Online Outsourcing and the Future of Work

Korok Ray

MERCATUS WORKING PAPER

3434 Washington Blvd., 4th Floor, Arlington, Virginia 22201
www.mercatus.org

Korok Ray. "Online Outsourcing and the Future of Work." Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2017.

Abstract

The push toward global connectivity and the worldwide expansion of the internet, combined with the ongoing decline in the cost of technology, will change global labor markets and the nature of employment. Future technology will coordinate the assignment, distribution, and measurement of tasks to a billion-person network across multiple countries and dozens of skill vectors. The fixed salary, full-time employee will be replaced with a virtual network of online contractors who receive and deliver their work through computer-mediated auctions, assignments, and other economic mechanisms. I document these trends, explain the underlying economics, investigate the current labor laws and benefits for independent contractors, and suggest policy proposals that can prepare for the transformation.

JEL codes: Demand and Supply of Labors (J2), Particular Labor Markets: General (J400), Outsourcing (M550), Innovation (O310), Economic Growth and Aggregate Productivity: General (O400), Technology (O330)

Keywords: online labor markets, crowdsourcing, human computation, artificial intelligence, and the future of work

Author Affiliation and Contact Information

Korok Ray
Associate Professor, Department of Accounting, Texas A&M University
korok@tamu.edu

This paper can be accessed at http://www.mercatus.org/publications/online-outsourcing-future-of-work

Online Outsourcing and the Future of Work

Korok Ray

Introduction

The text you are now reading began as an audio file recorded in Texas. The file was sent to an IBM Watson artificial intelligence engine, which converted the audio into text. The text was edited by a worker in South Africa who competed in an online auction against a pool of workers around the world. The edited text was reviewed by a graduate research assistant in Washington, DC, and printed and marked up by the author in Texas, after which it was edited once more by another worker in the Philippines. All of these steps occurred entirely through the internet, and they represent the modern-day equivalent of the assembly line. The internet has expanded its reach around the world, through strategic investments by technology giants like Facebook and Google. The mostly poor populations coming online for the first time will serve as producers, rather than consumers, bringing their own labor to the global marketplace. The internet will serve as a massive clearinghouse for matching buyers and sellers of work, and this will have deep ramifications for the global distribution of wages, skills, and productivity.

This transformation, currently in its early stages, is not inevitable. The recent push toward nationalism and retreat from global economic integration can threaten this new global market. It is incumbent on entrepreneurs, financiers, intellectuals, and civil society as a whole to commit to free trade in services, especially trade that will take place over the internet. In what follows, I assemble preliminary evidence on this economic transformation, anchor the analysis in economic principles, speculate on long-term economic impacts, and recommend possible strategies to encourage online labor markets through actions of the public and private sector.

The Evolution of Outsourcing

The first wave of outsourcing was offshoring, in which manufacturing jobs in the 1960s and the 1970s moved abroad because of free trade (Mankiw and Swagel 2006; Gereffi 2005). The second wave of outsourcing took place during the first internet bubble of the late 1990s and early years of the 2000s, when companies set up operations abroad to outsource services such as call centers in India to handle their back office. Online outsourcing is the further evolution of this trend. Technology platforms will allow buyers and sellers to contract for work through dynamic and continuous auctions. Corporations will no longer hire only full-time employees who perform all the tasks themselves, but rather these employees will interface with a global network of workers available on demand. This third wave of outsourcing, I wish to argue here, will open up whole new worlds of productivity, expand economic opportunity across the globe, and change the nature of work. Forbes showed that, in 2014, nearly 35 percent of the US workforce were freelance or contingent workers (Adams 2014). It is projected that 40 percent of the workforce, or 60 million US workers, will be freelancers in 2020 (Intuit 2010).

The initial wave of outsourcing saw many cries that foreign workers were stealing American jobs. We now know that much of the rhetoric was overstated. Global wages reflect productivity, and productivity in American factories is high, given the high levels of capital investment. Many of the benefits from offshoring failed to materialize because capital-enabled factories in the United States could not compete with factories abroad with much lower capital-to-labor ratios. This same logic falls apart in the online world. The spread of information technology has made IT much more uniform across the world. For the purposes of services, a desktop computer in New York and a laptop in the Philippines are roughly equivalent; therefore, it is likely that outsourcing will shift more jobs outside of the firm now than offshoring did in the past.

Indeed, the notion of distributed computing (which forms the basis of cloud computing) has inspired the development of distributed work. In the future, occupations as varied as architecture, financial services, software development, writing, customer service, and marketing will be performed by an international network of contractors hired through a continuously adaptive mix of auctions and assignment algorithms.

To fix ideas, let me distinguish between local and nonlocal transactions. Companies like Uber, TaskRabbit, Thumbtack, and Airbnb all match buyers and sellers together over internet-based technology platforms. Each of these platforms facilitates a transaction that is *local*. Though Uber, for instance, is a global company operating in cities around the world, every transaction takes place by matching a buyer (passenger) and a seller (driver) together in a particular locale because transportation is a physical transaction. Alternatively, websites like Upwork and Amazon Mechanical Turk (AMT) match buyers and sellers of labor in global transactions and are the two major platforms of their kind. Both serve as a directory for companies and individuals to hire a wide variety of freelancers to perform computer programming, typing, copyediting, virtual assistance, and other internet-based tasks. In fact, given the global disparity in skills and wages, these transactions are almost exclusively *nonlocal*, often with buyers residing in high-wage countries and procuring services from workers in low-wage countries.

Online outsourcing refers to this latter kind of trade. It is still in its infancy. Nonetheless, online outsourcing technically falls under the gig economy because workers are acting as independent contractors, rather than full-time employees, which, as I will discuss later, has consequences for benefits.

