-ZNM7] (last visited Oct. 25, 2019).

relatively infrequently on governmental "one-stop" centers and far more on community colleges and current employees.[258] Although employers gain significant benefits from the programs,[259] dropouts and poaching of graduates by other employers (about 25% each) concern them,[260] as do too much training time and paperwork (about 10% each).[261]

The Industrial Revolution transformed a unitary product market into separate product, labor, capital, and technology markets.[262] Changes in technology both increased and separated labor and capital productivity[263] and changed production functions (the way in which firms combine the factors of production). Technology's march forward made capital much more expensive, even as it made it more productive,[264] thus increasing economies of scale. When the production function involved small quantities of capital—a spinning wheel or a hand loom—many workers had sufficient wealth to make the investment. They could combine their labor with raw material using that capital and sell the resulting product directly to customers. When technology gave birth to the spinning jenny and the power loom, capitalists had to amass the capital to buy or build machinery and the land to house it.

258. LERMAN ET AL., *supra* note 63, at 26 tbl.8.1 (reporting that 14% relied on one-stop centers, 66% on current employees, and 41% on community college or technical school).

259. *Id.* at 16–19 (reporting that apprenticeship sponsors—mostly employers—found large benefits from the programs). *But see id.* at 20 (admitting that sponsors queried in the study were likely to find programs beneficial because otherwise they would not sponsor them).

260. *Id.* at 20 tbl.6.1. Sponsors identified "personal issues" such as "family needs, mental health or substance abuse problems, physical illnesses, and legal issues" as the most common reason for dropping out (36%). *Id.* at 23.

261. *Id.* at 20 tbl.6.1.

262. Shmoop Editorial Team, *Factors of Production*, SHMOOP, https://www.shmoop.com/economic-principles/factors-production.html [https://perma.unl.edu/W4VD-T2AY] (last visited Oct. 25, 2019) ("Many economists also identify a fourth factor of production: technology."). Frances Cabot Lowell's mill enterprise separated capital from labor. *See* ROSENBERG, *supra* note 135, at 211–12 (discussing Frances Cabot Lowell's practice of employing young women and investing in "labor-saving machines"). When almost all work was performed at home, work was fused with the capital it used—a mule, a plow, a spinning wheel, a blacksmith forge, or a printing press. Even modestly successful households could mobilize the necessary capital. No labor market existed separate from the product market because entrepreneurs did their own work, sometimes with the aid of members of their households. No capital market existed because, for the most part, not much capital was required, and not much existed because the surplus was small. From the twelfth to the nineteenth centuries, markets gradually expanded in geographic scope, allowing more economic activity to move out of the household into the market.

263. Labor productivity is the quantity of output producible by a unit of labor, all other things being held constant.

264. The "minimum efficient scale," increased as a result. Minimum efficient scale is the smallest plant that can be profitable, given capital costs and demand.

As a result, they took on the responsibility of combining the factors of production into a product for the consumer.[265] Workers now worked, not for the ultimate customer, but for a firm. Product markets and labor markets became distinct.

Separation of labor, capital, land, and technology freed up each to move separately. Capital was the most mobile. Labor, though as mobile as capital in economists' simple models, was in fact far less mobile. Cultural and language differences, along with a desire to keep the familiar within easy reach, make workers reluctant to relocate. Technology's inherent mobility resisted efforts to isolate it,[266] although patent systems restrict its mobility.[267]

Capital mobility repeatedly reshaped the textile industry. At the beginning of industrialization, Frances Cabot Lowell moved capital that had been employed in ocean shipping and merchant trading into the first textile mills.[268] Capital moved to the South from the 1880s to the 1930s[269] and then overseas for the balance of the twentieth century. Every business school student learns how to assess alternatives for capital investment by estimating the return on invested capital for each. When the New England textile manufacturers looked at the South in the last quarter of the nineteenth century, they saw lower labor costs, lower regulatory costs, and lower transportation costs for raw material, offset somewhat by higher transportation cost for shipping their finished product to markets in the Northeast and Midwest. Higher returns on investing in the latest technologies were available in Gadsden, Alabama, than in Chicopee, Massachusetts. Capitalists made new capital investments in the South rather than in New England, and they did not replace capital already invested in their New England plants as the machinery wore out. The workers, however, did not follow the capital; they stayed in New England.

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265. Francis Cabot Lowell was a member of one of the wealthiest families in New England, but he had to invent a corporation as a business form to pool capital from other individuals and families to build his first mill. He was an innovator in finance as well as in industrial production. *See* ROSENBERG, *supra* note 135, at 231–37 (describing Lowell's efforts to finance Boston Manufacturing Company, including formation of a "joint stock company").

266. *See id.* at 178 (reporting Lowell's determination to learn British industrial secrets); *id.* at 206 (reporting Samuel Slater's evasion of the "British ban on the emigration of skilled artisans").

267. *See* Loom Co. v. Higgins, 105 U.S. 580, 599 (1881) (holding that a patent for carpet loom improvement was infringed); Mason v. Graham, 90 U.S. (23 Wall.) 261, 277 (1874) (revising a damages award for infringement of patent on loom pickerstaff mechanism); Allen Pusey, *The Sewing Machine Patent War*, 101 A.B.A. J. 72 (Sept. 2015).

268. ROSENBERG, *supra* note 135, at 1, 4, 232.

269. MINCHIN, *supra* note 107, at 31–32 (acknowledging a split in New England textile interests as substantial numbers of them moved their capital to the South).

