Employment & Sustainability:

Report of the Cornell ILR School

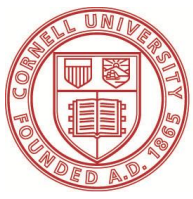
2013 Roundtable on Employment and Technology

The Challenge

The Great Recession has compounded the ongoing forces of technological change and globalization to drive an even more profound transformation in the relationships between Americans and work. Jobs are disappearing, skill sets are a moving target and the evolving concept of earning a sustainable living is becoming increasingly complex and, for many, increasingly remote.

The Cornell ILR School, a renowned leader in advancing the world of work, recognizes that today's and tomorrow's challenges demand a new paradigm, one that joins together the many highly educated – but also siloed – discussions about employers' use of new technologies and the impact on quality job creation.

On April 12, 2013, the ILR School convened 40 economists and engineers, academics and corporate executives, social scientists and philanthropists, policy makers and journalists and statisticians in a ground-breaking, cross-sector, invitation-only dialogue. It was a day full of agreement, fervently diverse opinions and insights – notably that most participants had never before discussed these issues with such a varied group of stakeholders, and that the country's best hope for reaping widespread gains from technological progress rests on continuing and expanding such discourse.



Cornell University
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Letter from the Dean

I am proud to welcome you to this critical dialogue about the impact of advancing technology on jobs in the United States.

We all talk about the latest BLS employment number and whether it finally shows that the U.S. economy is truly recovering from the Great Recession. But beyond the unemployment rate, there is a substantial, continuing decline in the central labor-force participation rate. Are these troubling indicators a sign of something even more profound – in fact, so profound that it's beyond the scope of earlier technological transformations?

On April 12, 2013, Cornell ILR convened experts from across sectors and disciplines to discuss this situation and, more importantly, what we can and must do to address it.

With a mission to advance the world of work, Cornell ILR is a natural leader of this ground-breaking conversation. We have the expertise in human resource management, labor economics and law, organizational behavior, conflict resolution, labor-management relations – all the facets of "work" that determine success for individuals, businesses and economies in today's global marketplace.

We also have a strong, institutional sense of responsibility and motivation. As one of Cornell University's four land-grant colleges, helping to find solutions to today's economic and social problems is part of our DNA.

Cornell ILR is unique in the depth and breadth of the teaching, programs, research and resources that we bring to bear on the world of work. Blending theory and practice with a social sciences and human perspective, ILR's impact reaches far beyond the campus.

We are grateful to the partners in this Roundtable – ILR's Institute for Compensation Studies and Labor Dynamics Institute, the EPRN Sustainable Entrepreneurship Network, The Conference Board and ILR alumnus Steven Berkenfeld '81. And we look forward to continuing this crucial conversation with you and many others.

Harry C. Katz, Ph.D.
Kenneth F. Kahn Dean and Jack Sheinkman Professor of Collective Bargaining
Cornell University ILR School

ILR School
ADVANCING THE WORLD OF WORK

The Conversation

The narrative that follows summarizes the key observations and take-aways from the Cornell ILR School 2013 Roundtable on Employment and Technology, and frames its many questions for the crucial conversations that must follow. Accompanying the report and referenced throughout are related essays prepared in advance by Roundtable participants and others also deeply interested in this topic. The comments from individual participants are not attributed by name because the Roundtable was convened under the Chatham House Rule to allow for a free and frank dialogue.

The reality is this: The continuing sea-changes in technological advancement, particularly when combined with the forces of globalization, are significantly impacting U.S. jobs and raising the risk that more and more U.S. workers will be caught in a shrinking "middle," as jobs migrate to higher-skill and lower-skill work.

The Great Recession has accelerated a fundamental transformation in the U.S. work landscape that's been driven for some time by technology and globalization. Job creation and labor-force participation have been dropping for decades. Wages and worker protections are declining.

Even jobs thought recently to be evergreen are disappearing. And wages are spread farther apart than ever before, a situation that seems attributable to a change in social norms as well as to technology-driven productivity.

> ***"More wealth has been created worldwide in the past decade than ever before in history, more millionaires and billionaires. But at the same time, median income is lower. Fewer people are working. … Technology is not the problem. It's creating an enormous amount of wealth. The problem is in the way we're not using it effectively to have widespread prosperity. The pie gets bigger when you have increased productivity. [But] a very, very small group of people by and large [has] benefited, and that has add-on negative effects for the whole economy."***

But the march of technology is moving so quickly that to focus on why this situation exists, and on how much of the cause is structural versus cyclical, risks distracting us all from the urgent need to address what we must do about it.

To read more: "Why Workers Are Losing the War Against Machines?" Erik Brynjolfsson and Andrew McAfee, *The Atlantic*, 10/26/11, www.theatlantic.com/business/archive/2011/10/why-workers-are-losing-the-war-against-machines/247278

Certain skill groups have always fared better than others in times of economic transformation. But today, despite U.S. gains in technology and (especially higher) education, the trend in the numbers of long-term unemployed and displaced workers remain troublesome. The necessary retooling of U.S. workers, particularly for now-critical cognitive skills, isn't happening fast enough. U.S. layoffs are increasingly becoming permanent job loss, with much more severe and long-lasting consequences. China is attracting companies with ever better adaptive capabilities. And China's ascension, along with India and the former Soviet Union, in the global economic game has effectively doubled the accessible labor supply.

> ***"[In] the argument that has traditionally been made, technology drives growth and knowledge-type jobs, so we'll retool people so that they can assume these knowledge jobs. Well, that hasn't happened. And some of the jobs that people always said aren't going away—construction jobs, healthcare jobs—well, we're building a bridge [in some other] country and importing it."***

There has been some growth among low-skilled service jobs such as janitors and food-service and hair-care workers, who have also seen a moderate hike in real wages. Interestingly, this isn't because technology is making these workers more efficient but in good part because, in this case, technology means some consumers have more money available to spend on these services.

But the larger picture is very bleak for workers with at best a high school diploma, who used to be well paid in manufacturing jobs that today are gone for good, with automation eliminating the need for unskilled labor.

> ***"In certain states, 40%-plus of a high school generation never graduate. What are we going to do with people that never have a high school diploma? [Meanwhile in the big aerospace companies], 50% of their engineers will retire within the next 10 years, so they have a vacuum at the top, of getting highly skilled labor. They don't need the unskilled labor."***

To read more: "Will a Robot Take Your Job?" Gary Marcus in *The New Yorker*, 12/29/12, www.newyorker.com/online/blogs/newsdesk/2012/12/will-robots-take-over-our-economy.html

The Innovation Edge

As globalization and technology make it more efficient for companies to engage fewer workers, and more of them in countries such as India and China, the combination of these forces is also changing the innovation advantage held by the United States.

> ***"Manufacturing jobs are about 15% of all jobs now. Some 70% of all corporate R&D is in manufacturing plants, so if you lose manufacturing, you also run the big risk that you're going to lose innovation."***

Technology's impact on the U.S. workplace, in terms of the number of jobs and how work gets done, is inextricably linked to the forces of globalization. Revenues from outside the United States contribute significantly to profits earned by U.S. companies. Emerging markets' expanding participation in the global economy has dramatically increased the globally accessible supply of labor.

In economic theory, holding all else constant, increasing the labor supply will lower the "price" of labor, i.e., what people earn. But all else is not constant – technology is also rapidly changing. The dynamic advancements of productivity-enhancing technology will almost certainly raise the incomes of those owning the capital and can raise the earnings of those workers who are made more productive by it.

History suggests that innovation follows manufacturing, but with manufacturing moving off-shore, how quickly is innovation following? How can the United States accelerate the pace of innovation at home to create new products and new jobs? And what skills will be needed in this globalized economy to support such innovation?

The conundrum for U.S. employment is that, simultaneously, the interactive effect between globalization and technology increases the efficiency of engaging workers in even slightly lower-cost countries to perform work, regardless of where the final products or services are needed.

> ***"In 'lean manufacturing,' the whole goal was actually not to use innovation or technology. It was to do the same job with less people, and not spend money on capital. And we did that why? Because it was better to save 30% of the jobs than lose 100% of them to China."***

To read more: "Jobs, Productivity and the Great Decoupling," Erik Brynjolfsson and Andrew McAfee, *The New York Times*, 12/11/12, www.nytimes.com/2012/12/12/opinion/global/jobs-productivity-and-the-great-decoupling.html?_r=0, and "Why Productivity Growth Is Good For a Healthier Labor Market," Bart van Ark and Gad Levanon, essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable

Marketability of those Caught in the Middle

With many of yesterday's middle-wage U.S. jobs transformed or eliminated by technological advances, what is asked of a middle-wage earner today is dramatically different from what was asked even five or 10 years ago. Yesterday's "machinist" is today's "technician." Is it also tomorrow's "robot?" The exploding need for training and retraining is not being addressed in a sufficiently creative or collaborative manner. U.S. institutions and U.S. education are not keeping pace with the rate of technological change. And companies often find that investing in retraining their workers doesn't pay off in their own balance sheets.

What's more, while we know where the work is not and where it is unlikely to rematerialize, we know much less about how to identify and/or create sectors in which workforce skills and advancing technology might combine to add the most jobs.

