

2018

The Impact of Emerging Information Technologies on the Employment Relationship: New Gigs for Labor and Employment Law

Kenneth G. Dau-Schmidt

Follow this and additional works at: <https://chicagounbound.uchicago.edu/uclf>

Recommended Citation

Dau-Schmidt, Kenneth G. (2018) "The Impact of Emerging Information Technologies on the Employment Relationship: New Gigs for Labor and Employment Law," *University of Chicago Legal Forum*: Vol. 2017 , Article 4.
Available at: <https://chicagounbound.uchicago.edu/uclf/vol2017/iss1/4>

This Article is brought to you for free and open access by Chicago Unbound. It has been accepted for inclusion in University of Chicago Legal Forum by an authorized editor of Chicago Unbound. For more information, please contact unbound@law.uchicago.edu.

The Impact of Emerging Information Technologies on the Employment Relationship: New Gigs for Labor and Employment Law

Kenneth G. Dau-Schmidt[†]

“Before the Internet, it would be really difficult to find someone, sit them down for ten minutes and get them to work for you, and then fire them after those ten minutes. But with technology, you can actually find them, pay them the tiny amount of money, and then get rid of them when you don’t need them anymore.”

—Lukas Biewald, CEO of CrowdFlower¹

I. INTRODUCTION

The technology of production has always shaped the employment relationship and the issues that are important in labor and employment law.² Since at least the late 1970s the American economy has adopted information technology³ that promises to change the employment relationship in ways at least as profound as those wrought by the other revolutions in general production technology, such as the adoption of steam power, electricity, or methods of mass production.⁴ The global

[†] Willard and Margaret Carr Professor of Labor and Employment Law, Indiana University-Bloomington; J.D. (1981) University of Michigan-Ann Arbor; Ph.D. (Economics 1984) University of Michigan-Ann Arbor. I dedicate this article to the “Millennials”, the generation that came to age along with information technology and the rise of globalization, and who will get to embrace and solve the many opportunities and problems outlined in this essay. In particular, I dedicate it to the three Millennials I was fortunate enough to father: Nick, Nathan and Ellie.

¹ Moshe Z. Marvit, *How Crowdworkers Became the Ghosts in the Digital Machine*, THE NATION (Feb. 5, 2014), <https://www.thenation.com/article/how-crowdworkers-became-ghosts-digital-machine/> [https://perma.cc/4THU-8B5H].

² Kenneth G. Dau-Schmidt, *Employment in the New Age of Trade and Technology: Implications for Labor and Employment Law*, 76 IND. L.J. 1, 1 (2001).

³ For the purpose of this article, I define “information technology” as the global network of cables, transmission towers, satellites, computers, and cell phones, as well as the accompanying software, that allow for the worldwide transmission, storage, retrieval, and manipulation of information. See DANIEL CHANDLER & ROD MUNDAY, A DICTIONARY OF MEDIA AND COMMUNICATION 211 (1st ed. 2011); Harold J. Leavitt & Thomas L. Whisler, *Management in the 1980s*, HARV. BUS. REV. 41, 41 (Nov.–Dec. 1958).

⁴ Dau-Schmidt, *supra* note 2, at 1.

network of programmable machines of the information age allows us to communicate and process much more information, much more quickly than ever previously imagined. This increased informational capacity has remade every aspect of the employment relationship, including: job search, the organization of production, the methods of production, and the size of the relevant market. With the new information technology, we have progressed from a system of manual production in a single physical location serving regional or national markets, to one of highly automated production drawing on and serving a global economy.⁵ We have also progressed to the point where information technology can replicate some higher-order thinking through the rote analysis of data, yielding “artificial intelligence” that can displace human intelligence in the work place.⁶

In this article, I examine how information technology has remade the employment relationship and the legal issues these changes have raised. I begin by chronicling those changes, their economic implications, and the legal issues they raise in job search, the organization of production, the demand for human skills, and participation in the global economy. I examine some now familiar problems, including telecommuting, outsourcing, and international trade, but also analyze some more recent topics, including using “big data” for “talent matching,” “work on demand apps,” “crowd-sourcing,” “job polarization,” and “artificial intelligence.” Although I hope that my economic analysis outlines and clarifies many of the labor and employment law issues the new technology raises, it is beyond the scope of this essay to attempt to resolve all of these issues for the reader. I leave the debate on at least some of these issues to the other authors in this volume, save that I venture to outline an argument on what has emerged as the quintessential question: whether the new production relationships developed using information technology constitute employment relationships for the purpose of coverage under the web of protective legislation known as labor and employment law. I argue that we need to abandon outmoded legal definitions of who is an employee and who is an “independent contractor.” In their place we should adopt two unifying principles for coverage: the avoidance of “regulatory arbitrage”⁷ so that decisions

⁵ *Id.* at 10–12.

⁶ Kenneth G. Dau-Schmidt, *Labor Law 2.0: The Impact of New Information Technology on the Employment Relationship and the Relevance of the NLRA*, 64 EMORY L.J. 1583, 1587, 1604 (2015).

⁷ See generally *Regulatory Arbitrage*, BUSINESS DICTIONARY, <http://www.businessdictionary.com/definition/regulatory-arbitrage.html> [<http://perma.cc/7SS4-4TTE>]; Victor Fleischer, *Regulatory Arbitrage*, 89 TEX. L. REV. 227, 230 (2010); Manning Gilbert Warren III, *Global Harmonization of Securities Laws: The Achievements of the European Communities*, 31 HARV. INT'L L.J. 185,

on the organization of production are made on the basis of real economic advantages rather than just on the basis of avoiding legislative responsibility; and the assignment of responsibility for the provision of benefits under protective legislation to the cheapest cost avoider so as to minimize the burden of fulfilling the promises of protective legislation.⁸ These principles argue for broad, perhaps universal, coverage for workers under protective legislation, and that responsibility for garnering the money necessary to pay for these benefits generally be with the large corporations who organize production in the new economic environment.

II. AN OVERVIEW OF THE IMPACT OF INFORMATION TECHNOLOGY ON THE LABOR MARKET

The new information technology has had an impact on every facet of the employment relationship. These changes raise a variety of legal issues that will have to be dealt with as legislatures and courts struggle to govern this fast-changing relationship. In this section, I examine the influence of information technology on various aspects of the employment relationship from an economic perspective. Economic analysis helps us understand the new phenomena and the legal issues information technology presents.

A. The Impact of Information Technology on Job Searches and Job Matching

Information technology has made it easier and cheaper to post and apply to job listings, and to screen jobs and job applicants. To the traditional job search avenues of personal referrals, hiring halls, employment agencies, and want ads, information technology has added internet job boards, searchable databases of job listings and resumes, online job applications, and employer-initiated searches of “passive” employees’ online credentials.⁹ Online job posting, searching, and applying have grown spectacularly over the last twenty-five years,¹⁰ and they are now a very important tool for employer-employee matching in the labor market.¹¹ A survey of the 100 most popular job posting sites from 2002 to 2011 showed that in 2011, the average number of job postings on an

189–90 (1990).

⁸ See GUIDO CALABRESI, *THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS* 282–83 (1970); Ronald H. Coase, *The Problem of Social Cost*, 3 *J.L. & ECON.* 1, 15 (1960).

⁹ David H. Autor, *Wiring the Labor Market*, 15 *J. ECON. PERSP.* 25, 25–26 (2001).

¹⁰ See *id.*

¹¹ See Sumanjeet, *Emerging Economic Models in the Age of Internet and E-Commerce*, 1 *GLOBAL J. BUS. MGMT. & INFO. TECH.* 53, 59 n.13 (2011).

examined site was 42,063, while the average number of resumes was 530,743.¹² The average number of job postings on these sites increased sixteen-fold over the period 2002 to 2011, while the number of listed resumes increased eleven-fold over the same period.¹³ A 2013 survey suggests that there are around 2.7 million active job ads online at any given time and that between 60–70% of job openings are now posted online.¹⁴ Online ads are disproportionately aimed at high-skill workers, and the percentage of job openings posted online climbs to 80% when considering just jobs that require a bachelor's degree or better.¹⁵

A cursory analysis of the impact of information technology on job search suggests increased productivity. By lowering transaction costs, information technology should reduce job search costs and improve the matching of employees to the right job.¹⁶ However, there are some qualifications. Information technology improves employers' ability to search applications, but it also vastly increases the number of applications. Indeed, an excess of applications seems to be the norm for online job listings, with employers reporting that they receive unmanageable numbers of both over and under-qualified applicants.¹⁷ Although computer algorithms can be used to screen information that is easily and objectively verifiable, such as education, credentials, experience, and salaries, they are not as useful in screening more subjective information, such as quality or motivation or whether the person is a "good employee."¹⁸ As a result, we see the rise of some pre-screening services, such as Pre-employ.com and PreScreenAmerica.com, to check qualifications and do background checks. It also seems that personal connections and references are still important and may even be growing in importance in gaining a job.¹⁹ Some employers have expressed the belief that online pools of resumes exhibit "adverse selection bias," consisting

¹² See Vera Brenčić, *Search Online: Evidence from Acquisition of Information on Online Job Boards and Resume Banks*, 42 J. ECON. PSYCHOL. 112, 115 tbl. 1 (2014).

¹³ *Id.*

¹⁴ ANTHONY P. CARNEVALE ET AL., CENTER ON EDUCATION AND THE WORKFORCE, UNDERSTANDING ONLINE JOB ADS DATA 11 (2014).

¹⁵ *Id.*

¹⁶ Autor, *supra* note 9, at 27 (citing Dale T. Mortensen, Presentation at the IRPP-CERF Conference on Creating Canada's Advantage in an Information Age: Modeling How Search-Matching Technologies Affect Labour Markets (May 2000)).

¹⁷ See *id.* at 30–31; see also Nick Corcodilos, *Job-Board Journalism: Selling Out the American Job Hunter*, ASK THE HEADHUNTER (June 17, 2003), <http://www.asktheheadhunter.com/newsletter/OE20030617.htm> [<http://perma.cc/S85Z-3QPH>] (citing CHARLENE LI ET AL., THE CAREER NETWORKS (Forrester Research 2000)).

¹⁸ See Autor, *supra* note 9, at 30–31.

¹⁹ See, e.g., *id.* at 31; Corcodilos, *supra* note 17, at 2 (reporting that, of approximately 3000 internet users surveyed in 1999, 4% had found their most recent job over the internet, compared with 6% via temporary help agencies, 23% via the newspaper and 40% via referral).

disproportionately of unemployed, unhappy, and un-promotable employees.²⁰ Perhaps due to this perception, employers increasingly engage in “talent mining” and use internet resources such as LinkedIn and LaunchPad to actively identify “passive candidates” who are currently happily employed but might be enticed to move to a better opportunity.²¹ Of course the “passive candidates” actively organize their online presence and LinkedIn networks and qualifications in a way they deem most likely to attract entreaties from employers. Even if information technology yields aggregate gains in productivity by improving job search and matching, the gains may not be enjoyed by all if the technology allows better segregation of workers by skills.²² Thus, although information technology may yield net improvements in efficiency in job search, those improvements may not be Pareto efficient.

New posting and search technology raises some issues of express or implicit bias under the Civil Rights Act, as well as privacy concerns.²³ Could online posting of jobs disadvantage poor people, who are disproportionately Black? Could employer online search engines used to identify possible employees contain express or implicit bias, especially if they rely on online job network connections and evaluations that themselves could contain express or implicit bias?²⁴ For example, LinkedIn’s featured “Talent Match” algorithm would seem to work against minorities who are already underrepresented in existing work networks.²⁵ Similarly, algorithms designed to look for a “cultural fit” may disproportionately recommend hiring people like those who are already employed at the company.²⁶ Algorithms that favor geographic proximity to work might also contain implicit bias.²⁷ Even if there is a theoretical remedy for such biases under the Civil Rights Act, how do we give plaintiffs a practical remedy when part of the employee search process is an opaque search algorithm?

