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# Crowd-Based Capitalism, Digital Automation, and the Future of Work

Arun Sundararajan<sup>†</sup>

## ABSTRACT

*The confluence of two digital forces—a shift towards platform-mediated peer-to-peer exchange, and a rise in the cognitive capabilities of artificial intelligence and robotics technologies—will dramatically reshape tomorrow’s workplace by making it difficult for a growing fraction of the population to earn a living as a provider of labor and talent. I contend that the emerging economic model of crowd-based capitalism could offer an alternative to the traditional employer-employee relationship. I discuss the factors that have led to the recent advent of crowd-based capitalism, arguing that the model becomes increasingly attractive as digital technologies blur the boundaries between institutions of differing scale that have historically facilitated the provision of trust and the use of intellectual capital. Facilitating this transition will require policy that favors the redistribution of capital rather than of income. Governments must cede a significant fraction of their regulatory responsibility to platforms and other self-regulatory bodies, while catalyzing the emergence of new educational infrastructure and providing incentives that favor platform models that decentralize the ownership of structural capital over those whose providers are simply sources of on-demand labor. These policy prescriptions are a politically feasible path towards the redistribution of capital ownership and in contrast with other proposed radical interventions like a universal basic income.*

## I. INTRODUCTION

Over the last decade, new digital platforms have enabled ways of organizing economic activity that shift much of what was traditionally accomplished by full-time workers within an organization to a distributed crowd of individual entrepreneurs and on-demand workers. This shift creates an economy that relies more extensively on short-term freelance relationships as opposed to full-time employment. Simultaneously, parallel improvements in the capabilities of artificial intelligence (AI) and robotics-enabled technologies threaten to automate many of

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the cognitive and physical tasks that comprise today's human work. Predictions of "a world without work"<sup>1</sup> have led many to believe that drastic solutions like a universal basic income—guaranteed monetary transfers from the government to the individual each month—are essential to counter the specter of social unrest projected to result from widespread unemployment.

While history suggests that the threat of technological unemployment is always overstated, today's ongoing structural changes in how work is organized increase the rate at which capital can be substituted for human labor, requiring work arrangements to shift away from the status quo. In this Essay, I argue that we must plan a future of "crowd-based capitalism" in which a majority of the workforce shifts away from holding a full-time job as a talent or labor provider, and instead runs a individual business, one that perhaps uses a mix of labor and talent inputs from themselves and from others. This will allow millions of newly minted owners to capture a tiny slice of the economy's capital. Digital technologies reshape the institutions that provide commercial trust and the institutions that are repositories of an economy's structural intellectual capital, and blur the boundaries between these institutions. These institutional changes are what make this potential decentralization of capital feasible.

Such a shift will challenge many facets of the social contract. A new approach to business regulation that divides responsibility for intervention between government agencies and non-governmental organizations is necessary. Some of this division has already happened, *de facto*, over the last decade, and I provide a set of heuristics that can help draw the right lines. The transition to crowd-based capitalism should also be accompanied by a shift in the focus of higher education, away from two- or four-year post-secondary colleges that educate early in life, and towards continuing education and mid-career transitions. A significant new government intervention like the Morrill Land-Grant Act of 1862<sup>2</sup> which spawned over 100 land-grant universities that still exist today (and that include some of the country's top educational institutions like Cornell, MIT, Ohio State University and the University of Minnesota), might facilitate the emergence of new educational institutions that may otherwise be underprovided by the market. Societies may also benefit from rethinking the emphasis placed on STEM subjects in middle and high school. Our social safety net, constructed and funded in many

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<sup>1</sup> See, e.g., Derek Thompson, *A World Without Work*, ATLANTIC (July 2015), <https://www.theatlantic.com/magazine/archive/2015/07/world-without-work/395294/> [<https://perma.cc/YQ7F-CRRH>].

<sup>2</sup> 7 U.S.C. §§ 301–309 (2012).

countries with the assumption of full-time employment rather than entrepreneurship, must be fundamentally re-conceptualized.

## II. WHAT IS CROWD-BASED CAPITALISM?

As I studied the “sharing economy” between 2011 and 2015, a frequent conversation at conferences and in the popular press was about what set of activities, business models or economic systems this term actually encompassed,<sup>3</sup> and whether it was in fact an appropriate label for commercial on-demand businesses like Uber and labor markets like Upwork whose connection to “sharing” seemed tenuous at best. As I explain in my 2016 book, “[a]lthough I find ‘crowd-based capitalism’ most precisely descriptive of the subject matter I cover, I continue to use ‘sharing economy’ as I write this book because it maximizes the number of people who seem to get what I’m talking about.”<sup>4</sup>

The central distinguishing feature of the “crowd-based capitalism” I refer to is a shift in the primary institutions that organize economic activity, away from the quintessential twentieth century managerial hierarchy, and towards new hybrids between the firm and the market. The “visible hand” of Alfred Chandler<sup>5</sup> remains, but its role changes. Many of the economic activities traditionally performed by large hierarchical organizations that employ full-time workers are instead delegated to a distributed and heterogeneous crowd of producers of varying size, independence, and capability.

Let me illustrate the idea of crowd-based capitalism with some examples. Consider the effects that video entertainment platforms like YouTube have had over the last fifteen years. In the 1970s and 1980s,

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<sup>3</sup> For a useful summary of the ambiguity surrounding the term in 2013, see Rachel Botsman, *The Sharing Economy Lacks a Shared Definition*, FAST COMPANY (Nov. 21, 2013), <https://www.fastcompany.com/3022028/the-sharing-economy-lacks-a-shared-definition> [<https://perma.cc/AJ8C-HD78>]; see also Kenneth Olmstead & Aaron Smith, *How Americans Define the Sharing Economy*, PEW RESEARCH CENTER FACT TANK (May 20, 2016), <http://www.pewresearch.org/fact-tank/2016/05/20/how-americans-define-the-sharing-economy/> [<https://perma.cc/6UE9-PEU8>] (highlighting the diversity of perceptions that Americans associate with the term, ranging from charity and socialism to asset rental marketplaces).

<sup>4</sup> ARUN SUNDARARAJAN, *THE SHARING ECONOMY: THE END OF EMPLOYMENT AND THE RISE OF CROWD-BASED CAPITALISM* 27 (2016).

<sup>5</sup> In his 1977 book *The Visible Hand*, Alfred Chandler traces the evolution of the US economy from the early 1800s through the late twentieth century, from what was largely a market economy through a steady transition to hierarchies of increasing complexity as a consequence of a series of technological changes spanning 200 years: the creation of plantations, the emergence of textile mills, the use of armories, the railroad and the telegraph, the ascent of mass distribution, of mass production and the emergence of the modern corporation through the integration of mass production and mass distribution, leading up to the dominance of modern managerial hierarchies through the twentieth century. See generally ALFRED D. CHANDLER, JR., *THE VISIBLE HAND: THE MANAGERIAL REVOLUTION IN AMERICAN BUSINESS* (1977).

most television content in the United States was created by large television or motion picture studios; this content was then distributed to consumers via television stations that were owned by or affiliated with one of the “Big Three” networks: NBC, CBS, or ABC.<sup>6</sup> Thus, both content production and content distribution were done by what one might consider traditional hierarchies.

Contrast this with the production and distribution model of a service like YouTube, currently owned by Alphabet (formerly Google). The YouTube platform centralizes the aggregation of demand, provides search and discovery capabilities, and performs some content filtering. The demand aggregation and content distribution activities are thus still handled by a traditional hierarchical organization. Content production, by contrast, is done by a distributed and varied “crowd.” Some content comes from large studios, traditional entertainment firms that also produce music videos and internet-customized programming. However, there are also millions of independent and semi-professional producers who create media “microbusinesses” that generate revenue from the advertising shown to users who view their content. Some of these producers boast tens of millions of subscribers and earn millions of dollars in annual revenue,<sup>7</sup> like Lilly Singh (comedy sketches and music videos, \$7.5 million in 2016) and Rosanna Pansino (unconventional baking ideas, \$6 million in 2016). Numerous others cater to a niche audience and generate more modest incomes. For example, Tim Wood, who creates content related to ghost hunts and paranormal activity, generated about \$6000 in monthly revenue in 2016.<sup>8</sup> Still millions of other YouTube content creators are amateurs who simply post content for fun.

