Employee vs. Independent Worker: A Framework for Understanding Work Differences

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Abstract

Independent work and the growing on-demand and crowdwork-based job opportunities facilitated by digital platforms, which have emerged as the gig economy, provide a unique opportunity to examine the differences in work characteristics between alternative and traditional labor arrangements. Although it is well known that, through intermediary digital platforms, independent workers take up commissioned tasks without guarantee of further employment, it is less well understood how work characteristics on digital platforms differ from work characteristics in traditional labor arrangements. We contribute to filling this void by systematically examining the difference in work characteristics of occupational roles currently found through digital platforms rather than in traditional work arrangements. We find that such independent workers rely less on team production and coordination and have greater separability of individual work outputs. Our results thus suggest there is a statistically significant difference in fundamental work characteristics between independent work and traditional employment.

JEL codes: D23, D26, J08, J4

Keywords: gig economy, independent workers, alternative work arrangements, transaction cost economics, team production

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1. Introduction

The growing on-demand and crowdwork-based job opportunities facilitated by digital platforms have come to be known as the *gig economy*. *Gig work*, *freelancing*, and *contracting* are terms that are often used interchangeably to refer to independent work opportunities that differ from traditional, employment-based work. Following the literature, we use the term *independent work* to refer to all these types of alternative labor arrangements to contrast with standard employer–employee arrangements.[1]

Although it is well known that, through intermediary digital platforms, independent workers take up commissioned tasks without guarantee of further employment,[2] it is less well understood exactly how work characteristics on digital platforms differ from work characteristics in traditional labor arrangements. We contribute to filling this void by systematically examining the differences in work characteristics of occupational roles currently found through digital platforms rather than in traditional work arrangements.

Research on independent workers often attempts to unpack the growth, size, composition, and demographics of this workforce, as well as workers' motivations to engage in this type of work.[3] Other research examines policy and legal considerations such as worker classification

[1] This usage is consistent with the literature, which also uses gig, freelance, and contract work interchangeably for analysis as various forms of alternative or external labor arrangements.
[2] See Valerio De Stefano, "The Rise of the 'Just-in-Time Workforce': On-Demand Work, Crowdwork, and Labor Protection in the 'Gig Economy,'" *Comparative Labor Law and Policy Journal* 37, no. 3 (2016): 471–504.
[3] Diana Farrell, Fiona Greig, and Amar Hamoudi, *The Online Platform Economy in 2018: Drivers, Workers, Sellers, and Lessors* (New York: JPMorgan Chase Institute, 2018); MBO Partners, *The State of Independence in America* (Herndon, VA: 2016, 2017, 2018, 2019); Lawrence F. Katz and Alan B. Krueger, "The Rise and Nature of Alternative Work Arrangements in the United States, 1995–2015" (NBER Working Paper No. 22667, National

issues and worker benefits: Because independent workers are legally classified as self-employed or independent contractors, they are often out of the purview of labor law and regulations that apply to those who are legally classified as employees.[4] In light of COVID-19, scholarly attention has also been given to how flexible work arrangements can benefit those disadvantaged by certain barriers to entry in the traditional labor market.[5]

Despite growing interest in independent workers and the gig economy in particular, existing research has not rigorously examined exactly how work context and work characteristics among independent workers empirically differ from those under traditional work arrangements. Apart from the fact that independent workers face no guarantee of future work, little is known about the work characteristics that may define independent workers. And with the focus on the legal distinction between employees and independent contractors, richer and more fundamental inherent differences in work characteristics between them are overlooked.

We begin to fill this void by empirically examining whether occupational roles performed through digital platforms indeed differ from those performed in traditional work arrangements along three key factors suggested by a transaction cost framework. These key factors are team production, coordination, and separability of outputs.

Bureau of Economic Research, Cambridge, MA, September 2016); Lawrence F. Katz and Alan B. Krueger, "Understanding Trends in Alternative Work Arrangements in the United States" (NBER Working Paper No. 25425, National Bureau of Economic Research, Cambridge, MA, January 2019); Katharine G. Abraham et al., "The Rise of the Gig Economy: Fact or Fiction?," *AEA Papers and Proceedings* 109 (2019): 357–61; Emilie Jackson, Adam Looney, and Shanthi Ramnath, "The Rise of Alternative Work Arrangements: Evidence and Implications for Tax Filing and Benefit Coverage" (Office of Tax Analysis Working Paper No. 114, US Department of the Treasury, Washington, DC, 2017); Tito Boeri et al., "Solo Self-Employment and Alternative Work Arrangements: A Cross-Country Perspective on the Changing Composition of Jobs," *Journal of Economic Perspectives* 34, no. 1 (2020): 170–95.