Finally, employer searches for or background checks on potential employees using big data raise privacy concerns because they can easily

²⁰ Autor, *supra* note 9, at 32 (citing H. PERRY BOYLE JR. ET AL., *E*CRUITING: FROM JOB BOARDS TO METAMARKETS* 45 (Thomas Wiesel Partners 1999)).

²¹ See Autor, *supra* note 9, at 32.

²² *Id.* at 33–34.

²³ See Allison Grande, *Use ‘Big Data’ With Caution, EEOC Counsel Urges Employers*, LAW360 (Sept. 15, 2014, 9:12 PM), <http://www.law360.com/articles/577390/use-big-data-with-caution-eEOC-counsel-urges-employers> [<http://perma.cc/LD6M-LNYC>].

²⁴ See generally ALEX ROSENBLAT ET AL., DATA & SOCIETY RESEARCH INSTITUTE, *DATA & CIVIL RIGHTS: EMPLOYMENT PRIMER* (2014).

²⁵ *Id.* at 6.

²⁶ EXECUTIVE OFFICE OF THE PRESIDENT, *BIG DATA: A REPORT ON ALGORITHMIC SYSTEMS, OPPORTUNITY, AND CIVIL RIGHTS* 8 (2016).

²⁷ See *id.*

link a candidate with any available data, including the candidate's medical records, legal disputes, purchases, social media posts, or even political beliefs.²⁸ Although any information in the public record is not protected by traditional common law doctrine, information technology now allows employers much greater access to all possible data over the course of the worker's life, with generally no chance for the worker to respond to or correct mistaken reports.²⁹ China's authoritarian state has recently experimented with big data search algorithms to determine whether its citizens are "good citizens," presumably to use these rankings to ration opportunities and thus discourage disapproved behaviors or opinions.³⁰ If American corporations begin doing this, it would seem cold comfort that there was no state action in violation of the First Amendment and no violation of common law privacy doctrine. At the other end of the employee privacy spectrum, the European Union promulgated the General Data Protection Regulation (GDPR) in 2016 providing employees with various protections, and some member states have even more substantial protections.³¹ The United States will have

²⁸ ROSENBLAT ET AL., *supra* note 24, at 4–5.

²⁹ See generally Gail Lasprogata et al., *Regulation of Electronic Employee Monitoring: Identifying Fundamental Principles of Employee Privacy Through a Comparative Study of Data Privacy Legislation in the European Union, United States, and Canada*, 2004 STAN. TECH. L. REV. 4 (discussing differences in employees' ability to identify and remedy inaccuracies in data held by employers).

³⁰ The goal of the program is to use an algorithm to evaluate all available online data about China's companies and citizens to assign them each a score based on their political, commercial, social, and legal "credit." Simon Denyer, *China's Plan to Organize Its Society Relies on 'Big Data' to Rate Everyone*, WASH. POST (Oct. 22, 2016), https://www.washingtonpost.com/world/asia_pacific/chinas-plan-to-organize-its-whole-society-around-big-data-a-rating-for-everyone/2016/10/20/1cd0dd9c-9516-11e6-ae9d-0030ac1899cd_story.html?utm_term=.8f97b1d5e553 [http://perma.cc/5HTR-LT5R].

³¹ The European Union adopted the General Data Protection Regulation (GDPR) (2016 O.J. (L 119) 1) with the intent of standardizing privacy protections across the European Union. This regulation significantly enhances the rights of employees and other data subjects. Generally, under the GDPR: (1) employers must be transparent in how they collect and use employee data; (2) employees have the right to access their data and correct inaccuracies; and (3) employees have "the right to be forgotten" and erase data under certain circumstances. The GDPR still allows employees to consent to intrusions on privacy, but the consent must be clear, unambiguous, and freely given—without detriment for refusal. Stefan Nerinckx et al., *The New EU Data Protection Regime from an HR Perspective*, FIELD FISHER (Mar. 24, 2016), <http://www.fieldfisher.com/publications/2016/03/the-new-eu-data-protection-regime-from-an-hr-perspective#sthash.zkzEXEc3.M5PF2ty7.dpbs> [http://perma.cc/CCG4-2XPD]. However, the GDPR expressly authorizes individual Member States to implement more specific rules in respect of the processing of job-related personal data. *Id.* For example, in France, employees enjoy a variety of privacy protections under the Data Protection Act and Article L of the French Labour Code. See Olivier Proust, *Technology and Privacy in the Workplace Under French Law*, BLOOMBERG BNA (July 30, 2013), <https://www.bna.com/technology-privacy-workplace-n17179875545/> [http://perma.cc/K7BW-C68A]. Germany has also issued specific privacy guidelines with respect to employees. See Clarissa Otto, Sam Castic & Christian Schröder, *Germany Issues Privacy Guidelines for Employer Access to Employee Email and Internet Use*, ORRICK TRUST ANCHOR (May 25, 2016), <http://blogs.orricks.com/trustanchor/2016/05/25/germany-issues-privacy-guidelines-for-employer-access-to-employee-email-and-internet->

to decide whether and how best to regulate the use of big data analysis in the selection of employees while giving expression to our cherished privacy values.

B. The Impact of IT on the Organization of Production

For many products and services, information technology allows much greater disaggregation of the work process in space and time. Unlike the old system of vertically-integrated production, workers whose services can be subdivided and electronically parceled out and coordinated no longer have to congregate at one “workplace” during set “work hours” but instead can undertake production from geographically disparate workplaces, even homes, at different times.³² Thus, information technology allows for both “telecommuting” and “outsourcing” jobs to sub-contracted workers in the United States or around the world.

1. Telecommuting

Telecommuting is of growing importance to a wide array of jobs. According to a Gallup poll, the percentage of workers who say they have telecommuted for work has risen from 9% in 1995 to 37% in 2015.³³ Among college graduates, the percent who say they have telecommuted is even higher at 55%.³⁴ These telecommuters still retain connections with the physical workforce, reporting that on average they telecommute only 6.4 days per month.³⁵ Indeed, some survey data show that workers who use the internet extensively to work at home do not significantly decrease the amount of time they work at the office.³⁶ This suggests that telecommuting from home (e.g., answering that nagging work email) may substitute time from leisure to production.³⁷ The possibility of remote access to information also raises the possibility of telecom-

use [<http://perma.cc/X2T2-AJRK>].

³² See Dau-Schmidt, *supra* note 2, at 11; see also PETER CAPPELLI, *THE NEW DEAL AT WORK: MANAGING THE MARKET-DRIVEN WORKFORCE* 59–63 (1999).

³³ Jeffrey M. Jones, *In U.S., Telecommuting for Work Climbs to 37%*, GALLUP (Aug. 19, 2015), <http://www.gallup.com/poll/184649/telecommuting-work-climbs.aspx>; see also *Latest Telecommuting Statistics*, GLOBAL WORKPLACE ANALYTICS (Jan. 2016), <http://globalworkplaceanalytics.com/telecommuting-statistics> [<http://perma.cc/K66E-4G8F>].

³⁴ Jones, *supra* note 33.

³⁵ *Id.* Nine percent of workers telecommute more than ten days a month or approximately more than half-time. *Id.*

³⁶ Mary C. Noonan & Jennifer L. Glass, *The Hard Truth About Telecommuting*, MONTHLY LAB. REV., June 2012, at 38–39.

³⁷ Autor, *supra* note 9, at 28–29.

muting for leisure, as employees use the information technology to access private email, amusement, or even work for another employer³⁸ on company time. There is evidence that employers are already concerned about decreases in productivity due to employee “web-surfing” during work hours.³⁹

Telecommuting holds the promise of efficiency gains for both employees and employers as it cuts commuting time, allows flexibility for family responsibilities at home, gives employers and employees twenty-four-hour access to other employees, and raises employee productivity. While overwork, telecommuting for leisure, employee access to personal email, and recreation on company time may cut employee productivity, employers can limit this by making reasonable rules and monitoring their employees’ online work. The possibility of telecommuting for work or leisure raises the problem of separating work from leisure time in the age of ready internet access. Certainly, some employees feel that pressure to constantly respond to emails or produce work from home allows the office to intrude on personal time in a way that had previously been unimagined. Some European countries have already responded to this problem by legislating to limit the hours during which company email can be used for business purposes.⁴⁰

Telecommuting for work or leisure also raises a number of issues under existing laws. For example, mixing work and leisure in remote work areas raises legal issues regarding adequate compensation of employees under hourly contracts or the minimum wage. Early cases on the subject suggest that time at home answering email or doing remote work is indeed time that has to be compensated under the Fair Labor Standards Act.⁴¹ Employer monitoring of employee productivity in order to police the separation between work and personal time raises legal

³⁸ Bourree Lam, *The Wasted Workday*, THE ATLANTIC (Dec. 4, 2014), <https://www.theatlantic.com/business/archive/2014/12/the-wasted-workday/383380/> [<http://perma.cc/U8AJ-38KF>].

³⁹ Evidence suggests that employers are increasingly concerned about the impact of access to recreation through information technology on company time. See Yuki Noguchi, *When It Comes to Productivity, Technology Can Hurt and Help*, ALL TECH CONSIDERED (Apr. 30, 2013), <http://www.npr.org/sections/alltechconsidered/2013/05/06/179072692/when-it-comes-to-productivity-technology-can-hurt-and-help> [<http://perma.cc/F4DE-4LZ7>].

⁴⁰ See generally David Z. Morris, *New French Law Bars Work Email After Hours*, FORTUNE (Jan. 1, 2017), <http://fortune.com/2017/01/01/french-right-to-disconnect-law/> [<http://perma.cc/DT83-WBW6>]; Scott Sayare, *In France, a Move to Limit Off-the-Clock Work Emails*, N.Y. TIMES (Apr. 11, 2014), <http://www.nytimes.com/2014/04/12/world/europe/in-france-a-move-to-limit-off-the-clock-work-emails.html> [<http://perma.cc/A4RU-5NKZ>]; Jeevan Vasagar, *Out of Hours Working Banned by German Labour Ministry*, THE TELEGRAPH (Aug. 30, 2013), <http://www.telegraph.co.uk/news/worldnews/europe/germany/10276815/Out-of-hours-working-banned-by-German-labour-ministry.html> [<http://perma.cc/D9S5-FJMP>].

⁴¹ Many of these early cases have involved workers that traveled between multiple worksites daily, such as installation technicians; in a typical case, these workers seek compensation for their time completing administrative work at home before their first call. See *Dooley v. Liberty Mut.*

issues of employee personal privacy under the common law doctrine of invasion of privacy and under federal wiretap and communications statutes.⁴² Employers currently can easily deal with privacy concerns under American common law by obtaining a sufficient waiver from the employee as a condition of employment,⁴³ but there are signs that American courts are beginning to question the legitimacy of broad waivers, and statutory restrictions can impose real limitations.⁴⁴ Once again, European countries are leading the way on this issue by placing limits on employers' monitoring, some of which cannot be waived.⁴⁵ Finally,

Ins. Co., 307 F. Supp. 2d 234, 242 (D. Mass. 2004) (finding time in which employees "are required, as part of their job duties, to check their email and voice mail, to prepare their computers for use, and to return telephone calls" from home compensable as "principal activities" under the Fair Labor Standards Act (FLSA)). *But see* Butler v. DirectSAT USA, LLC, 55 F. Supp. 3d 793, 806–07 (D. Md. 2014) (holding that an employee's time reviewing "emails regarding his next day's appointments, mapping out directions, and prioritizing his routes is not compensable under the FLSA" because they were analogous to commuting time).

⁴² See KENNETH G. DAU-SCHMIDT ET AL., LEGAL PROTECTION FOR THE INDIVIDUAL EMPLOYEE 283–84 (4th ed. 2011).

