Workforce Futures

Working Adults and The Workplace Revolution

A Review of the Evidence
For
Employers, Educators, and Employees

(Illustrated with 32 Charts and Graphs)

Occasional Paper # 3

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Preface

American employers face an unprecedented challenge in creating and keeping a highly qualified adult workforce. Traditionally employers have depended on outside groups – educators, other employers, and the experience of working adults themselves – to educate and train most their staff. Our research indicates this will no longer work.

It is an oft-told story. An ongoing workplace revolution is transforming the nature of work almost beyond recognition. Occupations requiring mostly heavy lifting, hand sorting and other largely routine, and often mindless, tasks are disappearing in the face of the unprecedented mechanization of work and digital disruption of every industry. Unfortunately, too many Americans lack the skills needed to be productive contributors in a world economy undergoing such a revolution.

In a mirror image of the fate of those in routine work, the number of jobs requiring more knowledge, thinking, and flexibility continue unhindered growth, raising the prospect of widespread skills shortages. Wages are high in the latter and low in the former. The changing workplace affects every employer and every working adult.

What is absent from the story is the stark fact that most of the workforce of the future is already working and not going anywhere anytime soon. An estimated 84 percent of the workforce now employed will still be working in 10 years and two-thirds will be there in 20 years.

This emerging workforce crisis jeopardizes the entire economy. Employers across the country are already reporting critical shortages of required skills. In a recent survey, over 38 percent of employers reported having difficulty filling jobs due to a lack of available talent. However, employers and educators have been slow to recognize the danger. The nation has the resources to address the challenge, if it has the will.

This paper lays out our findings on five major areas relating to the emerging shortages of qualified working adults. We base the paper's text, statistics, and charts on openly available sources including US Census, the Bureau of Labor Statistics (BLS), and the National Center for Education Statistics (NCES), the National Bureau of Economic Research (NBER), and numerous peer reviewed academic papers and reports.

We realize that economists, statisticians, and other professional in the field may wish for a more detailed analysis. However, we researched and wrote the paper with a lay audience in mind. We hope that the charts and graphs will help readers better understand the sometimes-arcane world of workforce economics. We have also attempted to put to rest several myths about the workforce and the economy.

The authors appreciate and thank the staff of Bureau of Labor Statistics, National Center for Education Statistics and the US Bureau of the Census for their invaluable service to the nation and patient assistance with the authors. We also acknowledge the contribution of the Georgetown Center for Education and the Workforce, for its many helpful studies, especially relating to college graduates in the workforce. Finally, we thank David Moore who provided meticulous and much-needed editing.

A PDF of this document is available free at **http://www.innovationamerica.us/** All opinions are those of the authors and do not reflect the position of any of the sources. If you find any errors or disagree with any of the findings, ***please*** let us know at **gmoore8131@yahoo.com** or **bob.bowman@bblumberg.org**

Garrison Moore and Robert Bowman

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Summary

In this paper, we review the facts about the workforce of the next 20 years. We look at the ongoing revolution in the nature of work and its impact on the workforce. The key findings are:

I. **People Now Working Will Dominate the Future US Workforce** An estimated 84 percent of those now working will still be in the workforce 10 years from now. Today's working adults will compose upwards of two thirds of those working in 2035. For employers, the current workforce is the primary source of future skilled workers.

II. **Nature of Work Is Changing Almost Beyond Recognition** Growth in the number of white-collar jobs continues to far outpace the growth in the number of jobs in factories, mines, and farms.

Jobs in "Routine" Occupations are Fading Fast The economy produced a net 12 million new jobs from late 2010 through 2015. Yet, the growth was not been equal. More than *six million* jobs lost in occupations involving mostly routine tasks have not returned. In 2000, routine occupations made up 35 percent of the workforce; by 2015, it had dropped to 25 percent.

Demand Rising for Occupations with More Knowledge, Thinking, and Flexibility Official projections predict strong growth in the so-called non-routine occupations. Growth in these occupations has more than made up for the loss in routine occupations. Technology will almost certainly transform many now routine occupations into positions requiring much more knowledge, thinking, and flexibility.

Growing Occupations Will Not Necessarily Require a College Education. However, they will most often require education and training beyond high school as well as a set of "soft" skills not usually required for routine occupations. This will be a challenge for those especially for the adults who do not have even a high school degree. Even well-educated and highly skilled employees will need continuous education, training, and retraining.

III. **A Comprehensive Understanding of Changing Skills Needed** A few score occupations have a clearly defined set of required skills. Most occupations have few clearly defined skills. The modern workplace requires an objective understanding of the talent requirements of all work throughout any given organization and local labor market - a complex and nuanced challenge.

IV. **US Has Many Resources, No System** More than one third of working adults currently take some kind of work-related education or training. However, we know little about the type or duration of the learning involved or its relation to employers' needs. Similarly, community colleges, universities, and federal programs lack focus on incumbent worker learning. Sharp higher education funding cuts during the recession have not helped.

V. **An Active Workforce Policy Offers Opportunity for Long-Term Success** Resolution of the skills problem will take careful planning and execution with input from employers, employees, educators, and policy makers of all types. All players will need to continuously coordinate and adjust policies, provide accessible schedules, develop objective certification credentials, tailor financial aid to working adult needs, and offer rigorous work-based learning.

Part I - Meet the Workforce of the Future

In recent years, there has been much public fretting about the future of the American workforce and its potential lack of appropriate skills. While fretting is not new, this time it feels real and concrete.

The revolution in the global economy and the mad rush of technological innovation seem to be getting ahead of us and threatening our very livelihoods not to mention the long-term prospects for the economy and the nation's position in the world.

In response, US leaders urgently demand general education reforms; the institution of special programs for education in the so-called STEM subjects (Science, Technology, Engineering, and Math); creation of new skills training programs for young people; free community college for everyone; expansion of pre-school programs, etc.

84%

Estimated portion of the people working today who will still be working in 10 years

That so much is made of educating our children and young people for the future workforce is laudable and needs to continue. As worthwhile as these efforts are, young people entering the workforce each year amount to only a small part of the existing workforce. Government analysts expect that new entrants into the workforce to be two percent or less a year through 2022. Concentrating on the young alone would leave us without the skilled workforce needed for decades to come.

67%

Estimated share of people working today who will still be working in 20 years

The Crux of the Problem

In the simplest terms, over the next 20 years or so, too many poorly prepared working adults will be chasing a declining number of low skilled jobs potentially holding back wages for those jobs.

At the same time, employers will be unable to find enough qualified applicants for more skilled and intellectually demanding work, driving up wages for some and/or preventing American employers from expanding their operations in the US for lack of qualified workers. The fact that fewer young people are available to enter the workforce and more people (baby boomers) will be exiting exacerbates the situation.

Even highly educated working adults will struggle to keep up with the changing workplace; they will have to keep learning just to keep up with technology and changing consumer demand. Matters will continue to get worse unless employers can adopt a system of lifelong workforce education and training.

Something will have to give.

Still There, Till Then

If the US wants to prepare for the economy of the future, society will have to attend to upgrading the skills of adults already working. To demonstrate the nature of the situation, we know that at least 84 percent of those who will be working in 2025 are already in the workforce according to an analysis of US Bureau of Labor Statistics (BLS) projections.

Furthermore, it is likely that two-thirds of today's workers will still be working in 2035, 20 years from now. Such slow replacement of experienced workers by new entrants has always been the case. Most of us have never noticed. Now is a good time to notice.

Figure 1

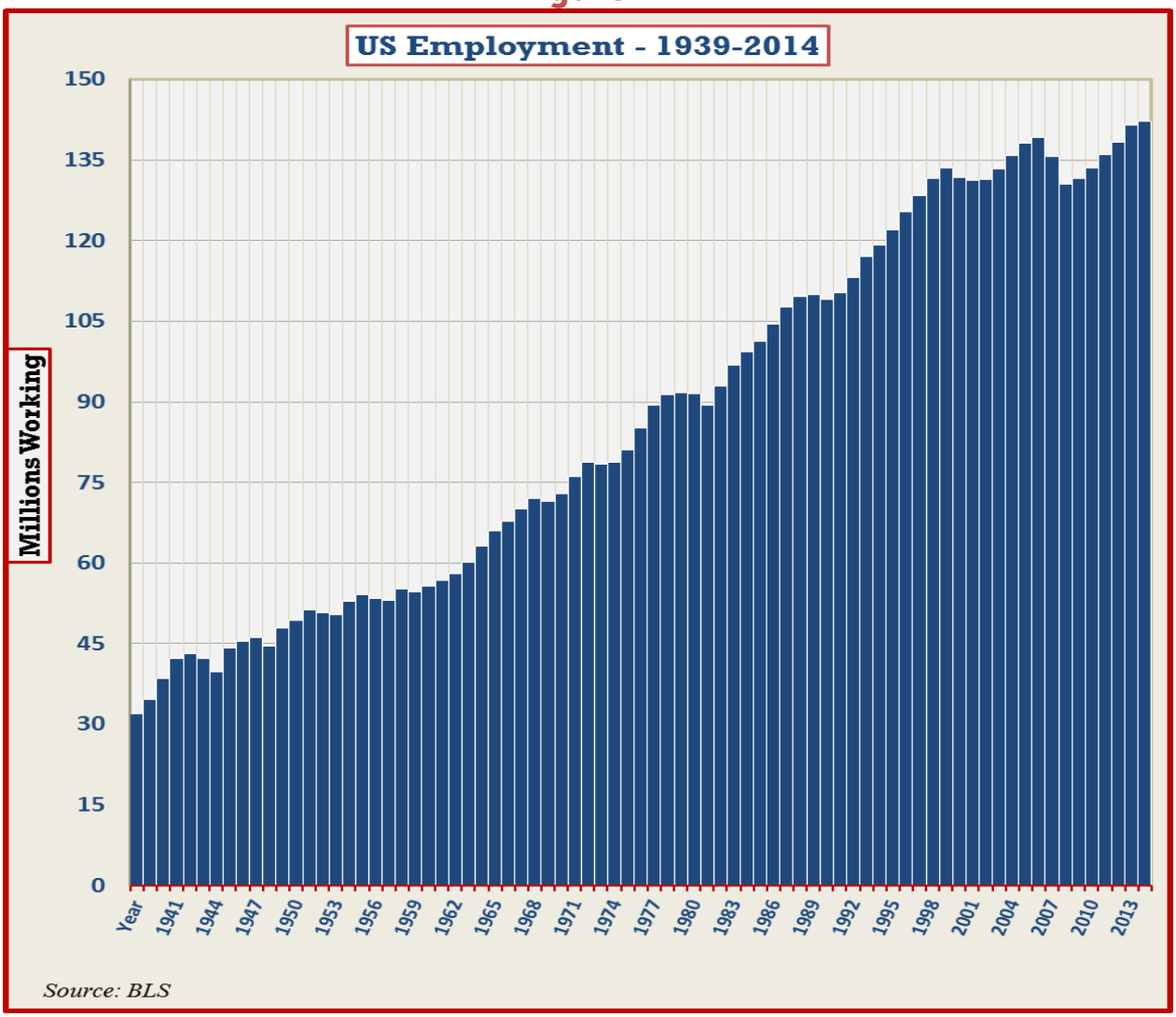

Fig. 1 shows the steady growth of the US workforce over the decades. The dips are recession years, the largest of which was the 2009-2011 Great Recession. Even then, the workforce resumed growing so that by 2014 the number of employed Americans exceeded pre-recession levels and continued the robust growth thereafter. However, the mix of occupations included in the workforce has changed significantly over time.

Part II - A Revolution in the Nature of Work

Given that most of the workforce for the near to medium term is already working; we now turn to the impact of technological and economic changes that confront the workforce and employers. In the larger scheme of things, not just the US, but the entire world is in the midst of a global economic upheaval that affects every person on the planet at light speed.

The triple whammy of the rush to new technology, the exponential expansion of international trade and the worst recession since the Great Depression has left ordinary working Americans wondering what will come next and how it will affect their livelihood. Even the economics journalists failed to see the jobs crisis coming in their own profession.

Employees bring their skills, knowledge, interests, aptitudes, and habits to the job. These, in varying degrees, are what employers value. Now it seems that demand for these qualities has shifted so much and so fast that a large portion of the current workforce may have little to offer employers in the near future.

Workplace Revolutions Past and Present

The current workplace revolution is the third in recent centuries. Each has built upon the past and each has continued spreading into the next. Though often considered "economic" or "technological" revolutions, each has had as dramatic an impact on the work people do as on anything else.

Dark Satanic Mills The first, the original Industrial Revolution, came with the advent of the steam engine – steam driven factories, steamships, railroads – which engulfed the world of the handmade, the fickle wind in the sails and the traveler's plodding horse. Along with the telegraph, new transport shrank the world from months and years to days and minutes. Production from steam powered factories and mines grew exponentially sending commodities and manufactured products across the globe in record quantities. The creation of a sophisticated international banking system

More Stuff - Fewer Jobs

The decline of manufacturing employment highlights the productivity issue; manufacturing now employs less than 10 percent of the work force, down from 25 percent in 1990.

Of the remaining jobs, manufacturers report that 80 percent are skilled or highly skilled. Contrary to popular belief and our experience as shoppers, the US remains the second largest manufacturer in the world by value.

The value of US manufactured goods in real dollars soared from $800 billion in 1990 to well over $2 trillion dollars in 2012. Only China, with four times the population, outproduces the US.

There has been considerable talk of "insourcing" manufacturing plants from overseas. Unfortunately, because of productivity gains, not many jobs are coming with them. It looks as if manufacturing jobs have become rather like farm work. See Figure 2

accompanied the revolution in production.

Many occupations disappeared entirely while other, often better paying, livelihoods eventually replaced them. In the meantime, it took 150 years and a great deal of suffering, to sort out the balance of rights and responsibilities between capital and labor in the new workplace.

Electrifying the World The second revolution, beginning in the 1880s gained full effect by the mid-20th century. The harnessing of new forms of energy, primarily petroleum and electricity sparked the upheaval. The new technology brought lighting for homes, offices and nightclubs, and power to drive factories and movie projectors, radios and telephones; cheap petroleum derivatives opened the way for automobiles, aircraft, and powerful diesel engines for railroads, mines, and farms.

As an example of the impact on the workforce, in the wake of massive mechanization of agriculture, the share of farmers in the US workforce dropped from 40 percent in 1900 to less than one percent today. (The adoption of the mechanical cotton picker in the late 1940s alone sent hundreds of thousands off the farms of the South and into the cities of the North.)

Other innovations simply replaced occupations entirely — dock workers by containerization, telephone installers and operators by electronic switching, gangs of ditch diggers with shovels by one woman with a backhoe, etc.

Productivity gains of the second revolution astounded those who lived through it; second revolution innovations continue to provide ever-greater efficiencies. The revolution blew away the world of the buggy whip, the manual clothes wringer, and much of the muscle work requiring strong backs, endurance, and little else.

Still, there remained a great deal of routine manual work. By one estimate, routine occupations made up as much as one-half of the workforce in 1950. Over time, new jobs with better pay and working conditions replaced jobs in defunct occupations.

Apples and Apps Now, the third - the digital - revolution surges across the globe creating unimaginably fast, clever and disruptive innovations. Like so many other social and economic disruptions, this one has had a long gestation. Though scientists and engineers invented the computer in the 1940s, it didn't have much impact on the workplace until the 1990s when the digital revolution seemed to hit everywhere at once sweeping through every home, factory, office, and shop. The changes shrank occupations, melded tasks, and altered skill requirements in the blink of an eye.

The *ménage a trois* of computers, the internet, and wireless technology has become the breeding ground for a seemingly endless stream of devices, digital apps, and software that continuously pour out their largess of disruptive innovations at breakneck speed. Very smart and dexterous machines have taken over routine tasks once performed by automobile assemblers, drill press operators, and bookkeepers.

Personal computers, tablets, and smart phones have seamlessly melded with the World Wide Web to devastate scores of occupations and industries (Remember paper?)

The computer has allowed the integration of shipping, warehousing, and air, ground, and sea transportation thereby eliminating thousands of routine jobs and still delivering the widescreen TV you bought online in time for the super bowl.

One has only to witness the spread of the smartphone to understand the pervasiveness of the impact of the new technology. The smartphone burst on the world in 2007.

As of this writing in 2016, just nine years later, Americans pay for their lattes, desperate Syrian refugees use GPS to make their way to safety, Congolese rainforest farmers do their banking and buying without bank or store, and Indian fishermen check prices in each port where they can sell their catch - all on smartphones.

Moore's Law on Steroids

". . . The real cost of performing a standardized set of computational tasks fell by at least *1.7 trillion-fold* between 1850 and 2006. . . When microprocessors became widely available in the 1970s, the rate of change increased discontinuously…Between 1980 and 2006, the real cost of performing computations fell by 60 to 75 percent *annually*. Processing tasks that were unthinkably expensive 30 years ago, say searching the full text of a university's library for a single quotation, became trivially cheap." *David Autor citing William Nordhouse (2007)*

Like a thousand other innovations in the past few years, this single product has profound workplace implications for many people, in many places - not to mention the 700 million or so smartphone users in China helping to make the Chinese online commerce site, Ali Baba, the world's largest company by some measures

Behind the scenes, there is an equally robust stream of innovations in data management and storage, digital automation of manufacturing, utilities, and transportation, etc. Then come Apple, Google, Amazon, Facebook and their kin proudly disrupting every home, shop, office, and vehicle.

One characteristic of this workplace revolution is that with digital technology, routine tasks have become much easier to "rationalize" work tasks - that is, to break down work into discrete steps from which engineers can then design ever more clever software for new, more precise, and productive machines and processes.

International Trade

For many people, international trade is the great job-eating monster that looks ever more likely to destroy the middle class and the American economy in general. It is true that the dramatic shift in international trade patterns over the past 30-40 years has disrupted many lives and businesses. The continuous movement of largely labor-intensive industries from higher to lower wage areas has affected many jobs in routine occupations while overall the workforce continued strong growth.

Economists often find it difficult to make the case that under free trade agreements we are all better off. The fact that the many benefit while relatively few suffer is not apparent to many people. Those who see only job losses – sometimes well-paying

Figure 2

Millions of Workers **Output in $Billions**

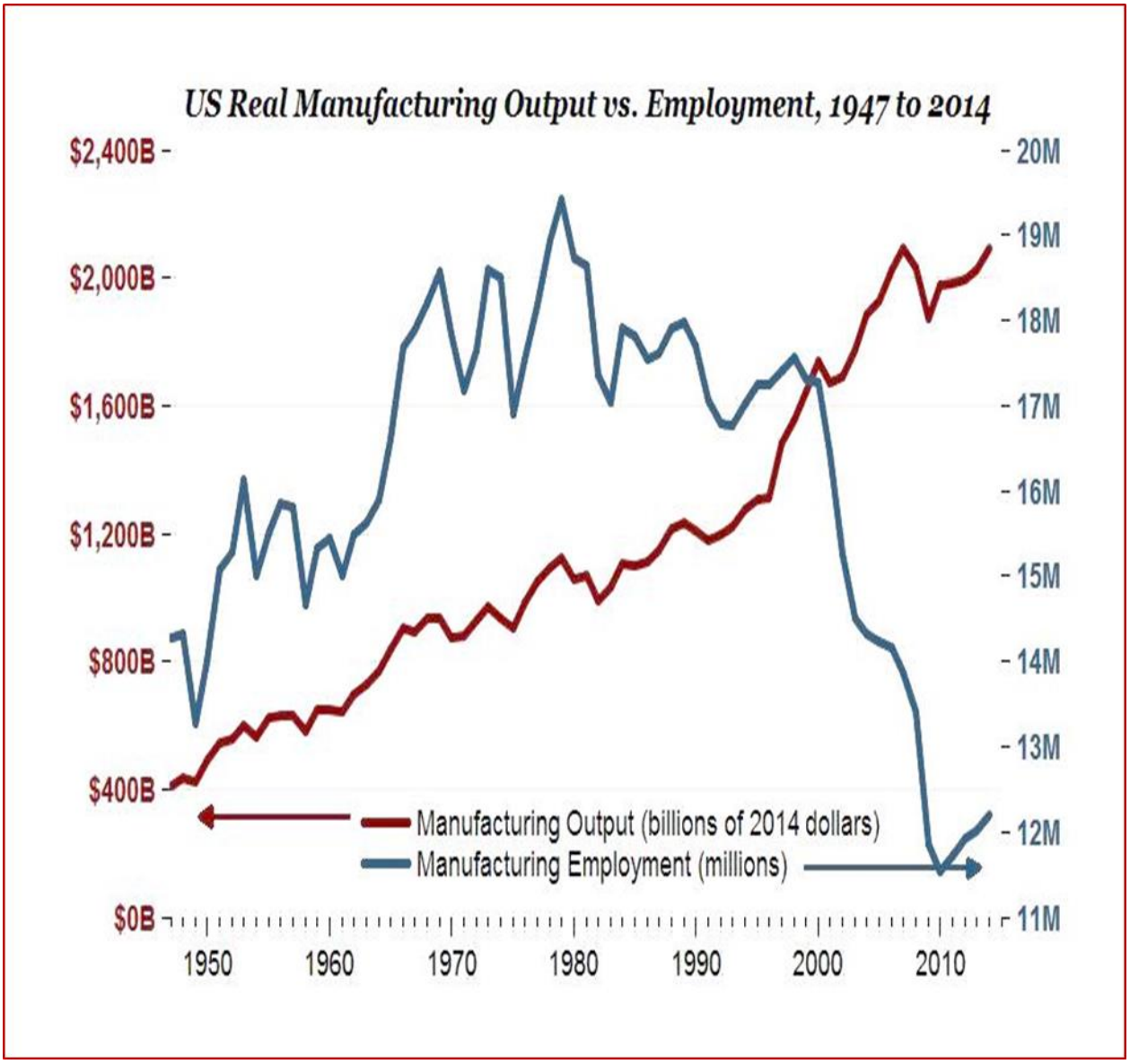

Figure 2 illustrates that contrary to popular opinion America still manufactures a huge amount. Made in America is alive and well, at least for the companies. Since 1990, the value of US manufactures has more than doubled. Unfortunately, manufacturing employment has fallen off a cliff. More than one third of all 1990 manufacturing jobs were gone by 2011.

The much-discussed return of manufacturing to the US – sometimes-called "insourcing" -- has brought back plants but not as many new jobs as were outsourced. Source: Mark J Perry, "US Real Manufacturing Output Vs Employment," American Enterprise Institute, October 2015 (from BLS data)

Figure 3

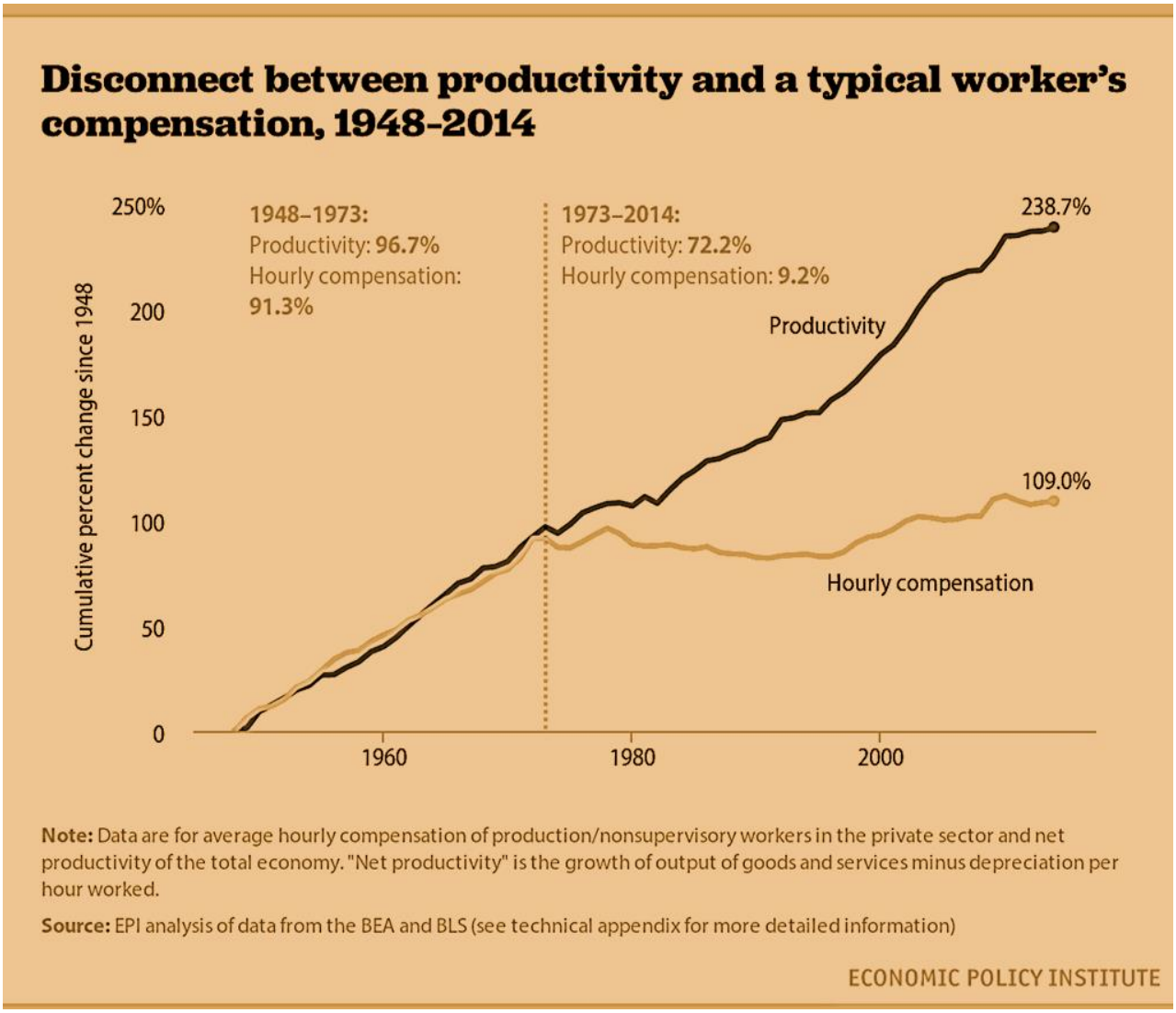

Figure 3 illustrates how the steady rise in productivity since1980 has resulted in higher returns for investors and a lack of growth in hourly compensation for wage earners. This tracks well with the breaking of labor unions by corporations and anti-union policymakers. See also Figures 23 and 25 in the Additional Charts section at the end of this paper.