As mentioned above, two of the major platforms are AMT and Upwork. Upwork registers 8 million freelancers on its two main sites: Elance and oDesk. The company claims that 53 million Americans are freelancing at some point, contributing $700 billion to the economy (Upwork 2014). This proves that Americans participate in online labor markets both as workers and as employers. Elance, in particular, posted over 1 million jobs in the first quarter of 2011 and almost 3.5 million by the end of 2013. By the end of 2013, freelancers earned $285 million in total earnings (Elance 2013).

The Scope of the Transformation

The scope of this shift is significant. Consider the simple fact that the growth of online marketplaces as a business model has ballooned in recent years, enabling buyers and sellers to transact business through technology platforms. Indeed, the top five firms leading the world in brand value have come from the top five US technology companies alone: Facebook, Google, Amazon, Apple, and Microsoft all run innovative platforms to create "connected ecosystems" (Frangoul 2017). For example, Amazon has created well-defined procedures for sellers to list their goods online, advertise to buyers, close a sale, evaluate transactions, and establish long-term reputation mechanisms that can bring in future business. What has already occurred in the goods marketplace will expand to these service marketplaces.

The service marketplace relies on the *extensive* rather than the *intensive* margin of the labor supply. The intensive margin refers to increasing the hours of work of those already in the labor force, whereas the extensive margin refers to bringing new populations into the labor market altogether. The intensive margin will count workers who leave full-time, face-to-face jobs in favor of online work, whereas the extensive margin will count all of the population who

will come online in the future to use the internet as a means of work. My expectation is that the extensive margin will dominate the intensive margin, thus growing more rapidly in the future than today. Of the world's population in 2015, 4.20 billion people do not have any kind of internet access that would allow the performance of work online (Broadband Commission 2015). If one-eighth of these people are brought online and enter the workforce through online opportunities, then the total global labor market would increase by 15 percent.

These calculations are admittedly speculative but so too were the early calculations on the growth of the internet. For example, the key statistic that led Jeff Bezos to leave his comfortable, high-paying job at the hedge fund D.E. Shaw in favor of starting Amazon.com was the single statistic that the internet was growing at an annual rate of 2,300 percent in 1994 ("Jeff Bezos" 2008). With technology giants like Facebook disclosing that they spent $860 million on internet infrastructure alone in 2012 (Leber 2012), it is virtually inevitable that bringing people online in substantially large numbers will occur.

While this transformation will be significant, it is unlikely to completely change all current work practices. For example, work that requires tight coordination, creative input, and face-to-face feedback from multiple employees will always provide a need for full time, in-person employment. As the trend towards agglomeration grows, the countervailing force will be the increased efficiency of urban centers, which will still make it efficient for some work to occur inside the corporation face-to-face. The traditional corporation will not vanish, but rather adapt to this new reality in which online workers are a nontrivial component. Full-time employees will interface with the network of on-demand workers, thereby shifting work out of the firm.

The Underlying Economics

The academic literature on the economics of organization can provide some guidance on the boundaries of the firm and, most importantly, the kind of work that takes place within the firm versus the market. Nobel laureates like Oliver Williamson and Ronald Coase established their careers by developing theories of transaction costs that help determine the location of work and the structure of the firm (Williamson 1981; Coase 1937). Broadly speaking, when transaction costs are high, organizations like corporations are efficient at conducting work because the control structure of a hierarchy is an effective way to produce output. In contrast, when transaction costs are low, individuals can contract with each other at low cost and can do so through price-mediated markets.

The key economic feature of the internet has been the massive amount of *disintermediation*, which has led to a marked decrease in transaction costs. Before, a buyer and a seller contracting with one another usually required a face-to-face meeting, possibly a long history of a business relationship, or even the use of a lawyer. However, the internet has replaced many of these requirements, as buyers and sellers no longer need to be in the same physical space, nor do they require local services like banking or legal contracts. Instead, reputation mechanisms online can now enforce behavior. As such, the secular decrease in transaction costs brought on by the internet has led to a shift in the boundaries of the firm, as more and more work has moved from within corporations into the marketplace through networks of contracts.

There are many more examples of this widespread disintermediation in transactions. Before, an entrepreneur in the United States would hire a graphics company, rather than an individual designer, to design its website. This company would provide office space, recruit talent, and secure payment. But today, rather than working for a company, designers can register

as independent freelancers over the internet, and the entrepreneur can contract directly with them. The internet can perform many of the same roles previously performed by the company: online search can substitute for business development, PayPal can provide a vehicle for payments, and the platform itself can provide performance evaluation and monitoring. Disintermediation cuts across a wide swath of industries, ranging from architecture to financial services, and the internet has enabled the removal of the middleman to provide more direct contact between buyers and sellers. Chicago economist Ronald Coase proved that transaction costs were the only barriers to efficiency between two bargaining parties (Coase 1937). As transaction costs fall, negotiated outcomes move closer to efficient solutions. The growth of digital technology and its concomitant performance measurement, search, and payment functions all help eliminate intermediaries and reduce transaction costs to facilitate greater trade between buyers and sellers.

Following disintermediation, the second major trend is the rise of global internet connectivity. Facebook and Google have made large investments in expanding the reach of the internet, especially to poor, rural, underserved areas. As of 2015, only 3.2 billion people, or 43 percent of the total world population, had access to the internet (Kende 2015; Broadband Commission 2015). The specific technology used to deploy the internet varies depending on the area and may include airborne drones, balloons, low-level satellites, towers, etc. While it is in the economic interest of internet companies to bring new users to their platforms, the positive externalities on society will be large. With the Google Chromebook available for a mere $150, it is hoped that low-cost laptops will spread across the developing world. Given their low incomes, the poor are unlikely to be large consumers and, therefore, are not the usual audience that Facebook and Google target with advertisements. Instead, they will bring their labor to a global

market, and new companies will form to harness this human capital. Indeed, bringing this human capital online could prove to be the largest economic transformation the world has seen.