> ***"The mantra of engineering has always been to try to automate stuff. That's what we still train our students to do. But maybe we should redirect our efforts. If you can phrase what the problem is that we need to solve, rather than only trying to understand if it exists or not, then we can start thinking about how to solve it, using the same engineering tools. … Wages and work are good goals, but they were driven by needs that may not exist in the future."***

There are varied initiatives like the federal Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grants, which can help colleges offering two-year degree programs identify job growth areas and design courses and curriculum around that knowledge. But a whole new collaborative mindset is needed – especially including the engineering profession – to look creatively and proactively at how technology can enhance society instead of just replace labor, at how it might drive new product innovation and enhance human skills.

> ***"As you develop new technologies, don't focus simply on automating existing processes and taking the labor out of them. Think of new processes where technology and people are complements instead of substitutes. If we focus on the complementarities, then I think we can have growth and jobs at the same time. … Can we crowd source this, through entrepreneurship, to identify different kinds of industries, jobs, work structures that combine technology and the skills of the workforce in some innovative way that no one has thought of before?"***

To read more: "A Roadmap for U.S. Robotics – From Internet to Robotics," 2013 Edition, Henrik I. Christensen, http://robotics-vo.us/sites/default/files/2013%20Robotics%20Roadmap-rs.pdf

While only a Luddite might propose slowing down the pace of scientific progress, history shows that major technological revolutions always create big winners and big losers, an important lesson especially as scientists get even closer to developing machines that can accomplish creative tasks as well as automation. The more disruptive the technological progress, the greater the pain of the displaced and the higher the probability of negative social consequences. Cooperative efforts can steer progress toward a wider good.

Can't Manage What Isn't Measured

In the midst of all this change, we are trying to project and plan for the future using metrics created for an earlier age. Today, more and more Americans earn their living via multiple "jobs," particularly as innovations like web applications can be produced from home (or anywhere) and initiatives like the Freelancers Union remove the traditional benefits barrier from non-salaried employment.

But collection of U.S. economic data for the purposes of measuring work and the labor market is not keeping pace with the rapidly changing world of work. Measuring work and productivity needs to be more about "tasks completed" and less about counting the number of W-2 employees in traditional workplaces. Employment statistics that report net gains and losses fail to capture job-market churn. The pace at which businesses adopt technology to make process improvements that require fewer workers seems to be faster than that of technology-spurred innovation that creates new products and services and hopefully new jobs. And comparatively little information is captured that shows which kinds of jobs are churning or lost altogether due to technological change.

> ***"We keep talking about robots replacing manufacturing jobs. What's revolutionary is that recently we've been automating service jobs, everything from retail clerks to warehouse employees. This is where the bulk of the jobs have been vanishing, and it's really new, and it's happening really fast."***

More and/or better synthesized data are needed to measure technology's impact on the many kinds of work that increasingly make up U.S. employment, covering part-time and freelance workers as well as salaried workers; analyses by profession, job category and occupation, and the specifics of job loss and job creation attributable to automation, enhanced productivity and outsourcing.

To read more: "Robots and Looms: If today's robots are just the automated looms of the 21st century...," George R. Boyer, essay prepared for Cornell ILR School 2013 Employment and Technology Roundtable

New metrics are needed to better measure innovation and productivity in our increasingly complex economy, and to assess the benefits to U.S. society of advances in technology and today's greater variety of products and services. It's easy to count the number of people who work at companies like Google and Facebook. But how do we measure the value added by such businesses via, for example, the multitudes of non-staff application developers and their respective support and sales functions?

> ***"Where are the nodes of the economy where there are hundreds or thousands of productive freelancers? Government would make better policy decisions if it knew those things, and businesses who had access to that information could put it productively to use. Academia should think about whether or not freelancers are happy. The typical view is freelancers are exiles from the corporate world in this kind of 1099 dingy diaspora. But the truth is that there are freelancers out there who are doing it because that's what they want to do. Or even if they got forced into it, they're finding out that that's how they'd rather work. Or maybe they've got two different loves that they've put together a living for. Find those people and talk to them and figure out what lessons we can draw."***

We also need to know more about what is happening to individual workers as well as groups — who is leaving the workforce, where they are going and what is or isn't helping them to make a living there. We need to understand which training/retraining programs work best, which ones don't, and how we can free up the resources from the latter to support the former. There is evidence that participation in some training programs can raise individual earnings by as much as 50 percent. At the same time, there's an insufficient understanding of how low-wage workers navigate through workforce development opportunities, and there are serious questions about the value of many of the credentials offered.

> ***"We have to get more creative about retraining and repurposing workers. When we lay off 200,000 postal workers, they may not become app developers – but they could be UPS or Federal Express employees."***

We should look beyond longstanding sources like the U.S. Bureau of Labor Statistics for minable data about things like hours worked and occupations which might be found, for example, among ADP's corporate payroll data or government surveys or even IRS forms. Indeed, research currently underway is examining how Twitter feeds may help to measure unemployment.

To read more: "Technology and the Labor Market: What We Know and How We Can Know More," John M. Abowd, Michael R. Strain, and Lars Vilhuber, essay prepared for Cornell ILR School 2013 Employment and Technology Roundtable

> ***"[My] biggest success in hiring students is if I can match their talent and their passion to what I need to get done. Because if the passion is there, the talent is there, then the learning and the skills, all that follows. But there isn't a lot of information about what people are actually good at. … There is a lot of potential to create more predictive models that go beyond ideologies, so that we can make decisions that are on the basis of data rather than philosophy."***

Whose Problem is This, Anyway?

It's easy to assign blame for the current situation. To educators for not imparting the skills to make a contemporary living. To scientists for continuing to create labor-saving technologies that add to quality of life for many but put many others out of work. To businesses for focusing their people-asset management on the "capital" over the "human." To policy-makers for enacting measures that become hiring disincentives.

The social and political elements of this situation are as crucial as the economic and technical ones. The roles and responsibilities for addressing it are widespread across all sectors and groups, and extend to individual workers themselves. As more and more adults have, and will have, multiple "jobs," they need better information about where the job market is going so that they can adapt and make the best choices to increase their own chances of earning a sustainable and rewarding living.

> ***"We need a tax system that offers possibilities for people along their lives and that actually introduces incentives for people to take risks and to move across occupations, across industries, for people to set up their own businesses. The tax system can address a lot of these issues of inequality [and] mobility that we've been talking about."***

The Corporate Role

The roles and responsibilities of employers in particular are complex, dynamic and often contentious. Changes in U.S. corporate culture and social norms have increasingly distanced top business leaders from their employees' living standards, which depend greatly on how much the company pays them. Today, "productivity layoffs" to reap efficiency cost-cutting savings are considered almost a routine and necessary business process, even when a company's profitability is strong. The sense of commitment between workers and companies is declining.

To read more: "Layoffs and Outcomes for CEOs and Firms," Kevin F. Hallock, essay prepared for Cornell ILR School 2013 Employment and Technology

> ***"Companies are laying off thousands of workers at the same time that they're announcing major stock buybacks – when they have record levels of cash, record levels of profitability – which is different than in other recessions, when companies had the stress and competitive challenges and needed to rebalance the workforce. Now, they can just do more with less. … The recession changed the norms. It gave these companies air cover to rationalize their workforce based on the productivity gains from technology. Now it's become like an annual event."***

Corporations have obligations to their shareholders to leverage technology to operate efficiently and cost-effectively in a global economy. Companies today face institutionalized disincentives to hiring full-time workers, and the U.S. social compact tying healthcare to employment unfairly burdens employers as well as employees (who can lose their benefits after losing a job or when changing employers).

> ***"We ought to look at the increased variation across corporations in their HR strategy, and it's across the world. Why is the variety appearing? I think some is because there's a weakening of the labor movement and government regulation. But I also think technology is playing a role. The variety's potentially a source of optimism, because it says we're not necessarily condemned to one best way, by technology or anything else. There are multiple ways to maximize profit. Technology affords us various choices, choices at the company level. Individuals are important, but companies matter a lot, and they really do have choice…How technology shapes that choice, I don't think we in the HR side understand very well. Technology and HR people could work together better to try and understand a bit more how these choices are evolving."***

There are some model employment practices that are bright spots - cooperative training by industry cluster, work-sharing arrangements in 24 states that can be an alternative to layoffs, and lessons to be learned from small- and medium-sized enterprises with more flexibility to adopt practices adaptable to new circumstances.

To read more: "A Primer on Private Equity at Work: Management, Employment, and Sustainability," Eileen Appelbaum and Rosemary Batt, CEPR Working Paper 12-2, www.cepr.net/index.php/publications/reports/primer-on-private-equity

UPS, where today's upper-level managers rise up through the ranks of the "men in brown," is one example of a company with sustainable jobs and career ladders. Lincoln Electric is another example of socially responsible success in the technology age.

Maybe it's time to formally expand the current conceptualization of corporate social responsibility (CSR) to "ESR," encompassing the social responsibilities of employers (and of engineers) to address sustainable employment. Moving jobs onto the corporate citizenship radar screen alongside philanthropic, environmental and corporate governance priorities recognizes companies' accountability for the consequences of their human capital decisions from a sustainability, as well as an asset management, perspective. Perhaps U.S. business should proactively establish and adhere to best practices regarding the societal effects of companies' employment practices.

> ***"[A company may] say that people are their most important resource, but that's window dressing. Government can nudge, but I think the onus is on corporate leadership to take a bold step and kind of step away from the pack. Ultimately, somebody's got to step up in the corporate leadership world and be the Henry Ford."***

To read more: "Jobs…a Pillar of Corporate Social Responsibility? Perhaps It Should Be," Jeff Hoffman, essay prepared for Cornell ILR School 2013 Employment and Technology Roundtable

Tragedy of the Commons?