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middle class jobs - are vocal about the issue. The relatively few workers who lose jobs, or think they may lose them, are far more active in opposing trade deals, and often evoke more sympathy than the mass of consumers.

Despite this, freer[1] trade has made many consumer goods – from food to clothing - much less expensive for millions of consumers than they would have been. This puts more dollars in everyone's pockets; it helps to keep inflation low. The poor benefit most as every dollar saved is a greater share of their income than for others and becomes available for other necessities. In addition, greater sales of US goods and services to treaty partners also ameliorate the effect on US employment.

In the early 1990s, alarmists raised the specter of freer trade having a massive negative effect on American jobs. Ross Perot, a 1992 presidential contender, predicted that we would hear a "great sucking sound" of jobs leaving for Mexico if the North American Free Trade Agreement (NAFTA) passed. It passed and US jobs continued to grow. In fact, the 1990s saw the creation of more US jobs than anytime in US history, including many from increased exports to Mexico.

The trade effect on jobs does not derive solely from trade agreements among nations. Labor intensive textile manufacturing and the jobs that went with them, for instance, were heavily concentrated in the US Northeast until the 1950s when the industry fled to lower wage southern states, especially the Carolinas (amid great efforts in the Northeast to prevent the moves) then to Mexico, and on to China and now to Vietnam and Bangladesh.

Such labor-intensive – low-margin work is likely to continue to seek low wage havens until people are willing to pay more for clothes or technology can improve productivity enough to allow employers to pay better wages, or for governments to enforce wage and hour laws - not that they necessarily will.[2]

A recent study conducted for the Third Way organization found that: "Of the 17 U.S. trade agreements since 2000, the trade balance improved after implementation by an average of $30.2 billion per year. Exports increased by 52 percent on an average annual basis after implementation." In other words, on balance, trade deals have seemed to work out well for most Americans.

The Great Recession

In the 2009-2010 Great Recession, losses in routine occupations pushed unemployment up while dragging overall employment and wages down. According to Siu and Jaimovich, between 1990 and 2010 the number of jobs in routine occupations lost 10 percentage points measured against the entire workforce - from nearly 35 percent of all employment in 1990 to just above 25 percent in 2010.

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[1] *The inaptly named "free trade" agreements between countries only loosen up trade restrictions not eliminate them. Free trade is what happens when products move between Illinois and Wisconsin. The agreement among the US states takes up only one line in the US Constitution. The agreements are complex. The relatively small Central American Free Trade Agreement is 500+ pages.*

[2] *Ironically, greater productivity may not be welcome when low-wage workers lose their jobs in desperately poor places where the only alternative may be unemployment. Nor will the remaining workers appreciate such changes if the benefits of increasing productivity go to executives and shareholders rather than to the remaining workforce.*

In other words, nearly a third of 1990 routine jobs were gone by the end of 2010. See Figure 4. The Great Recession had particularly profound impact. The number jobs in routine occupations dropped by an estimated 6.1 million jobs from 2009-2010 – jobs that as of early 2016 seem lost forever. In the meantime, as indicated above nonroutine jobs continued their steady growth.

In the past, routine jobs created in the recovery, replaced routine jobs following the recession. Most *new* jobs required routine tasks. They may have involved different tasks but still routine. This is no longer the case. Now, as old occupations fade, most newly growing occupations involve nonroutine tasks requiring specialized knowledge, skills, and behaviors. Instead of going from farm work to auto assembly work, less skilled working adults with routine jobs are now more likely to have to go from automobile assembly work to that of a trained and licensed health care worker.

Workforce Transformation and Jobs Many fear the world's mindless rush toward ever-greater technological innovation will leave working adults to pay the devil his due in jobs and wages while others prosper. Is this necessarily so? Certainly, great changes are afoot. How things look in retrospect is another question.

Economic transformations are painful. There is no question that many people have lost and will lose their jobs. Yet, past such transformations have proved beneficial for working people in the end. Numerous new and often better paying jobs have always accompanied economic transformations. It is happening today with the growth of tech jobs, new kinds of health services, and a record number of entrepreneurs.

It is doubtful that individuals and institutions can do anything to avert a continual loss of pay and jobs in occupations involving mostly routine tasks. However, employers and incumbent working people combining with educational institutions and trainers can build a system that allows working adults to continuously advance their skills and knowledge to keep up with the workplace revolution.

Figure 4
Routine Occupations Share of Working Age Population

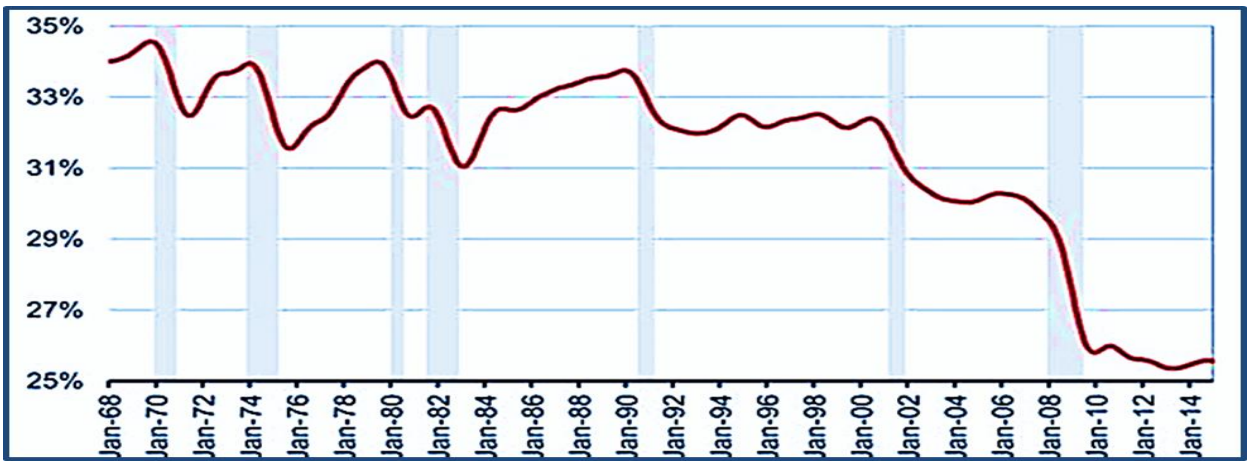

Figure 4 *shows the fate of routine occupations over nearly 50 years. It clearly demonstrates the dramatic fall in the proportion of working age population in routine occupations especially in the latest recession*

Disrupted Routines

The latest fundamental restructuring of the workplace has buffeted working people in routine occupations[3] over the past three recessions – 1991-1992, 2001-2002, and 2009-2010. This stands in contrast to earlier postwar recessions when employment in most such occupations moved quickly back to pre-recession levels. The 2009-2010 recession saw by far the worst losses in routine occupations. (See Figure 4)

Figure 5

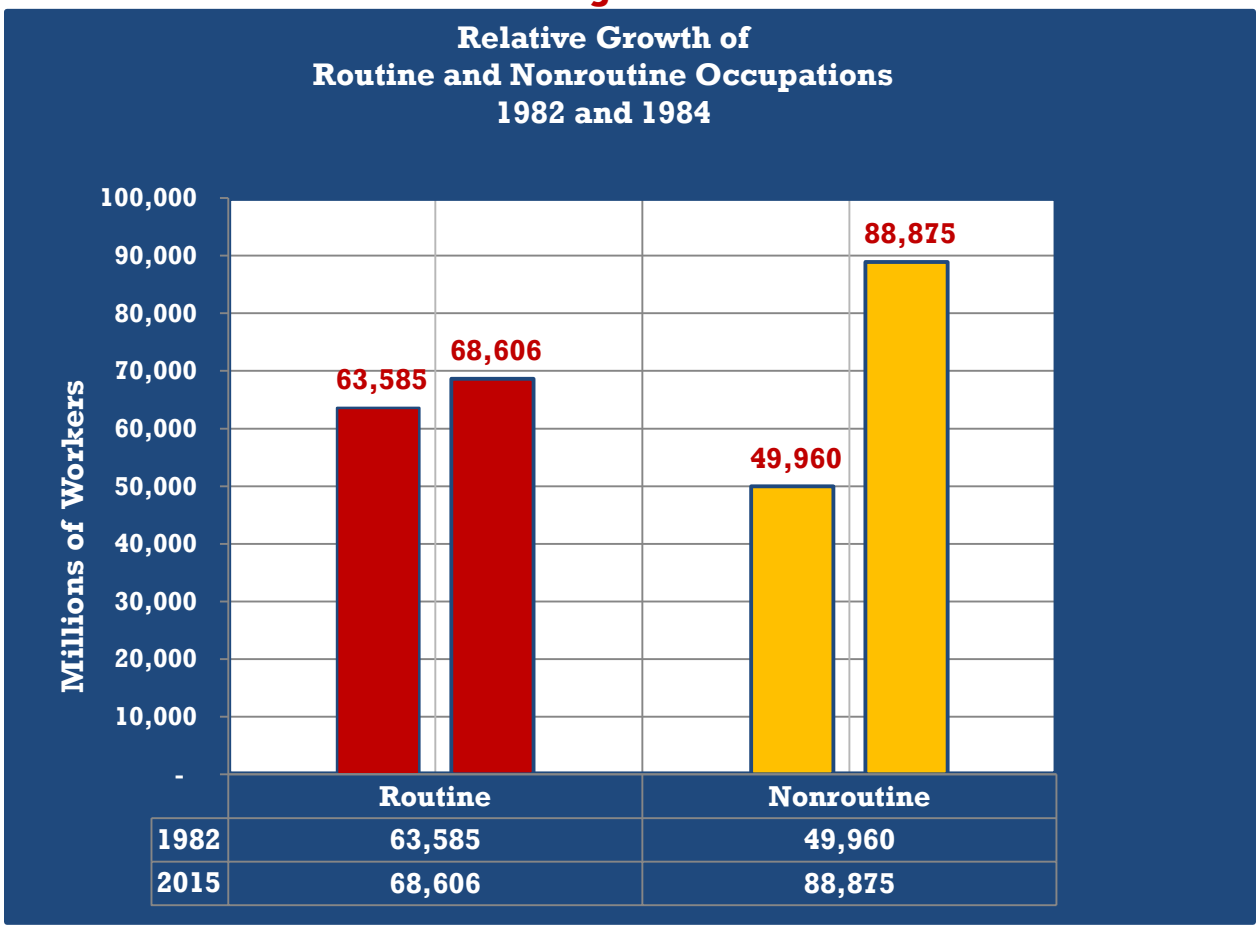

Figure 5 shows the growth of jobs in Routine and Nonroutine occupations over 33 years. These estimates demonstrate that while the number of routine jobs grew slightly in that period, the much greater growth in nonroutine jobs and a greatly reduced the portion of working people with routine jobs

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[3] The terms "jobs" and "occupations" are often used interchangeably. However, for labor market analysis a "job" is what we go to every day. An "occupation" is an abstraction of many jobs, which necessarily blurs the differences among jobs in the same occupation. The primary source of occupational titles is the Bureau of Labor Statistics' Standard Occupational Classification. The SOC starts with a detailed description of about 1,000 occupations and aggregates these to increasingly higher level of abstraction at the top are 10 broadly similar occupational groups. The researchers cited in this paper use the Census version of the SOC that has a list of 300 occupations.

Some economists have called the aftermath of each of the past three recessions "jobless recoveries." In fact, the recoveries have not been jobless; the overall number of jobs has shown healthy growth in succeeding years. See Figure 1.

Taking the recent great recession as an example, by January 2016 the overall size of the working population reached a record high at 150 million working people up from 138 million in 2010 – a net increase of 12 million from the depth of the recession. Furthermore, by 2016 the economy had added a net 3.5 million new jobs over the previous high water mark in 2007 before the recession began.

Yet, it was a rocky recovery for millions of unemployed workers forced to change occupations for lack of opportunities in their old fields. On average, they took much longer than usual to find new work and too often circumstances forced them to take lower pay due to the lack of skills needed for jobs more in demand.

The analysis of the effects of workplace change on occupations derives from the work of economists David Autor, Henry Siu, Nir Jaimovich, and others. They have analyzed the tasks required of occupational groups in the US Census list of occupations to try to determine the dynamics of the new workforce.

To do so, the researchers divided occupations into four general categories. The categories are quite broad and sometimes mix skill levels in each of the four groups. While the data may lack detail, they prove useful in understanding the dynamics of the labor market in recent decades. The occupational categories are:

Routine Manual Occupations (e.g. machine operators, assemblers, packers) involve repetitive tasks that machines or computers could potentially do[4]. The number of jobs in these occupations fell by nearly 10 percentage points in the recession and most did not come back.

Routine Cognitive Occupations (e.g. bookkeepers, bank tellers, janitors, etc.) involve more decision making and planning than strictly manual jobs. Nonetheless, between 2000 and 2014 the number of jobs in these occupations fell nearly as fast as routine manual jobs.

Non-Routine Manual Occupations (e.g. skilled members of the construction trades, pest control specialists, repairers, machinists, and maintainers of complex equipment, and technicians of all types) require planning and decision-making, as well as manual skills. Theses occupations don't face total automation in the near future. In fact, between the years 2000 and 2014 growth in these jobs has far outpaced all others, growing by about 25 percentage points. See Figure 6.

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[4] "Routine" and "unskilled" are not the same. Some jobs are skilled but routine. Any neophyte who has ever harvested fruit alongside an experienced farmworker will recognize the difference. Listen to the song "John Henry" for an example of skill against machine. Still, in many cases, the two are similar enough for understanding the changes in the workplace.

Figure 6
Percent Change in Occupation Types 1982 – 2012

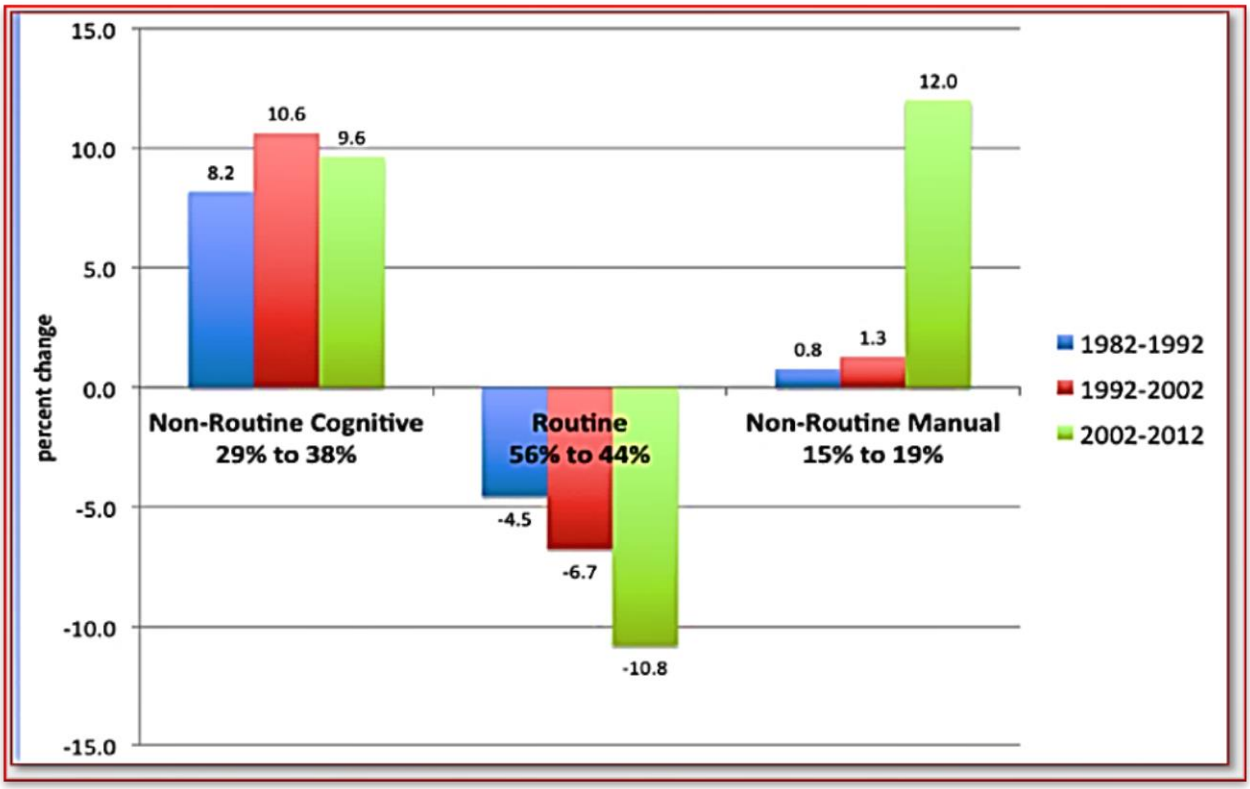


Figure 6 shows the relative changes in the share of routine and nonroutine occupations over the past three decades. The acceleration of change shows itself most dramatically from 2002 through 2012. Note that the fastest growth shows up in the non-routine manual category versus the non-routine cognitive fields (e.g. Professional, managerial, engineering, etc.), which also showed healthy growth, Source: "Job Polarization and Jobless Recoveries" Nir Jaimovich Duke University and NBER and Henry Siu, University of British Columbia and NBER

Non-Routine Cognitive Occupations (e.g. traditional professionals, academics, executives, engineers, office professionals of all types, independent business owners, etc.) usually require a college degree and sometimes-extensive postgraduate preparation.

Nonroutine cognitive occupations require considerable knowledge of the field, flexibility, and problem - solving skills. The skills required can change, sometimes radically, over time, requiring more or less continuous skills upgrades. The Great Recession barely touched working adults in these occupations and the occupations resumed healthy growth more quickly than others did.

Decimating the Routine In the middle decades of the 20th century, routine occupations allowed hardworking, reliable, men and women without an advanced education – blue-collar factory workers, telephone installers, receptionists – to lead comfortable middle class lives. Now such occupations are slipping away. (For a more detailed graph of the all categories, see Figure 26 at the back of this report.)

In addition to technology and trade, the dismantling of trade unions in the private sector, especially in manufacturing, over the past 30 years has only accelerated the loss of income and jobs in routine occupations. Without other skills, those routine workers who lose jobs suffer in an economy that prizes higher skill levels are bound to have a difficult time maintaining their income and self-respect. See Figure 2.

Routine tasks are disappearing from the entire spectrum of work whether whole occupations are threatened or not. Everyone from janitors to journalists and from stockbrokers to steelworkers feel the impact of this new revolution The skill requirements of every occupation now change continuously, if sometimes as imperceptively as the small hand on the clocks which used to hang on every wall. (So much for the wall clock makers) However, occupations with the most routine tasks are feeling the greatest impact.

A Long History of Concern Loss of jobs during workplace revolutions is not new. Resistance to replacement of people by machines goes back to the English Luddites smashing cotton-spinning machines in the early 19th century. Increasingly efficient production equipment and methods have eliminated occupations ever since.

However, this time the change seems so much faster and more disruptive than in the past. The challenges of keeping up seem much greater. This is not going from farm worker to steel worker; it is going from hospital orderly to medical technician requiring more education and a professional credential.

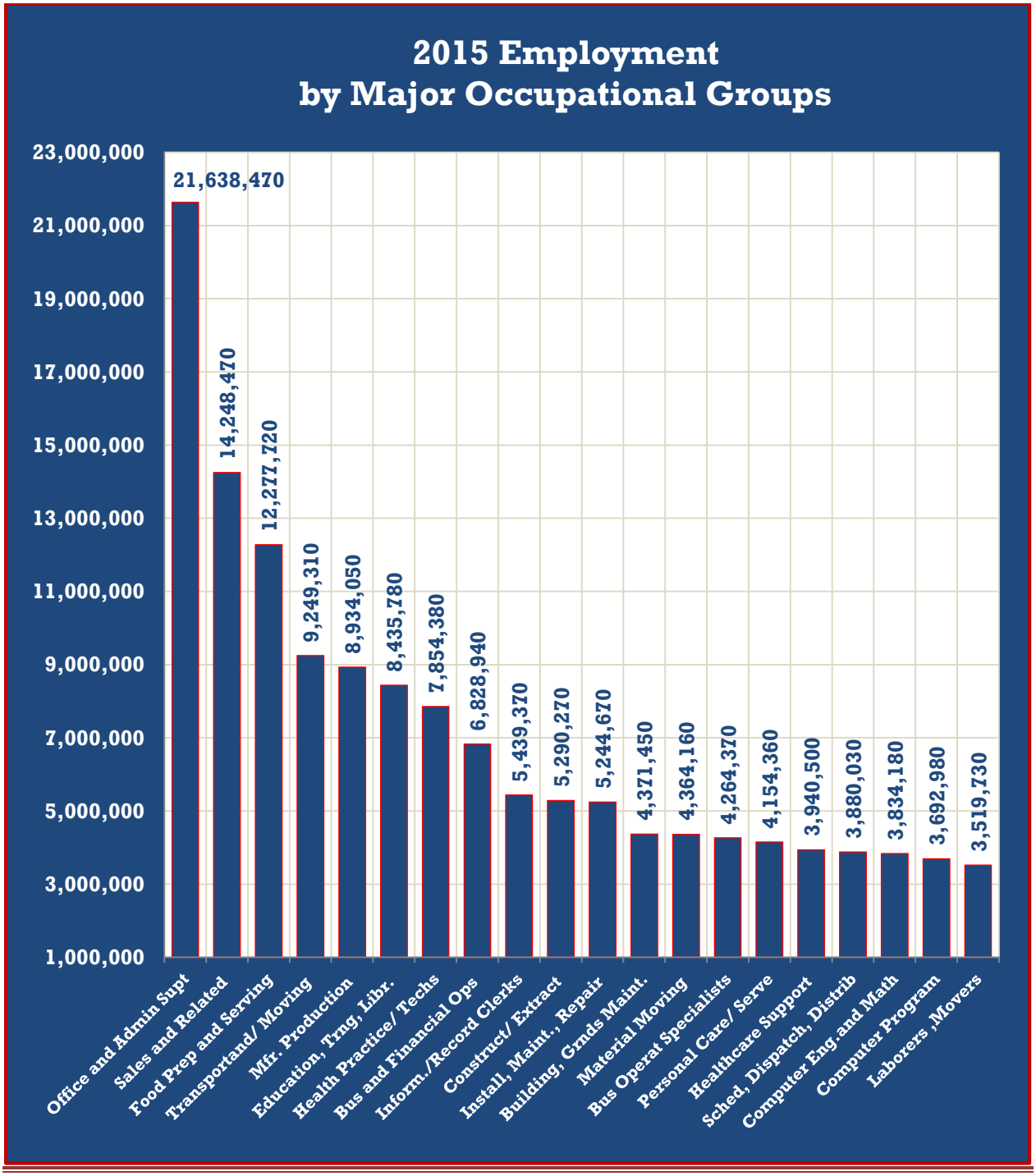
The question is not so much whether the jobs will be available but whether today's workforce will be part of a system of lifelong learning as they proceed in their careers or if they will end up by the wayside with great cost to workers, to their families, and to the economy as a whole.

Many Jobs, Fewer Opportunities One point that often gets lost in any public discussion of the shift in the makeup the workforce, is that while millions of routine jobs are being lost, they still make up a very large part of the workforce, and many of those jobs will not be going anywhere. In other words, the fastest growing occupations are not those with the most jobs. Figures 29 and 30 show the occupations with the largest anticipated gains and losses.

Figure 7 shows the number of employees in each of the 'major' occupational clusters -- the highest level of aggregation. At least seven of the top 20 consist mainly of routine work. For example, routine manufacturing production work remains the fourth largest major occupational group despite the drastic decline in overall routine manufacturing employment.

Yet, many of the major occupational clusters offer fewer opportunities for the future. The number of jobs in these routine occupations remains high as trade and technology has affected them less. Nonetheless, they may experience lower wages and less secure employment in the face of the larger supply of working age adults with insufficient skills for nonroutine jobs

Figure 7



"Major Occupational Groups" is the highest level of aggregation of occupations designated by the BLS Occupational Employment Statistics program. It subsumes all 1,000 or so detailed occupations. Figure 7 shows that many of the groups that rank high on the list include routine occupations. Though jobs in many of these occupations continue to disappear, the numbers are still large enough that employers and educators will have to address the training and retraining of these incumbent workers in order to develop the more skilled workers they will need.