[4] See, for example, Seth D. Harris and Alan B. Krueger, "A Proposal for Modernizing Labor Laws for Twenty-First-Century Work: The 'Independent Worker'" (Hamilton Project Policy Brief 2015-10, Brookings Institution, Washington, DC, December 2015); Liya Palagashvili, "Disrupting the Employee and Contractor Laws," *University of Chicago Legal Forum* 15 (2018): 397–408; Seth Oranburg and Liya Palagashvili, "Transaction Cost Economics, Labor Law, and the Gig Economy," *Journal of Legal Studies* (forthcoming).

[5] Titan M. Alon et al., "The Impact of COVID-19 on Gender Equality" (NBER Working Paper No. 26947, National Bureau of Economic Research, Cambridge, MA, April 2020).

To measure the importance of these factors across occupational roles, we selected work characteristics that best represent these factors from the Occupational Information Network (O*Net) database. We then classified all occupational roles into independent versus traditional work and tested whether independent work exhibits a lower importance of team production, coordination, and lack of separability of individual outputs, as transaction costs economics would predict. Our results suggest there is a statistically significant difference in fundamental work characteristics between independent work and traditional employment.

Our paper has implications for public policy in the United States. Currently, workers in gig, freelance, and contracting jobs are legally classified as "independent contractors" or "self-employed" (1099 workers), whereas workers in traditional employment jobs are classified as "employees" (W-2 workers).[6] Recent policies such as California's Assembly Bill 5 (AB5) require many independent workers to be reclassified as employees. Lawmakers have argued that the work performed by many independent contractors is not that different from work performed by employees, and thus the independent contractors should be subject to the same labor regulations as employees. Our findings, however, suggest that there are richer differences in work context beyond the fact that jobs are nonpermanent in nature for independent workers. Policies such as AB5 that seek to provide independent contractors and employees the same legal treatment thus overlook the diversity of work characteristics across independent and traditional work arrangements.[7]

The paper proceeds as follows: Section 2 reviews the literature on independent work and the gig economy, and section 3 provides the transaction cost theoretical framework for

[6] *W-2 workers* (employees) and *1099 workers* (contractors) are terms established by the Internal Revenue Service to distinguish between the two classes of workers.

[7] In fact, many different types of independent workers began asking for exemptions because of the problems the bill posed for them. These exemptions are outlined by Michael Farren and Trace Mitchell in "Exploring the Consequences of Worker Reclassification Proposals" (Public Interest Comment, Mercatus Center at George Mason University, Arlington, VA, October 27, 2020).

thinking about independent work broadly. Section 4 presents the data and results. Section 5 has a discussion of the implications for public policy, and section 6 has our conclusions.

2. Literature Review: Measuring and Understanding Independent Work

Rapid changes in technology may be leading to significant changes in the labor market. This change is evident in the current prominence of the gig economy and the freelance movement. *Gig work* refers to work that is mediated through digital apps or platforms—such as Uber, Lyft, Postmates, Handy, or TaskRabbit—and is often service-based work.

Freelance work is similar to gig work in that both are considered independent work and are characterized by short-term contractors who are legally classified as self-employed and independent contractors. Not all freelance work is gig work, however, as freelancers do not always find work through intermediary digital platforms, and they typically have more control over setting their own rates. Freelancers are also more likely to be in knowledge-work professions (such as software developers, researchers, or translators) and creative-work professions (such as musicians, actors, and writers). Upwork, Fiverr, and Freelancer.com are platforms where freelancers might find their market.

Contract work may involve high-skilled contractors (e.g., consultants) and middle-skilled workers such as electricians, carpenters, or construction workers. *Gig* or *platform-based work*, *freelancing*, and *contracting* are all terms that are often used interchangeably because they are all forms of independent work referred to as alternative or external labor arrangements and are contrasted with the standard employer–employee relationship.