"It's not in the interests of any individual firm in the United States to try to solve the jobs problem. They're pressured to make short-term profits. They're global corporations. They have shareholders and options to invest around the world. But it is in business' collective interest to address these issues because we need purchasing power, and even the multinationals still get 60% of their revenue from U.S. sources. We've got to figure out a way to deal with this tragedy of the commons problem, and the only way is by getting people to work and institutions and organizations to work together. Over the last 30 years with the decline of the labor movement, you've seen a lot of institutions go downhill. We don't see the kind of dialog, the enforcement of our social norms and social policies that discipline corporations. We need to invent the new institutions that will cut across and aggregate these interests and help us to address these challenges. We've got to get the education community working with business and employers, working with labor and civil society. I'm not a believer that technology is going to naturally eliminate jobs and cut income. But if we don't do anything about it, if just left, as we have, to individual market forces and to individual corporate actions and to individual technology innovations, then that's probably where we are headed. It's up to us to change that trajectory."

To read more: "Root Causes for America's Jobs Crisis and Strategies for Addressing It," Thomas A. Kochan, essay prepared for Cornell ILR School 2013 Employment and Technology Roundtable and summarized from "The American Jobs Crisis and Implications for the Future of Employment Policy," ILR Review, April 2013, www.ilr.cornell.edu/ilrreview/index.html

Moving Ahead

The Roundtable closed with widespread commitment among participants to drive a much broader and more vigorous national discussion about the short- and longer-term impacts of technological advances on the nature of work, on the elimination and creation of jobs, and on the ability of U.S. workers to earn a sustainable living. The day's key take-away: Cross-sector thinking and new partnerships are urgently needed to determine how the enormous gains and benefits from advances in technology can be shared to have the widest and most positive effects on the U.S. economy and on individual standards of living.

Through events like the 2013 Roundtable on Employment and Technology, the ILR School – in this case partnering with its Institute for Compensation Studies and Labor Dynamics Institute, the EPRN Sustainable Entrepreneurship Network and The Conference Board – will continue to advance informed and open-minded, cross-sector conversation about the forces driving the high adoption rates of productivity-enhancing technologies throughout the U.S. economy, and the impacts on employment and the future of work.

See more at: http://bit.ly/Ye2mbv or
www.ilr.cornell.edu/ICS/InsightsAndConvenings/EmploymentSustainabilityInitiative/

Cornell ILR School
2013 Employment and Technology Roundtable
April 12, 2013 | New York, NY

Participants

Jaison Abel, Federal Reserve Bank of New York

Timothy Aeppel, The Wall Street Journal

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Steven Berkenfeld, Barclays Capital

Alan Blinder, Princeton University

Erik Brynjolfsson, MIT Sloan School of Management

Diane Burton, Cornell University ILR School

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Lorrie Foster, The Conference Board

Maggie Gagliardi, WorldatWork

Danielle Goonan, Clinton Global Initiative

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Cornell ILR

The ILR School is advancing the world of work through teaching, research and outreach. ILR's mission is to prepare leaders, inform national and international employment and labor policy, and improve working lives. The school offers undergraduate and graduate education as well as career-long learning for professionals.

The ILR School was founded in 1945 as the New York State School of Industrial and Labor Relations. As the world of work evolves, the school's focus broadens to keep pace with that change. Today, the school is becoming better known simply as ILR.
See more at: www.ilr.cornell.edu

Roundtable Collaborating Partners

Institute for Compensation Studies (ICS)

An interdisciplinary center in the Cornell ILR School that researches, teaches, and communicates about monetary and non-monetary rewards from work, and how these rewards impact individuals, companies, industries, and economies around the world. ICS is dedicated to delivering innovative research, leading-edge insight, and practice-strengthening knowledge.
See more at: www.ilr.cornell.edu/ics

Labor Dynamics Institute (LDI)

A research center in the Cornell ILR School whose mission is to create and make accessible novel data on the dynamics of the labor markets. Working with research networks and statistical agencies, LDI develops appropriate statistics to inform policy makers, researchers, and all those seeking knowledge.
See more at: www.ilr.cornell.edu/ldi

Employment Policy Research Network (EPRN) Sustainable Entrepreneurship

A research collaborative that seeks to better understand and disseminate to policy makers, current business and organization leaders, and future entrepreneurs research-based information, analysis, and commentary on the critical job-creation and job-quality issues needed to increase the probability that entrepreneurial start-ups will survive, grow, prosper, and generate high-quality jobs.
See more at: www.employmentpolicy.org/topic/1027

The Conference Board

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See more at: www.conference-board.org

Cornell ILR School
2013 Employment and Technology Roundtable
April 12, 2013 | New York City, NY

Further Reading

"Jobs…a Pillar of Corporate Social Responsibility? Perhaps It Should Be," Jeff Hoffman; essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable. REPRINTED ON PAGE 17.

"Jobs, Productivity and the Great DeCoupling," Erik Brynjolfsson and Andrew McAfee, *New York Times,* December 11, 2012, www.nytimes.com/2012/12/12/opinion/global/jobs-productivity-and-the-great-decoupling.html?_r=0.

"Layoffs and Outcomes for CEOs and Firms," Kevin F. Hallock; essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable. REPRINTED ON PAGE 20.

"A Primer on Private Equity at Work: Management, Employment, and Sustainability," Eileen Appelbaum and Rosemary Batt, CEPR Working Paper 12-2, www.cepr.net/index.php/publications/reports/primer-on-private-equity.

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"Robots and Looms: If today's robots are just the automated looms of the 21st century,…" George R. Boyer, essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable. REPRINTED ON PAGE 23.

"Root Causes of America's Jobs Crisis and Strategies for Addressing It," Thomas A. Kochan, essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable. REPRINTED ON PAGE 27 and summarized from "The American Jobs Crisis and Implications for the Future of Employment Policy," *ILR Review*, April 2013, www.ilr.cornell.edu/ilrreview/index.html.

"Technology and the Labor Market: What We Know and How We Can Know More," John M. Abowd, Michael R. Strain, and Lars Vilhuber, essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable. REPRINTED ON PAGE 30.

"Why Productivity Growth Is Good For a Healthier Labor Market," Bart van Ark and Gad Levanon, essay prepared for the Cornell ILR School 2013 Employment and Technology Roundtable. REPRINTED ON PAGE 38

"Why Workers Are Losing The War Against Machines," Erik Brynjolfsson and Andrew McAfee, *The Atlantic,* October 26, 2011, www.theatlantic.com/business/archive/2011/10/why-workers-are-losing-the-war-against-machines/247278.

"Will a Robot Take Your Job?," Gary Marcus, *The New Yorker,* December 29, 2012, www.newyorker.com/online/blogs/newsdesk/2012/12/will-robots-take-over-our-economy.html.

Jobs…a pillar of Corporate Social Responsibility? Perhaps it should be.

Jeff Hoffman, Jeff Hoffman & Associates

The concept and practices of Corporate Social Responsibility (CSR) have become common place in many businesses. Community investment, environmental stewardship, human rights, labor standards and governance are areas that companies have embraced as part of being a good corporate citizen. Shared Value, where business practices not only contribute to the bottom line but also provide societal benefits, is gaining ground.

There is an issue that few companies include in their CSR framework and that is jobs or more specifically, employment sustainability. Yes, companies provide and create jobs. Jobs are core to economic development and for building strong communities. Companies invest in education and youth not only to help develop tomorrow's customers, but also their future workforces. Much focus is put into STEM (Science, Technology, Engineering and Math) education as a key to competing in the global economy. (I am an advocate for adding an "A", for arts, to make it STEAM as creativity is critical for innovation.) With the high school dropout rate in the United States at 25%, education is rightly a high priority. But many holding jobs today are in jeopardy and currently overlooked in their employers' CSR framework. Let's explore why and the repercussions.

The world of work is changing rapidly and this is nothing new. The industrial revolution of history is now the technology revolution of today. The way people live, work, consume and communicate is evolving. Changes of the past have provided a higher standard of living and better paying jobs. But today, is technology inadvertently contributing to a decline in standard of living? Does higher productivity mean fewer positions are needed for the same level of national output? Is this contributing to unemployment, underemployment and to lower paying jobs economywide?

From a single business perspective, managing human resources in the same manner as other business functions makes sense. Improving productivity and shrinking payroll costs can rapidly increase the bottom line. Yet, it is not uncommon to see a company that touts its good corporate citizenship turn around and lay off 10,000 well paid employees with legacy skills no longer needed, and hire new, fewer and/or lower paid employees with different skills to fill new roles - all while announcing record profits. For a company standing alone, this may make good business sense. However, if the cumulative impact of businesses operating this way is to depress societal living standards and jeopardize the long term sustainability of all businesses, can the good corporate citizen label still apply?

Going back to the illustration of the 10,000 employee layoff, what is the impact of those who become unemployed, underemployed or are paid less? Too often, purchasing power for this

group falls. The newly hired may be fewer in number and/or not being paid as much, and most likely with diminished employer-provided benefits, depressing their purchasing power as well. Collectively, this population will be less able to afford housing, transportation, dinners out, shopping, vacations, etc. Multiply this shift by many businesses and many employees, and you see the potential negative impact.