The same thing happened fifty years later as textile capitalists evaluated the opportunities in Asia. While training costs might be higher in Asia, because the available labor force was unskilled, technology had advanced to the point that skill was less necessary. Regulatory costs over the long run might be higher than in the South, because of political instability and uncertainty over the viability of capitalism, but much lower wage rates, the possibility of starting with fresh technology, and lower shipping rates for sending finished cloth in shipping containers tipped the scales decisively toward investing in Asia. Trade barriers were being lowered, allowing entry into American and European markets at competitive prices. Once again, the workers did not follow the capital.

In the simpleminded economist's model of labor markets, a textile plant operative who lost his job when JP Stevens liquidated and closed its North Carolina plant would have moved to Bangladesh to seek work in the rapidly growing industry there. That did not happen to any significant degree. An engineer might have moved from North Carolina to Bangladesh, and a few executives along with him, but not the main workforce.

Labor immobility as a cause of labor market adjustment friction plays a more prominent role now than it did in earlier periods. In the first fifty years of the American Industrial Revolution, as section V.A points out, going west to acquire land and start a farm was a common aspiration which induced many young men just entering the workforce to go west. That form of labor mobility was attractive, common, and relieved pressure when industrial employment opportunities diminished. For the second half of the Industrial Revolution—the period running roughly from the Civil War to the turn of the twentieth century—labor mobility operated differently. It was immigrants from Europe who were mobile, following the capital invested in expansion of textile production in the United States. Section IV.B describes mill owner and governmental efforts to recruit immigrants. In the South, workers moved off the farm and into the mills as the mill owners worked to make the mills attractive alternatives.[270] Mobility between jobs in different mills within the same region was common, both in New England[271] and in the South. But, labor was unwilling to follow

270. *See* McHUGH, *supra* note 203, at 18–19 (stating mill owners used housing, good living conditions, and schools to attract workforce from farms); *id.* at 59–61 (stating mill owners built good schools to attract a high-quality workforce); *id.* at 61 (stating schools increased monopsony power by reducing mobility); *id.* at 94–95 (explaining that the differences between labor markets in the South and New England started with the impoverished nature of the Southern farm sector).

271. *See* Costello, *supra* note 157, at 165, 170 (1990) (describing looking for mill work in different places); Albert Cote, *I Learned It Myself as I Went Along*, *in* THE LAST GENERATION, *supra* note 23, at 186, 190 (describing work in different mills during strikes); Harry Dickenson, *That's What They Used to Call Them: Mill Rats*, *in*

capital South, and then it was unwilling or unable to follow it to Asia.[272]

Timothy Minchin's *Empty Mills*[273] tells the story of creative destruction in the New England textile industry as production moved south. Even if they complained about their work environment, workers had become emotionally attached to their jobs and employers.[274] They did not want to work anywhere except in the mills that now were closing.[275] Textile work was embedded in their communities—more than that, it *defined* their communities; when the textile plant closed, the town had no more reason to exist.[276] Workers were unwilling to move to seek new jobs,[277] and they had little interest in retraining to work in jobs other than those they had grown up with. Unemployment rates as high as 50% for older workers persisted for decades after the Great Depression.[278] This reality is completely inconsistent with an economist's model of a frictionless labor market, easily adjusting to change.[279]

C. Unemployment Compensation

Legislation to cushion spells of unemployment with some kind of an insurance scheme was not enacted until the 1930s. Talk of a right to a job, however, had been current much earlier as a part of confused public discourse over Agrarianism and Marxism. Horace Greeley talked about a right to a job in 1845, but his advocacy occurred in the context of debate over liberalizing homesteading law.[280] Greeley's right to a job was a right to a farm.[281]

THE LAST GENERATION, *supra* note 23, at 158, 159–60 (reporting on movements between mills in Maine, Rhode Island, and Massachusetts).

272. *See* ENGLISH, *supra* note 196, at 177–82.

273. MINCHIN, *supra* note 107.

274. *Id.* at 30 (describing strong sense of identity from work, fascination with machines and mills, and close, near familial, bonds with fellow workers).

275. *Id.* at 29 (indicating "most workers wanted to stay in the mills" and not take jobs in growth industries).

276. *Id.* (describing the effect on communities).

277. *Id.* at 26 (noting reluctance of laid-off workers to move).

278. *Id.* at 24–29.

279. Christopher Mims, *Adding Friction to the Market*, KELLOGG INSIGHT (Aug. 1, 2011), https://insight.kellogg.northwestern.edu/article/adding_friction_to_the_market [https://perma.unl.edu/2TJK-LZ9A] (summarizing problems with a simplified view of frictionless labor markets).

280. John R. Commons, *Horace Greeley and the Working Class Origins of the Republican Party*, 24 POL. SCI. Q. 468, 481 (Sept. 1909) (quoting Horrace Greely, *Editorial*, WEEKLY TRIBUNE, Nov. 29 1845, at 5, c. 5) (noting the purpose of homestead law in "securing to every man, as nearly as may be, a chance to work for and earn a living").