Despite much attention and the relevance of independent work and the gig economy in particular, there is not much agreement on the true size and growth of this workforce. On the basis of a 2017 survey, the Bureau of Labor Statistics (BLS) found that 10.1 percent of workers

engage in contractor, freelance, or gig work as their primary income source, and this figure represents a *decline* since the last BLS survey in 2005.[8] Another survey study found that there were 57 million independent workers in 2019, implying that close to 35 percent of the US labor force engaged in this type of work as a primary or secondary source of income.[9] Other survey studies by MBO Partners and McKinsey Global Institute point to a growing workforce of gig, contractor, or freelance work.[10] Between 2014 and 2017, one study found that independent workers grew three times as fast as the US workforce.[11]

Some research also attempts to measure this workforce in the United States through use of tax forms or other official government data. Since independent workers are legally classified as "1099" or "self-employed" workers, following the growth of these tax forms can also provide us with some information. Using this micro administrative tax data from the IRS, a recent study found that the share of the workforce with income from alternative work arrangements increased by 1.9 percentage points from 2000 to 2016, and it now accounts for 11.8 percent of the workforce.[12] The same study was also able to differentiate between gig and non-gig platforms and concluded that more than half the increase in alternative work arrangements occurred between 2013 and 2016 and that the increase "can be attributed almost entirely to dramatic growth among gigs mediated through online labor platforms."[13] In another study following tax

[8] BLS, "Contingent and Alternative Employment Arrangements—May 2017," news release no. USDL-18-0942, June 7, 2018, https://www.bls.gov/news.release/pdf/conemp.pdf. The 2005 BLS survey found that 10.7 percent of workers engaged in alternative labor arrangements.
[9] Edelman Intelligence, "Freelancing in America: 2019," study commissioned by Upwork and the Freelancers Union, October 2019.
[10] MBO Partners, *State of Independence in America*, annual reports for 2016–2019; James Manyika et al., *Independent Work: Choice, Necessity, and the Gig Economy* (New York: McKinsey Global Institute, October 2016).
[11] Edelman Intelligence, "Freelancing in America: 2017," study commissioned by Upwork and the Freelancers Union, September 2017.
[12] Brett Collins et al., "Is Gig Work Replacing Traditional Employment? Evidence from Two Decades of Tax Returns" (working paper, IRS SOI Joint Statistical Research Program, March 25, 2019).
[13] Collins et al., "Is Gig Work Replacing Traditional Employment?," 1.

forms, Eli Dourado and Christopher Koopman found a 22 percent increase since 2000 in the use of 1099-MISC (independent contractor) forms accompanied by a decline of 3.5 percent in the use of W-2 (employee) tax forms.[14] Several other studies also document the rise of contractor and self-employed work in the United States through use of administrative data.[15]

In Europe, research suggests that individuals engaged in independent work make up about 9 percent of the labor force in Germany and the United Kingdom and about 22 percent in Italy.[16] Professional services company PricewaterhouseCoopers estimates that the gig economy could generate revenues of $335 billion globally by 2025.[17] A recent study also found that among Organisation for Economic Co-operation and Development (OECD) countries, "solo self-employment" (self-employed individuals without workers—typically freelancers, contractors, and gig workers) accounts for 4 to 22 percent of total employment and that solo self-employment has been rising relative to self-employment with workers (i.e., owners of businesses who have employees) in almost all OECD countries.[18]

Nonetheless, limitations remain for correctly measuring the size and growth of independent work. In a 2015 study, economists Lawrence Katz and Alan Krueger suggested that 15.8 percent of workers in the current labor force engage in alternative work arrangements as a primary income source.[19] In a follow-up study, Katz and Krueger downwardly revised their estimates and highlighted the various problems that exist in accurately measuring the size and

[14] Eli Dourado and Christopher Koopman, "Evaluating the Growth of the 1099 Workforce" (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, December 10, 2015).
[15] Abraham et al. "Rise of the Gig Economy"; Jackson, Looney, and Ramnath, "Rise of Alternative Work Arrangements"; Lawrence Mishel, "Social Security Data Confirm Same Old Pattern: Self-Employment Headcount Has Risen but Economic Impact Remains Small," *Working Economics*, Economic Policy Institute, June 28, 2018.
[16] Ursula Huws et al., *Work in the European Gig Economy: Research Results from the UK, Sweden, Germany, Austria, the Netherlands, Switzerland and Italy* (Brussels: Foundation for European Progressive Studies, 2017).
[17] John Hawksworth and Robert Vaughan, *The Sharing Economy: How Will It Disrupt Your Business?* (London: PricewaterhouseCoopers, August 2014).
[18] Boeri et al., "Solo Self-Employment and Alternative Work Arrangements."
[19] Katz and Krueger, "Rise and Nature of Alternative Work Arrangements."