Let's look at the potential positive implications for businesses by working to reverse this trend through the lens of Corporate Social Responsibility and shared value. Companies must look at their human capital differently. Employees do need to step up to the plate and realize that in this changing world, they will need to adapt and stay relevant. But, that doesn't excuse employers' responsibilities. Could the example company above have trained many of those downsized employees for new roles? Could the company have come up with a compromise on salary and benefits for these existing employees that would keep them in a better position financially, not realizing immediate cost savings, but knowing that their efforts will be contributing to the long term sustainability of their company along with the greater good? If many companies do the same (retrain workers in a more organized and aggressive way or find a payroll compromise that dampens layoffs), the collective buying power increases resulting in greater consumption, creating more jobs and a healthier economy. Does this sound radical? It's really quite similar to the sustainability/green approach that employers routinely consider with regard to their environmental footprint and P&L statement. Examples of Corporate Social Responsibility, balancing corporate profits and environmental impacts, do exist. The provocative question is: "Why for sustainability of environmental resources but not human resources?"

Many businesses have partnered with community colleges to help them re-train employees to learn the skills necessary to continue to work at their current place of employment. In the Cincinnati area, for example companies such as MAG, Kellogg, MUBEA and Mazac partnered with the Gateway Community and Technical College to create the Center for Advanced Manufacturing. Through their Workforce Solutions program, Gateway customizes programs specifically for companies to re-train their employees with many of the businesses covering the cost of tuition.

It's acknowledged that operations ceasing and factories closing in communities can have a devastating effect. While "company towns" are not as prevalent as they once were, when a company pulls out of a community it doesn't only have a detrimental effect on those employees but has a ripple effect on business and therefore jobs in the region. One example of a positive step that companies can take as good social citizens to prepare a community for post operations is that of Vale, the global mining company based in Brazil. They have a program where a few years before the mine is closed, they work with the community to help "develop an economic life that is independent of mining." They do this through a variety of tools including public-private partnerships. (This one example doesn't suggest that companies with Corporate Social

Responsibility in one area don't have poor CSR performance in another. While Vale is proactive in the example cited here, they also have a mixed record on the environment, which is not unexpected in their industry.)

Volunteering is not only an important way that people help their communities, it is also a great way to either strengthen existing skills through skills-based volunteering or learn new skills while providing valuable services. Volunteering can also be a way to network while adding skills and experience to the resume. Many companies offer employee volunteer programs including providing pro-bono service. During times of workforce transition, volunteering is often overlooked as a tool to help with re-training employees or to help employees who will be transitioning to develop skills that will aid in finding new employment. Points of Light is leading the way in skills-based and other forms of employee volunteering through its Corporate Institute.

Goldman Sach's 10,000 Small Businesses and 10,000 Women programs "help entrepreneurs create jobs and economic opportunity by providing greater access to education, capital and business support services." While this program is external to Goldman Sach's employees, it demonstrates the power that a company can bring to job creation.

As Corporate Citizenship evolves and companies look deeper into how they impact society, both positively and negatively, sustainable employment will be harder to ignore, as happened with environmental concerns. The traditional components of CSR are community, environment, human rights, labor standards, safety and governance. The positive multiplier effect for the economy that good-paying jobs can create, as well as the positive implications on people's lives, means that employment sustainability should be added as a specific pillar of Corporate Social Responsibility.

Layoffs and Outcomes for CEOs and Firms[1]

Kevin F. Hallock, Cornell University

Do CEOs profit when workers are laid off? Whether or how CEO pay is linked with employee job loss or downsizing is not really a new question, but it does seem to be of increasing interest. In fact, how a company overall fares following a mass layoff is the focus of an interesting new working paper by Elizabeth Handwerker and Lowell Mason (2013). Handwerker and Mason estimate what happens to employers following mass layoffs using the methodological framework that has heretofore been used to study the long-term impact of layoffs on employees (e.g., Handwerker, Hildreth and von Wachter 2009). Essentially, the authors are asking whether or not firms that execute mass layoffs later experience a rebound or growth in their employment levels.

Handwerker and Mason find that firms' long term, post-layoff employment patterns vary by reason for the layoff as well as by other firm characteristics (e.g., age, business complexity). As expected, employers reporting seasonal slowdown as the reason for a mass layoff do see their employment levels recover quickly, "only to fall again each year." Employers that gave other reasons for the layoff, among them "Organizational Reasons" or "Production Reasons",[2] were experiencing "slowly growing levels of employment before the mass layoff, and particularly sharp declines in employment which continue well after the initial quarter of the mass layoff" (p. 12). In these cases, the company may well have prospered by or survived due to the downsizing decision, but employment growth was not part of the post-layoff experience. Important to note, they also conclude that "[m]ass layoffs in the 2001 recession look very similar to mass layoffs in the 1990s expansion and the 2000s expansion, but mass layoffs in the Great Recession of 2007 – 2009 occurred at employers with more stable employment levels before and after the layoff" (p. 24)

Turning to the post-layoff experience of the person leading the company, twenty year ago a provocative press release appeared titled "CEOs Win Workers Lose" (Institute for Policy Studies, 1994). The piece listed the companies, then, with the largest number of layoffs and also listed the raises for their CEOs. The average raise for the CEOs was over 30% and the report and others who took up its findings seemed to suggest that the layoffs *caused* the raises.

The implied causation was intriguing, but it turned out that when I did my own calculations for those CEOs, although the *mean* raise was 30%, the *median* was less than half that -- about 11% and nearly identical to the median increase for *all* CEOs of the top 800 U.S. publicly traded companies that year, regardless of whether or not their companies experienced layoffs.

[1]A closely related essay will appear in the "Research for the Real World" column in WorldatWork's *Workspan* magazine, June 2013 edition.

[2]Handwerker and Mason report the "Other Reasons" category to include "Organizational Reasons," "Financial Reasons," "Production Reasons," "Disaster/Safety Reasons," or "Other/Miscellaneous Reasons." With the exception of "Disaster/Safety Reasons," all these could be a reason given if the mass layoff resulted from the adoption of productivity-enhancing technologies that resulted in an employee downsizing, but could also capture other explanations as well.

Prompted by this press release, I collected data from about a thousand firms over a seven year time span, including data on employee layoffs, CEO characteristics (e.g. age and seniority) and company characteristics (e.g., size, shareholder returns and market value) to explore more robustly the relationship between layoffs and CEO pay (Hallock, 1998). Applying standard statistical analysis, I found further evidence to dampen the emotive reaction evoked by that earlier press release. Separating companies into those that made a layoff announcement in the previous year and those that didn't, it was the case that the CEOs who made at least one large layoff the previous year did make a lot more (about 40% in cash pay) than those that made no layoffs in the previous year. But, controlling for company and CEO attributes, the findings change quickly.

CEOs of bigger firms earn more than CEOs of smaller firms. It also turns out that, among publicly traded companies, bigger firms are more likely to have layoffs. So controlling for just the market value of the firm (or the number of employees, or assets – it doesn't really matter), those CEOs leading firms that announced a layoff the previous year only make about 12% more than those that did not. And, after controlling for lots of other things (e.g., CEO age and experience, firm industry, stock returns and the like), there was absolutely no relationship between layoffs and CEO (cash) pay or pay raises. Then, like now, a lot of the public discourse about CEO pay seems to involve throwing out provocative statistics which can too easily be dismissed, missing a deeper conversation about truer casual factors.

But, that first study of mine only examined current pay (salary, bonus and other). Isn't a lot of CEO pay wrapped up in stock and stock options held by executives; what about that? For publicly traded companies in the U.S., CEOs are not only frequently granted stock and stock options, but they also can hold considerable equity in their firms. It is important to consider, therefore, whether and how the stock market reacts to announcements of layoffs, if we are interested in the relationship between layoffs and CEO compensation. Even if there is no relationship between CEO *current* pay and layoffs, if the stock market reacts positively or negatively to layoff announcements, there still could be substantial material effects on CEO wealth.

I investigated this in a number of papers, including a more recent one with Henry Farber (Farber and Hallock 2009; Hallock 2009), and found was a notable shift between the 1970s and 2000s in the reaction of the stock market to layoff announcements. Specifically, the stock price reaction to layoffs was negative in the 1970s and became increasingly less so (on average) over 40 years when it ended most recently, weakly positive in the 2000s. Farber and I reasoned that in the 1970s layoff announcements would be met with immediate stock price declines (example: deficient demand in the US automobile market at the time) and in the 2000s layoffs might be met with stock price increases (example: "efficiency" and "belt-tightening"). In fact, we found evidence of just that. Specifically, the stock price reaction to layoffs was negative in the 1970s and became increasingly less so (on average) over 40 years when it ended most

recently, weakly positive in the 2000s.

Some ask: but don't CEOs get fired if their firms get into so much trouble that they must resort to layoffs? Sometimes. In an additional paper with Sherrilyn Billger (Billger and Hallock, 2005), we investigated the link between CEO turnover, mass layoffs and stock prices. Among our findings are that mass layoffs in firms are significantly related to CEO turnover (voluntary or involuntary departure) the following year and, in some time periods, layoffs are strongly related to CEO turnover two years later. We also find that if the stock market reacts positively to a layoff announcement, the CEO is likely to stay on for some time. However, if the stock market responds negatively to the layoff announcement, the CEO is, before too long, also much more likely to exit the company.

In the context of today's public frustration with CEO pay and the continuing labor market doldrums, to better understand whether or not employment growth returns, it is important to understand why layoffs happens. Additionally, the link between job loss in firms and CEO pay is also interesting. Since 2000, things are perhaps changing and new studies are needed to better understand what's different.