Education and the New Workplace

"A college degree and a good job go hand in hand. Ninety seven percent of good jobs added in the recovery from the Great Recession went to college graduates." Tony Carnevale et al, Georgetown Center for Education and the Workforce, November 2015[5]

The quotation above is not particularly good news for the nearly 70 percent of working adults who do not have a college degree. This is the 70 percent that most employers will have to work with to get their work done over the near and medium term.

For the lack of more precise data on routine occupations, researchers often use greater education as a proxy for greater skill, disregarding experience and talent. We do this with some trepidation. (See Box) Nonetheless, the workplace revolution has had significant benefits for working adults with advanced education.

The US Census Bureau reports that nearly 25 million US adults 25 years of age and older who lack a high school diploma have dramatically fewer opportunities in the labor market. Figures 9 and 10 show the price of not having a high school diploma. They are much more likely to hold jobs in routine occupations, run a higher risk of unemployment and receive lower wages.

During the Great Recession, the unemployment rate for adult high school dropouts peaked at an unprecedented level of 14.7 percent. Those without a high school degree are likely to receive 25 percent less pay than high school graduates. The inverse is true of those with more education, especially college graduates.

Caveat: Education and Competence

For *non*routine occupations, employers often need a complex cocktail of knowledge, experience, technical and social skills, as well as the ability to learn and to solve problems as they arise.

To find such people, by either recruitment or promotion, employers often use education as an informal proxy for these traits - education trumps experience and training.

This practice can raise unnecessary barriers to advancement and deprives the employer of valuable human capital. This obviously has serious implications for upgrading skills and promotion of working adults without a college degree.

Some jobs genuinely require the knowledge and skills implied in a college degree. However, there has been a drift toward academic inflation in recent decades. This precludes otherwise qualified high school graduates from many jobs

Competency driven credentials based on objective assessment, on the other hand, can offer greater value (if not used trivially). Information technology, health care, and construction have shown the way in this regard. Employers here tend to value demonstrable competence over formal education alone,

It is worth remembering that up through the 1940s most Americans did not have a high school diploma. (See Figure 15) A high school diploma was considerate adequate for most occupations including U.S. President. Like 95% of his fellow Americans, Harry Truman managed without a college degree. In the 19th century, many prominent Americans were largely self-taught. After all, Abraham Lincoln, Henry Ford, and Thomas Edison never went past 3rd grade.

[5]By "good jobs" the authors mean – ones that pay at least $53,000 annually, usually with benefits compared to the national median of roughly $47,000 often without benefits.

The best opportunity for those with a "routine" work history lies with completing high school, if they haven't already done so, and getting at least some post-secondary education, training or occupational certification; a university degree could help a lot more. This is an ideal situation where employers can intervene to assist poorly educated employees and raise their potential productivity.

Figure 8

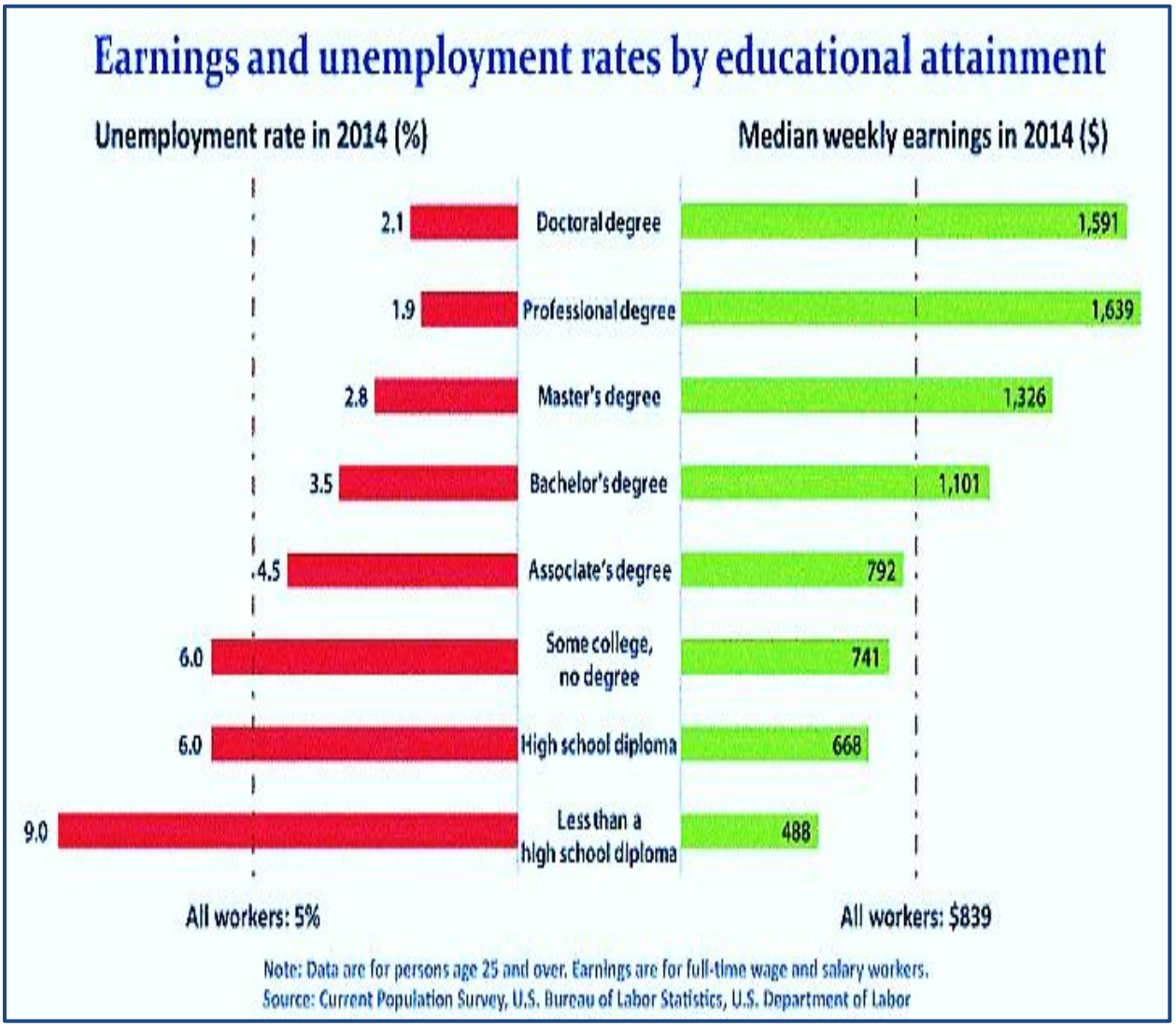


Figure 8 clearly demonstrates the effect of education on income and employment.in 2014 a person with a college degree was likely to earn more than twice as much as one without a high school degree and face less than half the chance on being unemployed.

Figure 9

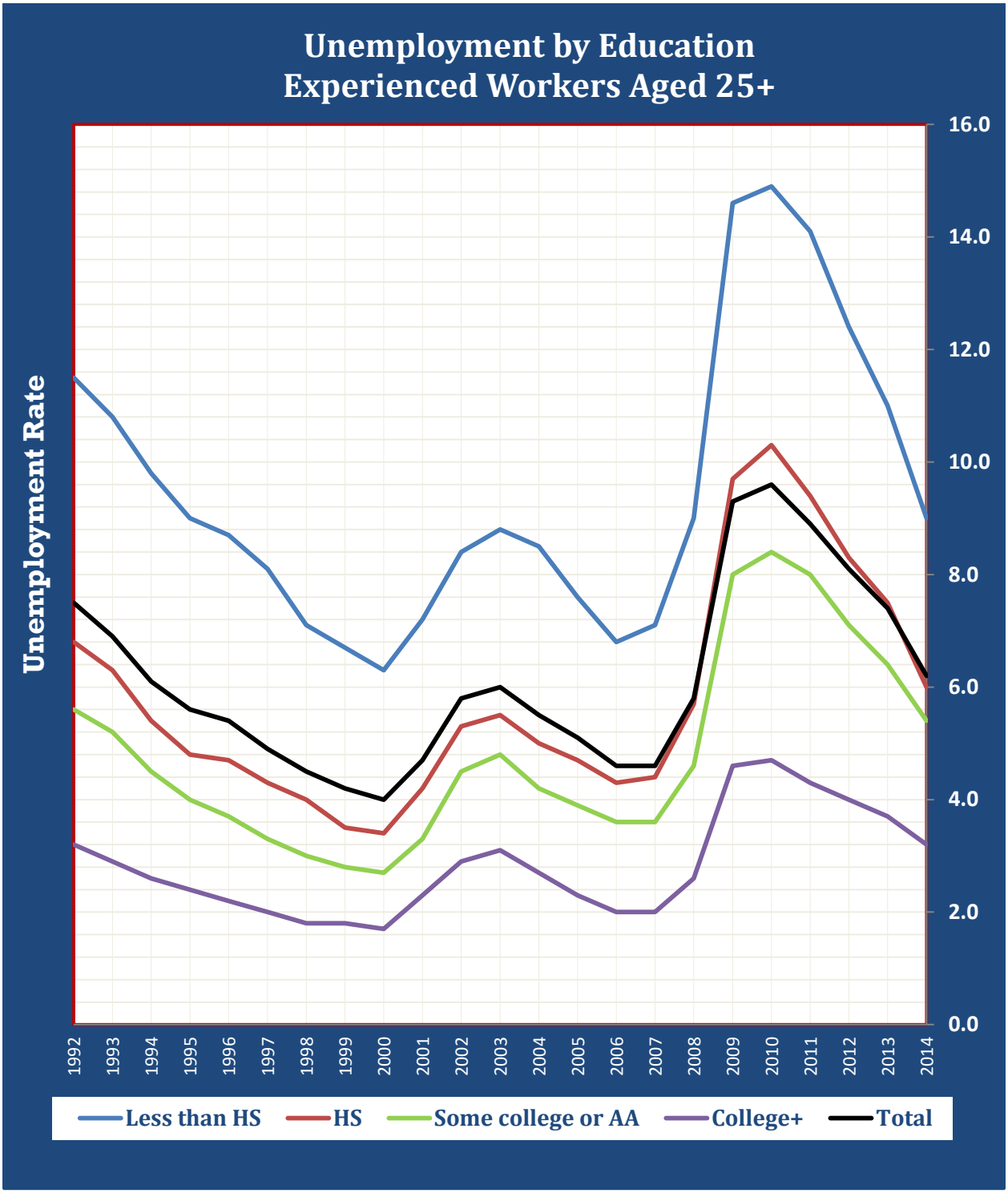


Figure 9 shows the impact of educational attainment on unemployment. While college graduates have unemployment rates well below the national average, those with less than high school education suffer the pains of unemployment far higher than the national average.

Figure 10

The Restructuring of the Industrial Landscape
US Employment by Industry

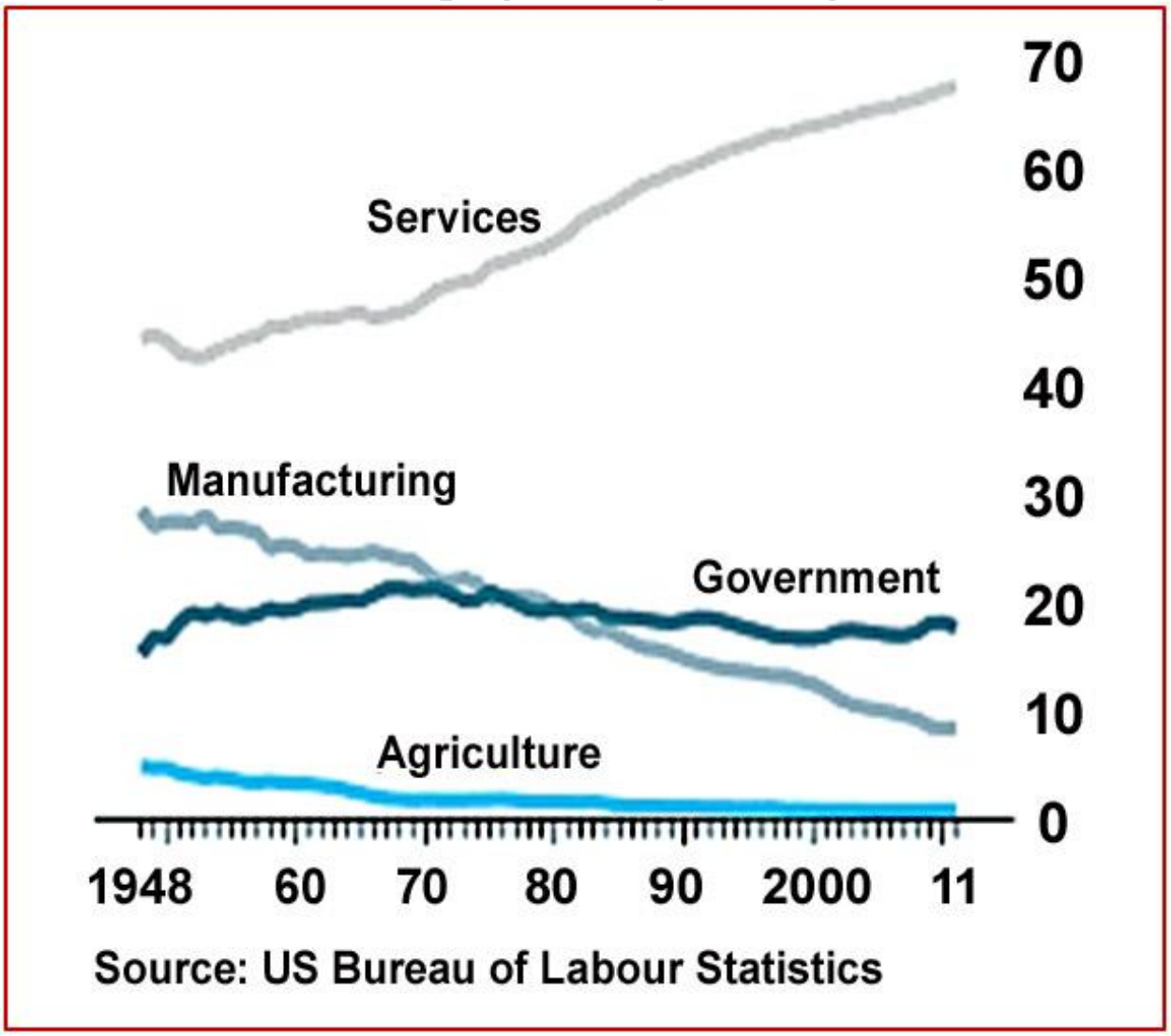


Figure 10 not only shows the relative decline of manufacturing with its multitude of routine jobs but a compensating rise in service sector jobs. These are more than retail clerks and laundry workers as traditionally portrayed by economists. Service occupations encompass a huge variety of occupations from CEOs and physicists to kitchen helpers and house cleaners in a multitude of industries. They are essentially every job outside of a factory, farm, or mine.

Mining employment, important as the industry is, does not show on the chart for lack of employees. Agricultural employment has nearly disappeared from the chart. In 1900, 41 percent of Americans worked on farms, most as owners. It turns out you really can't keep them down on the farm. Government employment has actually declined as a share of total employment in recent decades despite emotional assertions to the contrary.

Working Adults: Dropping Out or Hanging in There

The overall US labor force participation rate (the percent of the civilian labor force[6] working or looking for work) has fallen steadily since 1997. The participation rate in early 2016 stood at 62.9 percent compared to a high of 67.1 in 1997 according to the Bureau of Labor Statistics.

Commentators usually present this decline as a bad thing. The implication is that working adults have dropped out of the workforce because they are too discouraged to look for work. The unspoken assumption is that middle aged and older adults laid off from routine occupations make up the bulk of those dropping out.

This does not hold up to careful scrutiny. Before attending to the causes of the decline, let us look at the data on discouraged workers - those who are not working or looking for work because they don't think work is available for them. The US Bureau of Labor Statistics (BLS) defines such people as "discouraged workers" and "out of the labor force."

BLS tracks discouraged workers closely. It reports that in December 2015 the number stood at 663,000 or only 0.04 percent of the 158,000,000 people in the workforce (those working or looking for work). The number of discouraged workers has actually fallen sharply recently, not risen. The number peaked at 1.3 million in 2010 meaning that nearly half of the previously discouraged workers joined those working or looking for work since then.

The argument that middle aged and older adults might have something to do with the decline does not bear scrutiny either. In fact, the participation bright spot has been the steady participation of middle aged and older adults 45-65 years of age (AKA baby boomers) falling from an unusually high of 83 percent in the early 2000s to 80 percent in 2015. In fact, the participation rate for those 60-65 years old rose steadily from 1997 to 2015 going from 47 percent in 1997 to 55 percent in 2015 – an eight-point jump.

The retiree portion may grow in the next 20 years, as the bulk of baby boom generation leaves the workforce. Of course, this depends on how long the healthier, longer-lived generation wants to keep on working. In any event, Boomer withdrawal from the labor force does not explain why participation rates have fallen since 1997.

A closer look at the age-related participation data also helps explain the bulk of the decline in participation. The BLS workforce participation data by age shows by far the largest drop in participation since the high in 1997 is among 18-19 year-olds. The National Center for Education Statistics (NCES) school enrollment data show a major

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[6] The government classifies everyone not in the armed forces or institutionalized and 16-years-of-age and older (i.e. until they die) as the "civilian labor force," Every member of the civilian labor force who is not working or looking for work is "out of the labor force." This includes students, retirees, homemakers not interested in work at the time, and ne'er-do-wells. Discouraged workers are those not working and not looking for work because they don't believe any jobs are available for them. They are considered "out of the labor" force rather than unemployed. See Figure 21 on Page 62.

rise in young people staying in high school and enrolling in college in ever-greater numbers over the past 20 years. (Again, students not working or looking for work does not count as workforce participants.) Thus, an increase in school attendance in this group lowers the participation rate.

Figure 11 shows that 18-19 year-olds (green line) experienced by far the greatest decline in workforce participation in the past 30 some years. Young people aged 20-24 also show a significant decline although not as steep. Figure12 shows that the labor force participation drop among young people coincides with students staying out of the workforce to continue their education. The chart does not include the increased number of 20-24 year old students in school. If it did, the rise in school attendance would be greater.

We do know that the dropout rate for those between 16 and 24 years of age has fallen by more than half since 1970. That is, 15 percent or 4.5 million dropouts to less than seven percent or 2.5 million dropouts in 2013. Falling HS dropout rates and rising college attendance appear to explain most of the decline in overall participation. Thus, students are the main, if not the only, factor in declining overall workforce participation.

Though students may be working or looking for work, many fewer have been doing so. Between 2000 and 2014, the number of working students fell from more than 50 percent to less than 40 percent (NCES).While adult workers add a small amount to the decline in labor force participation, they are not a major concern while the increasing schooling of young people seems a good thing.

The New Workplace And Income Inequality

Is there a connection between loss of routine jobs and the widening gap between incomes of the rich and everyone else? Does the loss of jobs in these occupations drag down the wages and household income? Affirmative answers to these questions seem quite plausible though hard to document.

It is certainly true that that in addition to record unemployment, median household income dropped during the Great Recession and as of late 2015 had not recovered. Individual wages recorded similar drops and the wage losses between 2009 and 2015 hit lowest paid wage earners hardest. See Figures 23 and 25

Both of these indicators are consistent with the fall in the number of jobs in routine occupations. As these jobs disappear, the supply of lower skilled workers per job grows so there is little workforce supply pressure on employers to raise wages.

Conversely, the *high* wages and *low* unemployment rate of college graduates would seem to indicate relative shortages of such workers. Higher skills and credentials for working adults now in routine occupations could raise their wages and potentially relieve shortages in nonroutine fields. Could be.

Figure 11

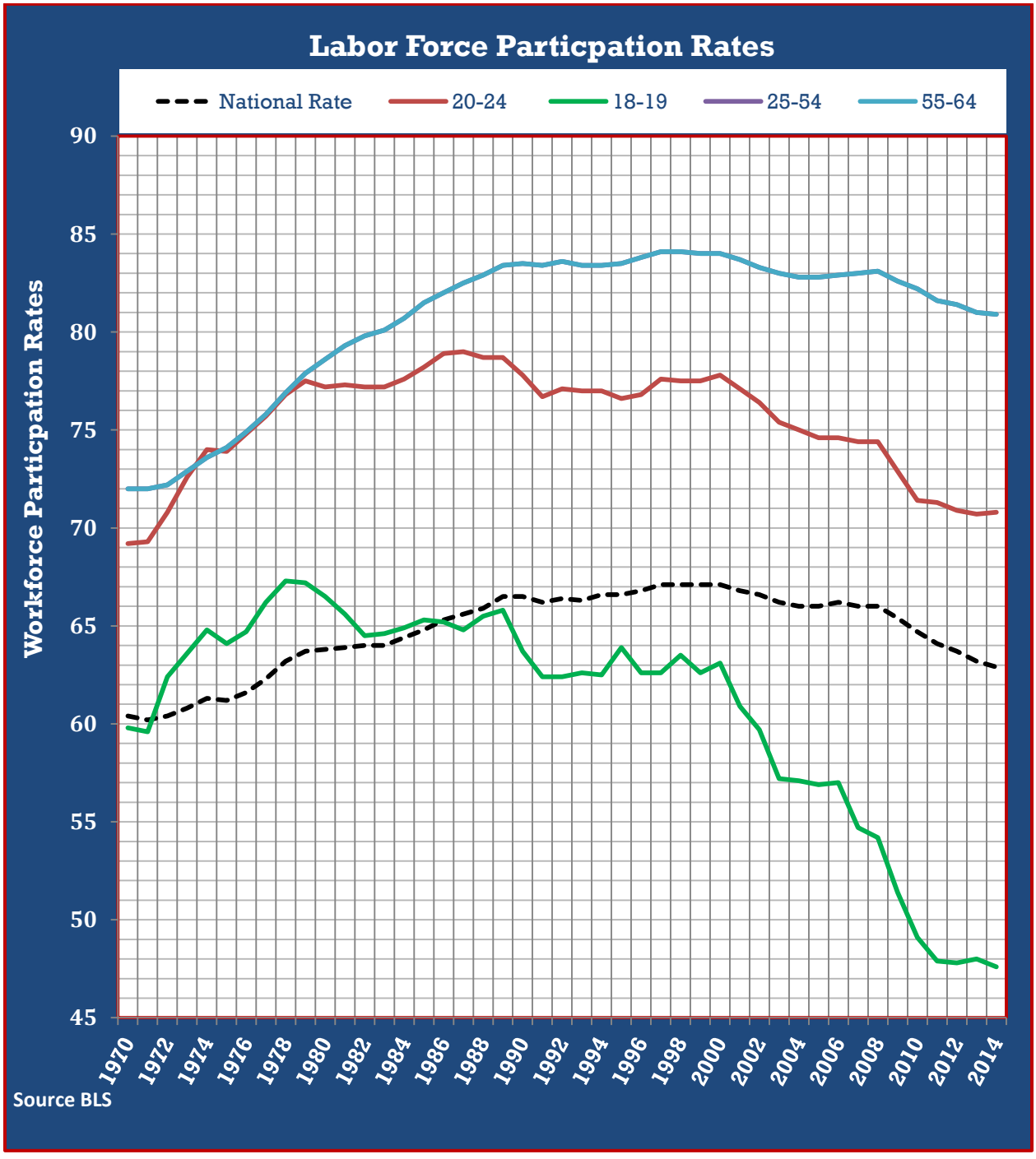
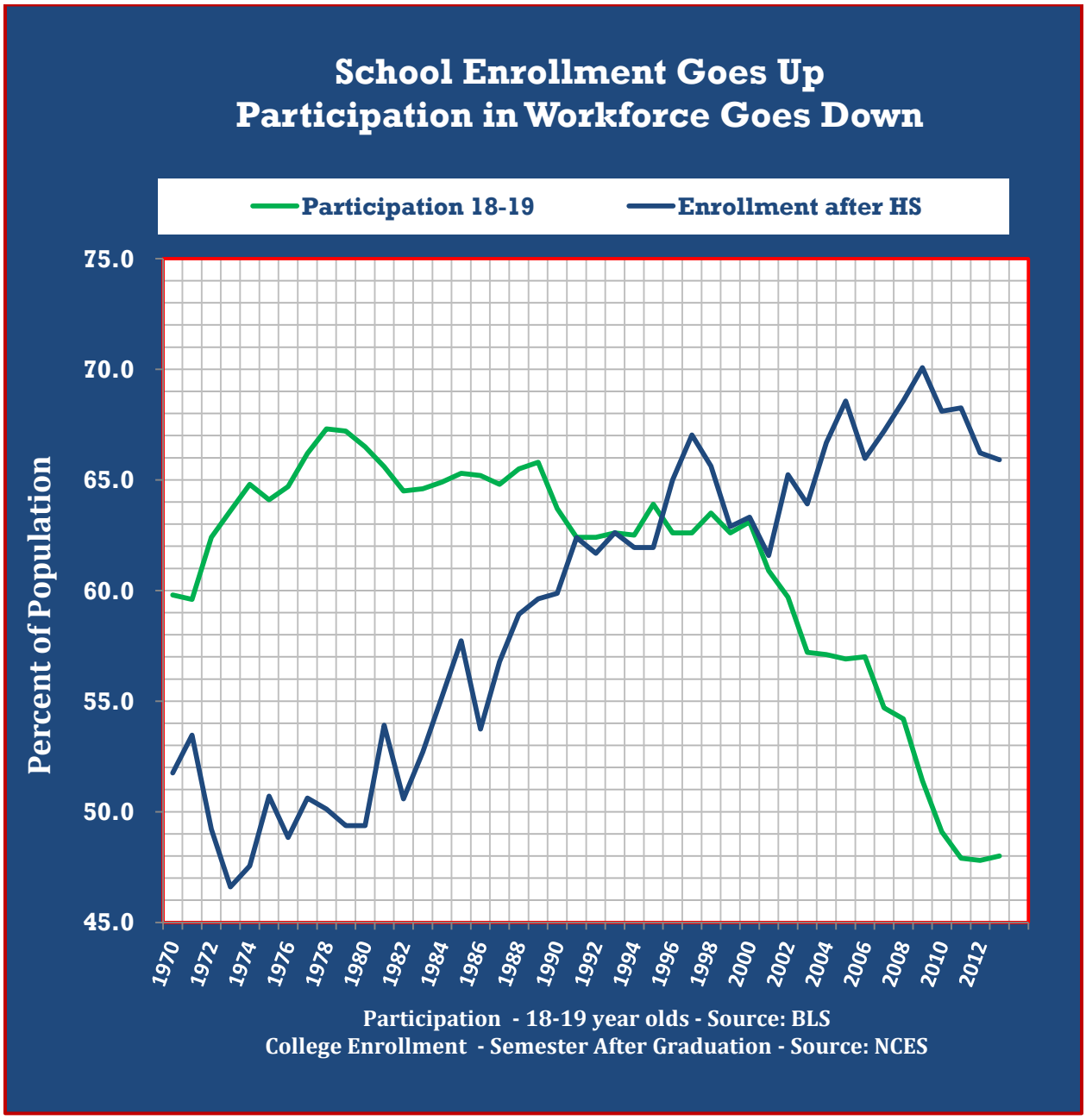


Figure 11 illustrate the differing participation rates by age over time. The most pronounced drop is among those aged 18-19 and 20-24. While the fall of the rates for those over 25 are markedly smaller.