growth of these alternative labor arrangements.[20] For example, apart from the standard problems of sampling and survey methods, Katz and Krueger suggest that a higher unemployment rate could lead to more gig work, and thus differences in timing of any given study could lead to different estimates of the size of gig work. Other economists also outline problems that exist in both household survey measurements and some official tax documentation that make it difficult to properly capture the size or growth of this workforce.[21]

Research on the gig economy also attempts to unpack the type of platforms (labor or capital) and industry, with much attention to transportation industries.[22] Moreover, there is discussion about the demographics and composition of the independent workforce. The BLS found that one out of three independent contractors is age 55 or older, and another high-profile survey found that 45–54 is the age group with the largest percentage of "solo-self-employed" workers in the United States.[23]

Scholars are also interested in examining the presence of women in these independent work opportunities. Using tax data, Brett Collins and coauthors find that, while independent work is more common among men, the participation in independent contracting since 2000 has grown significantly more among women.[24] Economists Lawrence Katz and Alan Krueger also find that between 1995 and 2015, the growth in alternative work arrangements was driven primarily by women.[25] Katz and Krueger also show that women are more likely than men to be

[20] Katz and Krueger, "Understanding Trends in Alternative Work Arrangements."
[21] Collins et al., "Is Gig Work Replacing Traditional Employment?"; Katharine G. Abraham and Ashley Amaya, "Probing for Informal Work Activity" (NBER Working Paper No. 24880, National Bureau of Economic Research, Cambridge, MA, August 2018); Katharine G. Abraham et al., "Measuring the Gig Economy: Current Knowledge and Open Issues" (NBER Working Paper No. 24950, National Bureau of Economic Research, Cambridge, MA, August 2018).
[22] Farrell, Greig, and Hamoudi, *Online Platform Economy in 2018*.
[23] Boeri et al., "Solo Self-Employment and Alternative Work Arrangements"; BLS, "Contingent and Alternative Employment."
[24] Collins et al., "Is Gig Work Replacing Traditional Employment?"
[25] Katz and Krueger, "Rise and Nature of Alternative Work Arrangements."

employed in alternative work arrangements.[26] Abigail Hunt and Emma Samman summarize several such studies and conclude that the share of gig economy workers who are women ranges from 33 to 55 percent in the United States, from 31 to 52 percent in the United Kingdom, and from 39 to 52 percent in continental Europe.[27] Survey research on the motivations for pursuing independent work suggests women may prefer it because of the flexibility granted by independent work arrangements.[28] For example, a 2017 HyperWallet survey of women who use digital platforms for work found that 96 percent of such women indicate flexible working hours as the primary benefit of platform-economy work.[29]

Most surveys of independent workers thus point to a unifying theme regarding alternative labor arrangements: they are often desirable because of the flexibility they provide workers. The BLS survey found that 79 percent of independent contractors preferred their arrangement over a traditional job, and fewer than 1 in 10 independent contractors would prefer a traditional work arrangement.[30] The report "Freelancing in America: 2019" also found that that 71 percent of individuals engaging in freelancing appreciate the increased flexibility of their work, and 46 percent state that freelancing gives them the flexibility they need because they are unable to work for a traditional company owing to personal circumstances.[31] In a survey of 5,578 individuals across the United States, United Kingdom, and Italy, researchers also found that among self-employed with workers and solo self-employed (those without workers), "the degree

[26] In 2019, Katz and Krueger provided a revised analysis to reconcile with the BLS findings. See Katz and Krueger, "Understanding Trends in Alternative Work Arrangements." However, this new paper does not provide revisions on the proportion of women in alternative work arrangements.
[27] Abigail Hunt and Emma Samman, "Gender and the Gig Economy: Critical Steps for Evidence-Based Policy" (ODI Working Paper No. 546, Overseas Development Institute, London, January 2019).
[28] HyperWallet, "The Future of Gig Work Is Female: A Study on the Behaviors and Career Aspirations of Women in the Gig Economy," 2017; MBO Partners, *State of Independence in America*, 2016–2019; Manyika et al., *Independent Work*.
[29] HyperWallet, "Future of Gig Work Is Female."
[30] BLS, "Contingent and Alternative Employment."
[31] Edelman Intelligence, "Freelancing in America: 2019."

of flexibility that self-employed work offers seems likely to be the main driver of relatively high levels of satisfaction . . . followed by the possibility to work from home for the solo self-employed."[32] Studies from MBO Partners, EY Global, and McKinsey Global Institute and surveys of workers on platforms such as Uber and Lyft all point to flexibility as the desirable characteristic of their alternative job arrangements.[33]