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Robots and Looms: If today's robots are just the automated looms of the 21st century, then expect a couple decades of wage stagnation, declining living standards, and civil unrest

George R. Boyer, Cornell University

In the very long run, industrialization has raised living standards immensely. Over the past 230 or so years since the first industrial revolution began in England, real per capita income in the West has grown by a factor of twenty. We are vastly richer than our ancestors were in 1780. However, while 21st century economists celebrate the first industrial revolution as the crucial breakthrough to modern economic growth, the majority of workers living at the time saw it as a painful and disruptive process. And for the thousands of workers who lost their jobs to new machines or who were crowded into the slums of Manchester and other English industrial cities, the effects were catastrophic. Those who lightly dismiss the technological revolution of today as "just another industrial revolution" do not understand the extent to which the process of an industrial/technological revolution is wrenching to society.

As Marx and Schumpeter (1950) stressed, capitalism is an evolutionary process driven by "creative destruction." One does not need to be a Marxist to appreciate the effects of the initial wave of creative destruction as described in Part I of the *Communist Manifesto*:

> The bourgeoisie cannot exist without constantly revolutionizing the instruments of production, and thereby the relations of production, and with them the whole relations of society. . . . Constant revolutionizing of production, uninterrupted disturbance of all social conditions, everlasting uncertainty and agitation distinguish the bourgeois epoch from all earlier ones. . . . All that is solid melts into air (Marx and Engels 2002: 222-3).

Since the first industrial revolution of 1780-1850 there have been periodic other industrial/ technological revolutions, associated with the internal combustion engine, the computer, etc. All of these technological revolutions were associated with waves of creative destruction that created "winners" and "losers." Once society recognizes this fact, it may be able to take actions to mitigate the negative effects of technological change, and thus to ameliorate the plight of the losers. Toward that end, the remainder of this essay will examine the historical lessons to be learned from the British industrial revolution.

The process of industrialization did not bring immediate prosperity to the working class through the creation of new higher-productivity jobs. During the first four decades of the industrial revolution, from roughly 1780 to 1820, manual workers' full-employment real earnings increased by slightly more than 10%; when unemployment is taken into account, earnings growth was even slower. Charles Feinstein (1998: 652) concluded that "for the majority of the working class the historical reality was that they had to endure almost a century of hard toil with little or no advance from a low base before they really began to share in any of the benefits

of the economic transformation they had helped to create." Ricardo and Malthus's notion that even in a growing economy workers' long run equilibrium wage was subsistence (the so-called iron law of wages) was based on empirical observation.

While workers' real earnings finally began to increase slowly after 1830, "biological" measures of well-being suggest that living standards continued to deteriorate in the 1830s and 1840s. After increasing from 1801 to 1826, life expectancy at birth stagnated until the early 1850s, and probably declined slightly for the working class. The jobs created by the industrial revolution were in cities, and workers who migrated from rural areas to industrial cities to take advantage of the new jobs paid a steep price for their increase in purchasing power. Early nineteenth century industrial cities were death traps—workers were crowded into slums lacking clean water and adequate sewers. As late as 1851, life expectancy at birth in large cities was 34, largely due to the appalling levels of infant and child mortality in urban slums. Another indicator of health is height by age, which is a function of net nutritional status, the amount of food taken in by children and adolescents net of demands make on their bodies by labor and disease. Military recruits born in the 1820s were taller on average than recruits born in the 1780s, but heights declined from 1830 to 1850, so that recruits born in 1850 were shorter than those born at the beginning of the industrial revolution. The decline in heights was a result of the disease environment which came with rapid urbanization, and also of the increase in child labor associated with the industrial revolution.

While the average manual worker benefited little from technological change during the first industrial revolution, some groups of workers were definite losers. Chief among the losers were the handloom weavers. In the late 18th century technological improvements in spinning had led to a sharp increase in the demand for handloom weavers. By the early 1820s there were approximately 200,000 handloom weavers living in Lancashire and Cheshire, equal to about a quarter of the adult male labor force in those counties. However, the widespread adoption of the power loom caused the wages of handloom weavers to decline by 60% or more from 1820 to 1840. By the 1830s weavers had become "among the most poverty-stricken workers" in England, many just managing to survive with the help of local welfare. Taking both factory workers and handloom weavers into account, John Brown (1990: 612-13) concluded that "there was virtually no improvement in living standards in cotton textiles," the "leading sector" of the first industrial revolution, until "at least the 1840s." One of the reasons why textile workers' wages did not increase more rapidly was that the newly adopted machinery enabled employers to replace adult male workers with women and children, who were employed at far lower wages. In the 1820s and early 1830s, before the first child labor laws, more than 10% of English children aged 5-9 and 75% of children aged 10-14 were working (Horrell and Humphries 1995).

The economic dislocations resulting from the "creative destruction" of the industrial revolution led to much industrial unrest, including waves of textile machine breaking in 1811-13 by the Luddites, agricultural machine breaking in 1830-1 by the followers of the mythical Captain Swing, and major strikes in the cotton industry in 1808, 1810, 1818, 1829-30, and 1842. The effects of industrialization also led to political unrest—a mass meeting of cotton workers from Manchester and surrounding towns resulted in the "Peterloo Massacre" of August 1819, in which eleven workers were killed and about 400 injured. The textile cities also were the center of Chartism, the working-class reform movement which demanded of Parliament, among other things, universal manhood suffrage, equal electoral constituencies, and the abolition of the requirement that members of Parliament be property owners.

After decades of inaction, Parliament finally responded to the social and economic disruptions caused by industrialization in the 1830s and 1840s. The Factory Act of 1833 eliminated the employment of children under age 9 in cotton and woolen mills, and set maximum hours of work for children and youths aged 9-17. The 1842 Mines Act, the Ten Hours Act of 1847, and later acts further restricted the employment of children and young persons and regulated the employment of adult women. The problems of urban squalor were addressed by the Public Health Act of 1848 and the Artisans' and Labourers' Dwellings Acts of 1868 and 1875. The Trade Unions Act of 1871 gave unions legal recognition, and an act of 1875 legalized peaceful picketing. Perhaps most significant, the 1867 Reform Act extended the franchise to the better-paid members of the working class, thereby doubling the urban electorate.

What can we learn from the first industrial revolution and from the other technological revolutions of the past two centuries? First, that capitalism is an evolutionary process, and that the creative destruction which is a necessary part of capitalist growth creates large numbers of "losers" as well as "winners." Second, that the workers displaced by job destruction often do not have the skills necessary for the new jobs that have been created. Third, that the private sector largely is uninterested and unwilling to help the "losers;" if their pain is going to be mitigated, it must be by government policy. In *The End of Laissez-Faire*, Lord Keynes wrote: "I think that capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative system yet in sight, but that in itself it is in many ways extremely objectionable. Our problem is to work out a social organisation which shall be as efficient as possible without offending our notions of a satisfactory way of life." Nearly 90 years later, this remains "our problem," and it is a problem that we must figure out how to solve.

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Root Causes of America's Jobs Crisis and Strategies for Addressing It[1]

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America needs a new Jobs Compact to close the nation's jobs deficit, to create sufficient high-quality jobs to raise wages and end thirty years of wage stagnation, and to update and strengthen labor and employment policies. A market failure and an institutional failure are the root causes for the persistence of this two dimensional jobs crisis. The market failure arises because while it is not necessarily in the interest of any individual firm to create jobs in the U.S. or to invest in and compensate employees or to promote high living standards, it is in the interests of the overall business community, workforce, and society do so The institutional failure is that the key groups that would need to coordinate efforts to overcome this market failure—business, labor, education, and government—either do not interact or are at impasse over how to address employment issues.

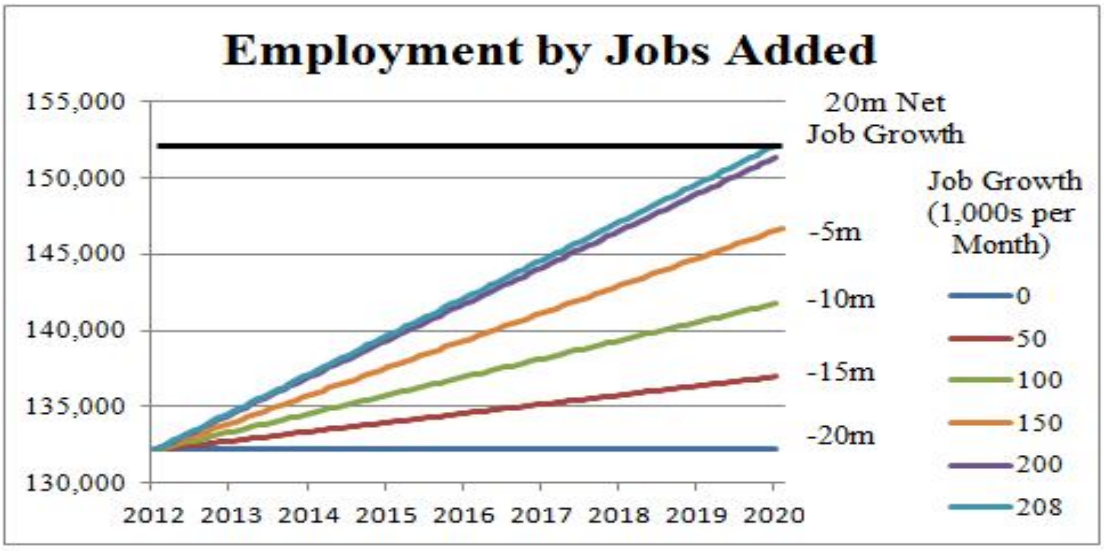
Overcoming these market and institutional failures will require new leadership to bring together leaders from the key stakeholder groups—business, labor, education, and government—to engage at the regional and national levels to build consensus and implement a new long-term Jobs Compact for America, one capable of generating the estimated 18 million new jobs (an updated estimate as of January, 2013) needed between now and 2020 to replace those lost in the last recession and to keep up with the growth in the labor force. The compact will need to consider significant changes in each of these institutions and in the interactions among them. This includes corporations and the overall business community; unions, professional associations, and other groups that give voice to the workforce; government policymakers and administrators; and educators who prepare and update the knowledge, skills, and abilities of the current and future workforce.