Contrary to what one might believe, YouTube is no longer on the fringes of video entertainment. It boasts over 1 billion monthly active users, a number far greater than the viewer base of any television network.<sup>9</sup> A good leading indicator of the impending shift in US video advertising revenues away from television and towards YouTube over the

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<sup>6</sup> See generally CHRISTOPHER H. STERLING & JOHN M. KITROSS, *STAY TUNED: A CONCISE HISTORY OF AMERICAN BROADCASTING* (1978).

<sup>7</sup> Nathan McAlone, *Meet the YouTube Millionaires: These are the Highest-Paid YouTube Stars of 2016*, BUS. INSIDER (Dec. 9, 2016), <http://www.businessinsider.com/youtube-stars-who-make-the-most-money-in-2016-2016-12> [<https://perma.cc/YKM8-GGKU>].

<sup>8</sup> Sapna Maheshwari, *Candid, Comedic, and Macabre YouTube Stars Feel an Advertising Pinch*, N.Y. TIMES (May 7, 2017), <https://www.nytimes.com/2017/05/07/business/media/youtube-stars-feel-advertising-pinch.html> [<https://perma.cc/73ZM-RKS8>].

<sup>9</sup> For an interesting early analysis of the potential of crowd-based systems in this industry, see CLAY SHIRKY, *HERE COMES EVERYBODY: THE POWER OF ORGANIZING WITHOUT ORGANIZATIONS* (2008).

coming decade comes from China: in 2016, Chinese digital video advertising revenue was over 20% of total advertising spending on video (digital and television), a fraction that is projected to rise to over 50% by 2021.<sup>10</sup>

A different example of crowd-based capitalism comes from the business of providing short-term accommodation. By many measures, the platform Airbnb may already, in early 2017, be the world's single largest provider of short-term accommodation.<sup>11</sup> A typical commercial hotel (whether owned by a franchisee or directly by a parent brand like Marriott Starwood) functions like a traditional twentieth century organization: it employs professionally-trained workers and managers full-time, invests in real estate dedicated to the provision of short-term accommodation, and receives some assistance from the parent company to attract demand, set standards, and maintain customer loyalty. Analogously, in the crowd-based version of the short-term accommodation business, Airbnb is not a mere marketplace that aggregates and helps match supply and demand. Rather, it provides the reassurance that comes with a global brand, employs over 600 people in its trust and safety team as of 2017<sup>12</sup>, while also setting and enforcing some standards (almost like a next-generation franchising operation). However, the productive role of the individual shifts from salaried worker to small business owner, responsible for the actual running of the tiny enterprise that eventually provides the short-term accommodation. The pricing, inventory management, positioning, merchandizing, and customer interaction is done by the millions of Airbnb hosts who are concurrently building their own micro-brands on Airbnb's online reputation systems.

Put differently, a feature that the Airbnb platform model shares with the YouTube platform model is the potential creation of *genuinely decentralized capital ownership*. Both Airbnb hosts and YouTube content creators are closer to running a microbusiness than providing labor for a commission or salary. They are (very) small business owners, in

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<sup>10</sup> *China's Video Ad Spend Forecast to Overtake TV by 2021*, EMARKETER, <http://totalaccess.emarketer.com/article.aspx?r=1016452> (last visited on Nov. 13, 2017).

<sup>11</sup> On December 31st, 2016, over 2 million people were staying in an Airbnb. The platform also reports having over 4 million listings, although the occupancy of a listing is typically a lot lower than the occupancy of a hotel room. Alison Griswold, *This New Year's, Airbnb Got the Hockey-Stick Growth That Every Startup Envious*, QUARTZ (Jan. 3, 2017), <https://qz.com/877080/airbnbs-growth-in-guests-on-new-years-is-the-hockey-stick-curve-that-every-startup-wants/> [<https://perma.cc/C6XL-TGJ8>]. The world's largest hotel chain, Marriott-Starwood, has an inventory of 1.1 million rooms. *Marriott International Completes Acquisition of Starwood Hotels & Resorts Worldwide, Creating World's Largest and Best Hotel Company While Providing Unparalleled Guest Experience*, MARRIOTT (Sept. 9, 2016), <http://news.marriott.com/2016/09/marriotts-acquisition-of-starwood-complete/> [<https://perma.cc/NB6C-3DJ4>].

<sup>12</sup> Conversation with Nick Shapiro, Global Head of Trust and Safety, Airbnb (Aug. 24, 2017).

contrast with providers on a labor platform like Amazon's Mechanical Turk, where the transaction is very clearly one of exchanging labor for money.

This distinction between capital owner and labor provider is a critical one. As I explain in what follows, structural changes in how economic activity is organized coupled with accelerating automation will make it increasingly infeasible for a nation's workforce to make a living as providers of labor and talent, whether as full-time employees or as on-demand contractors. Avoiding mass unemployment or underemployment and the need for massive new government welfare programs requires us to reimagine the role of the individual in the productive activities of an economy.

### III. DIGITAL AUTOMATION AND NON-EMPLOYMENT WORK ARRANGEMENTS

Fears of widespread technological unemployment are hardly new. The Luddite rebellions, labor riots between 1811 and 1816 in the five central manufacturing counties of England, saw British textile workers destroying weaving machinery they believed were replacing their role in production.<sup>13</sup> Similar apprehensions were voiced by a 1960s presidential commission on technology, automation and economic progress: "The fear has even been expressed by some that technological change would in the near future not only cause increasing unemployment, but that eventually it would eliminate all but a few jobs, with the major portion of what we now call work being performed automatically by machine."<sup>14</sup>

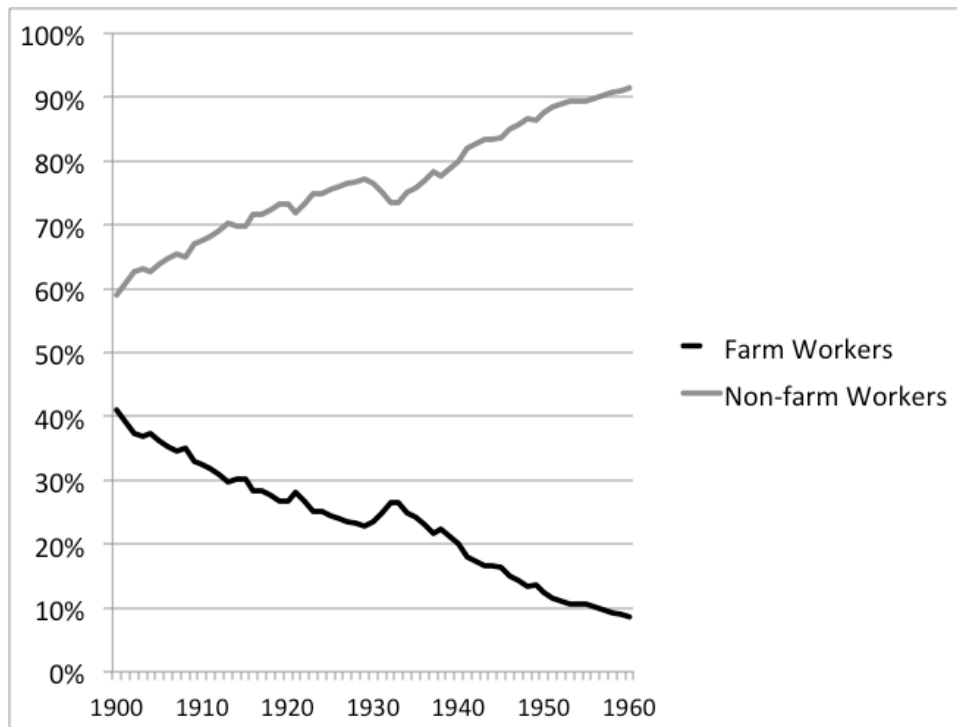
There is no denying that technological progress leads to radical changes in the demand for certain types of human labor. Perhaps the most significant shift of this kind in the United States took place during the twentieth century, as the fraction of the workforce earning a living as farm laborers dropped from over 40% in 1900 to under 2% in 2000.<sup>15</sup> These changes were most dramatic in the first half of the century, as illustrated in Figure 1.