⁴³ See, e.g., Muick v. Glenayre Elec., 280 F.3d 741, 743 (7th Cir. 2002) (finding no reasonable expectation of privacy in workplace computer files where employer had announced that he could inspect the computer); United States v. Simons, 206 F.3d 392, 398 n.8 (4th Cir. 2000) (finding no reasonable expectation of privacy in office computer and downloaded internet files where employer had a policy of auditing employee's use of the internet, and the employee did not assert that he was unaware of or had not consented to the policy).

⁴⁴ See, e.g., Stengart v. Loving Care Agency, Inc. 990 A.2d 650, 664–65 (N.J. 2010); Nat'l Econ. Research Assocs. v. Evans, 21 Mass. L. Rptr. 337, 337 (Super. Ct. 2006) (finding reasonable expectation of privacy in electronic transmissions despite broad waiver, at least in the case of client attorney communications); see also Matthew W. Finkin, *Employee Privacy and the "Theory of the Firm"*, 26 J. LAB. RES. 711 (2005) (questioning whether contracts of adhesion regarding privacy deserve broad legal deference). Employers are prohibited from intercepting employee electronic communications under 18 U.S.C. §§ 2510–22 (2012) (Chapter 119—Wire and Communications Interception and Interception of Oral Communications), absent consent or interception in the ordinary course of business. However, employers are allowed to retrieve communications that are already sent and stored on their communications system or server. Fraser v. Nationwide Mut. Ins. Co., 135 F. Supp. 2d 623 (E.D. Pa. 2001).

⁴⁵ Under the "Privacy Guidelines" published by the German Data Protection Authorities in 2016, if the employer limits the use of the internet and company email services to only business purposes, the employer can check the employees' internet randomly to ensure compliance, but it is recommended that the employer block websites that accessed primarily for personal use. If the employer allows both business and personal use of the internet and company e-mail, then the employer can still set reasonable limits, but must get clear consent in monitoring. See Otto et al., *supra* note 31. In France, the rules on workplace privacy are largely based on case law. In a 2001 landmark decision, the Court of Cassation ruled that "an employee has the right to the respect of his private life—including the right to the secrecy of correspondence—on the work premises and during working hours." Cour de cassation [Cass.] supreme court for judicial matters] soc., Oct. 2, 2001, No. 4164 (Fr.). The Court's ruling is based on Article 9 of the Civil Code, which states: "Everyone has the right to the respect for his private life." CODE CIVIL (C. CIV.) [CIVIL CODE] art. 9 (Fr.). As a general rule, in France an employer cannot access computer files on the company hard-drive marked "private" by the employee, without the employee's presence or informing the employee, unless there is a particular risk to the company. Cour de cassation [Cass.] [supreme court for judicial matters] soc., May 17, 2005, No. 03-40.017 (Fr.); Olivier Proust, *Technology and Privacy in the Workplace under French Law*, BLOOMBERG BNA (July 30, 2013), <https://www.bna.com/technology-privacy-workplace-n1717987545/> [<https://perma.cc/SAJ8-N95A>].

telecommuting raises issues for collective bargaining. Although information technology may aid worker communication in organizing, remote work may hamper employee interaction and solidarity, especially if the employer alone controls the addresses and means necessary for remote communication. Recently, however, the National Labor Relations Board has acted to help ensure that employees have access to electronic communications for the purposes of organizing. In its 2012 *Hispanics United of Buffalo*⁴⁶ opinion, the Board held that employee Facebook comments concerning the employer constituted “concerted activity” and enjoyed the same protection under the NLRA as in-person employee communications.⁴⁷ In its 2014 opinion in *Purple Communications, Inc.*,⁴⁸ the Board held that employees who have already been granted access to their employer’s email system for work purposes have a presumptive right to use that system to engage in Section 7 protected communications.⁴⁹ It is of course yet to be seen whether these opinions updating Board precedents to account for the impact of information technology will survive under a Board appointed by President Trump.

2. Outsourcing

a. Domestic and International Outsourcing

Information technology has also wrought a revolution in both domestic and international outsourcing, particularly in manufacturing and transportation.⁵⁰ Information technology has allowed firms to coordinate production horizontally in one location, across the country, or across the globe.⁵¹ In its most common forms, “domestic outsourcing” occurs when a firm employs independent contractors to perform work previously done by employees or when the firm contracts for a different company to employ people to supply a portion of production or delivery,

⁴⁶ *Hispanics United of Buffalo, Inc.*, 359 N.L.R.B. 368 (2012).

⁴⁷ *Id.* at 369–70. This doctrine applies whether or not the affected employees are organized. *Id.*

⁴⁸ *Purple Commc’ns, Inc.*, 361 N.L.R.B. No. 126 (Dec. 11, 2014), *overruling*, *Guard Publ’g Co.*, 351 N.L.R.B. 1110 (2007).

⁴⁹ *Id.* at 14. The employer is now required to give the union the employees’ email addresses and phone numbers as part of the “Excelsior List” so that the union can use modern methods of communication to communicate with prospective voters. See *N.L.R.B. Representation Case-Procedures Fact Sheet*, NAT’L LAB. REL. BD. (2016), <https://www.nlrb.gov/news-outreach/fact-sheets/nlrb-representation-case-procedures-fact-sheet> [<http://perma.cc/56S3-3DRB>].

⁵⁰ See Annette Bernhardt et al., *Domestic Outsourcing in the United States: A Research Agenda to Assess Trends and Effects on Job Quality* 2–3 (Ctr for Econ. & Policy Research, Working Paper, 2016); see also DAVID WEIL, *THE FISSURED WORKPLACE: WHY WORK BECAME SO BAD FOR SO MANY AND WHAT CAN BE DONE TO IMPROVE IT* 168–71 (2014).

⁵¹ Dau-Schmidt, *supra* note 2, at 12.

with the work being performed at the same worksite or elsewhere in the United States.⁵² “International outsourcing” occurs when American firms employ workers in a foreign country, either directly or through a subsidiary or sub-contracting firm, to perform work previously done by American employees.⁵³ To support international outsourcing, firms need free trade agreements that ensure stable conditions for trade with low or no tariffs, protection of intellectual property, mobility of capital, and favorable competition policies.⁵⁴ International outsourcing has greatly increased the relevant labor market, an effect I deal with below in my discussion of the increase in global trade.⁵⁵

A review of the recent economic literature demonstrates the growth of both domestic and international outsourcing, especially since the late 1980s. In recent years, the transportation industry has seen a dramatic shift away from the traditional employment relationship in favor of using independent contractors as drivers, contracted warehouse services, and third-party logistics companies.⁵⁶ Recent survey evidence suggests that logistics outsourcing accounts for about half of business spending on transportation and close to 40% of spending on warehouse activities.⁵⁷ A 2005 Bureau of Labor Statistics survey of workers showed that, in that year, 7.4% of transportation workers identified themselves as “independent contractors” and another 1.5% worked for temporary agencies or firms that contracted out their services to one customer.⁵⁸ Indices of international outsourcing have tripled and quadrupled since the late 1980s, reflecting the rise of outsourcing by American firms to low-wage countries such as Mexico and China.⁵⁹ The use of outsourcing

⁵² See Bernhardt et al., *supra* note 50, at 5.

⁵³ See generally Rt. Hon. Lord Neil Kinnock, *The Seventeenth Henry Kaiser Memorial Lecture, “Globalisation, Labour Conditions, and Human Rights”*, 39 GEO. J. INT’L L. 577 (2008); Carole A. Spink & Ute Krudewagen, *From Acquired Rights to Reverse Tupe: Employment Law Issues in Global Outsourcing Transactions*, 9 CHI.-KENT J. INT’L & COMP. L. 46 (2009).

⁵⁴ Richard Baldwin & Javier Lopez-Gonzalez, *Supply-Chain Trade: A Portrait of Global Patterns and Several Testable Hypotheses 3* (Nat’l Bureau of Econ. Research, Working Paper No. 18957, 2013).

⁵⁵ See *infra* Part II.D.

⁵⁶ See George P. Baker & Thomas N. Hubbard, *Make Versus Buy in Trucking: Asset Ownership, Job Design and Information*, 93 AM. ECON. REV. 551 (2003); see also Michael H. Belzer, *The Motor Carrier Industry: Truckers and Teamsters Under Siege*, in CONTEMPORARY COLLECTIVE BARGAINING IN THE PRIVATE SECTOR 259 (Paula B. Voos ed., 1994); William Armbruster, *Stacking Up: Manufacturers Are Pleased with Gains from Outsourcing of Warehouse Management*, 4 J. COM. 18 (Dec. 1–7, 2003); Robert Lieb & Brooks A. Bentz, *The Use of Third-Party Logistics Services by Large American Manufacturers: The 2004 Survey*, 44 TRANSP. J. 5, 5 (2005).

⁵⁷ Rudolf Leuschner et al., *Third-Party Logistics: A Meta-Analytic Review and Investigation of Its Impact on Performance*, 50 J. SUPPLY CHAIN MGMT. 21, 21 (2014).

⁵⁸ See Bernhardt et al., *supra* note 50, at 27. More recent surveys suggest that this 1.5% figure has significantly increased by 2016. *Id.*

⁵⁹ See Baldwin & Lopez-Gonzalez, *supra* note 54, at 3; see also Robert C. Johnson & Guillermo

also seems concentrated in the manufacturing sector where approximately 40% of all temporary workers have been employed over the period 1995-2005.⁶⁰ Other sectors that employed significant percentages of our population of temporary workers in 2005 included professional and business services (18.4%), trade transportation and utilities (13.9%), and healthcare (11.9%).⁶¹ More broadly in the economy, the 2010 National Organizations Survey suggests that a significant proportion of American businesses use contractors for facilities management (34%), IT systems (34%), transportation services (30%), sales and marketing (22%), research and development (20%), management administration (14%), and customer service (12%).⁶² Industry input-output data suggest that the share of GDP accounted for by domestic providers of outsourcing services—excluding telecommunications and financial services—rose from 7% to 12% between 1982 and 2006.⁶³

b. “Work on Demand” and “Crowdsourcing”

Two recent special cases of outsourcing made possible by information technology, and that merit separate discussion, are “work on demand” and “crowdsourcing.” Both are creatures of the new “sharing economy,” in which firms produce and administer proprietary “apps” that allow customers to arrange for the provision of goods and services from suppliers or workers online.⁶⁴ In “work on demand,” customers arrange for the provision of services, such as transport, cleaning, errands, and secretarial work, by retaining the services of workers through the organizing company’s proprietary app.⁶⁵ The organizing company sets

Noguera, *Fragmentation and Trade in Value Added over Four Decades* (Nat'l. Bureau Econ. Research, Working Paper No. 18186, 2012); Robert Koopman et al., *Give Credit Where Credit Is Due: Tracing Value Added in Global Production Chains* (Nat. Bureau of Econ. Research, Working Paper No. 16426, 2010).

⁶⁰ The estimated percent of temporary workers working in manufacturing were 40% in 1995, 37.9% in 1997, 37.6% in 1999, 28.5% in 2001, and 38.7% in 2005. Matthew Dey et al., *What Do We Know about Contracting Out in the United States? Evidence from Establishment and Household Surveys*, in *LABOR IN THE NEW ECONOMY* 267, at 290 tbl.7.3 (Katharine G. Abraham et al. eds., 2010).

⁶¹ *Id.*

⁶² PETER BØEGH NIELSEN & TIMOTHY STURGEON, USING BUSINESS FUNCTIONS TO MEASURE INTERNATIONAL TRADE AND ECONOMIC GLOBALIZATION 8 tbl.3 (2014).

⁶³ Robert E. Yuskavage et al., *Outsourcing and Imported Services in BEA's Industry Accounts*, in *INTERNATIONAL FLOWS OF INVISIBLES: TRADE IN SERVICES AND INTANGIBLES IN THE ERA OF GLOBALIZATION* 247 (Marshall Reinsdorf & Matthew Slaughter eds., 2008).