281. *Id.* at 482 ("The freedom of the public lands to actual settlers . . . are also measures which seem to us vitally necessary to the ultimate emancipation of labor from thraldom and misery. What is mainly wanted is that each man should have

Legislative concern over child labor largely pushed unemployment to the fringes of public policy agendas. Still, the recessions and depressions of 1857, 1873, 1893, and 1907 reawakened calls for state governments to be employers of last resort. States responded with various kinds of public works programs.[282] UI suffered the opposition of the trade union movement, which was concerned that it would tie workers to particular employers and weaken trade unions.[283] If a craft worker lost his job, he had to resort to the union hall to find another one; if he was covered by UI, he could ignore the union and wait to be recalled. Others argued that a British-style "dole" system would demoralize workers and erode their character.[284]

The public discourse continued into the twentieth century, with advocates of public works jobs gradually losing ground to claims that such programs interfered unduly with markets. State proposals for UI began to proliferate after the turn of the twentieth century, but none were enacted, primarily because of fears that any enacting state would lose industry and jobs to other states.[285] Stimulated by an avalanche of proposals in the wake of the worsening Great Depression, the basic contours of UI had emerged by 1932. First, Wisconsin,[286] followed by Ohio, adopted somewhat different programs.[287] The differences between the two approaches lie behind the collaborative federal-state nature of the existing system. According to the executive secretary of the committee President Roosevelt appointed to draft federal legislation, the committee members adopted a cooperative federal-state system because they could not agree on the content of a purely federal system. Further, they also wanted the federal government to prescribe the rate of the payroll tax to support it and to collect the tax to eliminate interstate competition.[288]

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an assured chance to earn, and then an assurance of the just fruits of his labors. . . . Every new labor-saving invention is a new argument, an added necessity for it.").

282. Bortz, *supra* note 257.

283. *Id.* (noting American Federation of Labor opposition).

284. Edwin E. Witte, *Development of Unemployment Compensation*, 55 YALE L.J. 21, 23–25 (1945) (noting opposition by President Harding and then-Secretary of Commerce Hoover).

285. Edwin E. Witte, *An Historical Account of Unemployment Insurance in the Social Security Act*, 3 LAW & CONTEMP. PROBS. 157, 157–58 (1936). Professor Witte was Executive Director of President Roosevelt's Committee on Economic Security and participated in drafting the federal legislation. *Id.* at 157 n.*.

286. Bortz, *supra* note 257 (describing Wisconsin's "Groves Act"); *see also Charity Versus Social Insurance in Unemployment Compensation Laws*, 73 YALE L.J. 357, 358 n.12 (1963) (describing history of unemployment insurance system).

287. *Id.* (describing differences between Wisconsin's individual employer rating system and Ohio's pooled contribution system).

288. Witte, *supra* note 285, at 163.

In *Carmichael v. Southern Coal & Coke Co.*,[289] the Supreme Court upheld the constitutionality of Alabama's Unemployment Compensation Act on the grounds that relieving unemployment is a permissible purpose for taxation.[290]

The current joint federal–state UI system begins with a federal tax of 6% on total wages.[291] Employers are entitled to a credit against this tax for payments made under state law.[292] The federal government also makes grants to states for unemployment compensation administration and can advance funds to state programs in financial distress.[293] States have considerable latitude in designing their own programs,[294] although the federal statute conditions receipt of federal funds on state plans' having certain characteristics.[295]

Benefits are limited to statutory employees.[296] Employee is defined as "any individual who, under the usual common law rules applicable in determining the employer-employee relationship, has the status of an employee."[297] The federal statute also allows UI payments under state law for "assisting such individuals in establishing a business and becoming self-employed."[298]

289. 301 U.S. 495 (1937).

290. *Id.* at 515–18.

291. 26 U.S.C.A. § 3301 (Westlaw through Pub. L. No. 116-91).

292. 26 U.S.C.A. § 3302 (Westlaw through Pub. L. No. 116-91).

293. 42 U.S.C. §§ 501–506 (2012 & Supp. V 2018) (addressing grants to states for unemployment compensation administration); 42 U.S.C. §§ 1321–1324 (2012) (addressing advances to state unemployment funds).

294. *See* Federal Unemployment Tax Act, 26 U.S.C.A. §§ 3301–3311 (Westlaw through Pub. L. No. 116-91).

295. *See* 42 U.S.C. § 503(a)(10) (conditioning federal payment to states on administration of recipient profiling program); 42 U.S.C. § 503(j)(1) (requiring profiling of unemployment insurance recipients to determine needs for re-employment assistance). States may not deny unemployment benefits to individuals for refusing to accept a job vacant because of a strike or lockout. 26 U.S.C. § 3304(a)(5)(A). States may not deny unemployment for refusing to accept a job that pays less than prevailing wages. 26 U.S.C. § 3304(a)(5)(B). States may not deny compensation to individuals because they are in state-approved training programs. 26 U.S.C. § 3304(a)(8).

296. 26 U.S.C. § 3306(i). In addition, these include positions such "as an agent-driver or commission-driver engaged in distributing meat products, vegetable products, fruit products, bakery products, beverages (other than milk), or laundry or dry-cleaning services, for his principal" and "as a home worker performing work, according to specifications furnished by the person for whom the services are performed, on materials or goods furnished by such person which are required to be returned to such person or a person designated by him." 26 U.S.C. § 3121(d)(3)(A), (C).

297. 26 U.S.C. § 3121(d)(2) (2012).

298. 26 U.S.C. § 3306(t).

The Illinois system is typical of state systems, although it is more generous than some others.[299] Illinois limits benefits to twenty-six weeks,[300] except for certain exhaustees.[301] Illinois further limits compensation to those who have "registered for work," and are "available for work."[302] Illinois, like most other states, cooperates in administering claims crossing state lines.[303] An employee with Illinois work credits who lives outside Illinois may file for benefits either in Illinois or their state of residence.[304]

Under most state statutes, unemployment benefits are available to claimants to move to other states to seek work,[305] at least when job prospects are good in the place to which a claimant moves.[306] Most of the relevant caselaw involves claimants who are denied benefits be-

299. The Illinois statute decreased the amount of UI benefits from 48% of the prior weekly average wage to 40.3% of the prior weekly average wage between 2008 to 2018. *See* 820 ILL. COMP. STAT. ANN. 405/401(B) (West 2019).

300. 820 ILL. COMP. STAT. ANN. 405/403 (West 2019).