Figure 12



Falling HS dropout rates and rising college attendance appear to explain most of the decline in overall participation. Figure12 shows that the decline in youth labor force participation rates matches a corresponding rise in school attendance. The education line would rise more if the decline in the number of high school dropouts – 4.5 million in 1970 down to 2.5 million in 2013 of those 16-24 –and college students aged 20-24 could be included. However, the two sets of data use different age breakouts.

Part III - Skills

A Qualified Workforce

The whole point of upskilling and reskilling –- terms we hear a lot these days – in addition to improving job prospects for adult workers - is to improve the productivity and effectiveness of business operations. An unqualified or marginally competent workforce is a dead weight on company profits and employees' pay.[7]

A highly qualified workforce increases the company's productivity, flexibility, and profits. Learning is the essential ingredient for a continuously transforming workplace, where brains are more important than brawn and employers require a smart, flexible workforce with well-honed skills.

However, employers often fail to take into account the loss of efficiency and productivity that results from a lack of training and continuing education. Employers generally believe that schools should provide the needed education and employer sponsored training should be limited to the very specific needs of the company (company policies, orientation to new equipment, management training, etc.). Since most occupations do not have mandatory continuing education requirements, adult workers have to adjust their skills catch as catch can.

A 2015 Manpower Group Talent Shortages survey found only 28 percent of companies were providing additional education or training current workers to meet their talent shortages. Another 36 percent appoint workers to positions for which they lacked appropriate skills apparently with the fond hope that the workers would learn the job along the way.

Furthermore, employers usually leave the task of initial training to the informal ministrations of the HR Department, supervisors, and colleagues. By using this informal and inconsistent approach, employers deprive employees of much useful information and valuable foundation skills. If workers want to advance in their careers, it is usually up to them to get outside education (e.g. master's degree, community college courses, etc.)

Why Trained Employees Stay

"If I train them, they will leave." This common assertion does not hold up to careful examination. "It sounds like the people who say that only want people that no one else wants – the least competent workers. Not such a good business plan when you think about it. I prefer to have the best employees in the business," a Hammond, Indiana steel company director retorted when asked about it.

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[7] This applies, as well, to government agencies and nonprofits trying to operate efficiently and effectively meeting their mandate.

Research backs up the steelmaker's argument. Scott Brum of the University of Rhode Island conducted a review of the available academic research on training and its effect on the employers and employees.

He found

> ". . . Organizations that train their employees consistently have better outcomes than those that do not. When business environments change abruptly, it is typically, the companies with the best-trained employees that adapt and adjust most efficiently…Research (has) affirmed that training encourages "spontaneous cooperation" in many large companies. Even in fast moving and ever-evolving industries, the cooperation achieved through training could lessen the need for complicated company policies.
>
> Organizational training can offer these employees an opportunity they may have not been able to achieve elsewhere. The result is a more committed employee that has a greater desire to remain (at his current job). . . From an employee perspective, general training[8] was found to be more valuable to employees than (company) specific.
>
> Since a great deal of research indicates that general and specific training are many times enmeshed and intertwined in each other, it may best serve organizations to promote and encourage participation in general training programs."

Perhaps counterintuitively, the more the organization provides employees with portable and valuable skills, the more loyal they will be to that organization.

The literature emphasizes five other points. The highly qualified worker model succeeds best when it:

- Is an integral part of an employer's business model;
- Provides continuous learning opportunities, sometimes formal, sometimes informal;
- Takes into account that all employees have at least some valuable skills that can be supplemented rather than ignored;
- Includes general as well as specific education especially where the employee can qualify for an academic, occupational, or a formal alternative credential (license, certification, etc.);
- Includes all employees from frontline workers to top executives.

Frontline Workers

It is our experience that frontline workers bring far more value to organizations than most employers understand or are willing to admit. These employees have the first (and often continuing) direct contact with customers and clients both external and

[8] General training provides portable skills and credentials - degrees, certifications, licenses, etc.

internal. Frontline workers provide the "moment of truth" – when an organization has the *first* direct contact with the customer or client - for the entire firm or organization. Most of us judge a company not by how hard the executives work and how smart the people in the back office may be, but by the service received from the frontline workers.

For the customer, an airline is the person behind the ticket counter, not the CEO, mechanics, or pilots. If the sales person is polite and helpful on first contact, the company is great. If the product is always what we ordered because the frontline workers in the factory or shipping office did things right the first time, we will have a good feeling about the firm. Of course, everyone makes mistakes, but if a company frontline worker can fix the problem politely, contritely and efficiently, we will let the mistake pass.

On the other hand, if the service is rude, if the product is late and inoperable, or the employee can't fix our problem promptly, our opinion of the organization goes down the tubes. Computers with fancy software can help avoid errors but they can't replace competent helpful human contact.

Other frontline employees – administrative assistants, IT help desk workers, etc. - serve internal customers. The quality of their interactions within the company can be critical to the organization's smooth functioning. Frontline workers skills are not trivial even though the employees may not be paid as much as others.

A second imperative for educating frontline workers is that with fewer employees in routine operations, and fewer skilled workers available from the outside, employers now ask more of people on the frontline. Such employees need to know more about the company, its products, and services. They need to be able to solve customer problems, service equipment, and interact smoothly with the people around them.

In many organizations, the employer now expects employees who until recently held routine jobs to broaden their skills, often quite quickly. Employers don't often give much thought to this profound transformation in the workplace and consequently provide little systematic training in the new skills required.

With the continuous education and training of frontline workers along with everyone else, an organization can greatly improve its reputation, the quality of its products and services, and overall effectiveness. Yet, according to a 2015 White House upskilling report, frontline workers are least likely to receive employer-provided training. At the same time, access for public training programs for less-educated adult workers has steadily declined in recent years.

Today, one third of all adult workers have a bachelor's degree or higher. Employers pay them considerably more than those with less education and they have dramatically lower unemployment rates. Workers in the skilled trades are similarly blessed. Nonetheless, frontline college graduates and skilled workers are just as likely to lack necessary skills as other working adults are.

Some occupations (teachers, nurses, physicians) have at least nominal continuing education built into their licensure or contracts. Other occupations have little in the

way of information of how they can be most effective and or ways to keep their skills up-to-date. Finding what skills employees lack and how to provide the education and training out takes some work.

Outtake

Unskilled and Unaware of It

"People tend to hold overly favorable views of their abilities in many social and intellectual domains. The authors suggest that this overestimation occurs, in part, because people who are unskilled in these domains suffer a dual burden: not only do these people reach erroneous conclusions and make unfortunate choices, but their incompetence robs them of the metacognitive ability to realize it.

Across four studies, the authors found that participants scoring in the bottom quartile on tests of humor, grammar and logic grossly overestimated their test performance and ability. Although their test scores put them in the 12th percentile, they estimated themselves to be in the 62nd.

Several analyses linked this miscalibration to deficits in metacognitive skill, or the capacity to distinguish accuracy from error. Paradoxically, improving the skills of participants, and thus increasing their metacognitive competence, helped them recognize the limitations of their abilities." Summary of research by Justin Kruger and David Dunning, Cornell University, 1997

Aim First, Shoot Later

For employers, educators, and trainers, understanding what the employer wants and the employee needs, lays the foundation for everything adult workers should learn. Too often, those wanting to do something about the skills problem just jump and try to fix it. This usually leads to failure. Psychologists sometimes call this the" illusion of competence" ("How hard could that be?"). In fact, the process takes patience, analysis and, yes, some training. (See box above.)

Occupations requiring licensing or formal certification usually have clear sets of critical knowledge and skill requirements. These tend to cluster in health and safety related fields (physicians, medical technicians, fire fighters, police officers, etc.) as well as in apprenticeable trades. (See discussion of credentials in next section.) However, few other occupations have such standards. Moreover, the formal standards often do not cover everything the employee needs to be an effective performer.

Identifying the appropriate education or training for working adults is tricky. Here are a few of the common pitfalls and suggestions. These apply to anyone analyzing a study, reading data, conducting a survey, or trying to gather information from individual employers and employees.

What *Are* You Talking About? The first pitfall in determining skill needs arises from the fact that people talk past each other without even knowing it. As we noted in an earlier paper, sociologist Michael Handel sums it up very well when he says:

"In the skills mismatch debate, it is often not clear who is missing what skill. The term 'skills mismatch' is used to talk about: technical manufacturing know-how, doctoral-grade engineering talent, high-school level knowledge of reading and math, interpersonal smoothness, facility with personal computers, college credentials, problem-solving ability, etc. "

"And, depending on the conversation, the problem lies with: high-school graduates, high-school dropouts, college graduates without the right majors, college graduates without the right experience, new entrants to the workforce, older workers (with obsolete skills), or younger workers (who aren't being properly trained by their employers). Since the problem is so ambiguously defined, people with vastly different agendas are able to get in on the conversation -- and the solution."

In other words, literally no one knows what they are talking about. At least they don't know for sure what anyone else is talking about. Handel continues: "All of the skill deficits may be real and all the groups may need better skills. However, until someone teases out the issues and we better understand which skills are needed by whom, no rational approach can be taken to addressing whatever skills shortages there might be."[9] Such lack of definition offers the first barrier to adequate determination of needs. When funding agencies sponsor research, the process often begins with assumptions about basic but ill-defined terms such as "skills," "need," "difficulty finding," "creativity," "math", "writing ability," etc.

Life, the Universe, and Everything

In his comic sci-fi novel *The Hitchhikers Guide to the Galaxy*, Douglas Adams presents a situation in which the people on a far-flung planet build a supercomputer to create the ultimate super supercomputer.

When the ultimate super supercomputer is finished and enquires what the people would like it to do, the leaders reply that the people want the answer to "life, the universe and everything."

After a great deal of time (7.5 million years), the super-super computer responds.

Computer: "I have the answer"
People: "Great! Tell us!"
Computer: "You are not going to like it."
People: "We don't care; we just want the answer to life, the universe, and everything."
Computer: "Well…um, the answer is, um. 42."
People: "How can that be? It doesn't mean anything."
Computer: "Right answer. Wrong Question."
(Adams 1978) This is a paraphrased version from the original GJM)

[9] Just to be clear ourselves, the paper address the skills employed of adults in the near to medium future.

Delving Deeper

With terms defined, the next job is to get the facts. Employers, trainers, educators, and working adults themselves need to know what they don't know about employers' specific needs and what the base line employee knowledge, skills, and abilities are. Rarely do any of these groups have access to such insights. They should.

Finding things out requires asking people questions – getting information from individuals, focus groups, surveys, or by task analysis. Proper structuring of the collection process determines success or failure.

Investigators (and readers) need to ensure that statisticians or competent researchers have properly prepared any survey, especially if it involves a study where the group is too large to interview individually. The following provides some advice for investigators on designing information collection instruments. In reading resulting studies, users should keep an eye out for defects in study design that may affect the quality of the information.

Ask the Right Question Questions need to be precise and unambiguous. A poorly framed question can ruin the value of the information collected. Questions can be baffling: "Please answer the following question yes or no: Do you have a lot of skills shortages or not?" (It happened). Alternatively, questions are too general or ambiguous such as asking of employers: "What skills do your employees need?" On the other hand, too many, and too specific questions (Is that a left-handed or right-handed screwdriver?) will reduce the response rate without adding useful information.

Ask the Right People If the questions are good but investigators gather information from the wrong people, the results won't be much help. Organizations often conduct voluntary or online surveys of their members. Since the respondents self-select, we have no idea whether the answers accurately reflect how the rest of the group would respond. The most poorly selected samples give numbers that are truly "meaningless statistics."

While findings of unrepresentative studies may provide some usable information on the general situation, they are too subjective to be very useful in designing education or training for working adults. Still, they are a step above the dreaded anecdote. The research behind Figures 13 and 14 (CED 2015) suffers from some of these deficits[10], but does provide some useful general insights into what a self-selected group of professional trainers believes about training deficits.

Get the Right Information Good definitions, well-designed questions, and a representative sample can go only so far. Content matters. Specific technical skill needs of

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10 This is likely a result of how the surveyors selected respondents, how the survey instrument was structured, and the range of options offered to the respondents for each question.

each employer are important.[11] Conducting job analysis using both employers and experienced employees adds considerably to the value of any skills study. The questions will need to elicit whatever measureable skills criteria the employer uses, or could use, in hiring and promotion and training. It is also well to prioritize the needs, since training usually, the players cannot do all the training at the same time, and the most trivial is often the easiest to do.

Don't Forget the Employees Ask the most skilled and experienced employees what a worker in their position should know to do their job really well. It helps to observe them doing it as well. The transfer of this information could greatly improve the performance of other employees.

The issue of employee competence starts from the beginning. Too few working adults get a rigorous orientation to the job beyond company health and retirement policies. Employees, new and old, should know how the entire company works and about the functions of other jobs within the company and the relation of these jobs to their own. Not knowing what the employees don't know can have costly consequences.

In the End All Skills Needs are Local Labor markets, employers, and working adults have specific and local educational and training requirements. Knowing these will be the key to a successful continuous learning system. Companies, colleges, and public programs can use many off-the-shelf resources – standards, curricula, assessment tools, etc. However, in the end, individual employers and employees need to set the learning agenda - no one else.

Think of a System Not a Program Beyond the specific skills needed for a given job, organizers would do well to design an organization-wide system of skills – a pattern of competent adults interacting and working in unison. This involves cross training among occupations, having disparate employees work in ad hoc teams focused on a single problem, etc.

Foundations

One critical category not addressed by most skills shortages reviews is the most basic: language, literacy, and numeracy. For many routine jobs, these may not be necessary. (Think non-English speaking laborers, groundskeepers, etc.) However, *all non*routine occupations require a solid grounding in the fundamentals.

Employers tend to forget how many adults lack basic literacy and numeracy. The US Census reports that nearly 25 million adults do not have a high school diploma and 20 percent of all adults with a high school diploma have only beginning literacy skills. Ten million adults lack even an eighth grade education. Two-thirds of U.S.

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[11] *Skills shortages may not be the only reason that employers have trouble finding and keeping qualified employees. Keep in mind that low wages and poor working conditions affect the availability of qualified workers. In a recent Manpower Group survey, 54 percent of employers said they could not find employees with the right skills because the applicants were looking for more pay than offered."*

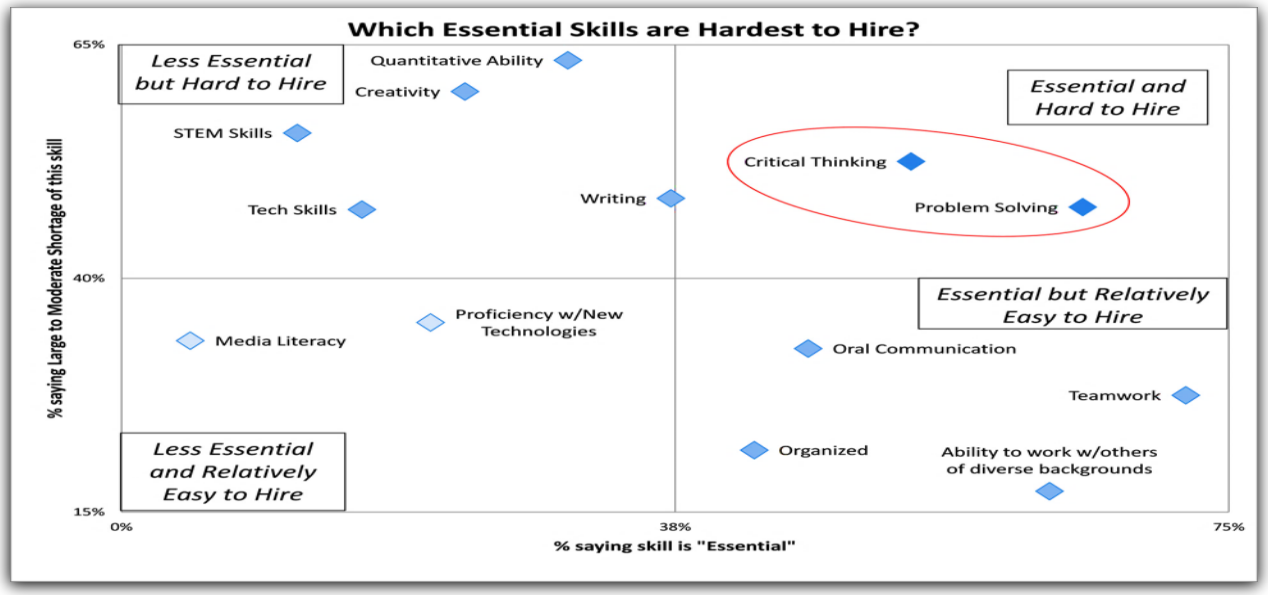
adults scored at the two lowest levels of proficiency in solving problems in technology-rich environments as reported by the US Department of Education.

As with other skills deficits, lack of English proficiency can present a serious barrier for some potentially very valuable workers and managers. Many times immigrants, highly educated in their own language, haven't mastered English well enough to apply their skills. Such employees too often resign themselves to working in low paying, insecure, and routine occupations. Immigrants not well educated in their home country, may speak English well enough to communicate but not enough to handle reading, writing and math on the job. A minority, usually immigrants from less developed countries, had no schooling at all. They are literally illiterate.

Even when employers require each applicant to have a high school degree (or even a college degree), they rarely check to see if their employees actually have basic academic competencies. They use, instead, the credential as a proxy for skills[12]. Unfortunately, actual skills often do not match those implied in the degree.

Further, many adults who did well in school may have lost the particular basic skills needed for their job. Most of us forget what we do not use regularly. We may have aced 9th grade algebra but are baffled by a binomial equation now. (Quick: divide 4/30ths by 3/23rds.) A similar problem occurs when employees encounter common technology with which they are unfamiliar or have not used for some time.

Figure 13



Source: Council for Economic Development September 2015

[12] This is actually a thorny human resources issue. It is difficult to find a reliable assessment that is both fair to all applicants and accurate in its findings. It is much easier to ask for educational attainment. On the other hand, diagnostic assessment to determine training needs for adults already working is less of an issue.

Various reasons help explain why employers overlook the fundamentals. For one, most employers just assume everyone in modern society can read, write, speak fluently, do basic math, and use simple computer applications (e.g. Microsoft Office).

For another, these deficits are easy for an employee to disguise given the shame often associated with poor literacy and innumeracy. In any event, employers think it is the schools' job to teach these skills, not theirs.

We once worked with a maker of professional uniforms that shipped its products all over the world. The firm was having serious quality control problems. Packages were going to the wrong customers with the wrong number of uniforms and the wrong names stitched on the front. It turned out that employees, who had moved from routine production tasks to distribution operations, though hardworking, could barely read or count. Simple competency assessments and a few months of refresher classes solved the problem.

In another case, a major appliance manufacturer opened a new warehouse. Soon after opening, multiple shipping errors bedeviled the operation until the manager called each one of the workers in to his office separately and asked them to count out 50 pencils he laid out on his desk. As it happened, few of the employees could count that far. The manager quickly implemented a basic math program for all employees. Once identified, the problem was relatively easy to solve.

Even college graduates often cannot write well enough to prepare situation reports or are unable to interpret data required for jobs that do not normally call for math skills. (Please draw a histogram without looking it up on the Web.)

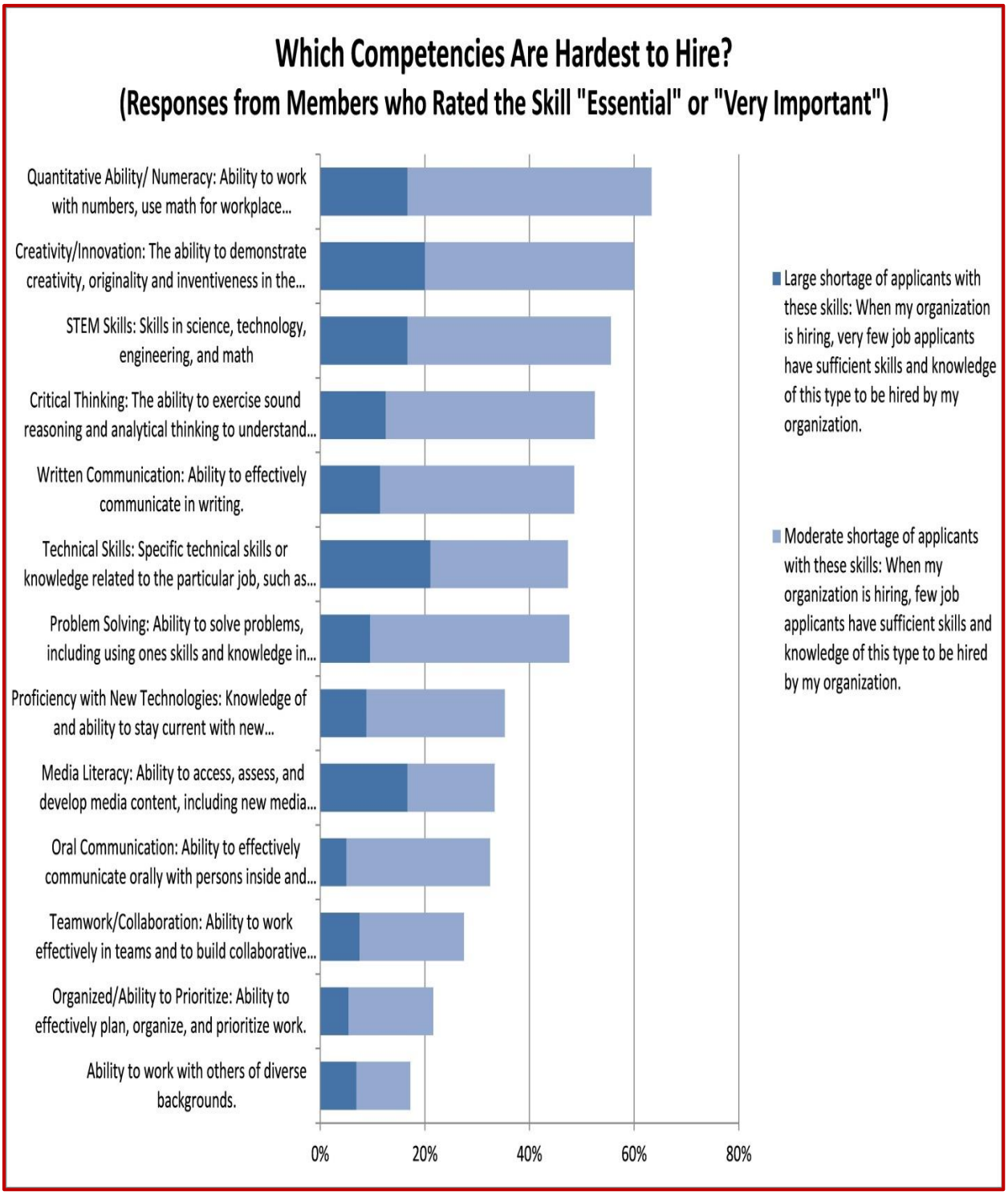
The lack of basic skills can be quite costly to employers. Specialists can usually remedy deficits quickly once identified and at little cost. Research has shown that employees genuinely appreciate this benefit. Sussing out these deficits and addressing them is the first step to further learning and a more productive workforce.