⁶⁴ Valerio De Stefano, *Introduction: Crowdsourcing, the Gig-Economy, and the Law*, 37 *COMP. LAB. L. & POL'Y J.* 461, 462 (2016).

⁶⁵ Valerio De Stefano, *The Rise of the “Just-in-Time Workforce”: On-Demand Work, Crowdwork, and Labor Protection in the “Gig-Economy”*, 37 *COMP. LAB. L. & POL'Y J.* 471, 474 (2016).

certain parameters on the transaction, for example pre-approving the workers, setting the pricing structure, specifying certain expectations of workers, and then transfers the payment for the services after retaining a portion for their management fee.⁶⁶ There are a number of providers of various services through work on demand, including TaskRabbit and Handy, but the quintessential examples in the field of employment law are probably Uber and Lyft.⁶⁷ Uber and Lyft arrange through their online services for customers to receive and pay for rides from pre-approved drivers who follow Uber and Lyft protocols, but work hours of their own choosing in their own cars.⁶⁸ Uber and Lyft's apps incorporate "surge pricing," allowing the customer's price and the driver's remuneration to increase as current demand for rides exceeds the supply of available drivers, encouraging more drivers to work during peak hours.⁶⁹ The surge pricing feature is an example of the "just in time" services systems made possible by information technology.⁷⁰ Although Uber and Lyft exercise some control over the drivers, including the ability to block them from using the app to obtain customers, a system of driver evaluation, certain minimum standards for driver qualifications and behavior, and the system of fares, to date Uber and Lyft have tried to characterize themselves as merely information companies and the drivers as independent contractors who contract for work directly with the customers.⁷¹

"Crowdsourcing" is a similar online matching of service consumers with workers through a proprietary app, except that it adds additional layers of impact from information technology. With crowdsourcing, not

⁶⁶ For a detailed description of how crowdworking works, see Wilma B. Liebman & Andrew Lyubarsky, *Crowdwork, the Law and the Future of Work*, 20 PERSP. ON WORK 22 (2017).

⁶⁷ See De Stefano, *supra* note 64, at 462.

⁶⁸ See generally Hannah A. Posen, Note, *Ridesharing in the Sharing Economy: Should Regulators Impose Uber Regulations on Uber?*, 101 IOWA L. REV. 405, 414–17 (2015) (describing Uber's business model).

⁶⁹ See Ben Fischer, *Gett Has a New Plan for Hailing Uber Drivers to Its Team*, N.Y. BUS. J. (Oct. 15, 2014, 11:00 AM), <http://www.bizjournals.com/newyork/blog/techflash/2014/10/gett-has-a-new-plan-for-hailing-uber-drivers-to.html> [<https://perma.cc/T2FM-3Z5A>] (describing efforts to increase market share in Manhattan).

⁷⁰ See De Stefano, *supra* note 65, at 474.

⁷¹ See, e.g., *O'Connor v. Uber Tech., Inc.*, 82 F. Supp. 3d 1133, 1141 (N.D. Cal. 2015) ("Uber's self-definition as a mere 'technology company' focuses exclusively on the mechanics of its platform (i.e., the use of internet enabled smartphones and software applications) rather than on the substance of what Uber actually *does* (i.e., enable customers to book and receive rides.); Order Denying Cross-Motions for Summary Judgment at 14, *Cotter v. Lyft*, No. 3:13-cv-04065-VC (N.D. Cal. Sept. 3, 2013), ECF No. 94 ("Lyft tepidly asserts there is no need to decide how to classify the drivers, because they don't perform services for Lyft in the first place. Under this theory, Lyft drivers perform services only for their riders, while Lyft is an uninterested bystander of sorts, merely furnishing a platform that allows drivers and riders to connect, analogous perhaps to a company like eBay.").

only is work assigned online, but it is generally performed online.⁷² Moreover, it is also common for crowdsourced workers to be both selected and managed by computer algorithm.⁷³ Well-known platforms for crowdsourcing include Crowdfunder and Clickworker, but the largest and best known platform is Amazon Mechanical Turk (AMT).⁷⁴

Through AMT, Amazon maintains an electronic bulletin board for subscribing parties to post and bid on jobs. Amazon maintains certain minimum standards for participation, a system of evaluation for each worker, a dispute resolution system, and a payment clearinghouse for the work (keeping for itself a percentage of the bill). On AMT, a subscribing party who wants to crowdsource work lists a “request” for a specified job or “human intelligence task” (HIT), along with the rate of pay and performance deadline. Crowdworkers or “contributors,” who also subscribe to the AMT platform, then apply to do the work and are either accepted or rejected by the “requester.”⁷⁵ Crowdsourced work might be fairly sophisticated—for example, writing computer code—but more commonly it is fairly menial “microtasks” requiring “judgment beyond the understanding of artificial intelligence (e.g. tagging photos, valuing emotions, ranking the appropriateness of a site or text, or completing surveys).”⁷⁶ The requester can accept various crowdworkers to perform the work based on their resumes and past evaluations or on a first-come/first-served basis. Acceptance of the worker is generally done through a prescribed algorithm for the minimum qualifications that will be accepted to do the job.⁷⁷ Once the crowdworker completes the assigned tasks, he or she submits the work to the requester who has the right to accept the work and pay the prescribed fee, or reject the work and not pay the worker—despite keeping the work-product.⁷⁸ Crowdsourcing rates are so low that requesters will sometimes assign the same tasks to various crowdworkers and then reject and not pay for work that does not match that of the other crowdworkers. These rejections are of course carried out by computer algorithms.⁷⁹

Although work on demand and crowdworkers comprise only a small portion of the American workforce—currently about 600,000 workers or

⁷² De Stefano, *supra* note 63, at 473–74.

⁷³ M. Six Silberman & Lilly Irani, *Operating an Employer Reputation System: Lessons from Turkopticon, 2008-2015*, 37 COMP. LAB. L. & POL’Y J. 505, at 505–06 (2016).

⁷⁴ De Stefano, *supra* note 64, at 462.

⁷⁵ Silberman & Irani, *supra* note 73, at 505–06.

⁷⁶ De Stefano, *supra* note 65, at 473–74; *see also* Liebman & Lyubarsky, *supra* note 66.

⁷⁷ Silberman & Irani, *supra* note 73, at 505–06.

⁷⁸ *Id.*

⁷⁹ *Id.*

0.4% to 0.5% of the labor force—it is a growing sector.⁸⁰ Uber’s active driver force has grown from basically zero in mid-2012 to 160,000 by the end of 2014.⁸¹ Uber’s drivers are more likely to be under forty years old (49.2%) than are taxi drivers (28.4%) or the general workforce (44.3%),⁸² and are more likely to have a college degree (36.9%) than are taxi drivers (14.9%) or the general workforce (25.1%).⁸³ Like taxi drivers (26.2%), they are less likely to be White non-Hispanic (40.3%) than the general workforce (55.8%) and, like taxi drivers (92%) they are overwhelmingly male (86.2%).⁸⁴ In addition, 38% of Uber drivers have no other job, while 30% of them work part-time elsewhere and 31% work full-time in another job.⁸⁵ Most Uber drivers (55%) drive less than fifteen hours a week and average about \$16.89 an hour in earnings,⁸⁶ but an analysis that takes into account driver expenses puts the hourly wage range at \$8.77 to \$13.17 depending on the city where the driver works.⁸⁷ In 2011, Amazon reported that AMT hosted more than 500,000 crowdworkers from 190 countries, but researchers estimate that this includes only about 50,000 “active workers” and 1,000–10,000 full time equivalents.⁸⁸ A more recent survey suggests that the “stable workforce” of AMT and CrowdFlower is about 20,000 workers worldwide, overwhelmingly in the United States.⁸⁹ That survey found that crowdworkers were highly educated, with 36.7% having a college degree and 16.9% having advanced degrees.⁹⁰ In the United States, they are gender balanced at 48% female and 52% male, but overseas they are

⁸⁰ Janine Berg, *Income Security in the On-Demand Economy: Findings and Policy Lessons from a Survey of Crowdworkers*, 37 COMP. LAB. L. & POL’Y J. 543, 543 (2016); see also Bernhardt et al., *supra* note 50, at 28.

⁸¹ Jonathan V. Hall & Alan B. Krueger, *An Analysis of the Labor Market for Uber’s Driver-Partners in the United States* 1 (Princeton Univ. Indus. Relations Section, Working Paper No. 587, 2015).

⁸² *Id.* at 8 tbl. 1.

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ *Id.* at 10. About one-third of drivers are doing so “while looking for a steady, full-time job.” *Id.* at 12.

⁸⁶ Hall & Krueger, *supra* note 81, at 18 tbl. 2. Only 15% of drivers reported driving more than thirty-five hours a week. *Id.*

⁸⁷ Caroline O’Donovan & Jeremy Singer-Vine, *How Much Do Uber Drivers Actually Make Per Hour?*, BUZZFEED (June 22, 2016), https://www.buzzfeed.com/carolineodonovan/internal-uber-driver-pay-numbers?utm_term=.esX6Qg1Wa#.exOrnBDgz [<http://perma.cc/H9FY-FJUC>].

⁸⁸ Silberman & Irani, *supra* note 73, at 506.

⁸⁹ Berg, *supra* note 80, at 547. Berg’s survey found that while CrowdFlower had a few workers from many countries, AMT’s workers were 85% American and 15% Indians. *Id.* at 549.

⁹⁰ *Id.* at 550

predominantly male (69–73%).⁹¹ Americans do crowdwork to supplement their income (45%) and because it can be done from home (19.4%).⁹² Although 38% of American AMT crowdworkers report that crowdworking is their primary source of income,⁹³ the wages are not high, averaging about \$5.55 per hour for American workers.⁹⁴ Crowdwork wages are even lower for overseas workers, averaging between \$1.77 and \$3.17 an hour.⁹⁵ The survey suggests that 60% of AMT workers hold other jobs, and that 40% do crowdwork while working at their other job.⁹⁶

Theoretically, outsourcing can yield greater efficiency through specialization, economies of scale, and by replacing less efficient firm administrative methods for monitoring and managing employees with more efficient market bidding mechanisms. Outsourcing can also allow employers to profit from lower labor costs in low-wage labor markets, even when the workers or production methods are less productive. Low wages have of course driven much of the recent outsourcing of American jobs to Mexico and China.⁹⁷ As a result, outsourcing is strongly correlated with a decline in employee bargaining power, and the contracted workers or independent contractors who replace employees do so under terms that are almost always inferior to the terms the original employees enjoyed.⁹⁸ Outsourcing is also associated with the “casualization of labor” and the “demutualization of risk.”⁹⁹ The transfer of work from long-term employees to short-term “independent contractors” using information technology has been accompanied by a decline in employer-provided benefits and training, pushing more of the risk of illness, injury, unemployment and obsolescence onto workers.¹⁰⁰ Not only do

⁹¹ *Id.*

⁹² *Id.* at 552.

⁹³ *Id.* at 554.

⁹⁴ Berg, *supra* note 80, at 557.

⁹⁵ *Id.*

⁹⁶ *Id.* at 556. Fifty-five percent of crowdworkers report that their other employer would accept them doing crowdwork while on the job. *Id.*

⁹⁷ David H. Autor et al., *The China Syndrome: Local Labor Market Effects of Import Competition in the United States*, 103 AM. ECON. REV. 2121, 2125 (2013).

⁹⁸ See Bernhardt et al., *supra* note 50, at 19.

⁹⁹ De Stefano, *supra* note 65, at 481.