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<sup>13</sup> See NICOLS FOX, *AGAINST THE MACHINE: THE HIDDEN LUDDITE TRADITION IN LITERATURE, ART, AND INDIVIDUAL LIVES* 24–25 (2002). As discussed in this book, the rebellions were not the first act of resistance by the workers, but followed failed attempts at collective bargaining.

<sup>14</sup> U.S. DEPT. OF HEALTH, EDUCATION & WELFARE OFFICE OF EDUCATION, *TECHNOLOGY AND THE AMERICAN ECONOMY*, (Feb. 1966), <http://files.eric.ed.gov/fulltext/ED023803.pdf> [<https://perma.cc/56D4-Z5LK>].

<sup>15</sup> See David H. Autor, *Why Are There Still So Many Jobs? The History and Future of Workplace Automation*, 29 *J. ECON. PERSPECTIVES* 3, 5 (2015).



**Figure 1: Farm and non-farm employment in the United States, 1900–1960**

A more recent casualty of workplace automation is manufacturing employment in the United States. After peaking at close to 20 million jobs in the late 1970s, it has fallen sharply, from 22% of nonfarm payroll employment in 1977 to less than 10% of it in 2016,<sup>16</sup> with a vast majority of the job losses over the last decade attributable to factory robots rather than offshoring.<sup>17</sup> This trend may be especially ominous for China, where urban manufacturing employment, a massive 80 million in 2014,<sup>18</sup> is bound to drop quite steeply in the coming decades.

<sup>16</sup> U.S. DEPT OF LABOR, BUREAU OF LABOR STATISTICS, THE EMPLOYMENT SITUATION: AUGUST 2017 (Sept. 1, 2017), <https://www.bls.gov/news.release/pdf/empisit.pdf> [<https://perma.cc/MT4R-GJEY>].

<sup>17</sup> See MICHAEL J. HICKS & SRIKANT DEVARAJ, THE MYTH AND THE REALITY OF MANUFACTURING IN AMERICA 6 (June 2015), <http://projects.cberdata.org/reports/MfgReality.pdf> [<https://perma.cc/BG3P-ZG9D>] (arguing that 87.8% of manufacturing job losses in the US between 2000 and 2010 can be attributed to automation rather than offshoring); see also David H. Autor, David Dorn & Gordon H. Hansen, *The China Shock: Learning From Labor Market Adjustment to Large Changes* (National Bureau of Economic Research Working Paper No. 21906, 2016), <http://www.nber.org/papers/w21906.pdf> [<https://perma.cc/W2PP-37XE>].

<sup>18</sup> Nicholas R. Lardy, *Manufacturing Employment in China* (Dec. 21, 2015), <https://piie.com/blogs/realtime-economic-issues-watch/manufacturing-employment-china> [<https://perma.cc/FLN5-54G5>].



Even in the U.S. economy, which has enjoyed low levels of unemployment despite farming and manufacturing falling to a relatively small fraction of total employment, the more menacing automation threat comes from the “second machine age” predicted by Erik Brynjolfsson and Andrew McAfee, wherein technologies start to perform the cognitive tasks that used to be the exclusive domain of humans.<sup>19</sup> There are a number of recent early examples of this expansion in the capabilities of such automating “machines.” IBM’s Watson technology promises AI-powered solutions for financial compliance, medical diagnostics, and legal services. Self-checkout counters are available at a growing number of retail stores. Self-driving automobile technologies seem poised to threaten tens of millions of trucking jobs globally.

If machines transcend automating physical labor and start to challenge the demand for human cognitive capabilities as well, one may wonder what will be left for us humans to do. A glance at the recent history of job displacement from automation provides some perspective. As farming was steadily mechanized in the U.S., progress in the technologies underlying farming automation spawned job creation in parallel.<sup>20</sup> And more saliently, entirely new industries, ones that fulfill different human desires and needs, emerged and expanded. For example, tourism, barely an industry in 1900, employed more than 235 million people globally in 2010, which constituted 8% of all of global employment.<sup>21</sup> Similarly, the healthcare sector, which was virtually non-existent at the time of the Luddite rebellions, accounts for about 12% of US employment today.<sup>22</sup> A pattern emerges: activities that used to be informal or done within the household or local community (like communication, entertainment, travel, education, or tending to the ill) become industries in the formal economy. Thus, as the labor demands of industries that fulfill contemporary societal needs continue to be automated by the latest generation of technologies, people become available to pursue the fulfillment of new societal needs, or of new underserved human aspirations. Perhaps we will witness a dramatic scaling of economic activity to counter climate change, or to educate the world, or the formalizing of the “care” economy.

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<sup>19</sup> See generally ERIK BRYNJOLFSSON & ANDREW MCAFEE, *THE SECOND MACHINE AGE: WORK, PROGRESS, AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES* (2014).

<sup>20</sup> See, e.g., Autor, *supra* note 15, at 7 (as passenger cars displaced equestrian travel and its supporting industries, this led to the emergence of the automobile industry, highways, gas stations, as well as the rise of the roadside motel and fast food industries).

<sup>21</sup> *Employment in the Tourism Industry to Grow Significantly*, INT’L LAB. ORG. (May 1, 2011), [http://www.ilo.org/global/publications/world-of-work-magazine/articles/WCMS\\_157893/lang-en/index.htm](http://www.ilo.org/global/publications/world-of-work-magazine/articles/WCMS_157893/lang-en/index.htm) [<https://perma.cc/92LY-FFKT>].

<sup>22</sup> U.S. DEP’T OF LABOR, BUREAU OF LABOR STATISTICS, *supra* note 16.

Nevertheless, there is cause for caution. This is in part because the labor displacement effects of the current wave of automation are likely to be exacerbated by a more recent trend in the United States: the growth of the fraction of the workforce engaged in *non-employment work arrangements*.<sup>23</sup> Estimates of the total number of such “independent” workers in the United States ranges from 40 million to 68 million.<sup>24</sup> These numbers include individuals who derive their primary income from non-employment work arrangements, as well as people who supplement their employment income by moonlighting as freelancers. According to one recent study, almost all of the net “employment” growth in the United States between 2005 and 2015 seems to have occurred in these kind of new work arrangements.<sup>25</sup>

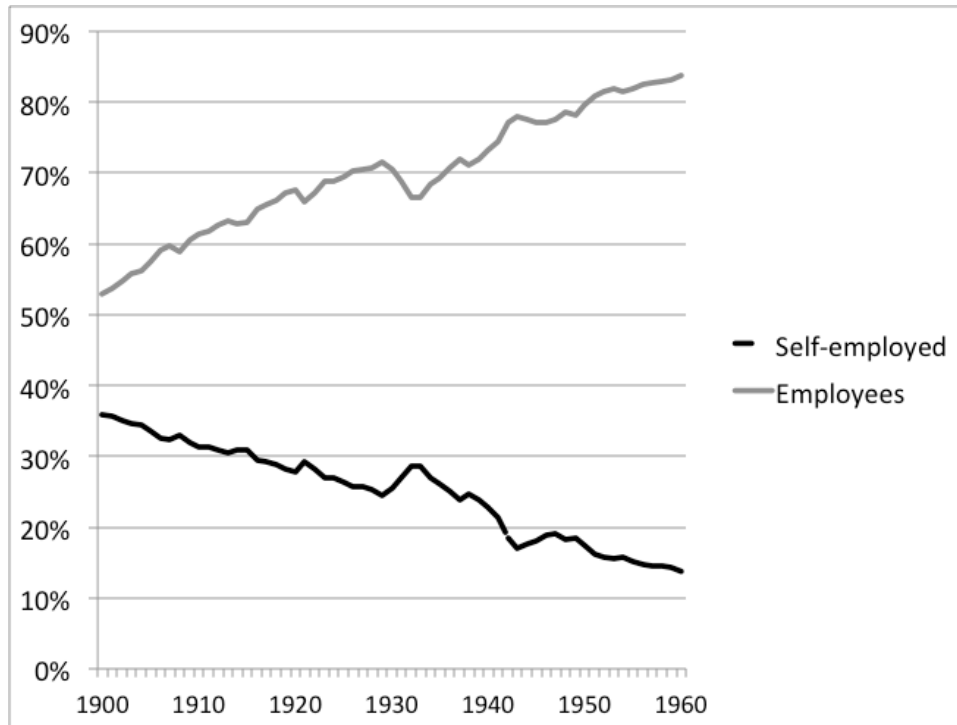
Whichever estimate one embraces, between 25% and 40% of the US civilian labor force of 160 million generates all or part of their income from such arrangements. More saliently, such arrangements represent a radical reversal of a different transition in the first half of the twentieth century, during which the US workforce shifted quite dramatically away from independent and towards full-time employment work arrangements (see Figure 2).