3. Transaction Cost Framework for Independent Work and the Gig Economy

An influential theoretical framework for questions regarding contracting versus employment is transaction cost economics (TCE) and the related branches of property rights theory and asset ownership. Ronald Coase first introduced the concept of transaction costs, which refers to all costs associated with carrying out an exchange: costs of originating, negotiating, consummating, monitoring, and enforcing a contract for any given exchange.[34] According to Coase, transaction costs in the market relative to those within the firm give rise to firm creation and growth when it is less costly for firms to set up and create one employment contract for a job that has to be done repeatedly rather than creating a series of contracts in the market.[35] Subsequent research has since identified particular types of transaction costs, such as search, bargaining, monitoring, and measurement costs.[36]

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[32] Boeri et al., "Solo Self-Employment and Alternative Work Arrangements," 180.
[33] David Storey, Tony Steadman, and Charles Davis, "How the Gig Economy Is Changing the Workforce," EY Global, November 20, 2018, https://www.ey.com/en_gl/tax/how-the-gig-economy-is-changing-the-workforce; MBO Partners, *The State of Independence in America, 2018: The New Normal* (Herndon, VA: MBO Partners, 2018); Manyika et al., *Independent Work.*
[34] Ronald Coase, "The Nature of the Firm," *Economica* 4, no. 16 (1937): 386–405.
[35] Coase explains that the owner "does not have to make a series of contracts with the factors with whom he is cooperating within the firm, as would be necessary of course, if this cooperation were a direct result of the working of the price mechanism." Coase, "Nature of the Firm," 391.
[36] Armen A. Alchian and Harold Demsetz, "Production, Information Costs, and Economic Organization," *American Economic Review* 62 (1972): 777–95; Oliver E. Williamson, "The Economics of Organization: The Transaction Cost Approach," *American Journal of Sociology* 87 (1981): 548–77; Steven N. S. Cheung, "The Contractual Nature of the Firm," *Journal of Law and Economics* 26, no. 1 (1983): 1–21; Sanford J. Grossman and Oliver D. Hart, "The

In unpacking this research to understand why some jobs may be employment jobs while others may be contracting jobs, we start with the work by economists Armen Alchian, Harold Demsetz, and Steven Cheung.[37] Workers can sell their labor either directly to a consumer or indirectly through a firm. Under the latter arrangement, workers enter into a contractual arrangement with the firm where they surrender some decision rights over their production activities to the employer in exchange for an income, which then allows the employer or firm to direct workers' production activity.[38]

From a firm's perspective, it may choose to hire individuals and pay them income to gain the ability to direct their production activities, or it may choose to buy individuals' services directly from the market, as would be the case if a firm is paying a contractor. From a consumer's perspective, he or she may directly purchase the service from the labor supplier—such as by finding and paying a housekeeper directly for cleaning services. Or the consumer may pay a cleaning company that employs housekeepers, and the cleaning company would direct a housekeeper to provide cleaning services for the consumer.

From the worker's, firm's, and consumer's perspectives, a clear distinction arises from these transactions' arrangements. In one case, the worker is an employee of a firm, and in the other case, the worker is essentially self-employed.

Transaction cost economics offers three key determinants for whether a contractor or employee is more likely to be observed in certain occupational roles. Some jobs require team or joint production, and in some cases of team production, it is difficult to ascertain and separate

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Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy* 94 (1986): 691–719; Oliver Hart and Bengt Holmström, "The Theory of Contracts," in *Advances in Economic Theory, Fifth World Congress* (Econometric Society Monographs), ed. Truman F. Bewley (Cambridge: Cambridge University Press, 1987), 71–156.

[37] Alchian and Demsetz, "Production, Information Costs, and Economic Organization"; Cheung, "Contractual Nature of the Firm."

[38] Cheung, "Contractual Nature of the Firm."

each worker's contribution to overall team output.[39] Cheung explains: "When input owners work in collaboration, in some situations the contribution of each may not be easily delineated."[40] In these cases, such workers would be employed by a firm, and the firm would in turn pay them an income while monitoring and measuring the individual worker's input, such as hours worked, as a proxy for the worker's output. Conversely, if the characteristics of an activity are such that an individual worker's contributions are easily definable and measurable, then either consumers or firms could directly buy the worker's output on the market.