The third trend is the shift from input-based pay to output-based pay. Input-based pay describes most forms of compensation in place today with physical, face-to-face employment. Workers are paid a salary with possibly some discretionary bonuses. Output-based pay refers to paying in response to the performance of the worker. This, of course, already happens: consider stock options for a CEO or the piece rate for every unit produced by a worker on an assembly line. But with the remote and distributed environment of the internet, output-based pay should only increase, and it will lead to significant efficiencies.

The academic support for output-based pay is long and deep. Output-based pay, also referred to as performance pay, has three primary benefits for productivity. First, it aligns incentives between the employer and the worker. Second, it attracts better workers to the firm. Third, it retains these talented workers over time (Lazear 2000). These three effects are called the incentive, selection, and retention effects of performance pay.

Notable labor economists like Edward Lazear have shown that performance pay can lead to a 44 percent increase in productivity over fixed salaries and other input-based pay (Lazear 2000). This increase splits evenly between incentive effects and selection effects. The economic benefits of performance pay explain the widespread use of equity compensation among executives and directors of major corporations around the world. It also explains its use throughout financial services and entrepreneurship, where founders of new companies receive large equity grants in order to have incentives to grow the firm.

I believe the benefits of performance pay will transfer to online workers. The measurement of human output is only increasing over time, as sensor technology becomes ever

more portable and cheap. The self-quantification movement, which first established itself in fitness culture and health tracking, will eventually permeate most jobs. The spread of cheap sensor technology will improve the monitoring and measurement of human output, leading to Big Data opportunities for better, more refined, and more dynamic compensation schemes.

These performance compensation schemes are called "mechanisms" in the academic literature. They are complex systems of payment to workers based on a vector of environmental variables, prior productivity measures, and other economic covariates. Surge pricing by Uber is one example of a mechanism that dynamically adjusts prices to match supply and demand for drivers and passengers. Other similar mechanisms will improve the productivity of online workers.

Human vs. Artificial Intelligence

A residual question lurking in the background is the interaction between human and artificial intelligence (AI). This is one of the deep philosophical debates of our time and will only become more acute as AI technology develops. The current narrative circulating in the popular press is that robots will steal all human jobs (Worstall 2017). However, technology has historically served as a complement rather than a substitute for human output. As such, AI can help improve the quality of marketplaces that coordinate labor in this new online world.

Even if humans are the ones performing actual work, technology can assist in coordinating, contracting, assigning, distributing, and evaluating that work. This evolution is not inevitable but requires conscious choice by several simultaneous actors. We as a society must choose to build a future that expands human opportunity, not shrinks it.

In essence, the core questions regarding online outsourcing are as follows: Who does the job, and at what price? The academic economics and computer science literatures split this into

two broad categories: auctions and assignment. Auctions allow platforms to develop prices under highly uncertain environments through a variety of bidding rules, some of which are unknown to users. For example, Google runs the largest ad auction in the world, with eBay as its primary bidder. These auctions are designed by humans but implemented through machines. They set prices to reflect changes in demand, supply, and other environmental variables.

Assignment algorithms are an alternative and more direct approach to determining who performs the job. In general, auctions work better when there is a lot of uncertainty about price and skill. Auctions reveal this information, but auctions suffer because of their complexity. Assignment algorithms are quicker and simpler than auctions, but require more environmental knowledge about the optimal price and the set of workers best qualified for the job. There is variation now in the market, as websites like Thumbtack use auctions to solicit bids from service professionals, whereas others like TaskRabbit use direct assignment to allocate tasks. It is impossible to know exactly which method will dominate or what the appropriate mix between the two is. Ultimately, both academic and industrial research will experiment with all kinds of mixtures, and it is likely that different mechanisms will perform better under different circumstances.

New technologies take time to change behavior. When Marconi first invented the radio in 1896, the primary form of communication was newspapers. Early media companies bought radios, and their radio shows simply involved reading newsprint over the airwaves. Eventually, the companies realized that radio opened up new opportunities that were unavailable before, and this gave birth to radio talk shows. When the television reached a mass audience in the late 1950s, early television shows were videotapes of prior radio shows (Blanchard 1998). Eventually, media companies again realized that television provided new opportunities

unavailable to radio and made full use of the broad spectrum of formats that now characterize modern TV.

This same shift is occurring through online outsourcing. An early entrant into the online marketplace was oDesk, a website that connected buyers and suppliers of labor through an online directory. The initial technology for oDesk was designed to mimic face-to-face employment. The website monitored the workers through screenshots, and payment was based on hourly wages ("The Workforce in the Cloud" 2013). oDesk at one time had the greatest revenue share of online labor markets. In 2012 alone, the company reported more than 35 million hours of work, and the company's online work market was projected to grow from $1 billion in 2012 to more than $5 billion in 2018 (Upwork 2013). If this trend continues throughout the entire online labor market, the scope for growth is enormous (Kokkodis and Ipeirotis 2016). At the same time, another website called Elance used fixed-price contracts, which are a form of output-based pay. These two companies proceeded simultaneously until they merged together to form a single company, Upwork, in 2015 (Pofeldt 2015).[1]

The existing online labor markets are still new on the scene. Even AMT and Upwork, which offer fixed-price payments, require high-touch interaction from the requester/employer. In particular, the employer needs to specify the terms of the agreement of the work to be performed, a timeline, and a price. A better, longer-term option is to automate all of these choices; software will set the price and eventually negotiate contracts on a somewhat individualized basis with workers. Existing markets also do not make use of worker performance data in a granular or dynamic way. Upwork allows employers to take screenshots of their workers for monitoring, but this information is not explicitly embedded in compensation. But as the informativeness

[1]Elance and oDesk merged in 2013, and Upwork was launched in May of 2015.

principle of Holmstrom (1979) shows, all information that is relevant to performance should be part of compensation. Otherwise, the employer is effectively leaving money on the table.