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<sup>23</sup> “Non-employment work arrangements” is my preferred term for work arrangements other than employment. For example, independent contracting, temporary work, freelance work, running a zero-employee business, and other forms of non-employment independent work that generate income. I prefer this term to the more frequently used “contingent work.”

<sup>24</sup> At the high end of these estimates is the 2016 study by the McKinsey Global Institute, which pegs the number of Americans who rely on non-employment work arrangements as their primary source of income at 32 million and the “moonlighters” at 36 million. See JAMES MANYIKA ET AL., INDEPENDENT WORK: CHOICE, NECESSITY, AND THE GIG ECONOMY 49 (Oct. 2016), <http://www.mckinsey.com/~media/McKinsey/Global%20Themes/Employment%20and%20Growth/Independent%20work%20Choice%20necessity%20and%20the%20gig%20economy/Independent-Work-Choice-necessity-and-the-gig-economy-Full-report.ashx> [<https://perma.cc/6VZZ-LF22>]. On the lower end of the spectrum is a 2016 study by MBO Partners, which estimates about 17 million primary and 23 million supplementary. See MBO PARTNERS, 2016 STATE OF INDEPENDENCE IN AMERICA REPORT 2–4 (2016), [http://info.mbopartners.com/rs/mbo/images/2016\\_MBO\\_Partners\\_State\\_of\\_Independence\\_Report.pdf](http://info.mbopartners.com/rs/mbo/images/2016_MBO_Partners_State_of_Independence_Report.pdf) [<https://perma.cc/5RRG-2H8Z>]. Another influential study, by the Freelancers Union and Upwork in 2016, estimates a total of 55 million independent workers. See *New Study Finds Freelance Economy Grew to 55 Million Americans This Year, 35% of Total U.S. Workforce*, UPWORK (Oct. 6, 2016), <https://www.upwork.com/press/2016/10/06/freelancing-in-america-2016/> [<https://perma.cc/S23E-DC7F>].

<sup>25</sup> LAWRENCE F. KATZ & ALAN B. KRUEGER, THE RISE AND NATURE OF ALTERNATIVE WORK ARRANGEMENTS IN THE UNITED STATES, 1995-2015 7 (2016) [https://krueger.princeton.edu/sites/default/files/akrueger/files/katz\\_krueger\\_cws\\_-\\_march\\_29\\_20165.pdf](https://krueger.princeton.edu/sites/default/files/akrueger/files/katz_krueger_cws_-_march_29_20165.pdf) [<https://perma.cc/GKK4-RTS8>].



**Figure 2: Changes in paid work arrangements in the United States, 1900-1960, the percentage (as a fraction of the total US civilian workforce) of workers of each type. The percentages do not add up to 100% because there were still a fraction of workers who were categorized as unpaid family workers.**

This recent trend towards non-employment work arrangements is accompanied by another threat to salaried employment: the decomposition of work into “tasks” or “projects.” In the past, hiring thousands of workers on short-term contracts to carry out small slices of work was simply infeasible because of the high associated administrative and transaction costs. Today, however, numerous digital platforms are enabling this deconstruction.<sup>26</sup> Perhaps the most extreme enabler is Amazon’s Mechanical Turk, on which workers bid to complete very small units of work (for example, suggesting a few words that are best associated with a digital image), typically getting paid a few cents per “microtask” completed. But this kind of platform-mediated task and project work is not restricted to simple tasks that humans currently perform better than software. There are a growing number of on-demand labor platforms for more complex task and project work. Some, like Upwork and Thumbtack, span a broad range of professions, from accounting and

<sup>26</sup> See Sundararajan, *supra* note 4, at 131–58, 173–75.

copy editing to personal fitness and photography. Others, like Handy, concentrate on a cluster of related services like house cleaning, moving, and home maintenance. Still other platforms focus on one specific profession, like Catalant for management consulting (over 40,000 providers), Gigster (whose providers are highly curated software engineers), and Upcounsel for legal services, which lists over 20,000 active providers, including professional solo law practitioners, stay-at-home parents who work part-time through the platform, and boutique law firms.<sup>27</sup>

It is now possible to reimagine what might have been a work arrangement involving full-time employees as one that is instead a succession of short-term contracts with best-of-breed providers, as enterprise software like the WorkMarket suite facilitates integrating on-demand labor into traditional corporate workflows.<sup>28</sup> Additionally, the popularity of on-demand *consumer* platforms in specific verticals like transportation (Uber and Lyft in the US, Didi Chuxing in China, BlaBlaCar in France, Ola in India and Grab in Southeast Asia) suggests that businesses may follow the lead of consumers and start to access certain services on an as-needed basis, which may further lower the need for certain kinds of employment (like full-time corporate drivers). Granted, many early “Uber-for-X” consumer services (like those for on-demand laundry and valet parking) are proving to have unsustainable unit economics, but others, like on-demand food, appear to be growing rapidly.

This two-pronged assault on salaried employment—the rise of non-employment work and the increasing cognitive capabilities of machines—makes it necessary for society’s model of earning a living to evolve. There are many reasons why the *confluence* of these two forces is more disruptive than the sum of the effects of each in isolation. First, the pace at which human work may be displaced by automation could be increased when the strength of the relationship between the human and the institutional source of demand for the labor is weakened. Put simply, it is easier for an organization to terminate independent contract workers than full-time employees. Thus, as non-employee work arrangements expand, the immediacy of the human labor displacement effects of automation technologies will be greater.

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<sup>27</sup> Based on my conversations with their CEO, 70% of Upcounsel’s lawyers (who have an average of 15 years of experience) have worked at top-200 law firms, and 50% of them have worked at Fortune-500 firms. Essentially, Upcounsel is building the infrastructure of a law firm to support a highly skilled crowd-based provider population by aggregating demand, managing client relationships, and guaranteeing client payment for them.

<sup>28</sup> For a discussion about how the New York Times uses such software to manage its freelance workforce, see Jim Thompson, *The New York Times Talks Automation with WorkMarket*, WORKMARKET (July 18, 2017), <https://www.workmarket.com/blog/new-york-times-talks-workfor-ce-automation-with-workmarket> [<https://perma.cc/N6U2-F2SE>].

Second, at a specific level of technological progress, different tasks that comprise a job are automatable to different degrees. Now, work arrangements that involve full-time and long-term employees allow for greater slack in the design of work systems: the people performing the tasks are collocated, there is a greater level of fault tolerance, and it is consequently harder to isolate the specific tasks suited for automation immediately and more challenging to seamlessly replace the associated human labor with a machine. In contrast, if the work associated with today's full-time jobs is "unbundled" and farmed out to on-demand labor platforms, this must necessarily be accompanied by a far more structured production process, one that is designed to make tasks more separable and modular. This will naturally increase the pace and precision at which such tasks can be automated when the technology is ready, which in turn will accelerate the pace of displacement of human labor.