301. 820 ILL. COMP. STAT. ANN. 405/508.5, 405/409 (West 2019).

302. 820 ILL. COMP. STAT. ANN. 405/500 (West 2019). "An individual shall be deemed unavailable for work if, after his separation from his most recent employing unit, he has removed himself to and remains in a locality where opportunities for work are substantially less favorable than those in the locality he has left." 820 ILL. COMP. STAT. ANN. 405/500(c)(3) (West 2019). "In determining whether or not any work is suitable for an individual, consideration shall be given to the degree of risk involved to his health, safety, and morals, his physical fitness and prior training, his experience and prior earnings, his length of unemployment and prospects for securing local work in his customary occupation, and the distance of the available work from his residence." ILL. DEP'T OF EMP'T SEC., ILLINOIS UNEMPLOYMENT INSURANCE LAW HANDBOOK G- 51 (2019), http://www.ides.illinois.gov/IDES%20Forms%20and%20Publications/CLI106L.pdf [https://perma.unl.edu/HDZ8-WFVK].

303. 26 U.S.C. § 3304(a)(9)(A) authorizes the Interstate Benefit Payment Plan. Illinois authorized participation in § 409J of the Unemployment Insurance Act. *See* 820 ILL. COMP. STAT. 405/2700(A)–(B). ILL. ADMIN. CODE tit. 56, §§ 2714.200–225 contains the rules for administration of the program. ILL. ADMIN. CODE tit. 56, §§ 2714.200–225 (LexisNexis 2019); *accord* ILL. DEP'T OF EMP'T SEC., *supra* note 302, at R-20–R-21.

304. ILL. ADMIN. CODE tit. 56, § 2720.155 (LexisNexis 2019).

305. *See, e.g.*, Fondu v. Adm'r, Unemployment Comp. Act, No. CV1550149914S, 2015 WL 7709361 (Conn. Super. Ct. Nov. 5, 2015) (stating the general rule that a claimant may be entitled to benefits when he relocates to another state and seeks work there).

306. *Compare id.* (affirming a decision that a web designer who moved to Spain was not actively seeking work there when he spoke no Spanish and directed most of his job seeking efforts to the United States) *and* Fiedler v. Metro. Prods. Inc., No. A09-1257, 2010 WL 1968782, at *2 (Minn. Ct. App. May 18, 2010) ("The record is void of any evidence that relator needed to travel to Spain in order to pursue his employment search.") *with* Rios v. Emp't Dev. Dep't, 231 Cal. Rptr. 732, 736 (Cal. Ct. App. 1986) (reversing denial of benefits to migrant farm workers who returned to homes in Texas where finding work was marginally less likely; they nevertheless were seeking work, as required; however, relative probability of finding work is not the test).

cause they moved from places of greater employment opportunity to places of less opportunity.[307]

On the other hand, states generally do not require claimants to move to seek job opportunities in other labor markets. In *Hanshew v. Employment Dep't*,[308] the court reversed the appeals board and held that an applicant may qualify for benefits even though the applicant is incapable of traveling to a part of the labor market that is twenty-four miles away.[309]

VI. REALISTIC POLICY DIRECTIONS

The question naturally arises: If government sponsored and designed job training programs do not work, how should elected officials and candidates for public office respond to the inevitable public outcry that the government should do something to cushion the hardship of job losses occasioned by creative destruction?

Three answers are plausible. First, the government should pursue macroeconomic policies that are most likely to lead to sustainable growth. The political compulsion to do this exists anyway, and policy leaders should recognize that sound economic growth and the embrace of new industries and technologies is the best guarantor of job opportunities.

Second, the government should recognize that the unemployment compensation system is the only labor market policy that has consistently produced proof of good results. The government should reform the unemployment compensation system to provide additional incentives for displaced workers to adjust by becoming more mobile.

Third, the government should recognize that the best path to good job opportunities is a solid education on fundamental job skills: a facility with reading, writing, and basic calculation, reinforced by basic literacy in computer and network technology. A solid work ethic that

307. *See* Yadro v. Bowling, 414 N.E.2d 1244, 1246–47 (Ill. App. Ct. 1980) (affirming the denial of benefits for an applicant who moved from a labor market with considerable job opportunities to one with significantly fewer); *accord* Lind v. Emp't Sec. Div., Dep't of Labor, 608 P.2d 6, 8 (Alaska 1980) (affirming the denial of benefits to a claimant who "moved from an area in which her services were in demand to a place 'where work is nearly non-existent in her profession'"); *In re* Claim of Montes, 561 N.Y.S.2d 106, 107 (N.Y. App. Div. 1990) (affirming the denial of benefits to a claimant who moved from a normal labor market area to a place of limited job opportunities); *cf.* Plzybylowicz v. Commonwealth Unemployment Comp. Bd. of Review, 546 A.2d 1332, 1333 (Pa. Commw. Ct. 1988) (affirming the denial of benefits to a claimant who moved away from the place where he claimed he was seeking work).

308. 214 P.3d 833 (Or. Ct. App. 2009).

309. *Id.*; *see also* ILL. DEP'T OF EMP'T SEC., *supra* note 302, at AA-257 (holding that a Peoria claimant who said she would accept work within fifteen to twenty miles from her home was not required by the able and available requirement to accept work at a greater distance).

comes naturally from involvement in a rigorous educational program is as important as these technical capabilities.