As transaction costs fall over time, I believe this information will be incorporated into compensation and will boost productivity. My own research shows that these productivity gains can be large and can help with all manner of decisions, such as when and whether to terminate a worker. When the information from a performance system is coarse or incomplete, low-performing workers stay employed for too long, draining output. But when this information is used for compensation and evaluation, it allows the employer to terminate low performers and raise output. In particular, the ones who remain employed are harder workers than the ones who are terminated (Ray 2007).

Case Study: The Philippines

Consider the Philippines: a country of 104 million people and widespread English education. The Philippines has historically served a primary role in business process outsourcing (BPO), as call centers sprouted up across the Philippines in the last decade. In some sense, the first wave of outsourcing built call centers in India, and now those centers have shifted to the Philippines. The increase in the connectivity of the internet will bring online labor markets to ever more remote regions of the islands. As a matter of fact, I have first-hand knowledge of such a development.

In 2012, I was seeking inexpensive dictation transcription services for my notes taken during academic conferences. On oDesk I located a woman named Cheryl Lamorin, a nurse living in the Philippine province of Cebu, 355 miles from the capital city of Manila. She chose her province because her mother was sick, and she spent half of her time caring for her mother at home. She needed to cut back on her hours at the hospital in order to do so, but of course,

stay-at-home care does not require full-time attention. She turned to oDesk in order to fill her time and earn extra income. I employed Cheryl for two full years until she formed her own medical transcription company with her friends, many of whom were stay-at-home moms.

Critics of online outsourcing have called it the digital sweatshop, effectively holding the workers to low wages and confining them to a life of poverty. But these arguments fail for the same reasons that the basic sweatshop arguments fail: all trade is voluntary, especially in online markets with large amounts of transparency and low costs of switching employers. Moreover, people like Cheryl have a low opportunity cost because they need to stay home for personal reasons. It was impossible for her to take a job outside of her home, and therefore, she was open only to online work. She often thanked me for allowing her to support herself while her mother was sick.

Over time, people like Cheryl will have multiple job opportunities. Their opportunity cost will rise because their options within the online market itself will increase. Over the long term, this will raise the level of wages, which in general should follow the long-term rise in productivity once the market develops more fully. The overall macro effect is that the low transaction costs of the internet will allow the market to spread to remote areas of the world where formal businesses are hard to establish, especially when the population is rural and scattered. This is how these online labor markets will increase the global supply of labor.

The Evidence

Measuring both traditional and online outsourcing poses a challenge because of incomplete and highly aggregated data. Traditional outsourcing refers to the permanent shifting of jobs to an external provider, while online outsourcing refers to interfacing with a website to contract

directly with individuals, some of whom are likely located abroad. There is much more publicly available data on the former than the latter, primarily due to aggregate government statistics.

In essence, there is some preliminary evidence from the International Monetary Fund and the Bureau of Labor Statistics (BLS) that traditional outsourcing is increasing. For example, outsourcing in the finance category involves functions that traditionally would have relied on the finance department of a US manufacturing company. Now, the services are either contracted with a firm abroad or established as a separate division in an overseas office, all within the same company.

Aside from financial functions, most of the other services are steadily increasing over time. This tends to confirm the public perception that outsourcing and global integration are increasing. Precisely measuring the economic magnitudes is another matter altogether. The two major sources of data on traditional outsourcing are the Mass Layoff Statistics of the BLS and the data from the Bureau of Economic Analysis of the Department of Commerce (Mankiw and Swagel 2006).[2] Levine (2012) conducted a comprehensive study of the BLS data, which track firms that lay off more than 50 workers who are out of work for more than 30 days. The BLS survey shows that most of these job losses did not involve any relocation of work. However, there are limitations because it does not capture work that is lost because of something other than layoffs, nor does it measure changes in future hiring as a result of outsourcing. Nonetheless, the survey illustrates that most job losses do not entail any relocation of work.

What are the responses of companies to these macroeconomic trends? Again, the data are mixed. Some studies find that US parent companies use *more* labor as outsourcing increases. This is consistent with the logic that outsourcing reduces the cost for the firm, freeing up

[2] There is some controversy regarding the completeness of these data (Levine 2012).

resources for investment elsewhere. These investments can lead the firm to hire more labor in new areas. Outsourcing increases job losses for domestic workers without a high school degree, but there is little evidence that it is significantly related to job loss for workers with college degrees (Kemeny, Rigby, and Cooke 2013). This supports the intuitive notion that education is an antidote to outsourcing-related job loss.

The only data available for AMT come from disclosure from Amazon itself. As of 2011, AMT claimed that over 500,000 workers were registered on their website from over 190 countries (Natala@AWS 2011). Online forums, like Turk Nation, have speculated that it is difficult for workers to earn a full-time wage on AMT, given the low pay of the jobs (Guarino 2015). An NYU professor calculated that the average compensation per hour for an AMT worker in 2009 was $2.30, well below the US minimum wage, though still above the income for much of the developing world (Guarino 2015).

Some preliminary data published through white papers on the Elance website show that at least for Elance, the total amount of outsourcing has increased over time, ranging from 1 million tasks outsourced in 2011 to 3.5 million tasks in 2013 (Elance 2013). These facts are undoubtedly part of the marketing apparatus of these companies because they show their success as a platform in matching buyers and sellers. However, it also shows that online outsourcing is on the rise.