¹⁰⁰ The percent of full-time workers under age sixty-five who are covered by employer provided health insurance has declined from 71% to 66% from 1999 to 2014. MICHELLE LONG ET AL., KAISER FAMILY FOUNDATION, TRENDS IN EMPLOYER-SPONSORED INSURANCE OFFER AND COVERAGE RATES, 1999-2014 (Mar. 21, 2016), <http://kff.org/private-insurance/issue-brief/trends-in-employer-sponsored-insurance-offer-and-coverage-rates-1999-2014/> [<http://perma.cc/FM7Q-XSG9>]. Over approximately the same period, the percent of American workers covered by an employer provided pension plan declined from 59.8% to 53.7%, while the average employer contribution also declined. Kenneth G. Dau-Schmidt, *Promises to Keep: Ensuring the Payment of Americans' Pension Benefits in*

fewer workers have employer-provided health insurance and pensions, but the new work relationships allow the employer to easily jettison the workers rather than retain them if production demands change and their services or skills are no longer required.¹⁰¹

Unfortunately, domestic outsourcing, including the most recent variants of work on demand and crowdsourcing, can also be used to engage in “regulatory arbitrage,” in which the choice of the method of production is influenced by whether it allows the workers to be excluded from coverage under protective regulation, or covered as employees of some judgement-proof entity.¹⁰² The rearrangement of the method of production may consist of fairly cursory changes intended largely to frustrate the law. For example, the shipping giant FedEx has spent years losing cases and then tweaking its operating system in an effort to claim that its drivers are independent contractors rather than employees, and so exempt from coverage under the NLRA, and other federal and state laws.¹⁰³ Even where the employer might make real substantive changes in the method of production, for example work on demand or crowdsourcing, the prospect of avoiding the costs of protective legislation would inefficiently favor structuring production to abandon the traditional employment relationship and coverage under the laws. Firms may also structure production in ways that allow them to avoid responsibility for protective legislation, placing that responsibility on judgment-proof “employers” further down the production chain. For example, Forever 21 contracted work from smaller suppliers, who in turn employed people to produce clothing under sub-standard conditions, but who disappeared at the first sign of statutory enforcement in order to benefit from low wages but avoid any liability under the minimum wage laws.¹⁰⁴

the Wake of the Great Recession, 52 WASHBURN L.J. 393, 397 (2013); see also Robert I. Lerman & Stefanie R. Schmidt, *Future Work: Trends and Challenges for Work in the 21st Century*, U.S. DEP’T OF Lab. (1999), <https://www.dol.gov/dol/aboutdol/history/herman/reports/futurework/conference/trends/TrendsIII.htm> [<http://perma.cc/984H-4JCJ>].

¹⁰¹ See Dau-Schmidt, *supra* note 2, at 3, 11.

¹⁰² *States and Federal Authorities Battle Problem of Misclassifying Employees as Independent Contractors*, 36 CONSTR. CONT. L. REP. 14 (2012); Scott A. Holt, *Will “Misclassification Initiatives” Reduce Employers’ Use of Independent Contractors?*, 15 No. 4 DEL. EMP. L. LETTER 6 (2010); *Employee Misclassification: Improved Outreach Could Help Ensure Proper Worker Classification Before the Sub Comm. on Income Sec. & Family Support & Sub Comm. on Select Revenue Measures*, H. Comm. on Ways & Means (May 8, 2007) (statement of Sigurd R. Nilsen, Dir. Educ., Workforce, & Income Sec.).

¹⁰³ See *FedEx Home Delivery v. N.L.R.B.*, 563 F.3d 492, 500 (D.C. Cir. 2009); see also *Roadway Package Sys., Inc.*, 288 N.L.R.B. 196, 196 (1988); *Roadway Package Sys., Inc.*, 326 N.L.R.B. 842, 842 (1998).

¹⁰⁴ See Natalie Kitroeff, *Factories that Made Clothes for Forever 21, Ross Paid Workers \$4 an Hour, Labor Department Says*, L.A. TIMES (Nov. 16, 2016), <http://www.latimes.com/business/la-fi-wage-theft-forever-ross-20161116-story.html> [<https://perma.cc/QMM3-ZFMA>].

Existing doctrine on who is an employee and who is an employer does not seem up to the challenges of the information age. The words of the statute in question of course control who are covered “employees,” but inevitably courts are left to apply general tests such as the “right-to-control” test, the “economic realities” test, and hybrids of these tests to fill gaps in the express language of the statute.¹⁰⁵ Under these tests, the court examines a list of factors to determine whether, under the “totality of the circumstances,” the contracting party has the right to control the manner and means of work, whether under the economic realities of the situation the worker is dependent on the contracting party, or some combination of these two tests.¹⁰⁶ More recently, a majority of state legislatures and courts have adopted the “ABC Test” to determine who is an employee for the purposes of some or all of their state labor and employment laws. Under this test, a worker is presumed to be a covered employee unless the employer can show that: (A) the worker is free from control and direction, (B) the work is done outside

¹⁰⁵ Federal statutes that use the right-to-control test include the National Labor Relations Act, Employment Retirement and Income Security Act, Federal Unemployment Tax Act, Immigration Reform and Control Act, Federal Insurance Contributions Act, and Federal Income Tax Act. Federal statutes that use the economic realities test include the Fair Labor Standards Act, Title VII of the Civil Rights Act, Age Discrimination in Employment Act, Americans with Disabilities Act, and Family and Medical Leave Act. Federal statutes that apply a hybrid test that combine features of both tests include the Age Discrimination in Employment Act, and Americans with Disabilities Act. See Charles J. Muhl, *What Is an Employee? The Answer Depends on the Law*, 125 MONTHLY LAB. REV. 3, Exhibit 1 (2002).

¹⁰⁶ The right-to-control test was developed in American tort common law as a means of distinguishing between employees, for whose torts the employer is liable under the doctrine of respondeat superior, and independent contractors, who are solely responsible for their own torts. See RESTATEMENT (THIRD) OF AGENCY ch.7 (AM. LAW INST. 2006); *Lynch v. Workmen’s Comp. App. Bd.*, 554 A.2d 159, 160 (Pa. Commw. Ct. 1989).

The economic realities test was developed by the courts to determine who was an employee covered by protective federal employment laws. The test examines whether, under the economic realities of the situation, the worker is economically dependent on the purported employer and thus covering the worker would fulfill the purposes of the protective legislation. The test also looks at a variety of factors similar to those considered under the right-to-control test, but with an eye toward determining whether the worker is dependent, rather than determining who has the right-to-control how the work is done. The economic realities test is broader than the right-to-control test and includes workers who are independent contractors under the right-to-control test, but who are economically dependent on the employer. See *U.S. Dep’t of Labor v. Lauritzen*, 835 F.2d 1529, 1534 (7th Cir. 1987) (pickle pickers who would be independent contractors under the right to control test found to be employees under the economic realities test); see also *United States v. Silk*, 331 U.S. 704 (1947) (the seminal case on the economic realities test); Myra H. Barron, *Who’s an Independent Contractor? Who’s an Employee?*, 14 LAB. L. 457 (1999).

The “hybrid tests” are similar totality of the circumstances tests that combine facets of both the right-to-control test and the economic realities test either because they consider both control and dependence in their list of factors, or because in considering a given list of factors they look for both control and dependence. As a result, these tests are also generally broader in finding covered employees than the right-to-control test. See Muhl, *supra* note 105, at 9–10.

the course of the employer's usual business, and (C) the worker is engaged in a customarily independent trade or profession.¹⁰⁷ The question of who is the worker's employer is similarly a statutory question with inevitable applications of similar "right-to-control" tests,¹⁰⁸ "economic realities" tests,¹⁰⁹ and "joint employer" doctrines.¹¹⁰

Complaints have been made about the irrelevance and ambiguity of these tests for years.¹¹¹ The National Labor Relations Board has chased first Roadway and then its successor FedEx through numerous reformulations of the work relationship in a largely futile effort to bring the company to heel for its responsibilities under the NLRA's right-to-control test.¹¹² More recently, courts have been asked to determine whether on-demand drivers for Uber and Lyft are employees of their respective companies for the purposes of various employment laws, or whether they are merely subscribers to their companies' information services who contract directly with the riders.¹¹³ As yet, no definitive answer has been reached, but Judge Vince Chabria famously described the problem in the Lyft case:

[T]he jury in this case will be handed a square peg and asked to choose between two round holes. The test the California courts have developed over the 20th Century for classifying workers isn't very helpful in addressing this 21st Century problem. Some factors point in one direction, some point in the other, and some are ambiguous.¹¹⁴

¹⁰⁷ *Hargrove v. Sleepy's, LLC*, 106 A.3d 449, 458 (N.J. 2015) (applying the ABC Test to New Jersey statutes on the payment of wages).

¹⁰⁸ *See, e.g., Depianti v. Jan-Pro Franchising Int'l, Inc.*, 990 N.E.2d 1054 (Mass. 2013) (applying the "Instrumentality Test" (a form of the right-to-control test) to determine if franchisers were the "employer" of the workers of their franchisees); *Kerl v. Dennis Rasmussen, Inc.*, 682 N.W.2d 328 (Wis. 2004) (same).

¹⁰⁹ *Orozco v. Plackis*, 757 F.3d 445 (5th Cir. 2014) (applying a form of the economic realities test to determine whether a franchiser was the employer of the workers of its franchisees for the purposes of the FLSA).

¹¹⁰ *Becerra v. Expert Janitorial, LLC*, 332 P.3d 415, 417 (Wash. 2014) (announcing joint employer doctrine in application of Washington State minimum wage law to contractor and subcontracting cleaning company); *see also* Daniel B. Pasternak & Naomi Y. Perera, *The NLRB's Evolving Joint-Employer Standard: Browning-Ferris Industries of California, Inc.*, 31 A.B.A. J. LAB. & EMP. L. 295 (2016); Carlsmith Ball Wichman Case & Ichiki, *Ninth Circuit Addresses Joint Employer Status Under the FLSA*, 1 No. 11 PAC. EMP. L. LETTER 1 (1997).

¹¹¹ *See, e.g., Lauritzen*, 835 F.2d at 1539 (Easterbrook, J., concurring).

¹¹² *See FedEx Home Delivery v. N.L.R.B.*, 563 F.3d 492 (D.C. Cir. 2009); *see also* *Roadway Package Sys., Inc.*, 288 N.L.R.B. 196, 196 (1988); *Roadway Package Sys., Inc.*, 326 N.L.R.B. 842, 842 (1998).

¹¹³ *See, e.g., O'Connor v. Uber Tech., Inc.*, 82 F. Supp. 3d 1133, 1141 (N.D. Cal. 2015); Order Denying Cross-Motions for Summary Judgment, *supra* note 71, at 14.

¹¹⁴ Order Denying Cross-Motions for Summary Judgment, *supra* note 71, at 19.

Indeed, proposals abound to broaden the test for who is an employee from including “dependent contractors,”¹¹⁵ to including “independent workers,”¹¹⁶ to adopting an entirely new “functional approach”¹¹⁷ in defining statutory coverage.¹¹⁸

As an outline for a solution to this problem, I advocate a new approach based on two general principles of statutory efficiency: 1) avoiding regulatory arbitrage and 2) assigning legal responsibility to the cheapest cost avoider. By enacting protective legislation, the legislatures have decided to allocate rights or responsibilities in the work relationship based on some larger public policy. To allow people to easily evade these decisions based on how they formulate their system of production undermines these legislative decisions and disadvantages those who follow the protective statutes. Accordingly, the first principle in deciding the coverage of protective legislation is to avoid regulatory arbitrage; work should not be excluded from coverage of a statute merely because of the method of production unless it is clear the legislature intended that work to be excluded.¹¹⁹

Moreover, we should promote efficiency in the administration and enforcement of our statutes. Courts should not conclude that the legislature intended to apply the law against the smallest, most numerous, and least powerful members of the production process when it can much more easily and cheaply be enforced against the large corporate structures that organize production. There are economies of scale in enforcing the laws against the larger entities that organize production rather than the smaller sub-entities. Why collect social security tax from 600,000 Uber drivers when it can be much more efficiently collected for the same work from Uber itself? Moreover, enforcement against the larger organizing entities is more likely to be effective because they are less likely to be judgment proof and they are more likely to be able to

¹¹⁵ Brian A. Langille & Guy Davidov, *Beyond Employees and Independent Contractors: A View from Canada*, 21 COMP. LAB. L. & POL'Y J. 7, 24 (1999).