As shown in Figure 1, this would have requiree creating on average 208,000 new jobs each month between 2012 and 2020. As of January 2013, this increased to 214,000 per month.

[1]Prepared for the Cornell ILR School Institute for Compensation Studies Roundtable, April 12, 2013. A more complete presentation of the points summarized here will appear in Thomas A. Kochan, "The American Jobs Crisis and Implications for the Future of Employment Policy," *ILR Review*, April, 2013.

Figure 1

Years to Close the Jobs Deficit at Different Monthly Job Growth Rates



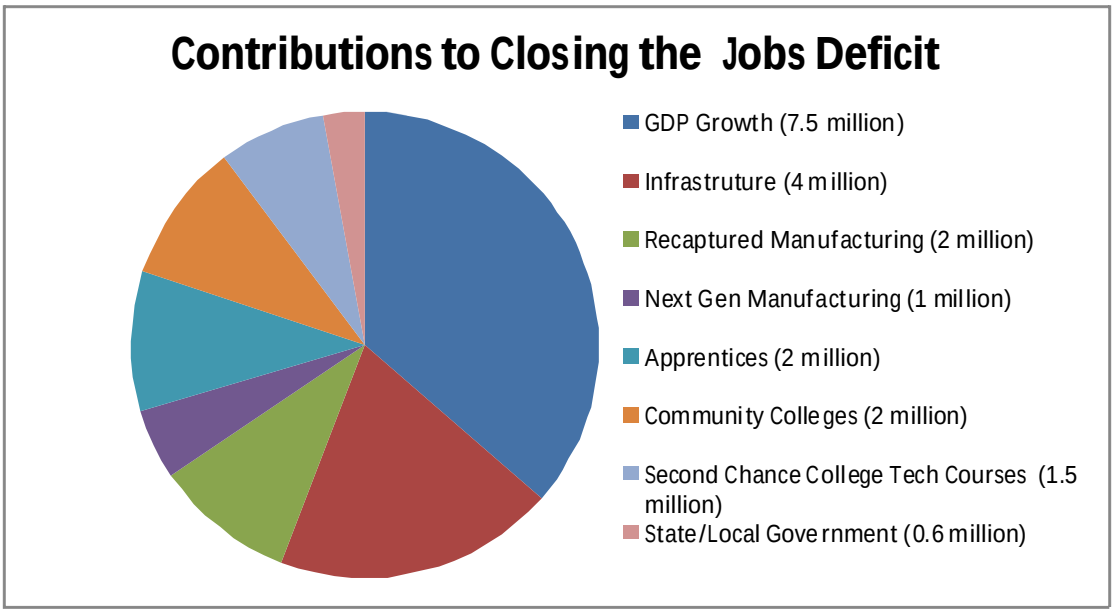
Options for Accelerating Job Growth

Figure 2 summarizes where I believe these new jobs could come from through a combination of investment in infrastructure, state and local education and other public service investments to regain the jobs lost in this sector since 2007, actions on the part of business and labor to recapturing manufacturing jobs previously outsourced to low wage countries and to capturing the next generation manufacturing jobs, coordinated regional efforts to rebuild apprenticeship and other vocational and community college programs that prepare workers for the large number of middle skill jobs that are either available now or will be open n the years ahead as the baby boom cohort retires, and use of university based on-line learning technologies to provide under-employed college graduates a second chance to acquire the technical skills and knowledge in high demand.

I do not believe that advances in technology will inevitably result in a persistent job shortage in the U.S. Instead that will be the default option and result only if we allow the effects of these market and institutional failures to persist. It is time for us to take the actions needed to make sure this does not happen.

Figure 2

Where the Jobs Could Come From



Technology and the Labor Market:
What We Know and How We Can Know More

John M. Abowd, Cornell University
Michael R. Strain, American Enterprise Institute
Lars Vilhuber, Cornell University

There is compelling evidence to support the theory that technology is changing the types of jobs in the U.S. labor market.

To understand how, think of three kinds of jobs: low-skill (a custodian, say), middle-skill (a bookkeeper), and high-skill (a technical engineer). A computer is not going to replace a custodian — computers cannot yet make the rounds in an office after hours, emptying trash cans, vacuuming carpets, and cleaning restrooms. And a computer is not going to replace a technical engineer. The engineer engages in creativity and problem-solving which computers are not capable of — computers are good at taking orders, but not at giving them. But a computer could replace a bookkeeper. In fact, accounting software for personal and small-business finances has replaced many bookkeepers. Similarly, ATMs have replaced bank tellers.

Bookkeepers and bank tellers were never the lowest paid workers. Their jobs required trustworthiness, professionalism, and accuracy — the bank teller has to add up the deposit correctly each time; the bookkeeper has to balance the accounts each month. There is more at stake if a bookkeeper or bank teller makes an error than if a custodian does. But precisely because their jobs required repetition and rule following, they were able to be replaced by a (much) cheaper computer.[1]

Does the effect of computers on employment have anything to do with our current labor market troubles? Is current unemployment being driven by structural, technology-related changes in the labor market? The labor market is in abysmal shape. Perhaps most troubling are the approximately five million workers who have been unemployed for 27 weeks or longer — the long-term unemployed. Prior to the Great Recession, the previous post-war record was a little under three million long-term unemployed. Today, over one-third of unemployed workers are long-term unemployed — a staggeringly high share, again a post-war record outside the current downturn.

One of the most urgent policy questions facing the United States today concerns the fate of the long-term unemployed. What will become of them? Will they be able to find good jobs and resume productive employment? To answer that question, it would be helpful to know the cause of the changing face of unemployment: Why are so many workers experiencing long-term unemployment? Why is it so hard for them to find employers who want to hire them?

Of course, we won't provide a definitive answer to that question here. But to begin thinking about that question, take a step back and ask whether our current unemployment is structural or cyclical.

While there are a number of ways to define the difference between these two types of unemployment , cyclical unemployment can be thought of as being a consequence of temporary responses to a lull in demand. A worker's unemployment is cyclical, for example, if she is on a temporary layoff and will return to her firm when the economy picks back up.

Structural unemployment is a different story altogether. A worker's unemployment is structural if, for example, he no longer has the skills or demographic characteristics the labor market demands, or if he lives in a geographic location where there are no jobs.

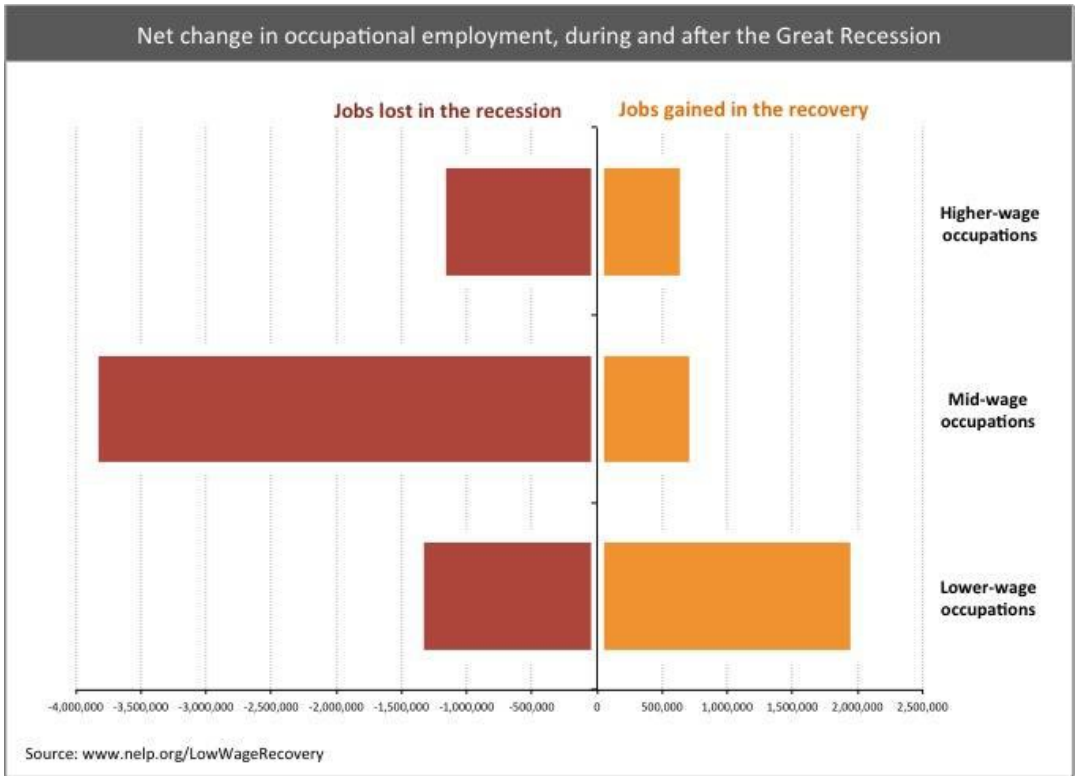
The weight of the evidence from the economics literature seems to be that current unemployment is mostly cyclical — it is largely a response to the significant decline in aggregate demand associated with the Great Recession — not structural. But both types of unemployment are surely present in today's labor market — it is likely that many of the workers who have been unemployed for longer than six months don't have the skills (or demographics) required to find and maintain employment in the current labor market.