In my view, these numbers are just the tip of the iceberg. The existing evidence on online outsourcing is more prospective than retrospective. It shows that online outsourcing passes a basic “proof of concept” test and can ultimately lead to massive growth. This is especially apparent when placed in the context of the large resources Facebook and Google are deploying to bring people online, as mentioned earlier. The current level of outsourcing is just a sliver of

what is possible, since connectivity in the world still reaches only half the globe.[3] Once this connectivity expands, it is entirely possible that outsourcing will explode in both quantity and quality, especially because the new people brought online will primarily be brought on as laborers rather than consumers.

Much of the growth in IT outsourcing has occurred through services and in businesses located on the coasts of America. This makes sense, given the high concentration of service businesses in California and along the eastern seaboard. BPO refers to all tasks traditionally relegated to the business back office, such as customer service, accounting, tech support, performance evaluation, and legal services. Gartner finds that global spending for IT services was approximately $932 billion in 2013 and is expected to grow to $967 billion in 2014, a 3.8 percent growth from 2013 (Gartner 2014). This suggests a global increase in BPO as a whole, and given that the levels of outsourcing have increased, the relative growth in outsourcing in Asian countries captures a disproportionate share of that growth. Finally, an Ernst & Young research publication finds that the five-year compound growth rate for worldwide BPO was 5.3 percent through 2016 (Ernst & Young 2013).

Trade in Services

Several policy questions arise in this new world of online outsourcing. Should the government subsidize or discourage online outsourcing? How should the government handle assistance to those hurt by outsourcing, if at all? Can the government invest in education for Americans to compete in online labor markets, or to help develop these markets themselves?

[3] As of 2015, nearly 94 percent of the world's population received a mobile phone signal, 48 percent could access the internet with their mobile phones, and nearly 28 percent subscribed to a data package (Kende 2015). As of 2014, there were nearly 711 million broadband connections worldwide (Broadband Commission 2014).

In essence, online outsourcing is another form of international trade. A company or individual can turn to a website in order to locate a worker to perform a service for a fee. Since the transaction is voluntary, both parties are better off. The buyer is better off because the value of his time is higher than the price paid for the work, while the seller is better off because her income from work exceeds her opportunity cost. This elemental transaction between a buyer and seller lies at the heart of economics.

Economists such as Adam Smith and David Ricardo have recognized the benefits of trade at the international level for over two centuries. Ricardo referred to this as comparative advantage; in a world with two countries and two industries, even when one country is more productive than another in both industries, both nations are better off if they trade. Each nation specializes in its highest comparative advantage.

Online outsourcing is the modern manifestation of international trade and should receive the same broad support from economists as free trade does. Civil society will need to acknowledge the benefits of free trade in services. The current wave of nationalism spreading throughout the world has led many governments to retreat from the principles of free trade. Although such policies may seem to benefit any one nation, generations of economists contend that they actually hurt the nation's economy in the long run. Ultimately, free trade increases both producer and consumer surplus, at least in theory; computations of welfare that defend protectionist trade policies would reach the same conclusion were they to count consumer welfare (which they usually do not) as well as producer welfare (which is usually the only thing they count). The North American Free Trade Agreement, or NAFTA, may indeed have cost some manufacturing jobs in the United States, but American consumers are better off as a whole due to the subsequent lower prices on commodity products imported from low-cost countries.

Just as faith in markets versus governments waxes and wanes over time, so too, I believe, will this debate on nationalism verses globalism. When the benefits of nationalism fail to materialize, the world will return to free trade. And when that happens, the next major debate will center on trade in services, rather than trade in goods. Outsourcing will take center stage once again and will change the very nature of many policy debates, such as that over immigration. A Filipino must wait years before being allowed to live in the United States but can now register online in seconds to work in the United States through online labor markets. As the debate on immigration shifts to the productivity of human capital, the location of that capital becomes irrelevant once most work shifts online.

Government policy should at a minimum not interfere with the development and growth of online labor markets and at best encourage their development. Examples of policies that could harm online labor markets are net neutrality rules that prevent pricing the internet and restrictions on the buying or selling of work online through some kind of labor tariff. Currently, such tariffs do not exist, but it is entirely conceivable that a protectionist nation-state could impose wage tariffs on all online work sourced from different nations.

To push the analogy with free trade, we know that trade creates winners and losers, even though it does make the economy better off as a whole. The traditional response to those hurt by trade has been Trade Adjustment Assistance (TAA), a federal program in place since 1962 that provides benefits to both workers and firms (Hornbeck 2013). Workers displaced through trade receive retraining, relocation allowances, and extended unemployment benefits, while firms hiring displaced workers receive loans, loan guarantees, technical assistance, and tax benefits. In the name of fairness, it seeks to compensate the losers by redistributing wealth from the winners (the population of taxpayers). The budget for TAA as of 2015 was $710.6 million (US

Department of Labor 2015, 11), still a small sliver of the total $3.7 trillion federal budget in 2015 (Congressional Budget Office 2016).

In large measure, the TAA program is fairly uncontroversial. Most of the debate centers on the size and scope of the programs, and it does not follow traditional party lines. One problem with TAA is its exclusive focus on trade-related economic shocks. For example, the TAA website tells a story of a Mr. Bustamante, a machine operator in California who lost his job because his company shut down his factory and moved it overseas. The TAA program paid for his retraining as a bus driver, and he soon earned a full-time job with LA Metro (Employment and Training Administration 2016).

There are two immediate concerns here. First, had the company kept the plant in place and simply replaced Mr. Bustamante with a robot who could operate the machine, Mr. Bustamante would not have been eligible for TAA benefits. Thus, it seems somewhat arbitrary that the government is compensating individuals from one kind of economic shock (trade) but not another (technology). Second, robots may eventually replace all mechanics, thus eventually displacing Mr. Bustamante from his new job as an HVAC mechanic. Obviously, it is not the government's role to pick and choose between industries, as it is no better at forecasting future technological change than others. However, that is exactly what it is doing through the TAA program when it pays for retraining into jobs that may eventually become obsolete anyway. This begs the question of whether this is the best use of taxpayer funds.