¹¹⁶ Seth D. Harris & Alan B. Krueger, *A Proposal for Modernizing Labor Laws for Twenty-First Century Work: The “Independent Worker”*, 2 (The Hamilton Project, Discussion Paper 2015-10, 2015).

¹¹⁷ Jeremias Prassl & Martin Risak, *Uber, Taskrabbit, and Co.: Platforms as Employers? Rethinking the Legal Analysis of Crowdfundwork*, 37 COMP. LAB. L. & POL'Y J. 619, 621 (2016); Brian Langille, *Escaping the Contractual Fly-Bottle*, forthcoming.

¹¹⁸ There have also been recent efforts to broaden the definition of joint employers in response to the changes wrought by information technology. See, e.g., *Browning-Ferris Industries of Cal., Inc.*, 362 N.L.R.B. No. 186, at 2 (Aug. 27, 2015); see also Ryan Funk, *What Does the Future Hold for Joint Employers?*, LAW360 (Aug. 15, 2016), <https://www.law360.com/articles/822657/what-does-the-future-hold-for-joint-employers> [<http://perma.cc/UWL4-ND9X>].

¹¹⁹ The idea of regulatory arbitrage, or formulating transactions or relationships so as to avoid legal costs and responsibilities has been around for some time. See *Regulatory Arbitrage*, *supra* note 7; Fleischer, *supra* note 7, at 230; Warren, *supra* note 7, at 189–90.

exercise control to effectively respond to legal incentives. States are beginning to come to this conclusion with respect to the requirement that Uber, rather than the individual drivers, should carry liability insurance.¹²⁰ This conclusion applies as well for the insurance of workers against various maladies, for example, with workers' compensation insurance, unemployment insurance and social security.¹²¹ Accordingly, the second principle is that legal responsibility should be assigned to the cheapest cost avoider in the system of production so that the laws can be most cheaply and effectively administered.¹²² The large powerful corporations who organize production in the information age should be the ones who bear responsibility for ensuring that the statutory rights of employees attach to their work using the new information technology. These two principles of avoiding regulatory arbitrage and selecting for regulatory efficiency might be ratified through legislative action; however because they seek the efficient application of the laws already enacted by the legislature, they might be appended to or replace existing tests for coverage of our labor and employment laws.

Beyond the quintessential question of who is an employee for the purposes of coverage under various labor and employment laws, the reorganization of production using information technology raises other important legal issues. For one, international outsourcing raises the issue of the extra-territorial application of American protective legislation to workers in other countries. American courts tend to avoid extra-

¹²⁰ California recently enacted Assembly Bill No. 2293, which institutes a number of new requirements for transportation network companies operating in California that must be met by July 1, 2015. Among other requirements, every transportation network company must provide a minimum of \$1 million in liability insurance coverage for passengers from the time the passenger is picked up until the transaction is complete. Alexi Pfeffer-Gillett, *When "Disruption" Collides With Accountability: Holding Ridesharing Companies Liable For Acts of Their Drivers* 104 CAL. L. REV. 233 (2016); Catharine L. Rassman, *Regulating Rideshare Without Stifling Innovation: Examining the Drivers, the Insurance "Gap," and Why Pennsylvania Should Get on Board*, 15 PITT. J. TECH. L. & POL'Y 81 (2014); Adam Cecil, *The Insurance Secret that Uber Doesn't Want You to Know*, POLICYGENIUS (Oct. 8, 2014), <https://www.policygenius.com/blog/insurance-secret-uber-doesnt-want-know/> [https://perma.cc/97PT-YDJX].

¹²¹ Where the law applies damages, fees or fines for the purposes of creating incentives for good behavior, those remedies will be most effective if they are applied against parties who can actually pay them (and so be incentivized) and have control over how the activity is undertaken (so that they have the ability to respond to those incentives). Certainly in the case of Uber and Lyft, the large companies who organize the industry have the resources to pay damages, insurance premiums or fines, and the ability to affect behavior in the industry by selecting drivers, making rules for conduct, and monitoring driver behavior using the same information technology they use to run their business.

¹²² Here I borrow from the application of the Coase Theorem with positive transaction costs, as formulated by Guido Calabresi. Although the Coase theorem is not strictly applicable to parties, like employers and employees who are in a contractual relationship, the principle of assigning responsibility to the party who can most cheaply fulfill that responsibility, and most cheaply be monitored by the government to ensure compliance with the law, is largely the same. See CALABRESI, *supra* note 8, at 282–83; Coase, *supra* note 8, at 15.

territorial applications of U.S. laws, citing a general presumption against extra-territorial application,¹²³ even when there is express language in the statute suggesting possible international application.¹²⁴ International outsourcing also raises issues about the enforcement of treaties establishing international labor standards by the United States government or American nationals.¹²⁵ “Management by algorithm” can raise important legal issues under our anti-discrimination laws and the NLRA. Like recruiting algorithms, management algorithms could harbor express or implicit biases that might run afoul of the Civil Rights Act. For example, crowdsourcers are known for favoring American workers for certain work,¹²⁶ might they also have preferences or reward systems that disadvantage protected classes of workers in violation of our antidiscrimination laws? The management algorithm itself is a great subject of interest among the workers, and they themselves have developed algorithms to help them choose which jobs to take and which to avoid.¹²⁷ If crowdworkers are found to be employees under the NLRA or another federal or state collective bargaining statute, the management algorithm would seem to be “wage data” that the employer would have to disclose in negotiations¹²⁸ and worker efforts at developing their own algorithms would seem to be protected collective action.¹²⁹

C. The Impact of IT on Which Skills are Demanded: “Job Polarization” and the “Rise of the Machines”

Information technology can serve as either a substitute for, or complement to, human labor.¹³⁰ When information technology serves as a substitute for labor, it displaces that labor, hopefully to other tasks.

¹²³ See *Labor Union of Pico Kor., Ltd. v. Pico Prods.*, 968 F.2d 191, 195 (2d Cir. 1992).

¹²⁴ Section 301 of the Labor Management Relations Act, dealt with in the *Pico* case, expressly raises the application of the law to non-citizens. See 29 U.S.C. § 185(a) (2012).

¹²⁵ See Gary Burtless, *Workers’ Rights: Labor Standards and Global Trade*, BROOKINGS INST. (Sept. 1, 2001) <https://www.brookings.edu/articles/workers-rights-labor-standards-and-global-trade/> [https://perma.cc/5ALH-4Q4E].

¹²⁶ See Berg, *supra* note 80, at 559.

¹²⁷ See Silberman, *supra* note 73, at 506–07.

¹²⁸ The Supreme Court has described the standard for relevance of information requested by a union as a liberal, “discovery-type” standard. *N.L.R.B. v. Acme Indus. Co.*, 385 U.S. 432, 437 (1967). Moreover, “[i]nformation related to the wages, benefits, hours, [and] working conditions” of unit employees is presumptively relevant. *Country Ford Trucks, Inc. v. N.L.R.B.*, 229 F.3d 1184, 1191 (D.C. Cir. 2000); see also *N.L.R.B. v. Assoc. Gen. Contractors of Cal., Inc.*, 633 F.2d 766, 770 n.4a (9th Cir. 1980).

¹²⁹ National Labor Relations Act of 1935 (49 Stat. 449), 29 U.S.C. § 157 (2012).

¹³⁰ David H. Autor et al., *The Skill Content of Recent Technological Change: An Empirical Exploration*, 118 Q.J. ECON. 1279, 1279–80 (2003); see also Dau-Schmidt, *supra* note 6, at 1593.

When information technology acts as a complement to labor, it augments that labor, increasing productivity and presenting an opportunity for higher wages.¹³¹

1. Job Polarization

Information technology has not been as successfully adapted to all forms of labor across the economy. Engineers and programmers can design computers or robots that excel at “routine tasks” such as organizing, storing, retrieving, and manipulating information, or executing precisely defined physical movements in a production process.¹³² These tasks are most often found in middle-skill/middle-pay jobs like clerical work, bookkeeping, and repetitive production jobs. However, tasks that require the exercise of some discretion, either in adaptation to a variety of physical situations or the performance of abstract tasks, pose much more of a challenge for engineers and programmers.¹³³ Tasks that require situational adaptability tend to be low-skill/low-pay jobs—for example, food preparation, food service, cleaning work, in-person health assistance, and protective services.¹³⁴ Tasks that require discretion in the performance of abstract tasks tend to be high-skill/high-pay professional or creative occupations such as lawyer, doctor, scientist, engineer, manager, public relations, and design.¹³⁵ Although information technology is making inroads into almost all occupations, it seems that currently it tends to act as a substitute for and thus displaces middle-skill/middle-pay workers in much greater numbers than it displaces low-skill/low-pay workers or high-skill/high-pay workers.¹³⁶

In addition, it seems that information technology is more likely to act as a complement for high-skill professionals and creative workers and thus most often acts as an opportunity for raising the wages of high-skill/high-wage labor.¹³⁷ Thus, information technology seems to have resulted in a phenomenon called “job polarization”: technology seems to

¹³¹ Autor et al., *supra* note 131, at 1285.

¹³² *Id.* at 1279–80.

¹³³ *Id.* at 1286 tbl.1.

¹³⁴ *See id.*; *see also* David H. Autor, *Polanyi's Paradox and the Shape of Employment Growth* 11 (Nat'l Bureau of Econ. Research, Working Paper No. 20485, 2014).

¹³⁵ *See* Autor, *Polanyi's Paradox*, *supra* note 134, at 11.

¹³⁶ ERIK BRYNJOLFSSON & ANDREW MCAFEE, RACE AGAINST THE MACHINE: HOW THE DIGITAL REVOLUTION IS ACCELERATING INNOVATION, DRIVING PRODUCTIVITY, AND IRREVERSIBLY TRANSFORMING EMPLOYMENT AND THE ECONOMY 50 (2011). The decline in middle-skill/middle-pay jobs was particularly acute during the Great Recession. Autor found that middle-skill occupations declined anywhere from five to fifteen percent in employment levels between 2007 and 2012, while low- and high-skilled jobs fared much better. Autor, *Polanyi's Paradox*, *supra* note 134, at 13–14.

¹³⁷ BRYNJOLFSSON & MCAFEE, *supra* note 136, at 39–42.

be displacing workers away from middle-skill/middle-pay jobs down to low-skill/low-wage jobs, where these workers further depress low-skill wages,¹³⁸ or for a lucky few who are retrained, up to high-skill jobs where the workers enjoy higher productivity and higher wages.¹³⁹ As a result, several economists have identified the adoption of information technology as one of the causes of the increasing income disparity in the United States.¹⁴⁰

2. Automation and Artificial Intelligence: Summoning the Demon

Like the transformative technologies of steam, electricity, and mass production that came before it, information technology has stirred up a fair amount of “automation anxiety” over the impact it will have on people’s jobs and employment.¹⁴¹ There is some concern that adoption of information technology will result in the displacement of huge swaths of the workforce, and perhaps even usher in a new relationship between capital and labor with labor suffering diminished importance and bargaining power.¹⁴² Information technology has already led to the automation and loss of many manufacturing jobs, even in low-wage

¹³⁸ The middle-skilled workers who suffered this fate were disproportionately men who did not enjoy the same opportunities for educational advancement as their female colleagues. *Cf. id.* Indeed, women have used their advantages in education to survive the adoption of the new information technology much better than men. Over the period from 1975 to 2010 women’s real median compensation increased 33.2% while men’s real median compensation increased only 0.1%. LAWRENCE MISHEL, ECON. POLICY INST., *THE WEDGES BETWEEN PRODUCTIVITY AND MEDIAN COMPENSATION GROWTH* 3 fig.B (2012). Some of the increase for women was undoubtedly due to an increase in hours worked, but some was undoubtedly due to women’s advantages in education.