This training should occur in high schools. No one should graduate from high school without being able to read, write, and perform arithmetic calculations at the level necessary for most jobs. Regrettably, this is not the case presently. Ideally, reform of job-training would begin with high schools and community colleges. The barriers to change are great, however. They include an abandonment of the rigor necessary for good educational achievement in the face of parental and community pressure to retain everyone and eventually to graduate them. Teachers' union boards and educational bureaucracies, reinforced by community control of schools have made reform daunting by elevating the goal of diversity over educational achievement.[310]

The community college system has always been beset by confusion over its mission: whether it is meant to be a system of trade schools or college prep schools; whether its main task is remedial education for those the high school system has failed; or something else.[311] Moreover, most community college systems are encumbered by bureaucracies as intricate and thoughtless as those paralyzing public education.

Last, charter schools and for-profit educational institutions can jump into the breach. But it has become clear that neither of them is a magic bullet. Charter schools are under attack all over the country. Scandals and shutdowns of for-profit schools proliferate and shape a major part of the debate federal education policy.

A. Restructure the Unemployment Compensation System to Provide Incentives to Relocate to Find Work

One very large target for reform is inextricably linked with labor markets: the UI system.[312] Expenditures on unemployment benefits

310. *See* Elizabeth A. Harris, *De Blasio Proposes Changes to New York's Elite High Schools*, N.Y. TIMES (June 2, 2018), https://www.nytimes.com/2018/06/02/nyregion/de-blasio-new-york-schools.html?module=inline [https://perma.unl.edu/68HH-Z9J2] (reporting on New York mayor's proposal to eliminate admissions test to make magnet schools more diverse ethnically).

311. *See* Kevin J. Dougherty et al., *Reforming the American Community College: Promising Changes and Their Challenges* 1 (Cmty. Coll. Research Ctr., Working Paper No. 98, 2017), https://ccrc.tc.columbia.edu/media/k2/attachments/reforming-american-community-college-promising-changes-challenges.pdf [https://perma.unl.edu/VX7E-XGDJ] (noting the multiple goals of the community college system).

312. Other social benefits are targets for improvement as well. Any form of government subsidy for someone who is unemployed and seeking work, or out of the labor market, represents a disincentive to work to earn income. Workers, like capitalists, calculate opportunity cost and marginal return. They may not do it quantitatively and explicitly, but they do it instinctively. Long-term unemployment assistance and overly generous disability insurance payments retard job seeking. *See* Ben Casselman, *Why Some Scars from the Recession May Never*

were about $100 billion per year for the first five years of the Great Recession.[313] Yet the system is remarkably unchanged from its initial implementation in 1936.[314] Far more energetic and imaginative policy development is needed to reshape the system for the needs of the twenty-first century. The most important goal is to reform the system to increase labor mobility.

The evidence is clear that the unemployment rate is significantly higher among less educated members of the labor force.[315] It is also

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Vanish, N.Y. TIMES (Oct. 5, 2017), https://www.nytimes.com/2017/10/05/business/economy/recession-recovery.html [https://perma.unl.edu/QLH7-YDRT] (noting high and increasing levels of people drawing disability payments as one possible explanation for adult males dropping out of the labor force).

Disability programs that allow payment to persons disqualified only from a particular industry or particular jobs should be disfavored in this regard, and disability programs generally should allow payments only for applicants who are disqualified from the full range of jobs in the economy, specifically including those that can be performed remotely. *Compare* MICH. COMP. LAWS ANN § 421.28(c) (Westlaw 2019 Pub. Acts 151) (allowing unemployment benefits only for those willing to accept "suitable full-time work of a character that the individual is qualified to perform by past experience or training, which is of a character generally similar to work for which the individual has previously received wages, and for which the individual is available, full time, either at a locality at which the individual earned wages for insured work during his or her base period or at a locality where it is found by the unemployment agency that such work is available."), *and* Jones-Jennings v. Hutzel Hosp., 565 N.W.2d 680, 686 (Mich. Ct. App. 1997), *with* 20 C.F.R. § 416.202 (2019) (listing disabled persons as eligible for SSI benefits), *and* MICH. COMP. LAWS § 416.260 (providing for extra benefits for those who work despite a disabling condition), *and* MICH. COMP. LAWS § 416.905 (defining disability as "severe impairment(s) that makes you unable to do your past relevant work (see § 416.960(b)) or any other substantial gainful work that exists in the national economy"); *compare* Johnson v. Colvin, 204 F. Supp. 3d 396, 408 (D. Mass. 2016) (affirming the denial of disability benefits while reviewing, in detail, evidence about claimant who suffered from a variety of generalized complaints and who systematically resisted medical advice and rehabilitative treatments but who was able to perform some jobs that existed in significant numbers in the local and national economy), *with* Thomas v. Comm'r of Soc. Sec., 294 F.3d 568, 572–73 (3d Cir. 2002) (reversing finding of no disability and holding that Social Security Administration should have considered that former job—that of elevator operator—was obsolete), *rev'd sub nom.* Barnhart v. Thomas, 540 U.S. 20, 26 (2003) (stating that an agency need not consider whether previous job existed in significant numbers, only other jobs existed in the national economy).

The platform economy, crowdsourcing, and working from home all expand the range of occupations that a person with a certain level of disability can perform acceptably.

313. Tami Luhby, *Unemployment Benefits Cost: $520 Billion*, CNN MONEY (Nov. 29, 2012, 1:46 PM), http://money.cnn.com/2012/11/29/news/economy/unemployment-benefits-cost/index.html [https://perma.unl.edu/9G2E-CY8Y].

314. *See supra* section V.C.