What would cause this structural unemployment? One answer is that firms may be using the

Great Recession as an opportunity to reorganize their production functions. Structural unemployment could result if firms are using the current downturn to move their operations to a better location, to change the types of workers they employ, to reorganize their occupational distribution. And, very importantly, to change the way they use technology in their production of goods and services.

During the current downturn, are firms changing the way they use technology in a way that affects employment?

The National Employment Law Project calculates that from 2008 to 2010 low-skill and high-skill occupations each constituted about one-fifth of Great Recession jobs losses. The remaining 60 percent of job losses were from middle-skill occupations.



In the recovery, nearly 60 percent of job gains have been from low-skill occupations, with roughly one-fifth of gains coming from the remaining two skill groups.[3]

These summary statistics are far from conclusive. But they are consistent with the theory that firms are using the recession to reorganize the composition of their workforce. And that this reorganization is consistent with what's been happening in the United States for several decades — middle-skill jobs are disappearing and are being replaced by technology. This could mean that middle-skill workers will have an increasingly hard time finding a job, being forced to spend months on unemployment.

HOW CAN WE learn more about the way that technology is transforming the labor market? There are many answers to this question, but here's a very important one: Through better data.

Many of the ways in which technology affects workers, jobs, and the labor market are inferred rather than measured. Firms, of course, have a pretty good idea of what their own workers are doing. Community colleges have a pretty good idea of what they are training workers to do. Workers typically know their own skills well.

But putting it all together — even from the point of view of a sophisticated economic analyst trying to make sense of the labor market — is an exercise frustrated by the incompleteness of current data. Much of what each party knows is not reflected in any dataset, and the information that is recorded is hard to put together across different data sources.

Consider the evolution of manufacturing. Back in the old days, many workers, manhandling machines, would produce a widget. Then the machine was replaced with a semi-automated machine, and the operator — now only one — needed to be trained in the particular electronic interface of the machine. Then, sometime in the hypothetical future, the machine will again be replaced, this time with an industrial 3D printer, requiring computer knowledge to program it, but requiring little training to operate. The worker now operating the machine has a degree in computer science.

This is, of course, a simplification of the dramatic changes in manufacturing, but it illustrates the underlying reality that the types and number of workers being employed by the manufacturing firm changed dramatically over time. The output of the firm, on the other hand, may not have changed at all: the machine still produces widgets. Traditional output-based measures would completely miss the complicated, technology-driven changes to the firm's workforce.

To understand and fully measure these phenomena, we need a way to pry open the black box of production. What is it that workers do at work? What do workers contribute to the production of goods and services? How do workers make these contributions? We need to be able to answer these basic questions through the direct measurement of economic data.

Currently, representative statistics only have a small window on what workers do and how much they earn doing it and cannot reliably be linked to what firms produced. We only have a periodic small glimpse into that world, and it is incomplete.[4] We need better data to get better measurement.

HOW CAN WE get better data? By building on data the government already gathers.

Did you know that every quarter, the U.S. government currently surveys over nine million establishments employing 98 percent of all workers? Every quarter. And every year, over 142 million survey forms are filled out by businesses — more than the number of households in the United States.

We don't normally consider them surveys: the above numbers relate to the Quarterly Census of Employment and Wages (QCEW) and the individual 1040 tax returns reported to IRS.[5]

We don't treat them as surveys because they are administrative data collected for the purposes of computing firm and person tax liabilities. But using them as surveys would represent a major improvement in our attempts to understand how technology affects employment.

How? Consider the possibilities present with income tax records. Many folks use electronic methods to fill out the form. One could use sampling methods to randomize some components — for instance, you could ask some percentage to provide information on their occupation using such survey tools as activity calendars, consistency checks, and default values (sometimes providing last year's value, sometimes not) — without increasing overall respondent burden. Overall, this might lead to more reliable measures of occupation, available for statistical purposes.

Consider also the unemployment insurance wage records that underlie the unemployment insurance administration and that are also the source for the QCEW. Currently, those wage records have only limited information: the worker's earnings, her Social Security number, and a code that identifies her employing firm. Supplementing this with additional information about the worker's job would tell us a lot. Analyzing millions of worker-level records over the course of several years would tell us much of what we want to know about how technology affects employment.

A simple improvement would be to include the occupation of each worker on her wage record. Many European countries already do this. Ideally, in addition to occupation, the form would indicate the types of tasks done by the worker. The form could indicate whether the workers' tasks are repetitive and automatable, or whether they involve creativity and judgment. Another simple improvement would be to list the number of hours the worker worked in, say, the week before the record was completed. Also, including the precise date on which the job ended would be a big help towards understanding the nature of the job.[6]

Data on gross labor market flows — on new hires, quits, layoffs, job creation, job destruction — are currently available in the United States,[7] but they do not contain information on worker occupation or worker tasks. We could significantly increase our understanding of technology's impact on employment if they did.

WILL A ROBOT take your job? With better data, we could fill in the blanks in this answer: Well, the economy destroyed X million jobs over the last three years, and Y percent of those jobs were characterized by routine tasks. The economy created Z million jobs over the same time period, and W percent of those jobs were characterized by tasks which require creativity and judgment. There were Q million "stable jobs" — jobs which last a reasonably long time with steady earnings — in the economy over the last five years. Of those Q million, R percent of the stable jobs that were destroyed this year were characterized by routine tasks.

Today we have crude measures of skills: median wage in an occupation and average years of schooling are two commonly used measures to define an occupation's skill level. But if we knew the actual tasks a worker performs, then we could have a much more precise measure of the skill level of the job and of the worker.

Today our best data on workers is not readily linked to our best data on firms. The Current Population Survey, Decennial Census, and American Community Survey are great data sources from which you can learn about the occupation of American workers, but they are not readily linked to information about the firms in which the workers are employed.[8]

Today we know stock measures: Relative to 1980, low- and high-skill occupations are more prevalent than middle-skill occupations. We know a series of snapshots, but we don't know the underlying dynamics. We can calculate net flows, but not detailed gross flows by occupation, skill, or tasks.

Better data could tell us more about skills than occupation and wages. Better data could let us link workers and firms to see how tasks result in output. Better data could let us measure dynamics — the rate at which middle-skill jobs are being destroyed, the types of low-skill jobs that are being created, and more.

The United States already has the infrastructure necessary to move our understanding of the effect of technology on employment from inference to measurement. The task ahead is building on that infrastructure. Adding more detail to IRS tax records and unemployment insurance wage records would be a great place to start.

The views expressed in this paper are those of the authors only and do not necessarily reflect the views of their affiliated and employing institutions.

NOTES

[1]David Autor, Frank Levy, and Richard Murnane attempt to discover how computers change the labor market. The rapid adoption of computing technology changed the labor market in two ways: (1) by replacing some jobs with computing technology, and (2) by making other jobs more productive. The types of jobs that computers are good at performing were replaced: jobs that are characterized by routine tasks — tasks which can be accomplished by following explicit, programmable rules. Computers made workers in high-skill occupations more productive. ("The Skill Content of Recent Technological Change: An Empirical Exploration," *Quarterly Journal of Economics*, Vol. 118, No. 4, November 2003.) In a separate paper, Autor and David Dorn calculate the change between 1980 and 2005 in the share of employment accounted for by different occupations. When occupations are ranked by skill level, a U-shaped pattern emerges. The share of employment accounted for by low-skill occupations is increased significantly over the time period. The same is true for the employment share of high-skill occupations. Middle-skill occupations account for a significantly smaller share, suggesting that those jobs are being disproportionately replaced by computers. ("The Growth of Low Skill Service Jobs and the Polarization of the U.S. Labor Market," *American Economic Review*, forthcoming.)

[2]Other prominent definitions not discussed above are (1) that cyclical unemployment can be affected by fiscal and monetary policy whereas structural cannot; (2) that cyclical shifts are short-lived whereas structural shifts are "permanent"; and (3) that cyclical unemployment is caused by changes in labor demand whereas structural unemployment is caused by changes in labor supply.

[3]A number of economists have studied this question. Atif Mian and Amir Sufi find that between 2007 and 2009 counties that experienced a large negative shock to consumer demand lost relatively more jobs in the non-tradeable goods sector (e.g., restaurant jobs), whereas job losses in the tradeable sector were distributed evenly across counties. They find that around two-thirds of job losses were caused by a drop in demand. ("What Explains High Unemployment? The Aggregate Demand Channel," NBER Working Paper No. 17830, February 2012.) Edward Lazear and James Spletzer finds that losses and gains in the labor market have been symmetric: those industries which initially had the largest increase in unemployment and the most "mismatch" between vacancies and unemployment later had the largest decreases. also show the largest decreases. ("The United States Labor Market: Status Quo or A New Normal?" NBER Working Paper No. 18386, September 2012.) See also Jessse Rothstein, "The Labor Market Four Years into the Crisis: Assessing Structural Explanations," Industrial and Labor Relations Review, Vol. 65, No. 3, June 2012.