¹³⁹ See Autor, *Polanyi’s Paradox*, *supra* note 134, at 11–12; see also BRYNJOLFSSON & MCAFEE, *supra* note 136, at 50; David H. Autor et al., *The Polarization of the U.S. Labor Market*, 96 AM. ECON. REV. 189 (2006). Of course, wages are a function of both demand and supply. “Middle-wage” jobs might be “preserved” by retraining enough middle-skill workers for high-skill jobs that wages do not rise for the now more productive high-skill jobs. See Alan Manning, *Lovely and Lousy Jobs*, 18 CENTREPIECE 2, 3–4 (Autumn 2013). To date the efforts at retraining middle-skill American workers have been fairly modest. Autor estimates that under our current trade adjustment programs, a \$1000 increase in Chinese import exposure leads to a rise in transfer payments of only \$58 per capita, including only \$2 per adult in training assistance. See Autor et al., *supra* note 97, at 2149–50. To limit possible wage increases in many of the high skill jobs, employers in the United States have increasingly used the H-1B visa program to import already trained high-skill workers from other countries. Kirk Doran et al., *The Effects of High-Skilled Immigration Policy on Firms: Evidence from H-1B Visa Lotteries* 29 (Nat’l Bureau of Econ. Research, Working Paper No. 20668, 2014).

¹⁴⁰ Autor, *Polanyi’s Paradox*, *supra* note 135, at 12. Economists have also argued that the new information technology fosters higher relative payments to innovators and managers, and lower relative payments to labor, because it allows the replication of innovations on a massive scale, converting many markets from ordinary markets into ones in which compensation for a few “superstars” dominates. BRYNJOLFSSON & MCAFEE, *supra* note 137, at 42–44.

¹⁴¹ Dau-Schmidt, *supra* note 6, at 1592.

¹⁴² *Id.* at 1594, 1603.

China.¹⁴³ Indeed, as the pace of innovation in information technology quickens, it seems certain that the largest changes are yet to come. Both the hardware and software components of information technology have been improving exponentially.¹⁴⁴ New driverless cars are poised to displace hundreds of thousands of taxi drivers and truck drivers within the next decade or two.¹⁴⁵ Frey and Osbourne have estimated that 45% of America's occupations comprising 47% of the workforce will be automated within the next twenty years, including jobs in transportation, logistics, production labor, administrative support, various sales and service clerks, and construction.¹⁴⁶ Moreover, advances in artificial intelligence suggest that we may be building computers that are "smarter" than the average human as soon as 2029.¹⁴⁷ Once computers are "smarter" than humans, who knows what sort of improvements in information technology these machines might develop?¹⁴⁸ There is already evidence that information technology has shifted the division of profits in favor of capital and against labor.¹⁴⁹ Could artificial intelligence herald a fundamental change in the production relationship between capital and labor in which capital increasingly relies less and less on labor and perhaps comes not to need labor at all?¹⁵⁰

Generally, economists are fairly tempered in their predictions regarding the impact of information technology on future employment. Economists acknowledge that technological change is not necessarily a Pareto improvement; there will be winners and losers.¹⁵¹ There is good empirical evidence that information technology has made the distribu-

¹⁴³ See, e.g., Steven Millward, *Foxconn Axes 60,000 Jobs in One Chinese Factory as Robots Take Over*, TECH IN ASIA (May 25, 2016), <https://www.techinasia.com/foxconn-robots-china-job-losses> [<http://perma.cc/BX97-66KY>].

¹⁴⁴ BRYNJOLFSSON & MCAFEE, *supra* note 137, at 17–20. Following "Moore's law" the number of transistors in a minimum-cost integrated circuit has been doubling every twelve to eighteen months since about 1965 and there is no end to the process in sight. The efficiency of software algorithms has grown at an even faster exponential rate. *Id.*

¹⁴⁵ *Id.* at 14; Chunka Mui, *Driverless Car Ripple Effects – As Far as the Eye Can See (Part 2)*, FORBES (Jan. 24, 2013), <http://www.forbes.com/sites/chunkamui/2013/01/24/googles-trillion-dollar-driverless-car-part-2-the-ripple-effects/> [<https://perma.cc/HTM3-BZFK>].

¹⁴⁶ Carl Benedikt Frey & Michael A. Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerisation?* 37–38 (Sept. 17, 2013) (unpublished manuscript), http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf [<https://perma.cc/AZ3F-HB SK>].

¹⁴⁷ MARTIN FORD, *THE LIGHTS IN THE TUNNEL: AUTOMATION, ACCELERATING TECHNOLOGY AND THE ECONOMY OF THE FUTURE* 100–01 (2009).

¹⁴⁸ See, e.g., *The Matrix* (Warner Bros. 1999).

¹⁴⁹ Dau-Schmidt, *supra* note 6, at 1596–97.

¹⁵⁰ Jeffrey D. Sachs & Laurence J. Kotlikoff, *Smart Machines and Long-Term Misery* 2–3 (Nat'l Bureau of Econ. Research, Working Paper No. 18629, 2012).

¹⁵¹ *Id.* at 8–9; see also BRYNJOLFSSON & MCAFEE, *supra* note 137, at 38–39.

tion of income and wealth less equal in our society by increasing rewards to capital and high-skilled workers and lowering rewards for middle- and low-skilled workers.¹⁵² Some have argued that this increased inequality may sap aggregate demand for goods and services and thus lessen the vitality of our economy.¹⁵³ As to whether information technology will result in the permanent displacement of large sectors of the workforce, economists generally argue that we should resist the “lump labor fallacy” that labor demand in the economy is a fixed amount that decreases when jobs are automated.¹⁵⁴ Although some workers will lose their jobs to computers, just as some lost their jobs to steam, electricity, and the assembly line, in the long-run the workers will find other jobs producing goods and services where their work is needed.¹⁵⁵ Technological displacements may be hard for individual workers, and transition to other work may require retraining, but economists argue that people will find useful work to do. According to “Polanyi’s Paradox,” there are always some tasks—creativity, flexibility, common sense—at which humans will have an advantage over computers. This is because people’s tacit knowledge of how to perform the task is greater than their express knowledge of how to perform the task, and thus people will never be able to reduce how to do the task to a computer program.¹⁵⁶

The “technologists” who have speculated on the future impact of information technology on human work are much less sanguine, arguing that the technology portends enormous changes in the allocation of the rewards in our economy and the demand for human labor.¹⁵⁷ Distinguished physicist Stephen Hawking has speculated that “[t]he development of full artificial intelligence could spell the end of the human

¹⁵² A large body of empirical evidence across countries confirms that adoption of the new information technology produces “job polarization,” in that the jobs that disappear are disproportionately middle-skill/middle-pay jobs while the types of jobs that continue to grow are low-skill/low-pay and high-skill/high-pay jobs. Autor, *Polanyi’s Paradox*, *supra* note 135, at 10; *see also* BRYNJOLFSSON & MCAFEE, *supra* note 137, at 50.

¹⁵³ *See* Joseph E. Stiglitz, *Of the 1%, by the 1%, for the 1%*, VANITY FAIR (Mar. 31, 2011), <http://www.vanityfair.com/society/features/2011/05/top-one-percent-201105> [<http://perma.cc/4S8Z-RW6T>]; *see also* BRYNJOLFSSON & MCAFEE, *supra* note 137, at 47–48.

¹⁵⁴ *See* Dau-Schmidt, *supra* note 6, at 1605.

¹⁵⁵ Autor, *Polanyi’s Paradox*, *supra* note 135, at 38.

¹⁵⁶ *Id.* at 8. People’s tacit knowledge in solving a problem or performing a task is always greater than their explicit knowledge, and this tacit knowledge cannot be reduced to a computer program. *Id.* at 1. An economist who is exceptionally negative about the future of work for most people in the Information Age is Tyler Cowen. *See generally* TYLER COWEN, *AVERAGE IS OVER: POWERING AMERICA BEYOND THE AGE OF THE GREAT STAGNATION* (2013).

¹⁵⁷ FORD, *supra* note 147, at 4–6 (2009).

race.”¹⁵⁸ Microsoft founder Bill Gates has identified artificial intelligence as perhaps “our biggest existential threat” and stated that he cannot “understand why some people are not concerned.”¹⁵⁹ SpaceX CEO Elon Musk likened building computers with artificial intelligence to “summoning the demon.”¹⁶⁰ Technologists argue that the nature of information technology is different from that of previous technologies in that properly programmed computers can use their enormous storage, retrieval, and computational skills to produce “artificial intelligence,” which allows them to perform, or learn to perform, many of the “abstract tasks” that have previously eluded them and been reserved for humans.¹⁶¹ At the very least, technologists argue that the ever increasing rate of technological change will shorten the useful work life of many employees who cannot keep pace with this change.¹⁶² They argue that computers’ ability to replace humans may usher in a new relationship between capital and labor, in which labor is superfluous to many production processes. Some technologists foresee a time when only a small sector of the population needs to work, requiring us to rethink our work-based economy and social structure.¹⁶³

We do not have to resolve the debate between the economists and the technologists to know that information technology has, and will, lead to enormous changes in the employment relationship. Information technology has already changed the way we undertake production, displaced scores of employees, created scores of jobs, and made many employees more productive. Even if computers never succeed in replacing human intelligence, it seems certain that it will become harder for humans to adapt to this technology, increasing displacement, retraining costs, and shortening useful work lives. At the margins, it seems likely that this technology will greatly improve the productivity of some people in our society, but also increase the proportion of our society who

¹⁵⁸ Rory Cellan-Jones, *Stephen Hawking Warns Artificial Intelligence Could End Mankind*, BBC (Dec. 2, 2014), <http://www.bbc.com/news/technology-30290540> [http://perma.cc/KW66-H7YC].

¹⁵⁹ Peter Holley, *Bill Gates on Dangers of Artificial Intelligence: I Don’t Understand Why Some People Are Not Concerned*, WASH. POST (Jan. 29, 2015), <https://www.washingtonpost.com/news/the-switch/wp/2015/01/28/bill-gates-on-dangers-of-artificial-intelligence-dont-understand-why-so-me-people-are-not-concerned/> [http://perma.cc/B9DV-4B76].

¹⁶⁰ Matt McFarland, *Elon Musk: With Artificial Intelligence We Are Summoning the Demon.*, WASH. POST (Oct. 24, 2014), <https://www.washingtonpost.com/news/innovations/wp/2014/10/24/elon-musk-with-artificial-intelligence-we-are-summoning-the-demon/> [http://perma.cc/6PUK-47J6].

¹⁶¹ See FORD, *supra* note 147, at 97–100.

¹⁶² BRYNJOLFSSON & MCAFEE, *supra* note 136, at 9–11; FORD, *supra* note 147, at 99–100; RAY KURZWEIL, *THE AGE OF SPIRITUAL MACHINES: WHEN COMPUTERS EXCEED HUMAN INTELLIGENCE* 180–82 (2000).

¹⁶³ FORD, *supra* note 147, at 100–03.

have trouble making enough money to support themselves, educate their children, and provide for their own retirement. Because of the decline in work prospects, pay, benefits, and effective work life for many employees, there will be no shortage of needs among these workers in the new economy. They will need: subsidized education and retraining that allows them to work as complements to information technology, health insurance to cover the health costs that are too large for an individual to bear, income insurance to see them through periods of dislocation and retraining, perhaps a subsidized pension to maintain them after their useful work lives are over, and perhaps even a guaranteed minimum income.¹⁶⁴ Due to the decline in workers' bargaining power, these needs will most likely have to be addressed by future legislatures.