315. Dennis Vilorio, *Data on Display: Education Matters*, U.S. DEP'T OF LABOR BUREAU OF LABOR STATISTICS (Mar. 2016), https://www.bls.gov/careeroutlook/2016/data-on-display/education-matters.htm [https://perma.unl.edu/NUA8-TEF7] (showing a dramatic relationship between education level and unemployment).

clear that less educated members of the workforce are not as likely to relocate to find a job. Why education correlates with mobility is a matter only of speculation. It is possible that lesser educated workers have stronger ties to extended families, local labor unions, and local social organizations that reinforce their safety net.[316] It is also possible that their lack of education leaves them with a weaker understanding of the larger world and its social and economic forces, making relocation inherently more frightening.

In any event, immobility impairs the economy's ability to adjust to creative destruction and its effects on workers. Labor market policy should try to do something to increase mobility. The policy will be better defined if it is backed up by more robust empirical evidence about causation than is available now.

Some employers are willing to cover relocation costs for new hires,[317] and proposals are beginning to emerge for incentives to relocate as a part of the unemployment compensation system. In 2016, the Obama Administration proposed to incentivize states to offer relocation vouchers.[318] The American Worker Mobility Act,[319] sponsored by Representatives Tony Cardenas (D. CA) and Mick Mulvaney (R. SC), would authorize the Secretary of Labor to grant relocation subsidies to UI recipients who have exhausted their benefits.[320] The grants would be available to workers who want to move more than sixty miles from their current residences for accepting "a bona fide offer of suitable employment affording a reasonable expectation of long-term duration in the area in which the individual wishes to relocate"[321] or who "[wish] to relocate to an area that has an unemployment rate that is at least 2 percentage points less than the unemployment rate of the area of the

316. *See* Naomi Schoenbaum, *Mobility Measures*, 2012 BYU L. REV. 1169 (2012) (providing an awkwardly written overview of forces at work in decisions to relocate that emphasizes social costs).

317. *See* Soc'y for Human Res. Mgmt., *Employers Willing to Pay to Relocate Employees*, SHRM (Jan. 24, 2012), https://www.shrm.org/resourcesandtools/hr-topics/compensation/pages/relocationpay.aspx [https://perma.unl.edu/K7X5-A5EJ] (reporting on a survey showing that thirty-two percent of employers would be willing to pay relocation benefits to new employees).

318. The Administration's proposal would also: subsidize employment and career counseling programs to unemployed workers; allow displaced workers making less than $50,000 to replace half of their lost wages, up to $10,000 over two years; allow states to extend benefits to part-time, low-income and intermittent workers who can't already take advantage of the out-of-work programs; and mandate states to provide at least twenty-six weeks of coverage for those looking for work. *See* Bradford Richardson, *Obama Unveils Plan to Reform Unemployment Insurance*, THE HILL (Jan. 16, 2016, 06:00 AM), http://thehill.com/blogs/blog-briefing-room/news/266134-obama-unveils-plan-to-reform-unemployment-insurance [https://perma.unl.edu/Z6NF-PRYB].

319. H.R. 4033, 113th Cong. (2014), *reintroduced as* H.R. 2755, 114th Cong. (2015).

320. H.R. 4033 § 2(b).

321. *Id.* § 2(c)(3)(A).

individual's initial residence."[322] The grants would be capped at $10,000 and could include up to 90% of relocation expenses plus three times the beneficiary's weekly unemployment benefit.[323]

One Berkeley economist, Enrico Moretti, points out that every unemployed worker who remains in an area where there are not enough jobs for all the job seekers imposes an externality on all the other job seekers.[324] The relocation payments could be layered on top of normal UI benefits, or the funds could be part of the current payments pool, with job seekers who remain in place being paid lower benefits.[325] A University of Southern California economist, Andrii Parkhomenko, concludes that that a relocation subsidy in the form of a voucher for moving expenses during the Great Recession would have reduced unemployment by 4.8% and increased national productivity by 1%.[326] The magnitude of the effect is modest, however, suggesting that reformers should seek more aggressive incentives.

The most obvious possibility is the one suggested briefly, almost parenthetically, by both Moretti and Parkhomenko, and embraced by New York Times columnist David Brooks:[327] divert a portion of the existing unemployment benefits to those who relocate to more promising labor markets. As they point out, this diversion could be in the form of supplementary benefits, or it could be in the form of reduced benefits for those who do *not* relocate. It is far from clear, as House Resolution 2755 provides,[328] that the relocation incentive should await expiration of normal twenty-six-week unemployment benefits. If incentives to search remote labor markets are desirable, they are as desirable at the onset of unemployment as after six months.

Despite widespread concern about unemployment resulting from the Great Recession of 2008, proposals to reform the UI system have been modest in scope and imagination. The Secretary of Labor must

322. *Id.* § 2(c)(3)(B).

323. H.R. 2755 § 2(d).

324. *See* ENRICO MORETTI, THE NEW GEOGRAPHY OF JOBS 161–64 (2012) (explaining and arguing for relocation vouchers to ease structural unemployment); Enrico Moretti, *Unemployment Benefits Should Encourage Geographic Mobility*, WASH. POST: OPINIONS (Apr. 12, 2013), https://www.washingtonpost.com/opinions/unemployment-benefits-should-encourage-geographic-mobility/2013/04/12/c84880be-a382-11e2-82bc-511538ae90a4_story.html [https://perma.unl.edu/9TD9-RZYV] (same; noting that Trade Adjustment Assistance program already provides relocation assistance).

325. *See supra* note 324.

326. *See* Andrii Parkhomenko, *Opportunity to Move: Macroeconomic Effects of Relocation Subsidies* (Nov. 24, 2016), bit.ly/2PAll3I [https://perma.unl.edu/4Q3D-DNQ5] (reporting econometric analysis).