Poor literacy and numeracy can also present a serious problem when an employee goes for a promotion. One major airfreight company we dealt with wanted to promote package handlers and drivers to become supervisors but found many of the best workers lacked the basic skills necessary to take the classes needed to qualify for the position. Again, an inexpensive program of remediation and specialized supervisory training successfully addressed the issue. These cases indicate how unseen skills deficits can hamper the operations of any employer.

One popular and highly effective community college program for small employers in New Jersey involved teaching employees the fundamentals of communications skills, basic math and using an IPad, and mastering Microsoft Office (Word, Excel, etc.) since the majority did not have a computer at home. (See box on New Jersey program.)

A common drawback of "remedial" academic programs is that they exceed the content needs of the employees and employers, which usually means they take too long and cost too much.

Figure 14



Source: Council for Economic Development September 2015

The Softer Side of Work

Traditional routine manual labor usually required little in the way of sophisticated social skills. Hard work and a good attitude were usually enough. However, the modern workplace requires much more interaction with other people (colleagues, customers, teams).[13]

For the modern workplace, employees need to exhibit more so-called "soft" skills. Often mentioned but rarely well defined, soft skills revolve largely around interpersonal relations. These include communication, reliability, the ability to work in a team, consideration of others and politeness. Sometimes called "emotional intelligence," they require behavioral skills rather than just knowledge and manual skill.

Some soft skills seem to border on innate personality characteristics rather than learnable behaviors. Some are a matter of good manners. (Communications, for instance, includes being willing to speak up and knowing how to convince others of a viewpoint without being obnoxious.) However, they all are important.

Lack of soft skills can be a huge drag on the productivity of any organization dependent upon human interaction. Deficiencies in soft skills can be just as prevalent among supervisors, managers, and human resource staff as among frontline workers. This often leads to high and expensive turnover.

Working adults can learn many of these skills but rarely receive any instruction in them from employers or educational institutions. When they do, the learning is rarely measureable. The instruction is usually *about* the desired skills rather than ways for learners to practice and perfect the behavior.

In fact, employers with some outside assistance can clearly define and measure soft skills, although they differ from situation to situation. (Geeks may need a little slack in the communication department.) Behavior modeling, individual coaching, and mentoring sometimes are the best methods to inculcate soft skills.

Thinking and Problem Solving

Often included under the soft skills, cognitive (thinking) skills include such abilities as problem solving, critical thinking, quantitative understanding (using math) and writing skills. Employers apparently find "critical thinking" and "problem solving skills" the hardest to find. See Figure 13.

It is likely that an employer of any size has working adults who excel in these skills already on staff. They may just be in the wrong place in the organization. There should be ways to identify, measure, and train for critical thinking and problem solving. Again, the danger is to teach about the skills rather than instilling them.

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13 *We recommend the film "On the Waterfront" starring Marlon Brando for the lack of social skills we are talking about.*

Keeping up with Technology

Public discussion of skills shortages often evokes images of blue-collar trade's people - men in hard hats - as the primary focus of shortages. In fact, the skills are as likely to be lacking in business process software engineers or any other occupation.

Technical skills sit at the heart of the business operations of most organizations. The need to keep technical skills honed cannot be overstressed. Nor should we define them too narrowly. Technical skills are not just for people who work with machines and tools (low-tech or hi-tech). The term refers to the talent required to perform the work in any occupation well.

Too often employers train working adults only on the most narrowly defined elements of the work to be done. Those who run machines may have no idea how they work. In one case, an instructor for a plastics operator's certification discovered that the operators were unaware what plastic resin was or what happened when it went through the machine.

At the same time, the employer complained that the company could not find enough skilled workers to maintain and repair the equipment. Testing and training of the operators provided them with the skills to improve their performance and better maintain and repair their equipment.

Similarly, those who use basic software applications like Microsoft Word or Excel may have no idea of the full potential of word processing and spreadsheet software. This all hinders productivity of the worker and the organization.

Continuous learning is as important for technical training as for any other area. Refreshing skills on less used aspects of the job and upgrading skills as improved techniques and technology come along keeps the workforce on the top of their game. Certification is discussed the next section of this report but it goes hand in hand with technical training and should not be ignored.

Small Employers and Community Colleges Basic Skill Training in New Jersey

The New Jersey Department of Labor for many years has had a matching grant program to deliver basic skill training (computers, communications, critical thinking, problem solving, basic math, English-as-a-second language etc.) to New Jersey employees of New Jersey businesses.

From the beginning, large businesses used the program with considerable success. However, small and medium-size businesses rarely participated. They found program requirements too burdensome.

That all began to change in 2007 when a partnership between the Department of Labor, the New Jersey Business and Industry Association (representing more than 20,000 mostly small businesses) and the New Jersey Community College Consortium for Workforce and Economic Development began to put together a streamlined employer-focused worker education system.

In 2009, the state legislature provided state funding for the Consortium and eliminated many formerly restrictive requirements. Working with the Business and Industry Association, the Consortium developed a service modifying community college curricula and delivering courses to meet the specific needs of the small- and medium-sized businesses.

By the end of 2015, just over 86,000 employees (46 percent earning less than twenty dollars per hour) from 5,860 small and medium size businesses had participated in the training. The state had provided $13 million for tuition. In turn, the employers paid the employees while in training. The average cost in state funds per employee trained has been just $151.

The program's success is due in part to the active involvement and support of the employers and its association and the state's 19 community colleges. The community colleges have just over 60 campus facilities that deliver training across the state; the state estimates that there is a campus facility within 20 – 25 minutes of where every state resident lives or works.

Independent evaluations have found that both employers and employees were highly satisfied with the program; 86 percent of the students said the program was "Far Above" or "Above" expectations. Employers expressed a high degree of satisfaction with almost every aspect of the program. Support from businesses, easily accessible campus locations, convenient scheduling of training, and curricula tailored to local business needs are the foundation for the program's success.

Robert Bowman

Part IV:
The State Of Learning for Working Adults

The United Sates has a vast, if ill coordinated, wealth of educational institutions and training providers with great potential to serve the needs of working adults. Overall, American educational achievement over the past 70 years has created a sophisticated postsecondary learning system well within the reach of working adults and their employers. In many respects, the US has the best and most admired postsecondary educational system in the world. Universities and colleges are beginning to show increased interest in working with employers to serve their adult workforce

What the US lacks at the national, state, or local level is what the Danes call an "An Active Labor Policy." [14] (See Box) This is an integrated system of public and private resources and policies supporting continuous learning for working adults.

The US is unlikely to establish such a national system anytime soon. However, states and localities can do so by combining new policies and existing institutions: employers, government, postsecondary educators, economic development agencies, and organized labor.

A Highly Educated Workforce

US educational attainment is high and continues to rise. Figure 15 shows the dramatic difference between 1940 when more than 75 percent of the adult population had not graduated from high school and 2014 when only about one in ten adults lacked a high school diploma. At the other end of the scale in 1940, only 4.6 percent of adults (less than one in twenty) had a college degree; now one-third does.

Outtakes

Denmark's Active Labor Policy

Alexander Kjerulf

"Since the mid-1800s, Denmark has focused on life-long education of its workers. This policy continues to this day, with an extremely elaborate set of government, union, and corporate policies that allow almost any employee who so desires to attend paid training and pick up new skills. It's called an "active labor market policy," and Denmark spends more on these types of programs than any other country in the OECD. This lets Danish workers constantly grow, develop, and helps them stay relevant (not to mention stay employed) even in a changing work environment. ...This may help explain why Danish workers are among the most productive in the OECD and why Denmark has weathered the financial crisis relatively well, with a current unemployment rate of only 5.4%."

Besides, the country that produces all those Legos must be doing something right.

Excerpted from Alexander Kjerulf, Fast Company Magazine April 15, 2014

[14] The Danish model resembles the German Dual Training system with less emphasis on formal apprenticeships. Most developed nations have some kind of national adult worker training system.

Job-related learning for working adults has made major gains as well. It turns out that the workers are not standing idly by waiting to lose their jobs. The share of working adults taking job-related education or training rose from 22 percent in 1995 to at least 39 percent in 2015. Much of the increase comes at the employee's own initiative and expense so that they can advance in their current field or take on entirely new careers

Similarly, a process of piecemeal, informal learning within companies often allows workers to gain skills and move up without formal outside intervention. Experience does count and employers legitimately use it as an indicator of skills attainment. However, it works best when general experience and informal learning have an element of planning and assessment. Otherwise, it is pretty much hit or miss.

Workplace Learning

The largest source of education and training specifically for working adults is the employers themselves. However, there is little reliable information on the nature of employer sponsored continuing training and education. What information is available is very general or suspect, although there are some reasonably reliable estimates of total employer training. According to a recent Georgetown University study, employers spend upwards of $170 billion a year educating their workforce. (Carnevale 2015)

In addition to in-house training, employers have ongoing training agreements with outside institutions. A large but undefined number of individual trainers and private training firms provide direct training under contract with employers.

Employers appeared to have retrenched their employee training programs during this latest recession, though there is little data on the size of the cuts. Typically, training is one of the first budget items cut in hard times. Even in a good economy, organizations tend to train for narrow, short-term, and company-specific purposes rather than the long-term workforce needs of the organization.

Organizations with 500 or more employees make up not quite half of the entire US workforce (See Figure 16.) but spend the lion's share of the training dollars, partly because larger companies have organized training departments with financial resources whereas smaller firms have few or no human resources staff and often no dedicated training funds at all.

Work related education and training tends to skew towards employees with higher education. Just under 10 percent of employees with less than a high school education, have work related training in any given year, while 58.6 percent of those with a college degree or more do. NCES found a similar discrepancy based on wages, with higher income employees more likely to get education and training than lower paid employees did.

Figure 15

US Educational Attainment 1940-2013

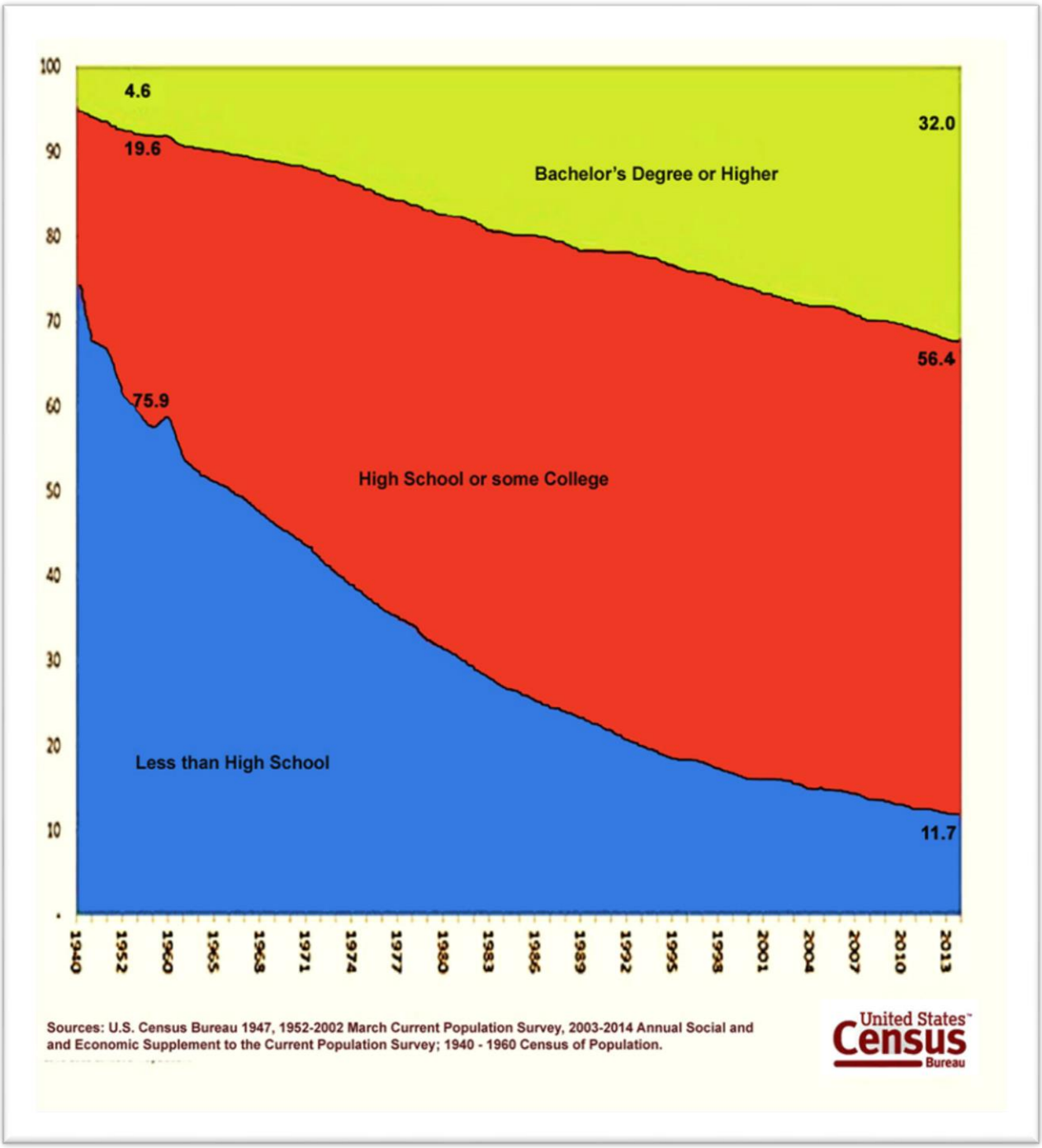


Figure 15 illustrates the dramatic rise in educational attainment of adult Americans over the past 65 years. In 1940, 76 percent of the adults (25 and over) did not even have a HS diploma. Today, that number is 11.7 percent and falling. At the other end of the spectrum college graduates have risen from a mere 4.6 percent to nearly one third of all adults.

While some of the differences can be put down to the fact that the higher paid executives, engineers, and scientists are studying much more complex and, thus, expensive subjects, the small amount of training reportedly given to lower paid and less skilled workers is more of a concern.

Working Adults in Work-Related Learning*

Total	**38.8**
Less than HS	**9.6**
HS equivalent	**23.5**
Hs diploma	**25.7**
Some college	**43.5**
Bachelors or more	**58.6**

Percent of employees at each educational level participating. Source: NCES

Corporate Universities "Corporate universities" developed in the late 1970's, grew rapidly through the 1990s, and then largely disappeared at the turn of the century. These internal employer institutions were set up to provide ongoing education and training for a wide range of employees and to bring suppliers in line with corporate requirements, etc.

A prominent example was Motorola University outside Chicago. It received a great deal of attention in the 1980s with its ambitious goal of ensuring that all Motorola employees got at least 40 hours of training annually. The university even offered training to employees of other companies' in its Motorola homegrown "Six Sigma" quality management program.[15]

However, as the company spun off divisions and changed course, Motorola abandoned its employee-training mandate and rolled the university back under a more traditional in-house training department. Most other companies with similar operations did the same. A notable exception is McDonalds' "Hamburger U," which continues to train thousands of supervisors and managers every year. The company also provides intensive on-site training for every new employee.

Smaller Firms Most organizations with fewer than 500 employees and especially those with fewer than 50 provide only the minimum training necessary to run the organization. They often lack the resources to organize and implement a comprehensive employee learning system for their company although this is not unheard of. (*See Do It Yourself: Branch Electric* below).

More common are arrangements among employers facilitated by industry associations, licensing bodies, community colleges, and economic development organizations. (See Box on "Small Employers and Basic Skill Training in New Jersey.") However, such arrangements are relatively rare. Many small employers have to fall back on informal on-the-job training and occasional courses from large customers as a form of back reaching quality control.

One of the virtues of small businesses is that they can be more flexible and nimble in response to changing markets and customer needs. However, that they are not always so. A well-designed and executed learning system is what the military calls a "force multiplier." A small cross-trained staff can out-maneuver much larger organi-

[15]In the early 1990s, *Harvard Business Review highlighted* Motorola University in a long article.

zations. Small employers will likely need outside assistance in developing and implementing an effective learning system.

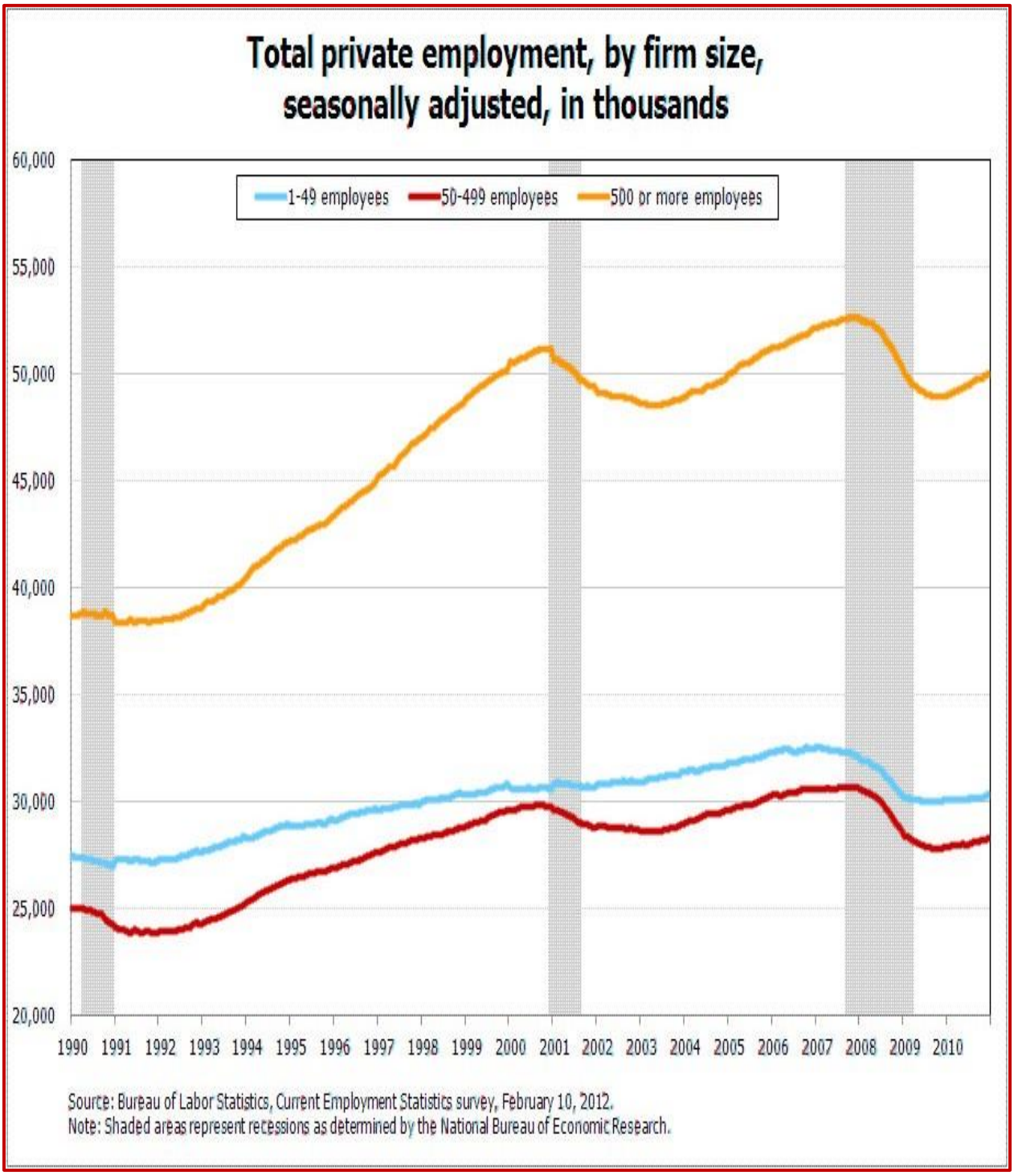
Apprenticeship Although an excellent method to train working adults, most employers in the US do not use apprenticeship training. There are several hundred federally approved apprenticeship occupations in the US but less than two dozen of these are used on a regular basis to train apprentices; most are found in the construction and manufacturing trades. There are less than one half million active apprentices employed in some 20,000 companies in the US.

Organized labor generally supports apprenticeships and unions operate programs for employers throughout the country. Again, however, most are in construction and skilled manufacturing occupations. However, only 6.6 percent of private employees are unionized. (It rises to 11.1 percent when public sector employees are included.)

US employers generally consider that apprenticeship is for blue-collar workers only. Most do not even consider the possibility of using the apprenticeship model for their broader workforce. The US Department of Labor and other organizations have undertaken several well-funded initiatives to expand the reach of the apprenticeship model with a notable lack of success.

German firms, including those in US, have long had a highly effective apprenticeship system that they would never consider abandoning. Commentators often cite the German system as a major factor in the high quality of German products. Other countries, mainly in Europe, have similar, if less highly recognized apprenticeship type training systems.

Figure 16



Private firms with fewer than 500 employers account for about 53 percent of all private employment. Those with fewer than 100 make about a quarter of all private sector employees. Thus, the size and importance of the small business sector depends on the definition of "small." It is often stated that small firms produce the most of the new jobs. Some smaller firms do grow rapidly but if rapid growth continues, they are no longer small firms. In addition, smaller firms are the ones most likely to fail. In any event, size of firm makes a great deal of difference in a firms' employee learning strategy.

Do It Yourself: Branch Electric

Branch Electric Supply, a 250-employee Maryland supplier of lighting and lighting-related electrical equipment with a dozen or so outlets, created an in-house, education and training system for its employees about 20 years ago. The company handled some 10,000 separate lighting products for interior designers, building contractors, and electricians. Its employees included warehouse workers, drivers, outlet counter staff, clerical, outside sales, buyers, managers, etc.

The Branch CEO became concerned that only a few people within the firm were expert in the lightening business and good at serving clients. This stretched the experts thin. Customers sometimes had to wait weeks to get professional assistance. In an assessment of its skill needs, the company concluded that there was no reliable outside source of experts in their specialized field.

The firm conducted a study that found it underutilized the bulk of its staff, particularly the frontline staff – drivers, counter staff, bookkeepers, etc. – that had the most contact with customers. The assessment revealed that cross–training staff could allow practically anyone to fill in for others in a pinch. Branch Electric staff then designed a customized and carefully structured workplace learning system. The system included:

- A training module on every aspect of the business designed by the employee or employees with the most expertise in the subject; the modules included "soft skills" training in customer services and internal communications;
- A bonus of $500 for each employee who completed and passed a test on each module paid out annually before Christmas;
- A stipend of $1,000 for every employee who served as an instructor in any given module;
- Tuition reimbursement and bonus for every outside college or technical school course successfully completed. The subject matter of the classes was not limited though the bonus was higher for electrical and lighting related courses;
- Regular informal company information sessions to allow executives and area specialists to share information on new products and trends; outside vendors would occasionally describe the features and workings of new products the company was preparing to sell.

After a year, the company hired an outside researcher to evaluate the program. The researcher interviewed customers, employees, and executive staff. The assessment found that customers were impressed with the expert advice from counter staff, warehouse workers, and other Branch employees. They no longer had to wait for a specialist to assist them with the sometimes-complicated field of lighting. Employees appreciated the portable skills and college credit. The human resources director noted the lower turnover since Branch started the program.

The program is no longer in operation because an international electrical and lighting firm acquired the company a few years ago. However, the new owners do have a training program for employees although is largely based on computer training modules.

Garrison Moore

Figure 17
Estimated Employer Spending on Training

Industry sector	Employer spending on formaltraining in 2013 (billions of2013$)	Share of total spending on formal employer training (%)
Services	**91.6**	**52**
Manufacturing	**25.1**	**14**
Transportation, communication, and utilities	**19.2**	**11**
Finance, insurance, and real estate	**16.6**	**9**
Wholesale and retailtrade	**15.9**	**9**
Construction	**5.8**	**3**
Mining	**2.5**	**1**
Total	**177.0**	**100%**

Figure 17 shows a great deal of disparity among industry spending on employee education. For instance, the services industry spends $91.6 billion on formal training each year, accounting for 52 percent of all national spending on formal training while construction spends $5.8 or three percent of the total. The number of employees in the various industries has a significant impact of on the amount of training conducted. Yet on a per capita basis, it appears that services firms are more likely to train.

Source: Anthony P. Carnevale, Jeff Strohl, Artem Gulish, "College Is Just the Beginning Employers' Role in the $1.1 Trillion Postsecondary Education and Training System," 2015
Center on Education and the Workforce bases its estimates on analysis of data from the Bureau of Labor Statistics' Survey of Employer-Provided Training (1995) and U.S. Census Bureau's Current Population Survey (2013) Note: Due to rounding, the column may not sum to the total.

The Higher Education System

The backbone of external learning resources for the American workforce remains the higher education system. A diverse and complex collection of institutions, the system includes 2,968 four-year degree granting colleges and universities, 1,700 two-year degree granting colleges and 2,528 non-degree granting vocational and technical schools (cosmetology, electronics, etc.). Higher education institutions may be either public or private and for-profit or nonprofit.[16]

Generally, the higher education system has not considered serving employers and working adults as a priority. As a result, unnecessary barriers (e.g. unworkable class schedules, prerequisites, etc.) prevent many working adults from continuing to build their skills and gaining occupational credentials.