Third, certain work arrangements lower the collective bargaining power of labor because of legal rather than economic reasons. For example, unlike employees, independent contractors in the United States do not have collective bargaining rights covered by the National Labor Relations Act. The prospect of impending automation, which translates into an increase in the rate at which capital can be substituted for labor or talent, puts downward pressure on the wages associated with the provision of this labor or talent. With lower labor bargaining power, the realized negative effect on wages will be more pronounced, lowering the desirability of being a labor or talent provider.

Finally, the labor displacement effects of technological progress are affected by the differential speed with which it lowers the cost of doing different tasks that comprise a job. Of the many tasks that comprise a production process, if only a few are automated, the variable cost of production associated with these tasks is lowered. As a consequence, even without any corresponding shock to the demand system, production may increase, thereby increasing the demand for the human labor associated with the other tasks. This mitigating effect may be higher when the tasks are done as a "bundle" of work, and less so when separated.

#### IV. WHY CROWD-BASED CAPITALISM MAY BE A SOLUTION

Faced with the prospect of this multifaceted attack on its primary model of work, any advanced economy needs to redefine how its citizens earn a living. I have discussed many reasons why the shift must be away from relying on a model of work in which humans earning money by providing their labor and talent to a large organization which owns the capital associated with the economic activity. Instead, the model we

must move towards is a workforce of capital owners who run tiny businesses that use a mix of labor and talent inputs, while retaining ownership of some fraction of the organizational and intellectual property capital associated with the service. Under this future model, as an increasing fraction of these inputs shift away from human labor and toward AI and robotics technologies, humans can retain their ability to earn a living.

In order to assess the viability of an economy based on crowd-based capitalism, it seems important to understand (1) what factors have enabled early examples of crowd-based capitalism to emerge in the last decade, (2) what exactly is the nature of the “capital” whose ownership is potentially distributed more evenly under this model, and (3) are there specific characteristics of an industry that afford the model of decentralized capital ownership at scale an inherent long-run economic advantage?

Two key technological factors that have led to the recent emergence of today’s crowd-based platforms are the ubiquity of powerful digital technologies in *consumer* products (one would be hard-pressed to imagine Uber or Didi Chuxing emerging in the absence of mass-market GPS-enabled smartphones), and the increased sophistication of digital systems that can facilitate *trusted exchange*.<sup>29</sup> I first explain the evolution of these systems that are reshaping commercial trust. Next, I explain these changes in trust systems are related to a blurring of boundaries between stakeholders in production that hold the human capital and those that hold the other structural intellectual capital, and how the emergence of crowd-based capitalism is connected to these shifting borders. I conclude with a discussion about how changes in work arrangements might alter the trend of rising income and wealth inequality.

#### A. New Mechanisms for Trust

It helps at this point to define “trust.” Of course, in many ways, the definition depends on the context. Trust in a romantic relationship might mean something different from trust in a commercial transaction. A definition in the commerce context comes from the sociologist James Coleman, who defined trust as “a willingness to commit to a collaborative effort before you know how the other person will behave.”<sup>30</sup>

For economic activity that is organized primarily the way that it was at the end of the twentieth century in the United States and West-

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<sup>29</sup> See Sundararajan, *supra* note 4, at 47–67 (discussing these and other factors).

<sup>30</sup> NETWORKS AND MARKETS 25 (James E. Rauch & Alessandra Casella eds., 2001).

ern Europe—production done by large organizations that employ individuals full-time, paying salaries in exchange for labor and talent—the commercial trust needs of the economy are met primarily by *government standards*, *economic institutions*, and *corporate brand*. The trust required for transactions between large trading partners is well addressed by contracts enforceable in a court of law. The relatively high transaction costs associated with writing (and potentially enforcing) a contract can be absorbed by exchange of sufficiently high value. On the other hand, it may not be economically feasible for a consumer to sign and enforce a contract about the quality of the cup of coffee he or she purchases in the morning. This kind of trust is established in part by government standards for food safety (if the coffee is hazardous to the consumer’s health, the seller is penalized) and in part through the profit motive of corporate brand (if the quality of coffee is consistently low, the consumer will take his or her business elsewhere).<sup>31</sup> These three forms of trust provision, and especially economic institutions and corporate brand, are relatively recent developments and contrast quite starkly with the social trust that enabled most of the world’s commercial activity until a few hundred years ago.<sup>32</sup> They have led to dramatic increases in the scale of the world economy.<sup>33</sup>

Given the central role that such trust systems play in shaping the nature of economic activity, the emergence of a new digitally enabled infrastructure for commercial trust is noteworthy because it explicitly involves a re-integration of social ties into commercial exchange. In the past, I have proposed that when using such infrastructures, the information needed to verify identity, intentions, and capabilities stems from multiple cues.<sup>34</sup> These cues include learning from one’s own prior interaction; learning through familiarity that comes from the nature of

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<sup>31</sup> Some of the earliest government regulations in human history were for food safety. See generally Peter Barton Hutt & Peter Barton Hutt II, *A History of Government Regulation of Adulteration and Misbranding of Food*, 39 FOOD DRUG COSM. L. J. 2 (1984) (discussing the role of government in preventing the adulteration of food in the past, and tracing guidelines that existed in ancient times, as well as specific rules and penalties that were in the Theodosian Code of 438 A.D.).

<sup>32</sup> A vast majority of early commercial exchanges were between individuals who shared social ties. For a discussion about the social enforcement mechanisms used by traders who wished to extend their scope beyond their immediate community, see generally Avner Greif, *Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders*, 49 J. ECON. HIST. 857 (1989). For an overview of the evolution of trust mechanisms for commerce, see also Sundararajan, *supra* note 4, at 142–46.

<sup>33</sup> To understand the central role that institutions play in economic development, see generally DARON ACEMOGLU & JAMES A. ROBINSON, *WHY NATIONS FAIL: THE ORIGINS OF POWER, PROSPERITY, AND POVERTY* (2012); Douglass C. North, *Economic Performance Through Time*, 84 AM. ECON. REV. 359, (1994). For a contrasting perspective, see PETER BLAIR HENRY, *TURNAROUND: THIRD WORLD LESSONS FOR FIRST WORLD GROWTH* (2013).

<sup>34</sup> See, e.g., Frédéric Mazzella, Arun Sundararajan, Verena Butt D’Espous, & Mareike Möhlmann, *How Digital Trust Powers the Sharing Economy* 30 IESE INSIGHT 24 (2016).

exchange (being part of the “cultural dialogue”); learning from the explicit experiences of others (such as what is learned by reading reviews written by prior customers); learning by relying on digitized social capital (such as what one might infer by viewing someone’s Facebook or LinkedIn network); and the reliance on digitized forms of real-world identity (validated by external institutions or entities, government and non-government, digital and otherwise). In a non-face-to-face (and sometimes face-to-face) setting, these cues can establish authenticity; they can assist in assessing goals; and they can help assess expertise or quality.

Every platform of crowd-based capitalism has some combination of these cues available digitally. In many ways, the lower the stakes of the interaction, the easier it is to establish sufficient digital trust. This is why examples such as YouTube and the crowd-based retailing platform eBay scaled early—the stakes are lower when buying a product from a stranger, or viewing a video from an unknown source, than when getting into a stranger’s car and saying “drive me to another city.” But while we have had digital access to some of these sources of trust since eBay was established in 1995, the final two—reliable verification of real-world identity, and access to social capital—have become digitally available at scale only recently.

#### B. Trust, Intellectual Capital, and the Fractal Nature of New Institutions

An even closer look at platforms like Airbnb and its brethren suggests that while they all share some form of digital trust infrastructure, there is a tremendous amount of variety in the production and intermediation activities that they facilitate. My research in 2015 and 2016 into the details of over 100 such platforms that span multiple industries has identified over 20 dimensions along which they vary. One might traditionally associate many of these dimensions with an organizational hierarchy. Other dimensions involve features that are decidedly market-like, and other capabilities seemed uniquely created to facilitate digitally-enabled exchange at scale.<sup>35</sup> Table 1 summarizes some of these dimensions for five crowd-based platforms that are popular in 2017: Airbnb, Uber, retailing platform Etsy, labor marketplace TaskRabbit, and city-to-city ridesharing platform BlaBlaCar.