D. The Impact of IT on the Relevant Labor Market: The Global Economy

Since the 1980s, the global economy has prospered from information technology, cheaper shipping methods, and favorable trade agreements. Information technology and container shipping technology have allowed employers to coordinate production among various plants, suppliers, and subcontractors around the world.¹⁶⁵ Free trade agreements that eliminated tariffs and protected companies' intellectual property rights allowed companies to manufacture and subcontract overseas with less fear of losing competitive advantages from research and development.¹⁶⁶ Information technology also facilitated the rise of Walmart and other "big box" retailers to a position of worldwide economic power. The bar code allowed these stores to act as the retail arm for manufacturers around the globe by facilitating inventory control and the coordination of product supply world-wide.¹⁶⁷ The globalization of the economy has thrown American workers into competition with low-wage workers across the globe, almost doubling the relevant global labor force from 3.3 billion to 6 billion in just a few years, while providing little increase in relevant capital.¹⁶⁸

¹⁶⁴ Dau-Schmidt, *supra* note 6, at 1607–08; *see generally* BASIC INCOME: AN ANTHOLOGY OF CONTEMPORARY RESEARCH (Karl Widerquist et al., eds., Wiley-Blackwell 2013).

¹⁶⁵ Dau-Schmidt, *supra* note 6, at 1594.

¹⁶⁶ Baldwin & Lopez-Gonzalez, *supra* note 54, at 3; *see also* David H. Autor et al., *The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade* 6–8 (Nat'l Bureau of Econ. Research, Working Paper No. 21906, 2016).

¹⁶⁷ Kenneth G. Dau-Schmidt, *The Changing Face of Collective Representation: The Future of Collective Bargaining*, 82 CHL-KENT L. REV. 903, 914 (2007).

¹⁶⁸ RICHARD B. FREEMAN, AMERICA WORKS: THE EXCEPTIONAL U.S. LABOR MARKET 128–40 (2007).

American workers have not fared well in the global economy of the information age. The mass expansion of the relevant labor market has put constant downward pressure on wages and benefits in developed countries and made it much harder for unions to deliver on bargaining demands.¹⁶⁹ At the same time, payments to capital in developed countries increased.¹⁷⁰ As a result, since 1980 the share of non-farm domestic product going to non-supervisory employees in the form of wages and benefits in the United States has declined from 35% to 27%, and payments to management and capital have seen a corresponding increase.¹⁷¹ Even simple international trade models predict that when high-wage, high-capital countries trade with low-wage, low-capital countries, the result will be decreased wages in the high-wage country and increased payments for capital, which is now in greater demand.¹⁷² These trade models predict that over time, workers displaced by foreign trade will retrain and transition to new jobs, and the balance of trade between the trading countries will equalize.¹⁷³ However, at least with respect to trade with low-wage developing countries, in particular China, these transitions have proven much slower and more costly than originally expected.¹⁷⁴ Between 1999 and 2011, it is estimated that the United States lost 2.4 million jobs due to trade with China, and saw no real countervailing job gains.¹⁷⁵ These job losses were concentrated primarily in Midwestern and Southeastern manufacturing, and for the affected workers resulted in substantial periods of unemployment, a loss of value in firm and industry specific human capital, and substantial wage losses.¹⁷⁶ America's trade deficit with China shows no signs that it will right itself, and this deficit retards job growth in the United States.¹⁷⁷ Although it is clear that international trade with low-wage countries results in a redistribution of income and wealth from American workers to American management and capital, the adjustment

¹⁶⁹ Dau-Schmidt, *supra* note 167, at 917–18.

¹⁷⁰ *Id.* at 920.

¹⁷¹ Kenneth G. Dau-Schmidt, *Promoting Employee Voice in the American Economy: A Call for Comprehensive Reform*, 94 MARQ. L. REV. 765, 794–795, fig.1 (2011).

¹⁷² This is the easy prediction of even a simple model of international trade. See ROBERT C. FEENSTRA, *ADVANCED INTERNATIONAL TRADE: THEORY AND EVIDENCE* 31–63 (2004); Doru Tsaganeeva, *Effects of US Trade with Low Wage Countries on US Wages: An Analysis Based on the Heckscher-Ohlin Model 15* (2014) (unpublished manuscript), <http://web.isanet.org/Web/Conferences/FLACSO-ISA%20BuenosAires%202014/Archive/3409d03b-d8c7-4487-af1c-3f37c7830cdc.pdf> [<https://perma.cc/L8AU-LZBG>].

¹⁷³ Autor et al., *supra* note 166, at 12.

¹⁷⁴ *Id.* at 3–4.

¹⁷⁵ *Id.* at 29.

¹⁷⁶ *Id.* at 23, 31.

¹⁷⁷ *Id.* at 30.

costs of this trade have proven far larger than anticipated and it is not yet clear that the benefits of that trade exceed these costs.¹⁷⁸

The globalization of the economy raises many larger employment policy questions. Although it has raised workers' wages in developing countries, the globalization of the economy has undermined workers' wages and benefits in the United States, increasing inequality in income and wealth.¹⁷⁹ Rising income inequality in the United States has been associated with declining economic vigor as workers have less money to spend and contribute to aggregate demand.¹⁸⁰ Increased income inequality has also been associated with undermining the performance of our democracy in meeting the needs of a broad array of the American people.¹⁸¹ At the very least, it has raised the issue of how to train and retrain workers so that they can compete for high-wage jobs in the global economy, and how to get companies and wealthy people who benefit disproportionately from international trade to help pay for this training.¹⁸²

The impact of globalization also raises serious concerns about the continued viability of our employer-provided benefit system, since employers who compete in a global economy cannot compete with companies in countries where healthcare and a larger portion of pensions are paid for through payroll and general tax revenues.¹⁸³ Merely allowing the risks of paying for healthcare and retirement to devolve onto individual workers will result in a much less efficient system in which the inability or failure of individual workers to insure for these risks will be

¹⁷⁸ As Autor et al. state, "[U.S.] [l]abor-market adjustment to trade shocks is stunningly slow, with local labor-force participation rates remaining depressed and local unemployment rates remaining elevated for a full decade or more after a shock commences. . . . The mobility costs that rationalize slow adjustment imply that short-run trade gains may be much smaller than long-run gains and that spatial heterogeneity in the magnitudes of the net benefits may be much greater than previously thought. Using a quantitative theoretical model, Caliendo, Dvorkin, and Parro (2015) find that in the immediate aftermath of a trade shock, constructed to mimic the effects of growth in U.S. imports from China, U.S. net welfare gains are close to zero. The ultimate and sizable net gains are realized only once workers are able to reallocate across regions in order to move from declining to expanding industries." Autor et al., *supra* note 166, at 38 (citing Lorenzo Caliendo et al., *The Impact of Trade on Labor Market Dynamics* (Nat'l Bureau of Econ. Research, Working Paper No. 21149, 2015)).

¹⁷⁹ See Laura Carvalho & Armon Rezai, *Personal Income Inequality and Aggregate Demand*, 40 CAMBRIDGE J. ECON. 491, 493, 501 (2016).

¹⁸⁰ *Id.*

¹⁸¹ Task Force on Inequality & American Democracy, Am. Political Sci. Ass'n, *American Democracy in an Age of Rising Inequality*, 2 PERSP. ON POL. 651, 655 (2004); see also John Ferejohn, *Is Inequality a Threat to Democracy?*, in THE UNSUSTAINABLE AMERICAN STATE (Lawrence Jacobs & Desmond King eds., 2009); Edward N. Muller, *Democracy, Economic Development, and Income Inequality*, 53 AM. SOC. REV. 50 (1988).

¹⁸² See Dau-Schmidt, *supra* note 6, at 1607.

¹⁸³ *Id.* at 1607–08.

externalized onto taxpayers through less efficient welfare programs. The globalization of the economy has already put in jeopardy the continued vitality of the American labor movement as American union density has declined from 22.3% of wage and salary workers in 1980, to 11.1% in 2015.¹⁸⁴ Unless the labor movement can develop the ability to organize workers internationally, sometimes in countries where collective bargaining is effectively prohibited, the labor movement will remain a diminished force for worker bargaining and political power surviving only in services and other jobs insulated from international competition.

Finally, the globalization of the economy has undermined the power of the nation state to effectively regulate the employment relationship, even when that regulation is clearly efficient or wealth maximizing. As long as trading partners allow employers to minimize costs, perhaps even by imposing externalities of hazards or pollution on workers or the general population, employers will have incentive to move jobs to those countries.¹⁸⁵ How to address this problem through international treaties or the extra-territorial application of law will be an increasingly important issue in this new age.

III. CONCLUSION

Information technology has transformed every aspect of the employment relationship. It has changed how we look for employees and jobs, how we organize production, and the skills that are demanded for work in the globalized economy. It is now possible to solicit and select employees online from around the world to perform work online that is managed and paid according to a computer algorithm. Although certainly not all jobs have been so affected, perhaps no job in developed countries in the twenty-first century has been left unaffected by information technology. Information technology poses many new and exciting possibilities. It can make it possible to work at home while caring for a child, teleconference with people in distant lands, free ourselves from many rote and tiresome tasks, increase productivity for many professions, and undertake new jobs supporting or organized through the new technology. However, it has also created many problems: some workers suffer disadvantages in accessing the technology or cracking

¹⁸⁴ GERALD MAYER, CONG. RESEARCH SERV., RL32553, UNION MEMBERSHIP TRENDS IN THE UNITED STATES, 22 app. A, tbl.A1 (2004); U.S. DEPT' OF LABOR, BUREAU OF LABOR STATISTICS, UNION MEMBERS SUMMARY, tbl.1 (2016).

¹⁸⁵ Kenneth G. Dau-Schmidt, *Meeting the Demands of Workers into the Twenty-First Century: The Future of Labor and Employment Law*, 68 IND. L.J. 685, 697 (1993).

the network of relationships that employer hiring algorithms reward; some suffer invasions of privacy as employers do background checks or monitor production; some have trouble escaping work to have time with family and friends; some have suffered declines in wages and benefits, or unemployment as jobs have been automated, subcontracted, or outsourced overseas; and some have found their collective voice in the workplace replaced by a market mechanism that gives exit as the only recourse to job dissatisfaction. As the pace of development of information technology continues to quicken, one is left merely to speculate on the further changes in the employment relationship yet to come.

This transformation of the employment relationship raises a host of legal issues. Central among these concerns is the issue of whether many of the people whose work is contracted for and organized through the new information technology are “employees” covered by our web of protective legislation, and if so, who is the “employer” responsible for ensuring compliance with these laws. The inadequacy of our current laws and doctrines on the matter encourages employers to organize the relationship in ways that avoid coverage, leaving the purposes of these acts unfulfilled, and leaving traditional employers who fulfill their responsibilities at a competitive disadvantage. I argue we should reform our laws and doctrines to discourage such regulatory arbitrage and to promote the efficient enforcement of our laws by placing responsibility on the cheapest cost avoider. In addition to this vital question, the transformation of the employment relationship wrought by information technology raises a host of other legal questions, including employee privacy in background checks and monitoring, discrimination via computer algorithm, the separation of work and leisure for purposes of our minimum wage laws, and the exercise of the right to organize and collectively bargaining in cyberspace. But even beyond these questions under current law, the transformation of the employment relationship raises a host of policy concerns, including how to provide the training and retraining necessary for employees of the information age, how to provide healthcare for workers and their families, how to provide pensions so that the workers can maintain themselves in their old age, how to encourage the retention and development of high paying jobs, and how to ensure the power of the state to establish minimum standards for employment in a global economy. These are the employment-related questions that we must confront in the information age.