Currently most colleges and universities address employer and adult worker training courses as stand-alone activities; i.e. non-credit courses, remedial training, technical training, non-credit, certificates, etc. unrelated to established academic college programs.

Colleges at the leading edge of workforce development establish clear links between individual courses, certificates, and degrees providing working adults with the opportunity to advance with credentials towards the college degree, a practice called "credential stacking."

For the most part, colleges now address course and program articulation – one institution accepting academic credits from another – by agreement between two colleges (a not very efficient process) as opposed to state, regional, or national agreements.

Colleges and universities like most organizations, follow the money, are tradition bound, and change-adverse. Higher education continues to focus on the traditional undergraduate and graduate full-time college student. Tuition continues to rise (even though tuition discounting is common and increasing) and college loans are ballooning.

Traditionally colleges and universities in the US have focused on recent high school graduates as their primary market. This situation has been propelled by growing societal emphasis on young people going to college backed by continuously increasing federal higher education funding for student aid (grants, loans, and work-study) over the past 50 years.

The passage of the Higher Education Act in 1965 and subsequent amendments greatly expanded college affordability and accelerated it through government policy emphasizing student access and choice in enrolling in higher education degree programs. The policy worked.

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[16] "*National Center for Educational Statistics - Table 317.10.*

Today one third of working adults (25 years of age and older) hold a four-year college degree (see Figure 15). The unemployment rate for those with bachelor degrees today is 2.5 percent vs 6.9 percent for those with less than a high school diploma. See Figure 9.

Yet there have been unintended consequences in this shift of federal public policy and appropriations from direct institutional aid to student aid. Colleges and universities experienced a growth in enrollments across the board in the Great Recession (community college enrollments always reflect the economic scene) in part fueled by high numbers of high school graduates and veterans.

Today colleges and universities face a world quite different from what they have become accustomed to over the past 50 years. The pool of high school graduates and veterans has begun shrinking, leaving the colleges looking for a new source of students.

In addition, traditional sources of revenue have declined. Both public and private support for postsecondary education fell sharply during the recession; states slashed funding and have been slow to restore the cuts ever since. As a result, higher education institutions have reached a point where working with employers and their adult employees sounds like a much better idea than it did just a few years ago.

At the same time, employers are beginning to feel the pinch of skills shortages as adult unemployment falls sharply coupled with a steady rise in overall employment at a time when the baby boomer generation is beginning to retire. As the pool of qualified applicants becomes smaller, employers are beginning to look for ways to alleviate the shortages. Thus, at this point, expanded collaboration between higher education and employers appears opportune.

Community Colleges These institutions in particular find themselves well placed to work with employers of all types to create comprehensive continuing worker education and training. Already, about 40 percent of all community college students work full time. The issue is that these students are rarely part of their employer's education and training strategy. The virtues of community colleges include that they:

- Were created in part to prepare students to meet needs of local employers;
- Are governed and funded in part by local government and therefore more responsive to local business and community needs[17];
- Can be more nimble than four year and graduate colleges in that they have a higher proportion of non-tenured part-time and adjunct faculty vs full time tenured faculty reducing barriers to change ;
- Have a history and extensive experience in delivering basic skill training (English-as-a-second-language, remedial math and English, communications, team

[17] Remaining funds come from tuition, state government resources, and federal grants.

building, conflict resolution, computer skills, and work readiness training) sought by local businesses;[18]

- Offer and are able to expand technical certificate and licensing courses and programs of both credit and non-credit offerings;
- Provide affordable accredited education for working adults and their employers;
- Can respond to business demands for modifications and complete curriculum changes to meet the immediate skill needs of the local businesses;
- Are for the most part conveniently located for working adults (New Jersey, for example, has a community college campus within 20-25 minutes of where every resident works or resides);
- Can help organize small and medium-sized businesses, which employ about half of the US workforce, to address local adult workforce needs

For-Profit Career Schools For-profit career schools and colleges are a growing source of practical post-secondary training in a variety of skilled occupations for working adults.

Traditionally, what these institutions offered was pretty much limited to practical noncredit career courses: computer technology, business administration, paralegal studies, mechanical engineering, commercial art, and cosmetology.

Recently for-profit institutions have greatly expanded their offerings to include academic degrees (associates, bachelors, masters, etc.). Nationally recognized academic accreditation organizations, which accredit all educational institutions, have aided this expansion by permitting these institutions to the offer academic degrees. Importantly, national accreditation allows for-profit schools access to federal student aid funds. A large number of new for-profit colleges and universities have sprung up as well.

There remain certain caveats about price and quality of for-profit institutions. They vary widely in quality and cost. A large portion of the typical for-profit institution's study body consists of low-income young people and veterans. Graduates of for-profit schools have the highest rates of student loan defaults; recent government reports lay the responsibility for the defaults at the doorstep of the schools themselves.

Nonetheless, many such schools offer high quality education and training for fast growing nonroutine occupations. They are often willing to work closely with employers to modify schedules and curricula to meet the company needs.

Employers can judge the quality of for-profit schools in a variety of ways including: by the proportion of students who graduate, the number who attain employment in their field and, where occupations are subject to licensing or certification, and by the number who receive the appropriate credential.

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[18] See Manpower Group,"2015 Talent Shortage Survey",although employers and adult works need to be wary of community providing more than is needed for continuingtraining and education.

Outtakes

Adult Learners in Higher Education

Peter J. Stokes

"To succeed in educating working adults, colleges and universities must become more customer-centric (and) better equipped to meet the changing needs of (adult workers), particularly with respect to access and affordability.

Adult Learners Require Easier Transfer of Academic Credit

Credit transfer policies must become more rational to support working adults who not only change careers and move from one part of the country to another, but also study at multiple institutions.

The movement of our people is increasingly fluid, but institutional efforts to control the flow of tuition create a non-integrated higher education infrastructure that is poorly suited to the needs of these mobile customers.

Adult Learners Require Flexible Certificate, and Degree Programs.

Recent federal policy changes, such as the elimination of the "50 percent rule" that limited the growth of online programs, reflect positive change in this direction. Increased access to online learning and education at the workplace is needed to open up higher education to greater numbers of working adults.

Currently, state regulations can inhibit certain forms of online learning as providers may be required to register within states simply to proctor an examination. Such regulatory burdens may do little to protect the public but much to forestall the increased access to educational opportunities for adult learners. Where appropriate, these regulations should be redressed.

Part Time Working Adult Learners Require Flexible Financial Aid Policies.

Most students studying less than half time simply do not qualify for financial aid, and few have access to other forms of grants or scholarships. More than 22 percent of prospective adult learners who choose not to enroll cite cost as an obstacle, according to research conducted by Eduventures.

Recent proposed changes to the Higher Education Act such as year-round Pell grants are a step in the right direction. Likewise, innovative programs such as Lifelong Learning Accounts (LiLas) and Career Advancement Accounts (CAAs) create critical new financing mechanisms for adults."

Excerpt: A National Dialogue The Secretary of Education's Commission on the Future of Higher Education ISSUE PAPER Hidden in Plain Sight: Adult Learners Forge a New Tradition in Higher Education Peter J. Stokes

Online Courses and Degrees Web based online courses potentially offer working adults and their employers the opportunity for a new and flexible source of employee education and training. Colleges and universities of all types have entered the world of on-line education and training in recent years.

The for-profit sector led the change in offering online technical training and academic degrees to workers and their employers. Public and non-profit colleges and universities have joined in.

For example, the Governor's State University, a multi-state consortium of the western states, began offering courses and degrees several years ago. Arizona State University today offers 80 college degrees on-line. Still others, including a number of teachers' education programs, have experimented with blended offerings requiring a combination of traditional classroom training and on-line courses.

In addition to traditional course materials such as filmed lectures, readings, and problem sets, many online learning systems provide interactive user forums to support interactions among students, professors, and teaching assistants.

MOOCs (Massively Open Online Courses) MOOC's joined the online education movement in 2008 and emerged as a popular form of learning in 2012. Under the MOOC arrangement, any student, anywhere, can enroll in college courses, usually at no or limited cost. Prestigious colleges and universities led the way in offering many of these courses.

Pioneers of the MOOCs concept often emphasized open-access features, such as open licensing of content, structure, and learning objectives. They promoted MOOCs as a means of delivering unlimited participation and open access to high quality courses via the Web. Nationally and internationally renowned professors often conduct the courses.

However, in recent years certain weaknesses have become apparent. It turns out that very few people actually complete the courses; one researcher found that completion rates were generally below 10 percent. The quality of instruction and inept adaption of traditional teaching methods to online media kept others away.

In addition, some educators have expressed concern about the ease with which the courses could be gamed by having other people fill in for the registered student. In 2014, Robert Zemsky argued that MOOCs had passed their peak: "They came; they conquered very little; and now they face substantially diminished prospects." In addition, some students do not adapt well to this form of training preferring live interaction and demonstration of in-person instruction.

Dayna Catropa ("Big MOOC Data") recently noted: "*The most successful results have thus far come from technical skill training and technical certification*" (italics added). The latter offers a significant opening for employers to join with educators to reach far more working adults than ever before. Employees can take their classes from work or at home and integrate their online learning with workplace experience.

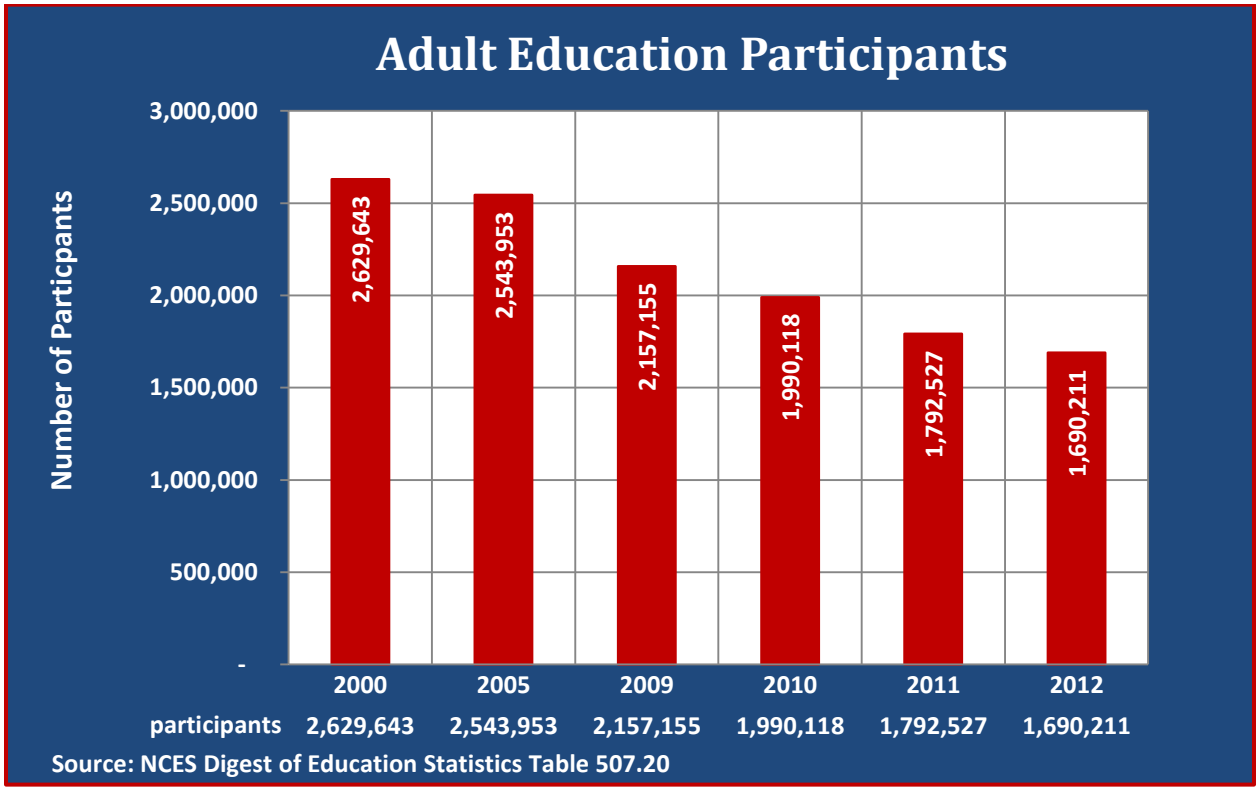
Adult Basic Education

Though funded primarily by the federal government, state and local agencies administer the Adult Basic Education program. High school districts and community colleges usually deliver the services.

Adult Basic Education is especially useful in helping adults earn a high school General Equivalency Diploma (GED), in refreshing basic math skills, improving reading skills of high school graduates, and in providing instruction in English as a second language for immigrants, who for all practical purposes are illiterate until they can speak and read English.

There are waiting lists for classes in all 50 states. Current funding cannot begin to meet the need. In 2011[19], the publicly funded Adult Education Program was able to serve 1.7 million adults, down almost 35 percent from the 2.6 million served in 2000. (See Figure 18)

FIGURE 18



Workforce Development Programs

Federally funded workforce development programs have been around in various permutations for 60 years. The programs currently receive much of their funding from the federal Workforce Innovation and Opportunity Act (WIOP), the US Em-

[19] The latest available data from NCES

ployment Service and various specialized services for the disabled, veterans, older workers, etc. States administer the funding and 500 or so local employer-led Workforce Investment and Opportunity Boards oversee the services provided at One-Stop Career Centers.

Though authorized to serve working adults, the Workforce Investment programs have rarely served more than a few working adults. Congress has always given priority of services to the low-income unemployed youth and adults, and laid-off workers, and specialized groups of the unemployed mentioned above. Although the local Workforce Boards have few funds to pay for adult worker training, many attempt to work with employers to facilitate and coordinate programs for working adults.

The local boards consist of a majority private employers and representatives of the various education sectors (community colleges, nonprofit training groups, private technical colleges, K-12 education, etc.) Thus, the Boards can help in coordinating programs for adult worker learning among the various member organizations.

Given the workplace revolution, it would seem to make sense for Congress to fund training and continuing education for working adults through the Workforce Investment and Opportunity Act.

Licensing and Certification

Legitimate occupational certification and licensure describe, and test for, the essential skills needed to perform a given job or set of tasks. The virtue of licensing and certification systems is that these credentials establish clear and measureable standards of knowledge and experience.

Credentials may cover an entire occupation or some component, such as certification for complex software or repair of certain types of machinery. As such, they provide working adults with bona fides and assure employers that an independent body has authenticated those skills.

However, any kind of certification system depends on how close the standards match actual tasks performed on the job. Weak standards result in weak certification. All legitimate certifications require independent and objective assessments of knowledge and skills and often require a fixed length of experience in the field.

So-called "high stakes" certifications, including licenses, are those that directly affect an employee's pay and promotion opportunities. Licenses exclude unlicensed individuals from working in the licensed field at all. High stakes certifications do not provide everything an employee needs to thrive and advance in the workplace but they form the solid foundation for continued learning on the job.

"Certificates of attendance" and the like are not high stakes certifications. They may provide a boost to attendee's morale but have little value in documenting skill attainment even though some professions allow such certificates to serve as "continuing education units" to meet required in-service training.

The National Center for Educational Statistics (NCES) reports that more than *one-quarter* of all U.S. workers now require a license to do their jobs, with most licenses issued by the States.

The number of occupational licenses has risen five-fold since the 1950s, NCES says. About two-thirds of this change stems from an increase in the number of professions that require a license, the remaining comes from growth in the number of jobs in the licensed occupations themselves. A majority of licenses and other high stakes certifications allow an individual to practice without having attained a college degree.

For working adults, attaining a license or other high stakes credential is usually a matter of individual initiative requiring attending courses outside of working hours. Employers can profitably assist employees, especially for costly certifications requiring extensive classroom instruction away from the workplace.

Private certifying bodies can also issue high-stakes certificates. Industry trade associations and unions often give their imprimatur to workers who have met their standards of knowledge and skill to practice a given occupation.

For example, to raise the qualifications and improve the poor reputation of auto mechanics in the 1970s, the automotive services industry created the Automotive Service Excellence certification system. Today it is difficult to find an auto shop that does not require its technicians either to have an ASE certification or to be in training for it. Private companies, especially software firms, also certify specific sets of skills in the use of their products (Cisco Systems, C++, etc.)

For occupations where no agreed upon standards or training curriculum exist, even within the company, employers generally rely on academic degrees and experience.

Employers often see it in their interest, as well as that of employees, to promote licensure and credentialing through tuition support, time off for study, and on the job learning. In some cases, companies require the employees of their suppliers to have a certification as a means of quality control. The White House Conference on Occupational Licensing listed what it considered best practices, which include:

- Limiting licensing requirements to those that address legitimate public health and safety concerns to ease the burden of licensing on applicants;
- Applying the results of comprehensive cost-benefit assessments of licensing laws to reduce the number of unnecessary or overly restrictive licenses;
- Within groups of States, harmonizing regulatory requirements as much as possible, and where appropriate entering into inter-State compacts that recognize licenses from other States to increase the mobility of skilled workers;
- Allowing practitioners to offer services fully at their current competency, to ensure that all qualified workers are able to offer services.

Credentials Defined

The National Center for Educational Statistics

License: A credential awarded by a licensing agency based on predetermined criteria. The criteria may include some combination of degree attainment, certifications, certificates, assessment, and apprenticeship or other work experience. Licenses are time-limited and must be renewed periodically.

Educational Credential (Diploma, Degree, etc.) This is a credential awarded by an educational institution - or training providers in the case of apprenticeship - based on completion of all requirements courses and a test or other performance evaluations. Often required for licensing, educational certificates are typically awarded for life.

Certification: A credential awarded by a certification body based on an individual demonstrating through an examination process that he or she has acquired the designated knowledge, skills, and abilities to perform a specific job. Certification is a time-limited credential that is renewed through a recertification process.

State certification, or "right-to-title," means that individuals seeking to assume a profession's official title must obtain the permission of the government, but anyone is allowed to perform the duties of the profession, regardless of whether or not they have been certified. Certification can also be done by private certifying bodies, which give their imprimatur to workers who have met their standards.

Registration is the least restrictive form of occupational regulation. It generally involves individuals paying a fee and filing their names, addresses, and qualifications with the government. This ensures they can be reached in the event of a complaint, thereby supporting civil remedies for consumer harm.

Figure 19

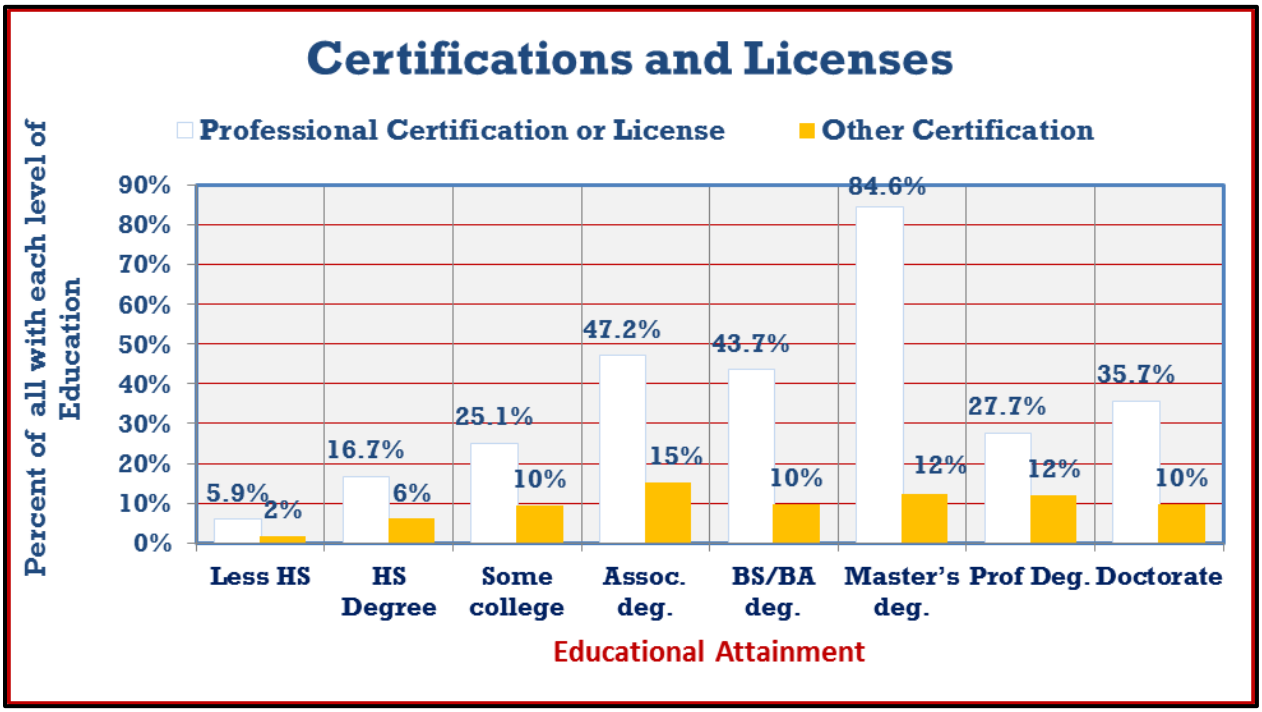
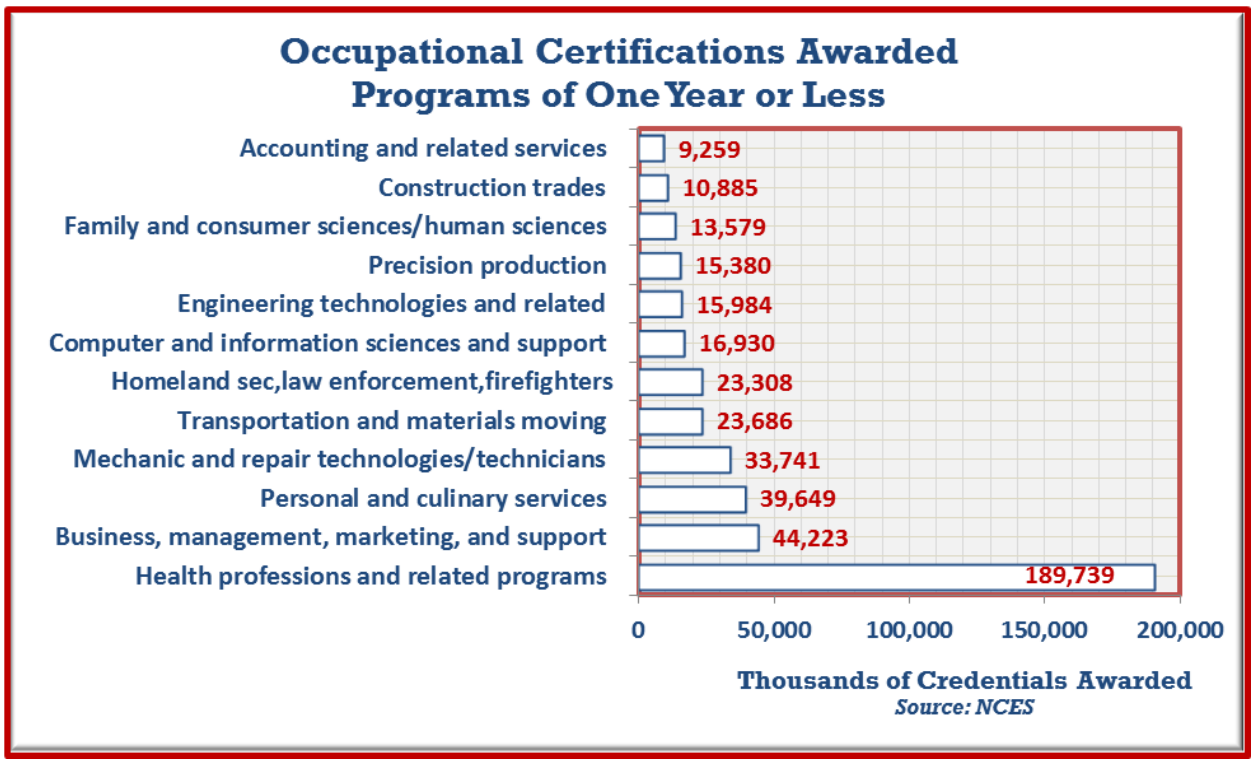


Figure 20



Figures 19 and 20 show the number of Occupational Certifications issued in 2014 for education level of the recipients and by number of certifications issued for programs of one year or less by occupation.

Licensing Facts and Concerns

The organizers of the 2015 White House Conference on Occupational Licensing prepared this summary of the strengths and weakness of licensing

- Estimates suggest that over 1,100 occupations are regulated in at least one State, but fewer than 60 are regulated in all 50 States, showing substantial differences in which occupations States choose to regulate. For example, funeral attendants are licensed in nine States and florists are licensed in only one State.

- The share of licensed workers varies widely State-by-State, ranging from a low of 12 percent in South Carolina to a high of 33 percent in Iowa. Most of these State differences are due to State policies, not differences in occupation mix across States.

- States also have very different requirements for obtaining a license. For example, Michigan re-quires three years of education and training to become a licensed security guard, while most other States require only 11 days or less. South Dakota, Iowa, and Nebraska require 16 months of education to become a licensed cosmetologist, while New York and Massachusetts require less than 8 months.