There is a political economy justification for trade assistance programs, namely, support for trade agreements. Trade assistance is a way to compensate the losers from free trade so that they will support (or at least not oppose) trade agreements. However, there is no natural analog to trade agreements with respect to technology. When Amazon replaces factory workers with a

fleet of robots, this does not impinge on any specific national economic policy. Technological change is a secular productivity shock; thus, it is not clear that the government needs to have any kind of formal TAA for technology. Workers cannot politically oppose technological change through government policy, so political economy arguments about compensating losers from technological change are not persuasive. Rather, the most the government can do is prepare workers through broad-based approaches.

Skill Development and Education

A better approach is for the government to acknowledge that online labor markets are inevitable and to prepare workers for them. However, rather than structuring an ex post corrective policy like TAA, a more sensible approach is to consider ex ante investments in human capital that allow people to prepare to participate in online labor markets. Primarily, this can occur through broad-based education and skill development. It is risky to build government policy around technological innovations because those innovations change much quicker than Washington can react; the solution, therefore, is to leave the details to the states, which can compete among themselves in offering training programs for those seeking to work online. The government can play an effective role as a disseminator of information, making these online labor markets fully transparent through uniform disclosure laws and market-based certifications that are easy to obtain.

Online labor markets already offer a wide spectrum of skills necessary for participation, ranging from data entry at the low end to advanced software development at the high end. Of course, a nationwide emphasis on STEM education would help with both the development of the market itself as well as with American participation in the market once it is built. Yet, existing proposals for STEM education are still vague. Both the federal and state governments are

scrambling to make investments in STEM education to respond to the secular shortage of computer science majors (Handelsman and Smith 2016). It may require a more targeted approach with a more careful understanding of the needs of online labor markets. This targeted form of educational investment can be optimal because it avoids picking specific winners and losers and provides enough flexibility for individuals to tailor their own educational needs. However, getting the balance right between broad-based and targeted education will be a challenge.

As a concrete example, the government could solve collective-action problems of disparate private actors by suggesting investments that promote skill development in addition to the usual investments in public education that states routinely make. Simply identifying areas of need and requiring public disclosure about online labor markets could induce the private sector to make the requisite investments in such areas. For example, if learning to code in Python becomes the dominant technical skill of the future, then the government could use some of its National Science Foundation research funds to support Python education and research. It could also encourage a national dialogue about developing companies that provide broad-based Python training to a wide class of workers.

There may be a limit to upskilling. The government needs to monitor the development of the online labor market to ensure that any transfers to the skill-development and education sector do not distort the behavior of market participants ex ante. For example, careful monitoring of online labor markets may show that American workers suffer from poor English grammar, relative to their Filipino counterparts. This signal can inspire greater federal and state investments in English-language training. Again, the key is that the government leans on the signals from the market, in this case from the emerging online labor market.

The main investment needs to come from the private sector. First, the labor markets themselves have room to grow, and the existing platforms like AMT and Upwork need much broader participation and engagement. Corporate America need not be ashamed to add online workers to their staff of full-time equivalent (FTE) employees. Finally, financiers like venture capitalists play outsized roles in the future evolution of industry, and they would be wise to take heart in the future profit-making opportunities of online markets.

Online labor markets will require expertise in building technology platforms that are closely calibrated to market conditions, such as finding the best way to measure human performance and integrating data on performance into the economic mechanisms that will run the platform. Participation in the online labor market will require skills that will emerge from the demand side of the market itself. As the market grows, the platform will reflect the needs of employers and entrepreneurs around the world, thereby providing a window on the different skills necessary to power the global economy. For example, 10 years ago, onsite network management was a key function of most businesses, with their growing pool of desktop computers connected on company networks. But as technology shifts more of these resources to the cloud, the key skill in high demand will be the ability to manage multiple systems that are distributed remotely. It is imperative for the online labor market to reflect timely and even prospective signals on labor demand.

Worker Benefits

A beginning question to ask is how to classify workers in the emerging online economy described here. In the United States, traditional, full-time employees are classified and protected by the Fair Labor Standards Act (FLSA), which guarantees a minimum wage and overtime pay and provides

explicit rules for calculating hours. If a worker is not covered by FLSA, then he or she is classified as an independent contractor. Therefore, there is an ongoing debate on how to classify gig economy workers and whether they should have the same benefits as full-time employees.

A key concern for regulators is the workplace safety net. Ever since the Occupational Safety and Health Act of 1970, a raft of employment protections has come with full-time jobs. Indeed, the act first attached workplace disability insurance to jobs, while worker's compensation had been attached to jobs since 1911 at the state level and 1906 at the federal level (Guyton 1999). These benefits are deeply entrenched in both law and American culture, and the new challenge is how to represent these benefits in an online world. While campaigning for the 2016 presidential election, Hillary Clinton stated that the "on demand or so called 'gig' economy is creating exciting economies and unleashing innovation. But it is also raising hard questions about workplace protections and what a good job will look like in the future" (Howard 2015).

This captures a particular concern that Democrats have with the online economy, namely, the erosion of workplace benefits. In the current regime (determined through labor laws), employers are required to provide extensive benefits to full-time employees regardless of the skills or responsibilities of the worker (Office of Federal Contract Compliance Programs 2016). This effectively makes the worker a fixed cost to the firm and therefore difficult for the firm to scale up or down as business needs change.