327. *See* David Brooks, *The Workers Paradise*, N.Y. TIMES (Dec. 18, 2017), https://www.nytimes.com/2017/12/18/opinion/republicans-taxes-voters.html [https://perma.unl.edu/5BFJ-P6HS] (arguing for mobility vouchers for the unemployed).

328. H.R. 2755, 114th Cong. § 2(b)(1), (2) (2015).

assure the availability of "reemployment services" and other pre-requisites for receiving unemployment compensation.[329] The Workforce Innovation and Opportunity Act of 2014,[330] among other things, requires states to submit four-year strategic plans for workforce development as a precondition of receiving federal funding.[331]

On the right, the Heritage Foundation proposes to reduce the overall tax burden, eliminate the federal–state divided responsibility, give full responsibility to the states with federal funding, and reject proposals to expand UI to cover family and pregnancy leave.[332] Further, the American Enterprise Institute opposed Obama Administration proposals to extend benefits to seventy-three weeks and urged more emphasis on "helping people relocate to find work or offering more assistance with job retraining . . . and addressing the serious skills gap for those with less than a college degree."[333]

Even some left-of-center think tanks, such as the Center for Equitable Growth, acknowledge that extending benefits longer is not helpful for re-employment.[334] The Center for American Progress proposes to:

- bolster re-employment services to connect more jobseekers with workforce development opportunities;
- strengthen tools such as work sharing that help workers stay in the jobs that they already have;
- expand UI eligibility to reach more unemployed workers;
- improve the adequacy of UI benefits; and increase participation in the program;
- reform UI inancing to assure solvency; and
- repair the Extended Benefits program.

It recommends establishment of a new Jobseeker's Allowance for workers who would remain ineligible for UI, such as unemployed independent contractors and those with limited work history.[335]

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329. 29 U.S.C. § 49b(c)(3) (2012).
330. 29 U.S.C. §§ 3101–3361 (Supp. V 2018).
331. 29 U.S.C. § 3112.
332. *Unemployment Compensation Reform: Hearing Before the Subcomm. on Human Res. of the H. Comm. on Ways and Means*, 106th Cong. 64–67 (2000) (statement of Mark Wilson, Research Fellow, Heritage Foundation).
333. Alex Brill, *Extended Unemployment Benefits: Not What the Labor Market Needs*, AM. ENTERPRISE INST. (Jan. 8, 2014), http://www.aei.org/publication/extended-unemployment-benefits-not-what-the-labor-market-needs/ [https://perma.unl.edu/DML5-VGAJ].
334. *See* Till von Wachter, *Unemployment Insurance Reform: A Primer*, WASH. CTR. FOR EQUITABLE GROWTH (Oct. 31, 2016), https://equitablegrowth.org/unemployment-insurance-reform-primer/ [https://perma.unl.edu/F7EZ-JNGH] ("Although the evidence is mixed, an ongoing concern is UI may damage reemployment prospects by lengthening the unemployment spell.").
335. *See* Rachel West et al., *Strengthening Unemployment Protections in America*, CTR. FOR AM. PROGRESS (June 16, 2016, 10:00 AM), https://www.americanpro-

This Article makes the point several times that engineering labor markets precisely is impossible in a market economy and is unlikely to be successful, even in a planned economy. Designers and advocates of relocation incentives must be thoughtful and articulate about the following considerations that shape policy:

- High unemployment in one region may be cyclical instead of structural; it makes the most sense for those unable to find jobs in such areas to remain there until the local economy improves rather than experiencing the disruption of moving elsewhere.
- The signals for looser or tighter labor markets are crude and are mainly limited to state-level and metropolitan-area unemployment rates.
- The exact amount of a relocation bonus necessary to induce significant incentives to relocate is uncertain, but it is reasonable to predict that larger economic incentives will have a greater effect.

To be effective, a practical and relatively simple administrative apparatus must administer any relocation incentive system; a system purporting to micromanage every worker's job search is doomed to fail. The starting point should be an applicant's representation or certification, just like under virtually all UI systems for conventional benefits, so that a benefit applicant who certifies that he has or is about to relocate to another labor market area is presumptively entitled to a relocation benefit. H.R. 2775 does not make it clear whether the applicant's representation creates a presumption, or whether the Secretary of Labor must take the initiative in making a finding.[336]

Then, if there is reason to doubt the representation, the fact of relocation or failure to relocate is quite easy to establish. The burden of proof should be placed on the applicant to show that he has, in fact, relocated within a certain period of time after he applies.

B. Target Student Loans and Reform For-Profit Trade Schools

The enormous federally subsidized student loan program provides a source of leverage to improve workforce training. Policymakers are concerned with the magnitude of student loan debt, which may represent a bubble that jeopardizes the health of the entire economy, and with the practices of many schools that misrepresent the job opportunities likely to be available to students after completion of the

gress.org/issues/poverty/reports/2016/06/16/138492/strengthening-unemployment-protections-in-america/ [https://perma.unl.edu/3FAF-DEL6].

336. *See* H.R. 2755, 114th Cong. § 2(c) (2015).

programs.[337] The level of dissatisfaction with the program makes it politically feasible to modify it and use it as a vehicle for a dramatic change in U.S. labor market policy.

For-profit trade schools have an important role to play. They are flexible, as capital mobility makes them nimble. The profit motive provides an incentive for them to perform in attracting new students and employers for their graduates. Their reputation, however, is in tatters. Better accreditation standards and enforcement for these for-profit trade schools might enable them to realize their potential. Entrepreneurs are perfectly suited to fill the job training gap. A need obviously exists, and trainees, potential employers, and governments are willing to pay.