[4]National Employment Law Project, "The Low-Wage Recovery and Growing Inequality," Data Brief, August 2012.

[5]For example, the Occupational Employment Statistics (OES) program at the Bureau of Labor Statistics (BLS) produces employment and wage estimates for over 800 occupations, but it only covers 62.2 percent of total national employment, and only surveys a given establishment once every three years. The Confidential Information Protection and Statistical Efficiency Act of 2002 should help with linking data on workers to data on firm output, but our experience is that data sharing between federal agencies could be improved.

[6]The Quarterly Census of Employment and Wages (QCEW) program — also referred to as the ES-202 program, its old name — at the BLS produces county- and MSA-level quarterly counts of employment and wages. The counts are comprehensive for workers covered by state unemployment insurance laws and for federal workers covered by the UCFE program. The 2010 Statistics of Income (SOI) Complete Report estimates 142,892,050 individual returns filed.

[7]Data on U.S. federal workers already has the date on which the job ended (the Enterprise Human Resources Integration-Statistical Data Mart). The Canadian government also collects this information for all workers, not just government workers (called the Record of Employment).

[8]To learn more, see John M. Abowd and Lars Vilhuber, "National Estimates of Gross Employment and Job Flows from the Quarterly Workforce Indicators with Demographic and Industry Detail," *Journal of Econometrics*, Vol. 161, March 2011.

[9]The Longitudinal Employer-Household Dynamics (LEHD) program of the U.S. Census Bureau creates and analyzes confidential, longitudinally linked employer-household microdata.

Why Productivity Growth Is Good For a Healthier Labor Market

Bart van Ark, The Conference Board
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Why are we creating so few jobs in the United States? In fact … we are not. Since the 2008/09 recession, when lost 8.7 million jobs, we recovered as many as 5.7 million. It definitely has been a bumpy path, as attested to by the latest job report for March. However, we are now back at an aggregate number of 135 million jobs, which is only three million behind the pre-recession peak. In some industries, such as mining and professional and business services we now even have more jobs than before the recession. Currently we are probably on a trend of about 180,000 jobs per month, which from a historical perspective isn't bad at all.

The reason why there is nevertheless not much of a feel-good factor about the job market is because the unemployment rate has remained stubbornly high. This is only partly because employment hasn't returned to pre-recession levels, but also because the working age population has continued to rise, at least until now. While participation has declined, the delaying retirement of older workers may add to the difficulty of younger workers to find a job. Another key problem is that government jobs don't recover as a result of subsequent spending cuts over the past 2-3 years.

But there is another big problem with the labor market today, which has largely gone unnoticed: ***today's jobs aren't getting any more productive***. Many argue not to worry about productivity now. The economy is still below the potential output level (perhaps even below the potential output growth), so more jobs is better whatever job it is. Also, in the short term productivity growth only kills jobs, so maybe slow productivity growth even provides a bit of support to job creation. But is slow productivity growth really a good model for future creation of jobs, and when do we need to start to worry about it? We would argue: sooner rather than later!

The reason for the need to accelerate productivity is simple: you cannot grow an economy for very long on the basis of jobs only. Even if labor compensation growth remains stagnant, without productivity growth there wouldn't be much left for new investment. Productivity growth provides the economy with the additional firepower to invest in new machinery and equipment, people's skills and other intangible assets, such as R&D and innovation. Without productivity growth, the average return on a job falls, jobs get cheaper and reduce the incentives for employers and employees to invest in training and education. Low productivity also means low wages, which won't help consumption. Less government austerity, or rather more government spending, would help counter the slow growth in GDP, and make some new investment possible, but not much help can be expected from there in the short term. In other words, with zero productivity growth rate diminishing returns kick in rapidly and growth eventually comes to a halt.

Indeed the latest numbers show that the productivity performance of the U.S. economy is dismal. Before the recession output per hour in the non-farm business was on average 2.6 percent during the peak-to-peak period from 2000-Q4to 2007-Q4. During the recession, labor productivity surged in a very unusual way to almost 6 percent year-over-year by the end of 2009. “Unusual”, because productivity typically behaves in a pro-cyclical manner and slows during recessions rather than accelerates. We all know what happened: companies panicked in late 2008 and laid off many more people than necessary, with little damage done to their business processes as they had the technologies from previous years available to do more with less. Once the recovery began in late 2009, many but jobs came back and productivity began to drop, again in an untypical anti-cyclical manner. But the latter was nothing more than a correction to what happened during the recession.

The productivity story has become more puzzling as of 2011. By now we had arrived in the “structural” phase of the recovery, characterized by slow GDP growth as demand remained low, a slowing global economy and – although contestable, and certainly not telling the full story – some persistent structural issues in the labor market itself, such as skill and geographic mismatches, etc.. Labor productivity growth in the non-farm business sector slowed to almost zero by 2011 and remained very low at 0.7 percent for 2012 as a whole. Manufacturing, the stronghold of productivity growth has been somewhat better at 2.2 percent in 2012, but nothing like the average of the 2000s which was in the range of 3-4 percent. Even from an international comparative perspective, U.S. productivity growth has been extraordinary low. In 2012, output per hour in the U.S. increased at only 0.2 percent, which was lower than in Europe (where it was 0.6 percent) or the OECD as a whole (about 1 percent). In fact, there are only two years in U.S. post WW-II history that productivity growth was even slower, which was 1974 (-1 percent) and 1982 (-0.8 percent).

So what’s going on here? There are a few possible explanations for this slow productivity performance in recent years:

1. Slow growth in equipment – In a typical year U.S. businesses increase the capital services obtained from equipment and software by around 3-4 percent. In contrast, capital services in 2009-2012 have been roughly only half of that, and the pace of improvement is very slow. Without an acceleration in investment it is difficult to raise labor productivity quickly, as most of it would come down to total factor productivity growth only, which is the growth in output after accounting for the growth of all inputs, including machinery and software.

2. Relaxing a little – As they fought for survival, many companies were stretched too thin in recent years, and now that profits are higher, they are adding new workers, which reduce productivity growth.

3. Cheap labor and low productivity – Taking advantage of very low compensation levels, on

the margin, many companies are incentivized to add more workers rather than invest in new equipment and technology. As a result, output per worker will slow down.

4. A long tail of less productive small and medium sized enterprises – Many SMEs who survived the worst of the recession, may have decided to hang in there until times get better, keep there (often local) people on the payroll at even lower wages, taking the solid productivity growth of large businesses down.

5. The "new normal" for productivity growth is only around 1% - Productivity already slowed since 2004, but the hardship many companies experienced during the Great Recession forced them to exhaust all the potential for technological and organizational improvements. Now they are left with fewer opportunities to improve efficiency. And, moving forward, there isn't enough technological progress out there to drive strong productivity growth.

It's hard to single out any one of those explanations as most important as all may be part of the story. But while the first four are more transitory issues, the last explanation may be the most worrisome as slow technological change and innovation could be a longer term concern. Indeed when looking at the total factor productivity (TFP) growth estimates, as published by the San Francisco Federal Reserve, and adjusted for cyclical factors, not only labor productivity but also the TFP growth trend has been clearly slowed down since the mid-2000s.

The debate about technological change and its impact on the skill distribution and the job market has become very contentious in the past year. Pessimists like Tyler Cowen and Bob Gordon would argue that there is little new technology around right now that will help accelerate the long term productivity trend. However, neither of them would argue that less technology would be of much help to job creation. Others, notably Brynjolfsson and McAfee, are arguing that the latest developments in IT will significantly reduce the job multiplier (the number of additional jobs created for one tech job), if not make it negative. Others argue that, at least historically, the number of "unanticipated" growth opportunities that arise from technology booms are so large, that one really cannot tell what's around the corner, and some optimism seems justifiable.

Technology and total factor productivity are not just enemies of jobs. While it's not difficult to imagine that robots can substitute for jobs, they can also be very helpful in making jobs much more productive, and freeing up the resources for new jobs that don't get done right now. The impact of new technology may stretch far beyond the manufacturing sector to other parts of the economy, including the health care and education sectors, where we likely need more rather than less help from technology. And, as labor force participation will be coming down even further as our population ages, we need the additional help down the road.

Whatever the relationship between technology and jobs, as slow as it currently is, TFP growth doesn't seem the biggest threat to job creation. For now, more productive jobs create the best

opportunity to push GDP growth beyond the dismal 2 percent trend we are currently on. While much faster economy-wide TFP growth may slow job creation, nobody can really predict by how much, as we don't know what new opportunities are around the corner. What we can predict, however, taking history as a guide, is that by not having sufficient productivity growth, the current pace of job growth will be unsustainable as GDP growth will get too slow to carry it. Without productivity growth we can also expect wage growth to slow across the board with few exceptions, and reduce incentives for firms to invest in training their people. Productivity growth also creates room to strengthen the tax base, raise revenue, reduce debt and create room for more government investment.

One of America's traditional economic strengths has been its ability to grow productivity. There have been times that one could get worried about "jobless growth" at times when productivity accelerated rapidly. But that's not the case time around. America now needs its productivity engine reignited to keep the labor market on a healthy growth path.