From a distributional perspective, those who are hired receive both benefits and a wage, whereas those who are not hired receive nothing. In this sense, the current regime of attaching benefits to the job increases inequality between workers for the same reason that the minimum wage does. A system whereby workers choose their benefits through, say, a benefits exchange would arguably be an improvement over this current regime because it would allow more choice

and flexibility for both the worker and the employer. The worker could choose the level of benefits he or she seeks, and the employer could dial up or down the quality of benefits that it needs to pay. Every employer would face the same economic tradeoff: dollars spent toward wages could substitute for dollars spent toward benefits. But the firm could not unilaterally increase both without cost. The benefits that attach to jobs are not "free"; they are a clear cost to the firm. On the margin, firms that are forced to pay large benefits through mandated labor laws will, in turn, offer lower wages. This emerges from the simple fact that the firm is subject to a budget constraint.

A more fundamental question is whether benefits should attach to jobs at all. In a truly free market, workers could simply purchase whatever benefits they needed and would not need these benefits to run through their employer. Unless there was a clear case for economies of scale, workers would be better off simply receiving higher wages and buying what they needed à la carte in a marketplace. Of course, this would require a more developed market for benefits. But if legislators successfully rolled back some of the current onerous labor laws, it is conceivable that this market for benefits would emerge. Indeed, there is no theoretical or conceptual reason why benefits should run through employers and become such a large fixed cost, like they are today.

The chief argument for employers purchasing benefits themselves are economies of scale. If the firm acts as a single buyer on behalf of its workers, it may negotiate better prices and better terms than workers purchasing it themselves (Employee Benefit Research Institute 2002). In this sense, the firm can pass these bargaining benefits on to workers, making workers better off. The benefits provider is able to lock in a large pool of customers at once, and this may have an advantage to contracting individually with workers. There is some evidence that, before

employee-sponsored insurance became widespread, private groups did provide health insurance. For example, Beito (2000) documents that fraternal organizations provided health care for their members before World War II.

To address the problem of providing benefits to flexible online workers, some solutions that are market-oriented have circulated in the policy arena. For example, in *National Affairs*, Eli Lehrer discusses worker-controlled benefits exchanges that would replace the traditional package of benefits offered to full-time employees through employers (Lehrer 2016). Workers could shop around from different vendors and assemble a package of benefits that provided a "replacement income stream" that effectively functioned as disability insurance, worker's compensation, and sick leave. The key with these exchanges would be their flexibility: workers could mix and match across different vendors. Employers would not need to use the same exchange. This flexibility would lower costs for workers because vendors would compete with each other to offer the best benefit at the lowest price. Employers would pay into the exchanges, just as they pay into the benefits vendors under current law. This notion of market-based exchanges is promising because it would inject a level of flexibility and creativity in the benefits space that does not exist today, as workers would have choices among vendors.

These exchanges could easily emerge from the local gig economy. For example, the Independent Drivers Guild represents Uber drivers in New York and is one of many associations taking the lead in both advocating and providing new platforms for benefits. But for online outsourcing, remember that American workers who choose to participate in Upwork or AMT will be competing with foreign workers who are able to offer their services at rock-bottom wages. Adding a comprehensive benefits package on top of the wages paid to an American online worker makes the total cost of compensation even less competitive in the global market.

Benefits exchanges will lead to significant government action because they will require updating the current benefits paradigm and portions of the FLSA. The example from the Independent Drivers Guild above suggests that markets can develop some of these exchanges on their own, but the government may have a role in coordinating multiple approaches to create a single standard that works for all kinds of markets. When the government picks a standard, it is important that there be a dose of healthy competition to ensure that the best standard emerges on its own. This is why an early stage of "creative destruction" of different kinds of exchanges may be necessary before one emerges as the leading candidate.

US labor laws that mandate large benefits packages make American workers more expensive than foreign workers (Meadows 1993). This is true with the physical economy, and even more so with the virtual economy. Prices are even more transparent online than, for example, behind the desk of an HR manager running the Ford plant in Detroit. This is all the more reason why Americans need to specialize in more cognitive skills. Just as manufacturing outsourcing led large sectors of the population across the nation to retool for information-economy jobs, so too must these populations pivot towards high-skilled knowledge work. As this transformation occurs, employers will still be able to afford to pay benefits to their employees because their employees will be more productive.

Conclusion

There is no question that we are living in the midst of a revolution in robotics and AI. Just consider the amount of equity and venture capital directed toward automated driving, self-piloting drones, household robots, and machines in manufacturing. This may lead one to

believe that these robots will displace all humans from jobs, leading to mass unemployment and greater inequality.

History and economics suggest otherwise. Technology and humans historically have served as complements, not substitutes. They have worked together, rather than against each other. Nearly all the innovations in modern life—the transistor, gene mapping, aerospace, battery technology, social media, wireless networks, clean energy, and personalized drugs, to name a few—have made humans more productive, not less.

Yet, there is something crucial that this narrative misses: the general equilibrium. Machines do not exist in a vacuum but operate in an economy collectively with humans. Prices and wages will adjust to reflect the economy-wide levels of skill, preferences, and technology. When Nissan builds an auto plant in Japan, it deploys teams of robots and requires only a few engineers to oversee the machines. But when it builds a plant in India, it chooses far fewer machines and relies more heavily on local labor. The relative price of labor to capital in India is far below that in Japan, making humans more affordable for the company. We cannot ignore examples like this because they push back on the simple narrative that it is always efficient to deploy machines in every circumstance.

Some view the future as inevitable and that the trends in AI are outside anyone's control. But just like the software that drives the new cadre of robots, the future can be designed, planned, engineered, and implemented. Entrepreneurs make choices, as do venture capitalists, governments, and civil society as a whole. We can choose to develop only machine technology, ignoring human productivity, or we can think more holistically about the macro environment—the global mix of skills, education, demographics, and interconnectedness—to design a future that is better for all. This does not need to occur for reasons of equity and fairness, but for pure

economic efficiency. The billions of people coming online in the next decade will usher in the economic transformation of our time. It is up to us as a society to use this as an opportunity to advance human potential and to harness the most valuable asset in the world: our human capital.