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<sup>35</sup> This research remains unpublished. I am grateful to Andrew Cowell, Varun Jain, and June Khin for their assistance with the associated data collection.



Feature	Airbnb	Uber	Etsy	TaskRabbit	BlaBlaCar
<b>Hierarchy-like</b>					
Platform provides "production" financing to providers	No	Yes	No	No	Yes*
Platform provides centralized mentoring	Yes	No	No	Yes	No
Platform facilitates peer-to-peer mentoring	Yes	No	Yes	No	Yes
Platform facilitates community groups among providers	Yes	Yes	Yes	No	Yes
Platform provides centralized customer support	Yes	Yes	No	Yes	No
Platform handles payment processing	Yes	Yes	Yes	Yes	Yes
Platform takes care of logistics in getting service to customers	No	Yes	No	No	No
Platform assigns provider to customers	No	Yes	No	No****	No
Platform assigns customer to providers	No	No	No	No**	No
Platform provides insurance, escrow, other risk-minimization	Yes	Yes	Yes	Yes	Yes
Platform provides day-to-day operational input to providers	No	Yes	No	No	No
<b>Market-like</b>					
Easy for provider to enter and exit provision	Yes	Yes	Yes	Yes	Yes
Provider acquires or uses owned assets for production	Yes	Yes	Yes	Yes	Yes
Provider takes on complex tasks of 'managing inventory/supply'	Yes	Yes**	Yes	Yes	Yes
Provider chooses pricing	Yes***	No	Yes	Yes	Yes
Provider free to merchandise as they see fit (description, photo)	Yes	No	Yes	Yes	Yes
Provider has in-person customer contact	Yes	Yes	No	Yes	Yes
Provider has virtual direct customer contact	Yes	No	Yes	Yes	Yes
<b>New "hybrid" capabilities</b>					
Peer-to-peer feedback systems	Yes	Yes	Yes	Yes	Yes
Transparent peer-to-peer feedback systems	Yes	No	Yes	Yes	Yes
Platform-based provider screening	Yes	Yes	No	Yes	Yes*****
Conduits to external trust indicators	Yes	No	Yes	Yes	Yes

\*: As of April 2017, BlaBlaCar offers auto financing to selected highly active drivers

\*\* : In some cities, Uber's staff may send information to drivers suggesting when to be available and where

\*\*\*: Airbnb has a pricing tool built into the platform, but as of April 2017, its use is voluntary

\*\*\*\*: TaskRabbit makes active suggestions, and restricts customers from browsing all available providers

\*\*\*\*\*: The screening varies by country; in some cases, it simply involves verifying a phone number

**Table 1: Characteristics of five crowd-based capitalism platforms in 2017**

A distinction here is between which factors facilitate *production* and which facilitate *exchange*. Much of what is embedded in these new platforms resembles what organization theorists might consider social or intellectual capital, the “knowledge and knowing capability of a social collectivity, such as an organization, intellectual community, or professional practice.”<sup>36</sup> Rather than merely making it easier for peers to exchange goods or services with other peers, these are capabilities that enable the production of these goods and services by providers, and include many of the forms of capital one might normally find embedded within a hierarchical organization.

For example, a Lyft driver gains access to the codified knowledge about where to look for their next ride from the “heat maps” that the application delivers to each of its drivers, the procedural knowledge about what route is best from the platform’s custom GPS navigator, and

<sup>36</sup> This definition of intellectual capital is from Janine Nahapiet & Sumantra Ghoshal, *Social Capital, Intellectual Capital and the Organizational Advantage*, 23 ACAD. MGMT. REV. 242, 245 (1998).

the codified knowledge from Lyft of what constitutes an acceptable interior for their vehicle, while also acquiring (by doing) tacit knowledge about what mode of customer interaction is more likely to generate a tip, or what specific pockets of demand for higher fare rides might exist in different locations at different points in time. An Airbnb host acquires knowledge about pricing from a variety of sources: from the host's own experimentation and learning by doing; from the intellectual capital codified in Airbnb's pricing tool; by attending Airbnb-organized host events; and from conversations with the informal community of hosts that operate in the same city. A high-performing host acquires intangible "brand" capital, which, while embedded in the proprietary Airbnb review system and not legally owned by the host, is inextricably associated with that specific host and cannot simply be appropriated by Airbnb and transferred to a different host.<sup>37</sup>

The intellectual capital represented by this knowledge appears to be both in the form of what Gary Becker<sup>38</sup> might consider human capital, "the knowledge, information, ideas, skills, and health of individuals," as well as what some management theorists would label structural capital, the infrastructure and processes traditionally held by a firm that allow human capital to function. Put differently, the individual may be acquiring some of the structural capital that was previously held by the company the individual was employed by. Each of the four forms of knowledge described by Spender that comprise an organization's intellectual capital—individual explicit, individual tacit, social explicit, and social tacit—seem to both be made available by a platform, as well as acquired and "held" by individual providers.<sup>39</sup>

Digital technologies are thus shifting the scale, mix, and roles of the institutions that have historically facilitated the provision of trust and the use of structural intellectual capital in economic activity. In a simplified view of twentieth century industrial capitalism, individuals who held human capital would work as salaried labor and talent providers for organizations, which developed and held other forms of intellectual capital and intangible capital to enhance the value of the individual human capital. Economic exchange between these organizations

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<sup>37</sup> An interesting example of the transferability of this kind of personal "brand" across platforms was illustrated when ridesharing platform Juno entered the Manhattan market in April 2016, allowing only those Uber drivers who had a rating on Uber of 4.65 or above to join and provide transportation through the Juno platform. See Sheelah Kolhatkar, *Juno Takes on Uber*, NEW YORKER (Oct. 10, 2016), <http://www.newyorker.com/magazine/2016/10/10/juno-takes-on-uber> [<https://perma.cc/2T75-U5HE>].

<sup>38</sup> See generally GARY S. BECKER, HUMAN CAPITAL: A THEORETICAL AND EMPIRICAL ANALYSIS, WITH SPECIAL REFERENCE TO EDUCATION (1964).

<sup>39</sup> See generally J.C. Spender, *Making Knowledge the Basis of a Dynamic Theory of the Firm*, 17 STRATEGIC MGMT. J. 45 (1996).

was facilitated by the trust systems in economic institutions that included banking, contracts, and courts of law, as well as by government regulations often aimed to protect smaller businesses from larger ones. A mix of brand and government regulation created enough trust for consumers to interact with these organizations.

In the emerging world of crowd-based capitalism, many of these boundaries are blurred. The scale of a provider is often reduced to that of an individual microbusiness, and what used to be enabled by government regulation and economic institutions is often facilitated by trust systems the platform provides. The intellectual capital and intangible capital held by organizations are redistributed between platforms and individual microbusinesses. In some cases, like that of transportation services using Uber, much of this capital remains with the large institution, the platform. In other cases, like that of short-term accommodation businesses run through Airbnb, or retailing businesses through Etsy, the provider appears to hold a greater fraction of this capital.

### C. Crowd-Based Capitalism and Value Distribution

This division of intellectual capital (and in particular, structural capital) and intangible capital between the platform and the provider is a central determinant of an equitable future of work. The lens used to study inequality shifts by French economist Thomas Piketty helps understand why this is the case. At the core of Piketty's 2014 book is a simple argument: inequality persists because the historical returns on capital ( $r$ ) are persistently higher than the overall rate of growth ( $g$ ) in the economy, while the rate of growth of wages that are paid in exchange for labor and talent is roughly the same as this overall rate of growth  $g$ .<sup>40</sup> As articulated by Piketty:

The inequality  $r > g$  implies that wealth accumulated in the past grows more rapidly than output and wages. This inequality expresses a fundamental logical contradiction. The entrepreneur inevitably tends to become a rentier, more and more dominant over those who own nothing but their labor. Once constituted, capital reproduces itself faster than output increases.<sup>41</sup>

This observation, aimed at explaining the persistent recent rise in income and wealth inequality, also highlights the promise of crowd-based capitalism that genuinely decentralizes the ownership of capital. It can increase the fraction of a workforce that makes money through

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<sup>40</sup> See generally THOMAS PIKETTY, CAPITAL IN THE TWENTY-FIRST CENTURY (2014).