- Licensed workers are sometimes unable to use distance or online education to fulfill continuing education requirements, as some States do not automatically accept accreditation from selected schools based in other states. Similarly, State licensing requirements can prevent workers from teleworking or taking advantage of new technologies, thereby inhibiting innovation.

- Licensing requirements often make it difficult for immigrants to work in fields where they have valuable experience and training. This deprives the U.S. market of a large share of their skills, and makes it difficult for these workers to make their full contribution to the workforce.

- In half the states, applicants can be denied a license due to any kind of criminal conviction, regardless of whether it is relevant to the license sought or how long ago it occurred. It often takes six months to a year for some States to simply review an applicant's criminal history and make an initial determination about whether she qualifies for a license.

Part V - An Active Workforce Policy

This paper demonstrates in some detail that US employers will face a demographic crisis that indicates a need for much greater continuing skills training and continuing education for working adults. Such efforts can pay significant benefits to employers, employees and the economy in coming decades. The paper also discusses the issue of skills determination and examines potential sources for such continuing training and education.

There exists a real and continuing need for such an emphasis, because:

- Some 84 percent of the people now working will still be working at end of the next decade, and two thirds will still be on the job in 20 years.
- Millions of adults working in jobs requiring mostly routine tasks lack the skills necessary to meet their employers' quickly changing requirements in nonroutine occupations that require greater knowledge, flexibility, and thinking skills on the part of the employee.
- Employer focused education and training can help move workers from low paying and precarious jobs in routine occupations to higher paying non-routine occupations while increasing productivity.
- The numbers of high school graduates is falling, causing traditional enrollments in higher education to drop especially for community colleges and non-exclusive private colleges. These institutions need new kinds of students. Serving more working adults could fill the need nicely.
- Employers and employer groups have leverage with colleges to get them to develop cost-effective education and training specific to their workforce needs.
- Community colleges, technical schools, and non-exclusive private colleges have several thousand independent campus facilities spread throughout the US. Most are easily assessable and many have on-line courses especially attractive to working adults. Such institutions can also provide worksite courses when required.
- Colleges can offer more competency-based training leading to industry and product related certifications as well as the attainment of credit bearing education leading to college degrees via the so-called "credential stacking."
- Employers can provide experienced subject matter expert employees to serve as adjunct instructors at the colleges.
- As unemployment continues to drop, there is an opportunity for policy makers at all levels to redirect and target public funds to meet the workforce education and training needs of working adults as part of economic development as well as employment policies.

A System Not Simply Another Program Good policy involves getting all the horses going in the same direction. A comprehensive workforce policy creates a system rather than simply more training programs. Such a system covers all employees from frontline workers to executives. It ensures coordination of learning needs with educational and training resources at the local, state, and national levels. Under such an

arrangement, the players make long-term commitments to create and maintain the system. This involves the sometimes intricate and arduous task of adjusting institutional and individual attitudes toward the continuing training and education of working adults.

We believe that creating an active workforce policy in the US is indeed possible. Creating such a system will require that:

- It originates at the local employer level;
- Employers recognize the need and indeed have a responsibility to support and lead any system focused on the continuing training and education of their workforce;
- Educators and employers go well beyond working together to create programs to train a few employees but rather create a local or regional system for educating and training all working adults including extending the scope to include local economic development goals;
- Colleges and universities adapt their priorities to the education and training of working adults especially in scheduling, allowing students to "stack" and link credentials to create a college degree, offering transferability of credits, and assisting small businesses in addressing their skills needs.
- Economic development organizations and industry associations facilitate the active involvement of employers in the system as a means of maintaining a competitive edge and expanding employment for their region;
- Working adults take responsibility for their own learning to the extent possible as well participating in employer-led education and training at the worksite and through participating educational institutions;
- State, local, and federal governments add or redirect funds to the education and training of incumbent workers;
- Employers, educators and working adults support legislation and funding at the municipal, county, and state level as well as encouraging their congressional representatives and US Senators to back federal funding to workforce development programs specifically for the training and continuing education of working adults;
- Educational institutions – in both public and private sectors - engage in the detailed and sometimes unpleasant task of changing policies and priorities within their own institutions and organizations and overcome the resistance of vested interests that oppose changes in the status quo.

Seize the Opportunity The time is right to begin creating a lasting system of adult worker learning in every state and locality. The US has the resources in place to meet the demands of the current workplace revolution, if it has the will to do so it. It could happen.

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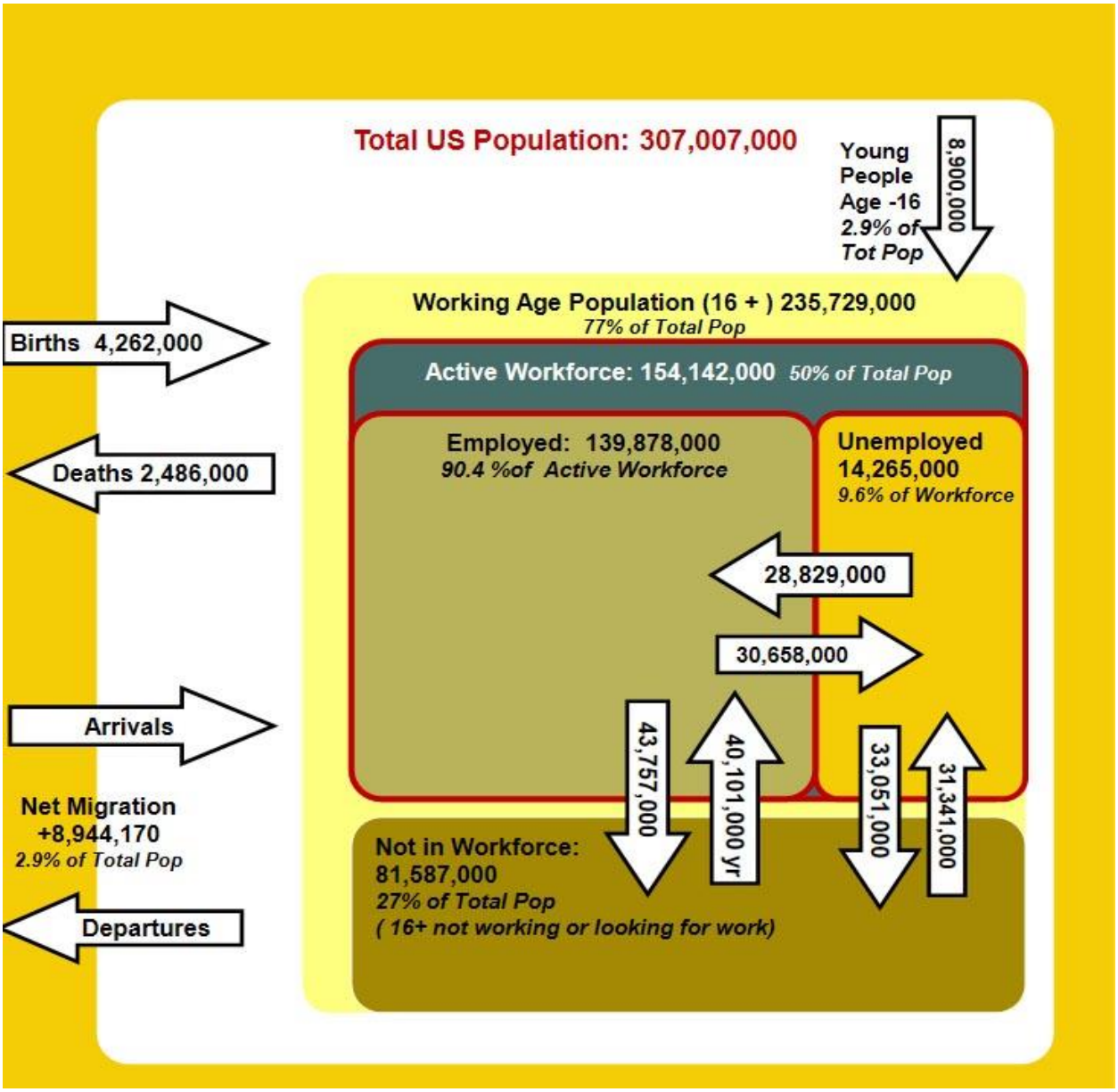
SUPPLEMENTAL CHARTS

Figure 21

Workforce Stock and Flows



The above provides a simplified schematic of workforce dynamics. Young people flow in to the general workforce pool when they turn 16 and older people flow out when they die. Immigrants flow in and emigrants flow out. The working age population is anyone over 16 and not institutionalized. To be part of the active workforce, an individual only has to be over 16 and working or actively looking for work. If you can't find work, you are unemployed. If you have a job, you are employed. (Well, duh) Figure 20 shows a great deal of churn as people move from one work force stratus to another. The chart uses data from 2009, a particularly active year.

Figure 22

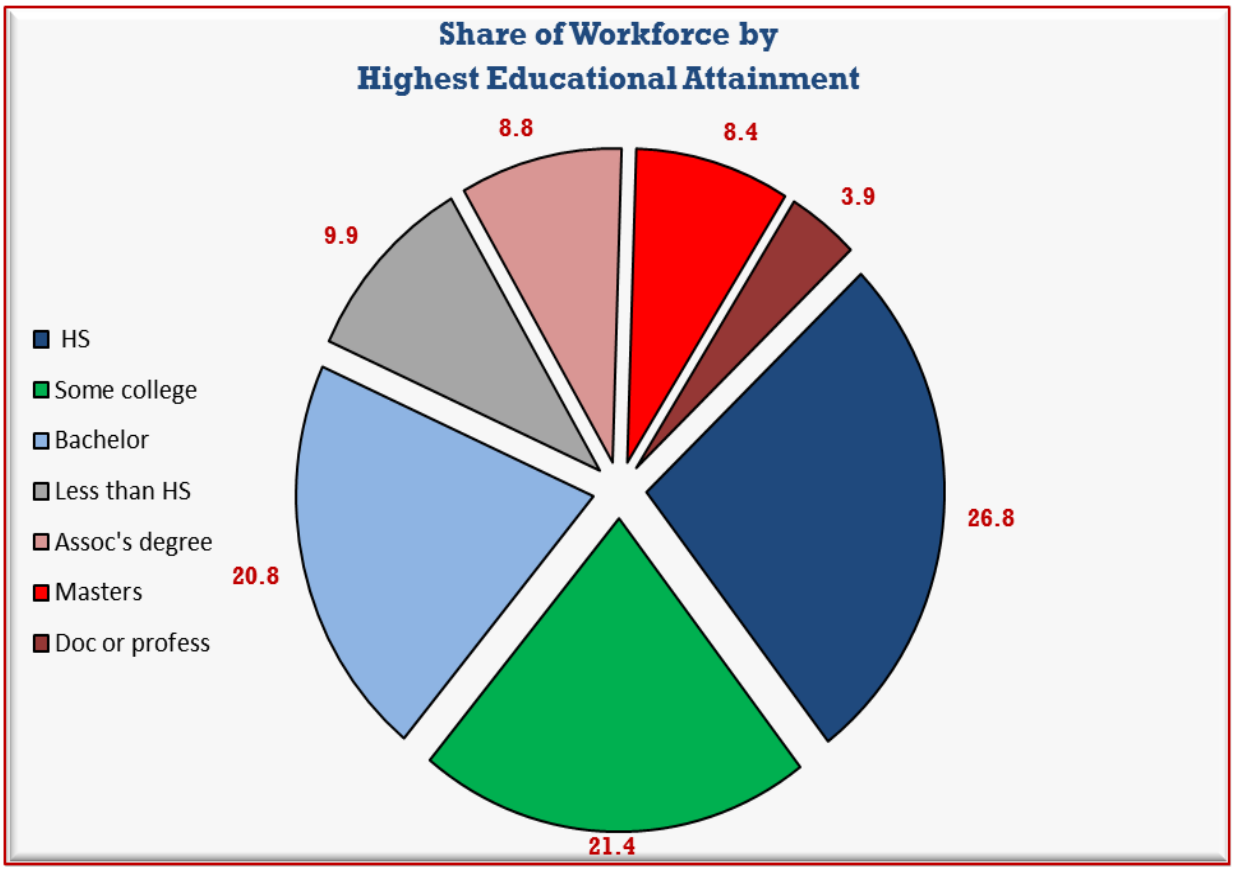
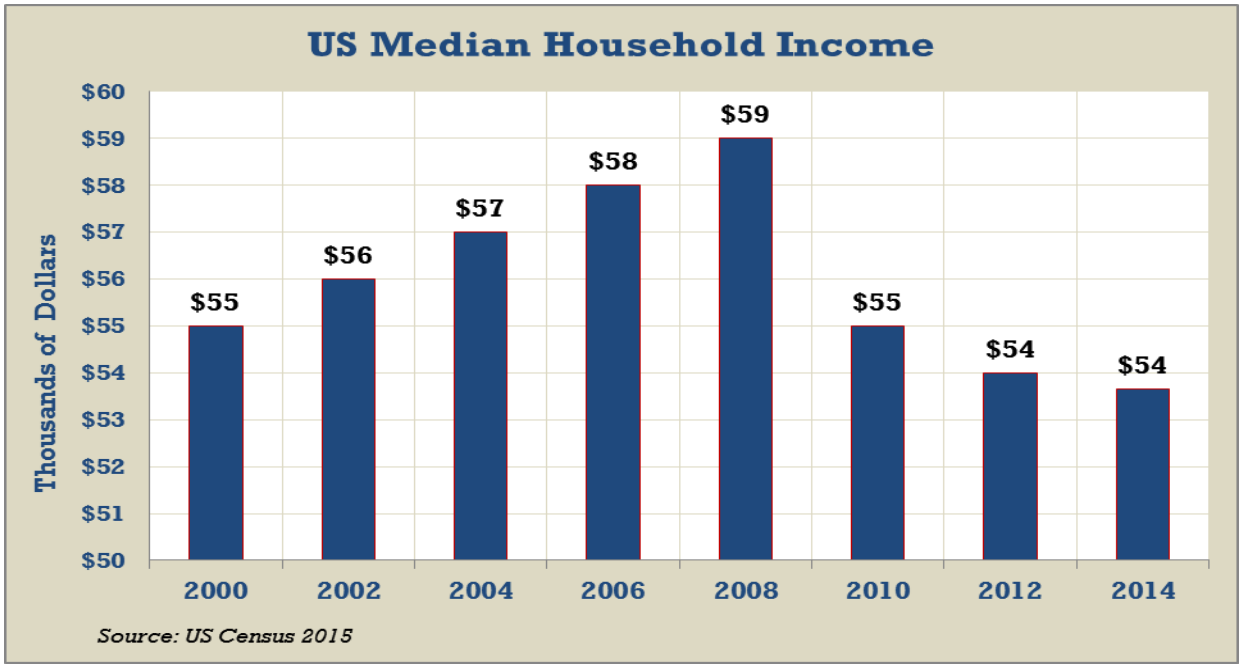


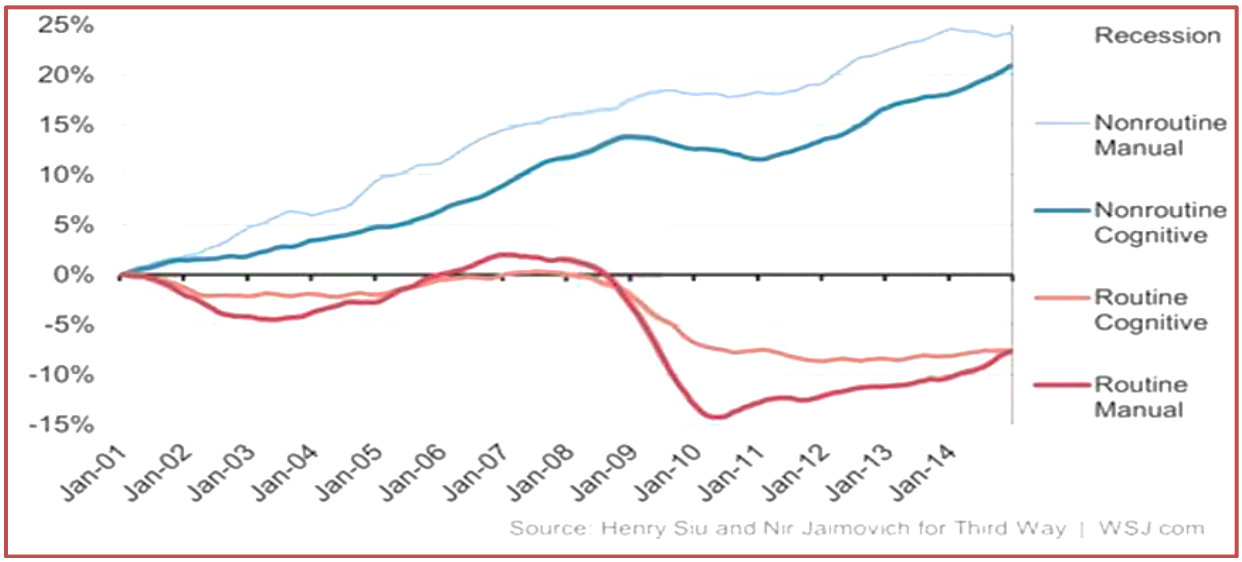
Figure 22 shows educational attainment of everyone in the current workforce over 16 years of age. The less than high school number is somewhat exaggerated since many 16-18 year olds are still in high school. Most will graduate.

Figure 23



In Figure 23, we see that after years of climbing steadily, median total household income (not just wages and salaries) took a real hit in the Great Recession. Median income from all sources continued to fall even after the overall economy recovered and strong job growth shrank high unemployment rates. The connection between the fall in median income and the massive loss of jobs in routine occupations is not definitive.

Figure 24
Changing Routines



Siu and Jaimovich tracked the growth and decline of all four of the types of occupations in percentage terms January using 2001 as their baseline. Figure 24 shows that jobs in nonroutine occupations rose significantly during the period; the great recession barely affected these occupations. Source: Henry Siu and Nir Jaimovich for Third Way

Figure 25

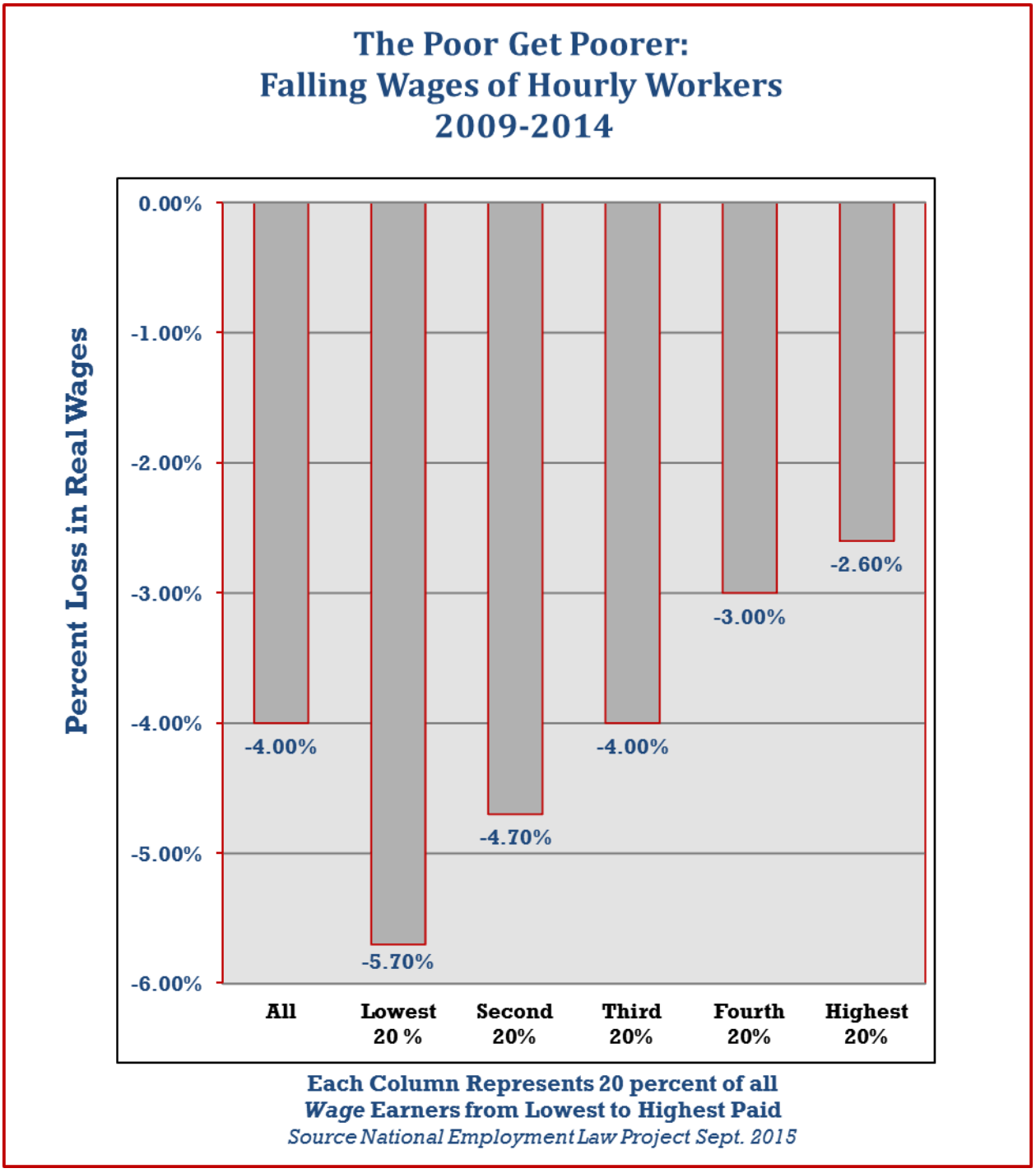
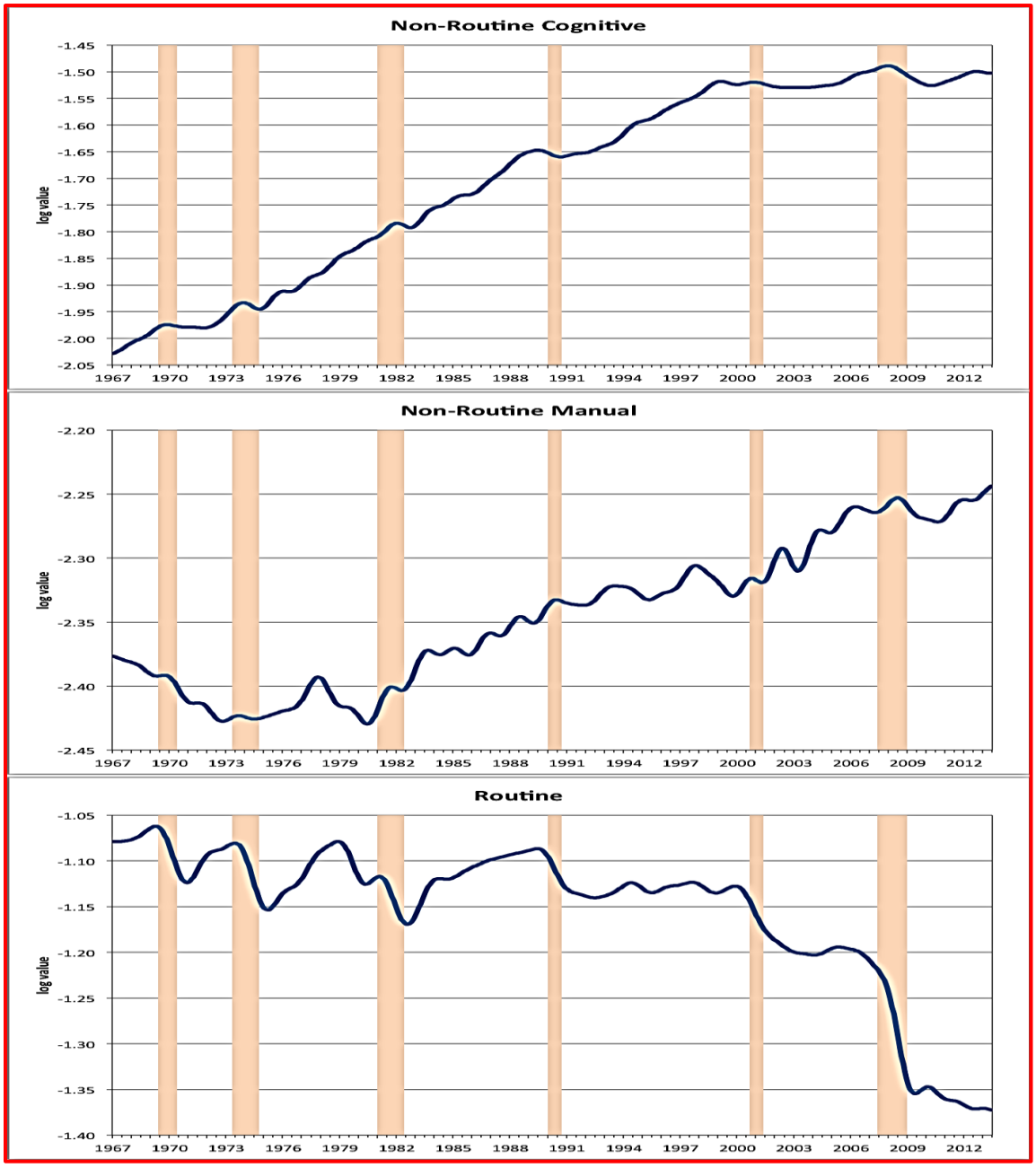