References

Adams, Susan. 2014. “More Than a Third of U.S. Workers Are Freelancers Now, But Is That Good for Them?” *Forbes*, September 5.

Beito, David T. 2000. *From Mutual Aid to the Welfare State: Fraternal Societies and Social Services, 1890–1967*. Chapel Hill, NC: University of North Carolina Press, May 29.

Blanchard, Margaret. 1998. *History of the Mass Media in the United States: An Encyclopedia*. New York: Routledge.

Broadband Commission. 2014. *The State of Broadband 2014: Broadband for All*. Geneva.

———. 2015. *The State of Broadband 2015: Broadband as a Foundation for Sustainable Development.* Geneva.

Coase, R. H. 1937. “The Nature of the Firm.” *Economica* 4 (16): 386–405.

Congressional Budget Office. 2016. “The Federal Budget in 2015: An Infographic.” January 6.

Elance. 2013. “Global Online Employment Report.”

Employee Benefit Research Institute. 2002. “History of Health Insurance Benefits.” March.

Employment and Training Administration. 2016. “Success Stories.” US Department of Labor, July 5.

Ernst & Young. 2013. “5: Insights for Executives Series.” http://www.ey.com/gl/en/services /advisory/5-insights-for-executives-series.

Frangoul, A. 2017. “Google, Apple, Microsoft, Amazon and Facebook Lead Most Valuable Global Brands List.” CNBC, June 5.

Gartner. 2014. “Gartner Says Worldwide IT Spending on Pace to Grow 2.1 Percent in 2014.” Press release, June 30.

Gereffi, G. 2005. “The New Offshoring of Jobs and Global Development.” *ILO Social Policy Lectures*. Geneva: International Institute for Labor Studies and International Labor Organization.

Guarino, Ben. 2015. “How Many Full-Time Mechanical Turks Work for Amazon? Can You Live at Two Cents a Microjob?” *Inverse Innovation*, October 15.

Guyton, G. P. 1999. “A Brief History of Workers’ Compensation.” *Iowa Orthopaedic Journal* 19: 106–10.

Handelsman, Jo, and Megan Smith. 2016. *STEM for All*. The White House, President Barack Obama, February 11.

Holmstrom, B. 1979. "Moral Hazard and Observability." *Bell Journal of Economics* 10 (1): 74–91.

Hornbeck, J. F. 2013. *Trade Adjustment Assistance (TAA) and Its Role in U.S. Trade Policy*. CRS Report for Congress, Congressional Research Service, August 5.

Howard, A. 2015. "It's Time to Talk about the 'Gig Economy.'" *Huffington Post*, July 14.

Intuit. 2010. *Intuit 2020 Report*. October.

"Jeff Bezos: The King of E-Commerce." 2008. *Entrepreneur*, October 10.

Kemeny, Thomas, David Rigby, and Abigail Cooke. 2013. "Cheap Imports and the Loss of U.S. Manufacturing Jobs." SERC Discussion Paper No. 14, Spatial Economics Research Centre, London School of Economics and Political Science, November.

Kende, Michael. 2015. "The Shrinking Digital Divide." *TechCrunch*, July 12.

Kokkodis, M., and P. G. Ipeirotis. 2016. "Reputation Transferability in Online Labor Markets." *Management Science* 62 (6): 1687–1706.

Lazear, E. 2000. "Performance Pay and Productivity." *American Economic Review* 90 (5): 1346–61.

Leber, Jessica. 2012. "The Biggest Cost of Facebook's Growth." *MIT Technology Review*, May 16.

Lehrer, E. 2016. "The Future of Work." *National Affairs*, summer 2016.

Levine, L. 2012. *Offshoring (or Offshore Outsourcing) and Job Loss among U.S. Workers*. Washington, DC: Congressional Research Service, December 17.

Mankiw, N. Gregory, and Phillip Swagel. 2006. "The Politics and Economics of Offshore Outsourcing." NBER Working Paper No. 12398, National Bureau of Economic Research, Cambridge, MA, July.

Meadows, Donella. 1993. "The NAFTA Debate—More Than Al Gore and Ross Perot." November 11.

Natala@AWS. 2011. "Re: MTurk CENSUS: About How Many Workers Were on Mechanical Turk in 2010?" Discussion forum, January 26. https://forums.aws.amazon.com/thread.jspa?threadID=58891.

Office of Federal Contract Compliance Programs, US Department of Labor. 2016. *FY 2016 Congressional Budget Justification*. https://www.dol.gov/sites/default/files/documents/general/budget/2016/CBJ-2016-V2-10.pdf.

Pofeldt, E. 2015. "Elance-oDesk Becomes 'Upwork' in Push to Build $10B in Freelancer Revenues." *Forbes*, May 5.

Ray, Korok. 2007. "Performance Evaluations and Efficient Sorting." *Journal of Accounting Research* 45 (4): 839–82.

US Department of Labor. 2015. *Budget in Brief, Fiscal Year 2015: Excerpts for Employment and Training Administration (ETA)*. https://www.doleta.gov/budget/docs/FY2015_BIB_ETA_Excerpts.pdf.

Upwork. 2013. "oDesk Reaches $1 Billion Spent Cumulatively via Its Online Workplace." Press release, August 5.

———. 2014. "53 Million Americans Now Freelance, New Study Finds." Press release, September 4.

Williamson, O. E. 1981. "The Economics of Organization: The Transaction Cost Approach." *American Journal of Sociology* 87 (3): 548–77.

"The Workforce in the Cloud." 2013. *Economist*, June 1.

Worstall, Tim. 2017. "The Robots Stealing Human Jobs—Bring It On." *Forbes*, August 19.