<sup>41</sup> *Id.* at 571.

investing or owning rather than providing labor in exchange for a salary, allowing a greater fraction to occupy new locations in the established economic equation, moving from wage receivers to capital owners, thus expanding the fraction of the population that have the “r” kind of growth in their returns rather than the “g” kind.

Although state intervention to preserve the viability of business models of existing large corporations (and especially those that employ large numbers of workers) seem quite likely, and may slow the pace of evolution to crowd-based capitalism, a government’s resources might be better spent instead shaping a transition that favors those platform models that are creating genuine individual-owned businesses. An expansion of the fraction of the population engaged in capital ownership will better insulate the workforce from improvements in the capabilities of automating machines.

In the future, an aspiring law associate might instead become a tiny law firm operating through a legal services platform, gaining access to corporate clients the platform aggregates and maintains relationships with, while leveraging AI enabled legal research capabilities. Micro-entrepreneurs might run urban transportation local trucking businesses using fleets of autonomous cars or trucks through a ridesharing platform (much like the numerous entrepreneurs who offer fleets of five to ten vehicles for rental through the peer-to-peer car rental platform Getaround today). Global consulting firms might evolve into platforms through which millions of individuals run micro-consulting practices (or even small partnerships). A wide variety of highly differentiated micro-educators, aided by online materials and AI-enabled teaching tools, could dramatically increase the supply of supplementary education at different levels and life stages. Over time, a percentage of these new “micro-entrepreneurship” opportunities that empower individuals previously constrained by employment at traditional corporations may evolve into enterprises larger than sole proprietorships. In contrast, if crowd-based capitalism converges towards systems where the humans in the crowd are simply sources of labor and talent, it is far more likely that there will be widespread workforce displacement.

Given these two potential futures, it is natural to ask whether there are specific economic characteristics associated with an industry that predict how prevalent crowd-based capitalism will eventually be, and whether there are specific government interventions that can steer outcomes towards the societally optimal level of decentralized capital ownership. I do not have a clear analytical answer to either question as yet. A model of crowd-based capitalism with genuinely decentralized capital

ownership seems to have emerged naturally in short-term accommodation and in peer-to-peer retailing, but not in decentralized transportation.

Examining what trajectory is likely in one specific industry and the factors that shape this trajectory may be illustrative nevertheless. It is widely believed, for example, that at some point in the not so distant future, fully autonomous (or what is currently called “level 5” autonomy) vehicles that can drive themselves will be prevalent. As this future emerges, are we likely to see today’s Uber, Lyft and taxi drivers in the United States evolve into millions of fleet owners who earn a living as capital owners by deploying their vehicles through a platform? Or will we end up with centralized platforms that operate millions of owned or leased vehicles?

The answer depends on a number of factors, some relating to the economic fundamentals of transportation, and others to regulatory path. It is widely accepted that as assets, owned personal vehicles are utilized with what seems to be a very low degree of efficiency.<sup>42</sup> The persistence of this inefficiency is in part because, with the current technology, owning a car and using it sparingly is still more economically attractive than calling a taxi every time one needs transportation. However, this inefficiency may also persist because the identity of many individuals is tied to their car ownership, and perhaps also because there is value perceived by consumers in having transportation available immediately when needed.

When fully autonomous vehicles arrive, lowering the average cost per mile of on-demand transportation, and expanding the fraction of the population for whom calling a car on-demand costs less than owning a car, the eventual industry structure depends in part on how large this expansion will be. If just 50% of current car owners are potential on-demand transportation customers (the rest perhaps living in parts of the country where residences and businesses are too far away from each other to share transportation effectively), an active market for purchasing personal vehicles will remain, which will in turn spawn a “secondary” market for on-demand transportation using underutilized and personally owned capacity. It seems quite likely in this scenario that there will be lots of room for decentralized capital ownership. In contrast, if

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<sup>42</sup> A variety of studies have established that personal vehicles are put to use only a fairly small fraction of the time. For example, my analysis of data from the National Household Transportation Survey indicates that vehicles in California were utilized an average of 4.6% of the time. See Samuel Fraiberger & Arun Sundararajan, *Peer-to-Peer Rental Markets in the Sharing Economy*, (NYU Stern School of Bus. Research Paper, 2017) [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2574337##](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2574337##) [<https://perma.cc/38DF-LHW9>].

urbanization and other changes in residential living make an on-demand transportation solution economically viable for close to 100% of the population, the likelihood of capital centralization is higher. Clearly, the strength of the other consumer effects alluded to earlier—the identity effect and the value perceived in having transportation parked in one’s driveway—will matter as well.

Regulatory history is another factor. Along with social/cultural acceptance, regulatory issues rather than the technological capabilities of the vehicles remain the biggest hurdle to mass-market autonomous vehicle adoption. Although federal regulations may dictate standards for the “brain” of the car, each city, state and local government can dictate what is on its roads. Until we figure out all the “edge cases,” train vehicles to deal with them, and grow citizen confidence, this regulatory path will be slow.

As a consequence, holding everything else constant, it is more likely that the first mass-market fully autonomous vehicles will emerge through platforms like Uber and Lyft rather than as owned Fords, not because of technological superiority, but because the code embedded in the on-demand platforms will be able to credibly enforce the complex mesh of different regulations and restrictions initially placed on fully autonomous cars. (Ironically, this may lead to a future in which regulation, rather than posing a barrier, creates an advantage for on-demand transportation.) This development may cause current automobile manufacturers makers to offer their own on-demand model as well (Ford has pre-announced one, and BMW and Daimler have on-demand businesses already), biasing the likely long-term equilibrium towards a greater centralization of capital ownership.

## V. POLICY GUIDELINES

### A. Capital Ownership

A particularly attractive feature of crowd-based capitalism is its promise to redistribute and make less unequal the ownership of capital. But this promise is just a possibility, and not a certainty. My guidelines are in contrast with other proposed policy responses to digitally enabled automation which focus more heavily on the redistribution of income rather than of capital ownership, most radically through the increasingly popular proposal of a universal basic income,<sup>43</sup> although also in

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<sup>43</sup> See, e.g., ANDY STERN & LEE KRAVITZ, RAISING THE FLOOR: HOW A UNIVERSAL BASIC INCOME CAN RENEW OUR ECONOMY AND REBUILD THE AMERICAN DREAM (2016). The extent of support for this idea is reflected in a letter signed by a diverse array of executives, policy thinkers and academics. See ECON. SECURITY PROJECT, <http://economicsecurityproject.org/> [<https://perma.cc/9G>

the form of progressive taxation and a capital tax.<sup>44</sup> As crowd-based platforms continue to proliferate and grow, and emerge in new industries like healthcare, energy, and professional services, the single most important broad policy guideline is to favor platform models that lead to genuine and decentralized capital ownership.

As some of the larger platforms become publicly traded corporations, such policy could take the form of government tax incentives that favor the issuing of “provider” stock ownership programs—under which providers are allocated shares in a platform.<sup>45</sup> Additionally, there may be a need to revise current U.S. antitrust laws that consider collective action by groups of non-employee providers anticompetitive. Collective bargaining power among providers will be important in shaping the future division of structural capital between providers and platforms. (For example, providers who wish to retain asset availability decision-making that a platform might want to centralize should not face onerous legal barriers to negotiating collectively.) Finally, since providers build “brand capital” through their online reputations, giving providers ownership over the associated data, perhaps through an extension of current intellectual property law would be good policy. This will allow the providers to credibly port not just the summary information but the details underlying their brand capital from one platform to another, increase the value of the associated intangible capital.