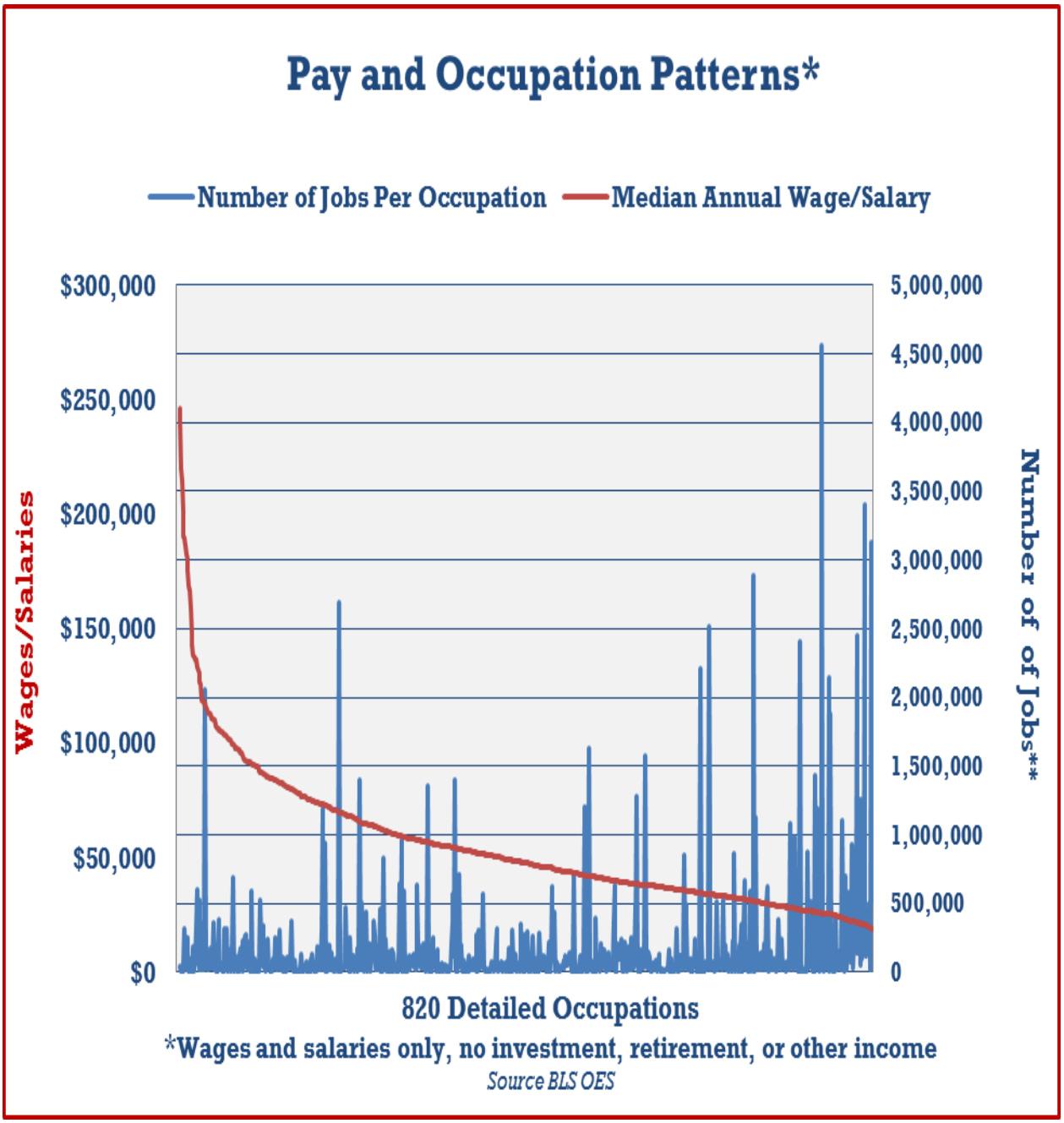
Figure 25 reveals how far real wages (including the effects of inflation) fell during and following the Great Recession with the lowest paid workers losing the most.

Figure 26
Change in Routine and Nonroutine Occupations 1967-2013



The charts above show the substantial growth in nonroutine occupations both cognitive and manual, over the last 50 years. Nonroutine manual occupations have had a bumpier ride, largely because a large number of these occupations are in highly cyclical (affected by recessions) industries such as construction. However, they have still risen sharply. Occupations involving mostly routine tasks have become an ever-smaller proportion of the workforce, especially during this past recession. Increasing skills of workers in routine occupations is one way to move them into nonroutine work where wages and salaries are much higher.

Figure 27



The chart above shows the distribution of occupations by wage levels with the number of jobs in each occupation. The number of jobs in low wage occupations far outweighs high-income occupations. The occupational category with the largest number of jobs is retail clerks.

Figure 28

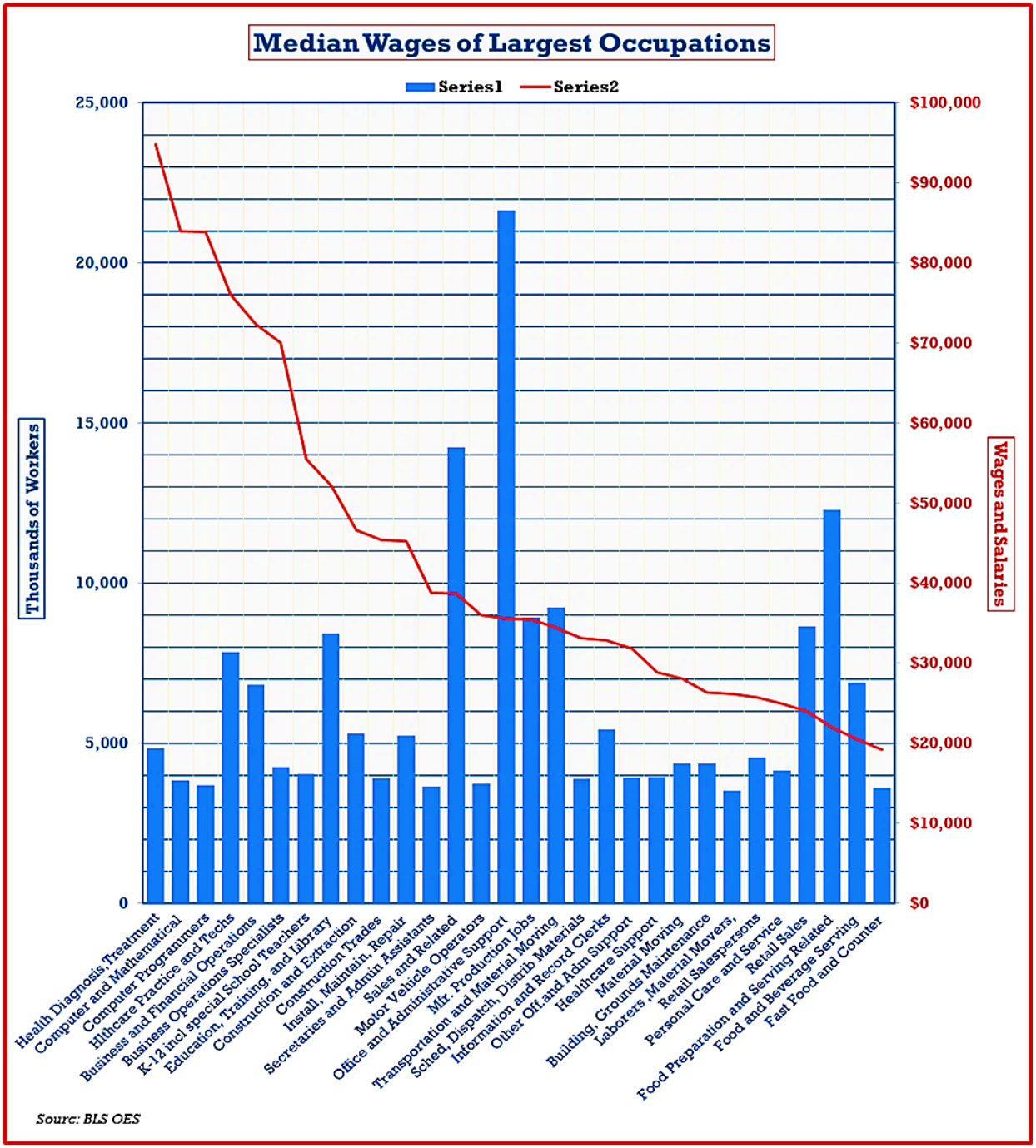
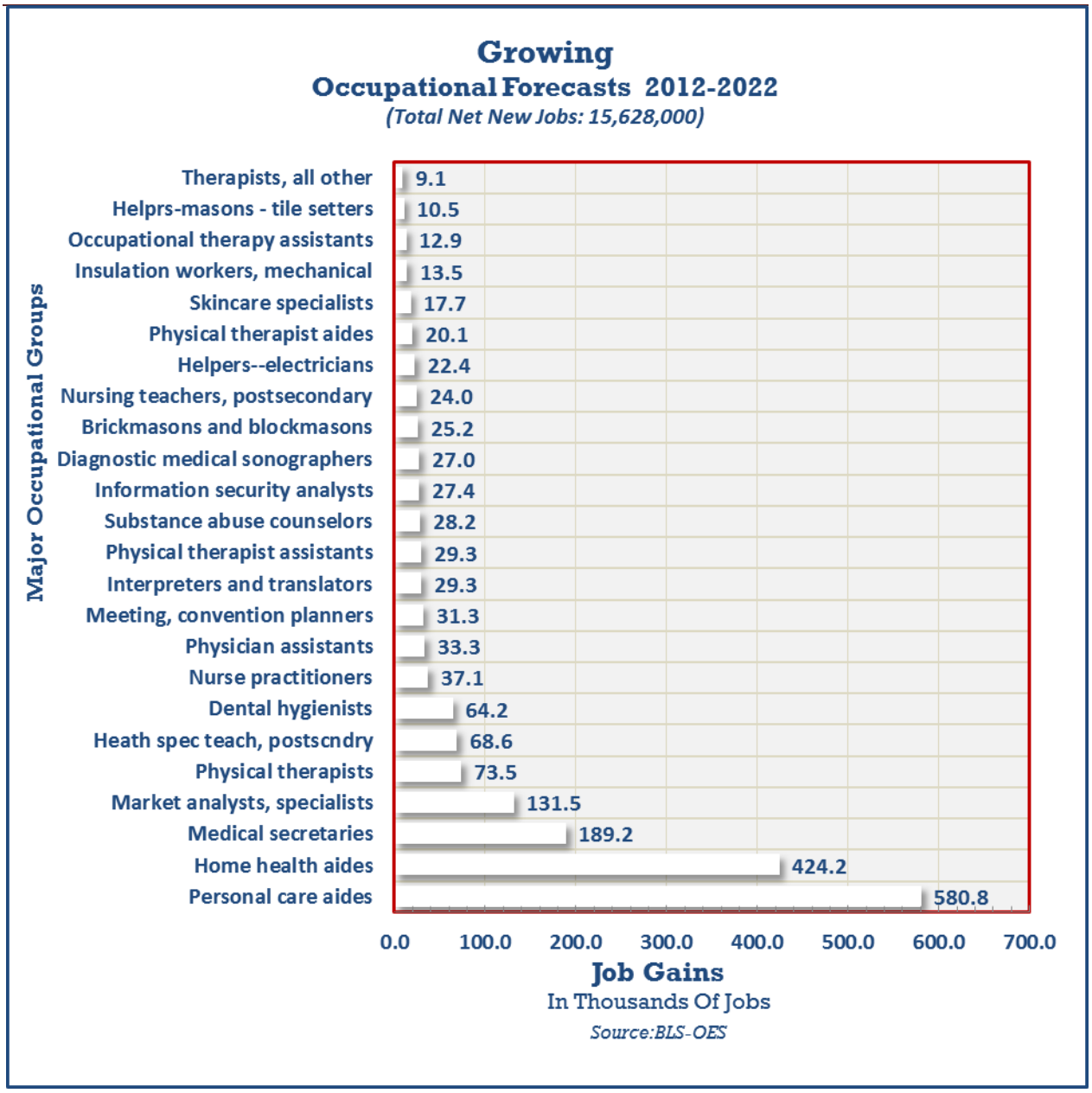


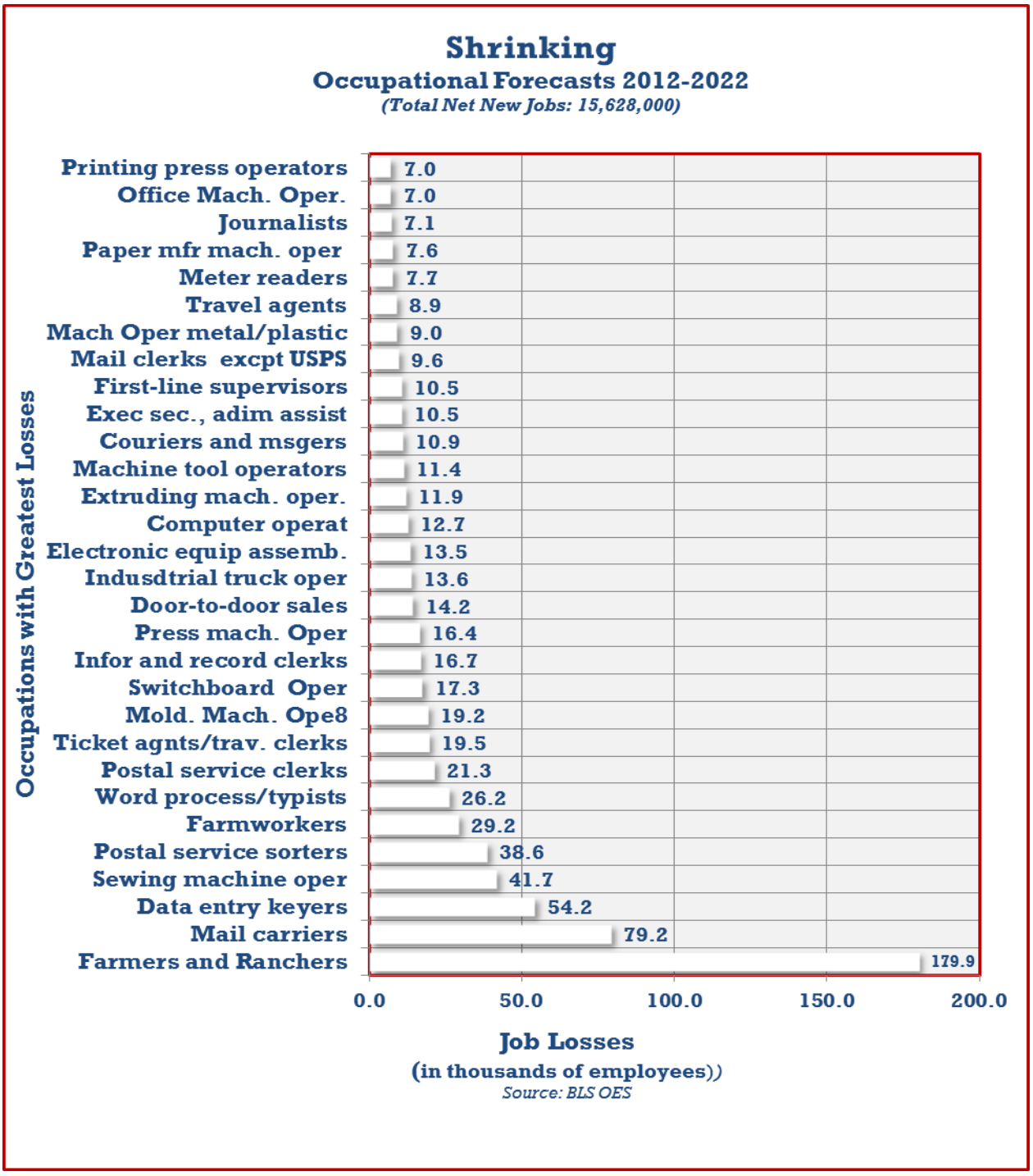
Figure 28 reveals that the median wage for the major occupations tend to cluster in the middle of the pay range with the clear exception of the personal care and the three foodservice occupations at the low end of the scale. It does not appear to show a polarization of jobs at the high and low end of wages. (The chart shows wages and salaries only. Investment returns, retirement income, and other non-wage earnings are not reflected in the chart.)

Figure 29



Three things stand out from Figure 29. First, the fastest growing jobs all require some education or training beyond high school. Second, even the fast growing occupation adds only 680 thousand jobs compared to nearly 16 million total new jobs expected between 2012 and 2022. Most occupations will grow in small numbers throughout the economy. Third, eight out of 10 of the fast growing new jobs are in the health care industry; 25 of the top 30 are also in health care.

FIGURE 30



As indicated in figure 30 routine jobs take the largest hit in the coming years with the exception of such occupations as farmers and journalists, who face their own special challenges. As with job gains, job loses will occur throughout the economy. The Bureau of Labor Statistics projects the net gain in us jobs at around 16 million jobs between 2012 and 2022.

FIGURE 31

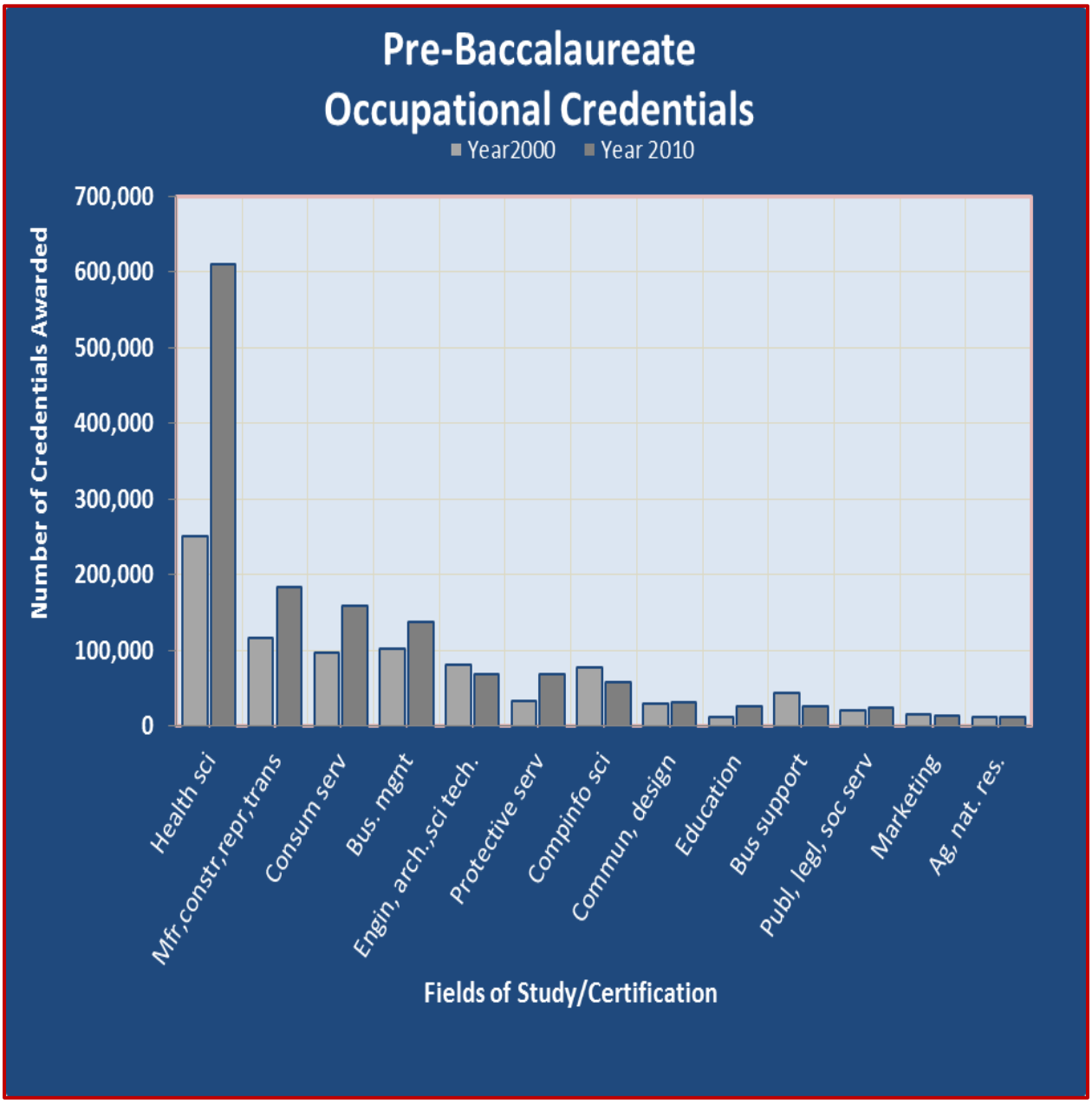
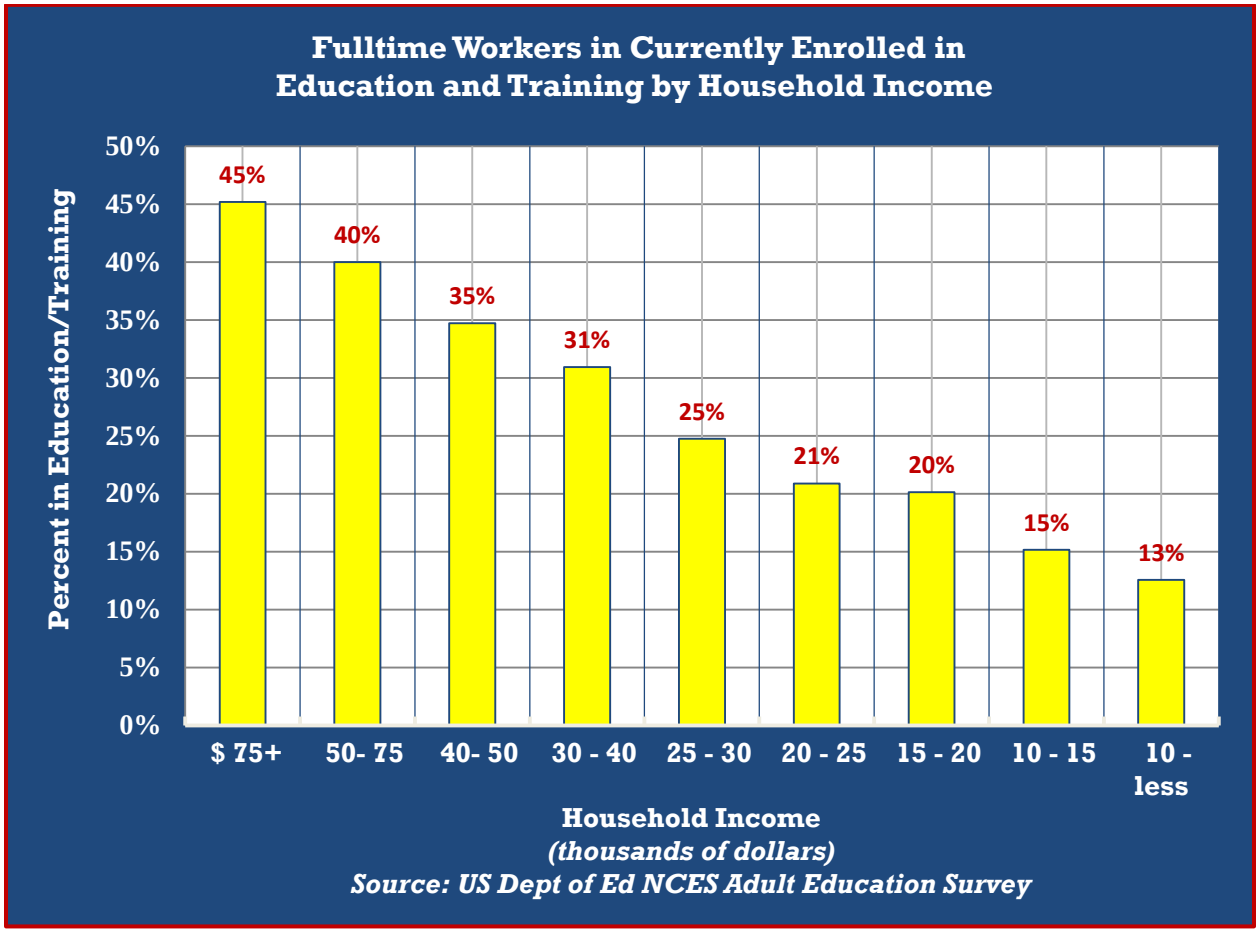


Figure 31 documents the growth in occupational certifications between 2000 and 2013 not requiring a four-year college degree. The health sciences field was both the largest and fastest growing area of certifications. Manufacturing/construction, consumer services, and business management followed with significant numbers while other fields fell behind in both in numbers and rate of growth.

FIGURE 32


Fulltime Workers in Currently Enrolled in Education and Training by Household Income
Percent in Education/Training
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
45%
40%
35%
31%
25%
21%
20%
15%
13%
$ 75+
50- 75
40- 50
30 - 40
25 - 30
20 - 25
15 - 20
10 - 15
10 - less
Household Income
(thousands of dollars)
Source: US Dept of Ed NCES Adult Education Survey

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