For-profit trade schools proliferated at the end of the twentieth century and the beginning of the twenty-first century, but the public perception is that they often merely exploit their aspiring students and do little to prepare them for actual work, let alone to place them in jobs.[338] The allegations in the Corinthian College case highlight the difficulties that led to student disappointment.[339] Such difficulties and questionable practices are not limited to for-profit institutions.[340]

A revised regulatory regime would require tight accreditation by bodies dominated by employers that regularly review hard data about the schools' placement rates in new jobs. The current accreditation regulations themselves are almost completely silent on placement of graduates in jobs.[341]

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337. *See* Stacy Cowley, *DeVos Toughens Rules for Student Borrowers Bilked by Colleges*, N.Y. TIMES (Aug. 30, 2019), https://www.nytimes.com/2019/08/30/business/betsy-devos-student-loan-forgiveness.html [https://perma.unl.edu/435X-F8YN] (reviewing controversy over loan cancellation for students disappointed by schools which closed, stranding students).

338. The California Attorney General's lawsuit against Corinthian Colleges is representative of the alleged instances of market failure. *See* Complaint, People v. Heald College, LLC, No. CGC-13-534793 (Cal. Super. Ct. filed Oct. 13, 2013) [hereinafter Heald Complaint], 2013 CA Sup. Ct. Pleadings LEXIS 14368, at *1–4; Press Release, Kamala Harris, Attorney Gen., Cal. Dep't of Justice, Attorney General Kamala D. Harris Files Suit in Alleged For-Profit College Predatory Scheme (Oct. 10, 2013), https://oag.ca.gov/news/press-releases/attorney-general-kamala-d-harris-files-suit-alleged-profit-college-predatory [https://perma.unl.edu/2QZG-N72X].

339. *See* Heald Complaint, *supra* note 338, ¶ 3 (discussing internal Corinthian documents about characteristics of target population).

340. *See* Elie Mystal, *Villanova Law 'Knowingly Reported' Inaccurate Information to the ABA*, ABOVE THE L. (Feb. 4, 2011, 3:34 PM), https://abovethelaw.com/2011/02/villanova-law-school-knowingly-reported-inaccurate-information-to-the-aba/ [https://perma.unl.edu/L5KG-YAB5]; David Lat, *In Defense of Law Schools Hiring Their Own Graduates*, ABOVE THE L. (Mar. 28, 2013, 6:06 PM), https://abovethelaw.com/2013/03/in-defense-of-law-schools-hiring-their-own-graduates/ [https://perma.unl.edu/F5HM-Z2XT].

341. The Accrediting Commission of Career Schools and Colleges (ACCSC) Standards of Accreditation has a two-sentence section on graduate placement assistance.

The risk of industry capture is less than it might be in the professions and traditional trades where practitioners have incentives to limit the supply of new entrants. The training programs considered in this Article supply workers for enterprises that want to *increase* the supply of qualified workers and, thus, experience less risk of industry capture.

C. Resuscitate the Apprenticeship Concept.

Replace "Registered Apprenticeships" with simplified apprenticeship incentives. The existing system protects the job and wage levels of those in declining industries without doing anything to facilitate transition to alternatives. The Trump Administration's proposal for "Industry-Recognized Apprenticeship Programs"[342] has gone part of the way by avoiding the bureaucratic impediments to registered apprenticeships. It eliminates the need to obtain government approval in advance for apprenticeships. It offers greater flexibility and ways of tying apprenticeship requirements more closely with actual labor market demands. It is weak on incentives, however.

The Trump Administration's proposal recognizes the need to spread the apprenticeship concept to new industries. Part of what is needed is an incentive structure for employers to invest in apprenticeships. The Trump Administration's proposal stops short of that. A more robust reform would provide an incentive for employers to offer apprenticeships by allowing a one-year training subminimum wage of 60% of the minimum wage. As an alternative, employers would be privileged to pay a training subminimum wage only when the DOL has certified the occupation as having a labor shortage. Employers could create apprenticeships even without any kind of precertification. The presumption is that, if a job is not already on the occupational list, it is presumptively one in which labor shortages exist. The burden should be on the employers to establish the existence of a bona-fide apprenticeship program when they are subjected to enforcement action by the DOL Wage and Hour Division.

The timing for this initiative is right as governments at all levels consider increasing the minimum wage. Absent the availability of such a subminimum as discussed above, the effect of increases in the

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ACCREDITING COMM'N OF CAREER SCH. AND COLL., STANDARDS OF ACCREDITATION 98 (2017), http://www.accsc.org/UploadedDocuments/1971/ACCSC%20Standards%20of%20Accreditation%20and%20Bylaws%20-%20070117%20final.pdf [https://perma.unl.edu/HE6E-PXH3]. It does, however, require "processes, policies, and procedures in the areas of student assessment and achievement and demonstrate that a high proportion of its students . . . obtain employment in the field for which trained." *Id*. at 99.

342. *See supra* section III.C.

minimum wage will be to decrease employer efforts at training employees.

VII. CONCLUSION

Training is the best adjustment mechanism for labor markets. Yet most training initiatives have not worked very well.

The textile industry led the Industrial Revolution in the United States. It has, in the 200 years since, repeatedly demonstrated the workings of creative destruction—a market-rooted process in which innovations in technology displace old enterprises and the employees that work for them. The workers' struggles to find their places in the redefined technological and industrial order drive politics. Governments spend $100 billion annually on paying unemployment benefits. By providing incentives for workers to relocate to where the jobs are, the UI program can make labor markets function more effectively.

Government registered apprentices might have a role to play, but only if the current apprenticeship programs change to encourage, rather than discourage, apprenticeships. The Trump proposal for Industry-Recognized Apprenticeship Programs is a modest contribution in that regard.