Beyond these prescriptions, policy makers need to tailor interventions that take into account specific industry characteristics. As reflected in Table 1, there is no optimal “one size fits all” split of capital ownership between providers and platforms. Some industries simply lend themselves more naturally to a greater level of decentralization. It seems natural for Airbnb hosts to choose differing prices for the diverse and differentiated accommodations they offer, and for consumers to compare alternatives when planning a vacation. In contrast, it seems less commercially viable to expect customers to choose between multiple drivers with differentiated offerings and prices when requesting a

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<sup>44</sup> See Jeffrey D. Sachs et al., *Robots: Curse or Blessing? A Basic Framework* (Nat'l. Bureau of Econ. Research, Working Paper No. 21091, 2015), <http://www.nber.org/papers/w21091.pdf> [<https://perma.cc/6KXC-22BU>].

For a discussion of how a capital tax can help alleviate a rise in inequality following a robotic technology induced productivity shock, see Jeffrey D. Sachs & Laurence J. Kotlikoff, *Smart Machines and Long-Term Misery* (Nat'l Bureau of Economic Research, Working Paper 18629, 2012), <http://www.nber.org/papers/w18629.pdf> [<https://perma.cc/UX9J-DWV4>].

<sup>45</sup> For further discussion, see OURS TO HACK AND TO OWN: THE RISE OF PLATFORM COOPERATIVISM, A NEW VISION FOR THE FUTURE OF WORK AND A FAIRER INTERNET (Trebor Scholz & Nathan Schneider eds., 2017).

short taxi ride. A standardized categorization of vehicle and fare by the platform seems more natural.

#### B. New Approaches to Regulation

As crowd-based capitalism redefines the role of different institutions in the economy, society's approach to regulating business must evolve. This is natural. Regulation is often created to bridge gaps in trust that may otherwise lead to market failure. When institutions that create commercial trust evolve, new ones emerge, and the boundaries between these institutions shift, it seems natural to re-examine an economy's approach to regulation. Digital precursors to crowd-based capitalism may have, *de facto*, started to return us to a model of trust built on community consensus and gained reputation. Such community-generated trust has been digitized through peer reviews for real-world institutional businesses. User-generated reviews of restaurants can affect the establishment's bottom line or help city health departments trace food-borne illness; such crowd-based monitoring can complement traditional regulations, detecting deficiencies in and inducing enforcement of regulations already on the books.

However, the intensity of regulatory resistance to early crowd-based capitalism platforms like Airbnb, Uber, and Lyft suggest that the broader regulatory transition will not happen naturally. Often, crowd-based providers and the platforms that enable them emerge without formal government approval. It is critical that this "experimental" nature of innovation is preserved. Since such entry disrupts the stability and continuity of rules, regulators will often try to fit innovative services into existing frameworks rather than updating frameworks to accommodate innovation.<sup>46</sup> As the number of independent commercial providers scales well into the millions in many industries, rigid enforcement of existing regulation will slow the transition.

A few simple guidelines can help. First, because platforms represent a new generation of third-party institutions that mediate peer-to-peer transactions, they can be called on to define or enforce rules that govern these transactions. Twenty years ago, a taxicab regulatory body was essential to prevent market failure. Today, because Uber, Lyft and Didi Chuxing exist as intermediaries, they can take on many of the roles that the government was forced to play. The space of possible regulatory solutions is expanded.

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<sup>46</sup> This issue is discussed at length in Sofia Ranchordás, *Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy*, 16 MINN. J. L. SCI. & TECH. 413 (2015).



Next, whether or not to delegate responsibility depends in part on who holds the data necessary for regulation,<sup>47</sup> as well as whether the interests of a crowd-based platform align well with those of society. For example, Airbnb's profit motive creates a natural incentive to ensure that hosts accurately represent the quality of their lodging; commercial and societal interests are well aligned. In ensuring that guests are not too noisy, however, Airbnb may not hold the best data, and may be faced with an additional conflict between commercial and social objectives.

Finally, decentralized capital ownership and an associated reduction in centrally mandated "standards" will naturally lead to greater variety in scale and quality. Thus, what might have been an easy "one size fits all" approach to, say, regulating taxicabs and limousines might be challenged when one has a range of different private cars, taxis, motorcycles, and other forms of shared transportation. Similarly, the sheer variety of options on Airbnb, relative to that of hotels, suggests that regulations that may be sufficient for, say, spare bedrooms may not be adequate for tree-houses or houseboats. Concurrently, there is a widespread expansion of the range of commercial scale. Micro-entrepreneurs making and selling handcrafted wooden toys on Etsy or renting out spare rooms on Airbnb may find onerous a body of regulations developed with major toy manufacturers like Mattel or a major hotel chain like Hilton in mind. New regulations must be designed so that they do not place insurmountable restrictions on micro-entrepreneurs.<sup>48</sup>

### C. Rethinking Education Policy

The shift in the production role of the typical individual earner in society, from provider of labor and talent in exchange for a salary to microbusiness owner necessitates a fundamental rethinking of post-secondary education. Countries around the world, most saliently the U.S., have invested heavily into creating universities and colleges that prepare, early in life, their workforces for a career of full-time employment. One change that will be essential is altering the mix of such education to be better suited for an economy of entrepreneurs, emphasizing design, creativity, and entrepreneurship education over deeper investments into cognitive skill-heavy professions with a higher probability of automation.

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<sup>47</sup> See Sundararajan, *supra* note 4, at 155–58 (discussing this idea of "data-driven delegation").

<sup>48</sup> See, e.g., *id.* at 131–158; see also ARUN SUNDARARAJAN, THE COLLABORATIVE ECONOMY: SOCIOECONOMIC, REGULATORY AND POLICY ISSUES 21–28 (2017), [http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595360/IPOL\\_IDA\(2017\)595360\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595360/IPOL_IDA(2017)595360_EN.pdf) [<https://perma.cc/2S8G-C8KY>].

More importantly, the focus of post-secondary education must shift away from one-time early life degrees and towards continuing education. Recent political outcomes in the U.S. and the U.K. reflect in part a significant underinvestment into creating new opportunities for a workforce displaced by automation and ill-equipped for a new world of work. We need new university-like institutions that can fill this gap, providing individuals in transition with structured and pedagogically sound education accompanied with a new professional network and access to new opportunities, facilitating relocation to pursue a new career more naturally, imbuing workers in flux with a new identity and sense of purpose, rebuilding self-worth to allow transition with dignity. Seeking this sort of mid-career intervention should be as natural as choosing to go to college after high school, a new rite of passage.

Creating such an ecosystem will necessitate the right government interventions. While the mix of post-high school education may naturally evolve over time in response to market forces, it is not realistic to expect a slew of robust new continuing education institutions to emerge naturally. The managerial revolution of the twentieth century in the United States was made possible in part by the universities that emerged from the federal subsidies given to states under the Morrill Land-Grant Act of 1862.<sup>49</sup> Although these institutions perhaps did not immediately fulfill their stated goal of teaching “agriculture and the mechanic arts,” the Act laid the foundations for a nationwide and broadly accessible post-secondary university system.<sup>50</sup> A similar intervention aimed at continuing education is needed.

In parallel, the social contract must be refashioned to accommodate a different kind of workforce. During the second half of the twentieth century, a variety of labor laws have been developed to improve the quality of work life for full-time employees, including minimum wages, overtime, and insurance. A number of other incentives—fixed salaries, paid vacations, workplace training, and healthcare—that fulfill different human aspirations, are funded based on the assumption that the model of work is full-time employment and the employer will fund all or part of the incentive. The design and funding of this social safety net must be adapted for a workforce that is increasingly independent, while also creating substitutes for the career paths and community that a growing fraction of the workforce now gets from the company that they work for. Perhaps the role of the post-secondary university will evolve to include this kind of lifelong career planning.

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<sup>49</sup> 7 U.S.C. §§ 301–309 (2012).

<sup>50</sup> *Id.*