For instance, it is easier to commission a writer to produce a screenplay than it is to contract separately with many lawyers to structure an acquisition. Screenwriting is an individual task, so a consumer or a firm can simply pay a screenwriter for a finished product. Structuring an acquisition requires many workers' collective efforts and may require several thousand person-hours of work to be completed in a few weeks' time, thereby making it difficult to correlate an individual lawyer's effort to the marginal increase in achieving a successful result. Thus, hiring a law firm and allowing the firm to monitor the workers is more economical.[41]

Although a final output may require team production, if individual worker contributions to the final output are easily definable and separable, such jobs need not occur through an employer–employee arrangement and may still economically be arranged through independent contractors.

Consider the following two examples: A movie requires the labor supplied from actors, directors, screenwriters, costume designers, makeup artists, sound specialists, and so on.

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[39] Alchian and Demsetz, "Production, Information Costs, and Economic Organization"; Cheung, "Contractual Nature of the Firm."
[40] Cheung, "Contractual Nature of the Firm," 8.
[41] Oliver Williamson, refers to this type of transaction cost as "the ease with which the productivity of human assets can be evaluated," Williamson, "Economics of Organization," 564. In the transaction cost literature, monitoring costs are a type of transaction cost that if decreased, would lead to greater usage of contract labor. It is important to note, however, that if technology reduces specifically the *input* monitoring costs, this can lead to a greater use of employees rather than contractors, given other factors for why firms are relying on the proxy measure of inputs rather than outputs. Cheung, in "The Contractual Nature of the Firm," elaborates on this analysis.

Although the final output requires a team of many individuals to produce it, individual worker contributions are relatively easily definable and separable. We can separate the contribution of the costume designer from that of the actor and that of the editor. Whether a particular costume for a scene is prepared does not depend on whether the actor showed up with his or her lines memorized for that day's scene. Most workers who come together to produce the final product, the movie, are freelancers (actors, designers, sound specialists, technical writers, etc.). When the production of this movie is over, they may be unemployed until the next project. This short-term, project-based business with reliance on self-employed and freelance actors, screenwriters, costume designers, makeup artists, and directors is known as the Hollywood model.[42]

Now, consider the recent technological advancements that have led to high-level decomposition of software design, which is called modular programming. In this model, code is written in a set of discrete, independent, interchangeable modules. This technique allows for the separation of individual contributions. Each module contains everything necessary to perform just one aspect of the overall program's function. This approach is distinguishable from a monolithic application in terms of both code structure and industrial organization. With modular programming, no one person or team is responsible for creating the entire program. Instead, the program is broken down into discrete projects. Each project can be completed by a small team or even one person. The success or failure of each project can be easily evaluated by determining whether the module performs its discrete function.

Modular programming can thus drastically improve the separability of workers' individual contributions to software coding. Instead of the entire program either working or not (which makes it difficult to determine which programmer broke the code), modules—the output—can more

[42] See, for example, discussion of the Hollywood model in Adam Davidson, "What Hollywood Can Teach Us about the Future of Work," *New York Times Magazine*, May 5, 2015.

easily be measured and attributed to individual worker efforts. As with the Hollywood model, although the final output (the overall program) requires a team, individual worker contributions can be separable because there are independent modules built into the team production process.

Transaction cost economics thus highlights that certain outputs may require team production and cooperation where it is difficult to ascertain and separate individual worker contributions to output. In such cases, it may be more economical for certain jobs to be performed by employees, where a manager measures and monitors individual worker inputs as a proxy for their output. Where output requires less team production and coordination, or where output is more easily measured and separable, it may be more economical for certain jobs to be performed by contractors rather than employees.

4. Data and Empirical Analysis

4.1 Independent Work Characteristics

We empirically examine whether independent work relies less on team production, coordination, and greater separability of output than does traditional employment. To do so, we use the O*Net database, which is sponsored by the Department of Labor and contains hundreds of job characteristics for more than 900 occupations.

O*Net collects data for each work characteristic through ongoing surveys of workers across all 900-plus occupations and supplements these surveys, in some cases, with occupation experts. The value of each work characteristic ranges from 0 to 100 and measures the average importance or average level of the work characteristic for each occupation. A higher value indicates greater importance or a higher level of that characteristic in a specific occupation. The average importance and average level of each characteristic are calculated from the participants' responses to survey questions.

For oral comprehension, for instance, the survey asks: "How important is oral comprehension to the performance of your job?" and "What level of oral comprehension is needed to perform your job?" In occupations where respondents indicate on average greater importance for oral comprehension and a higher level of oral comprehension needed to perform the job, oral comprehension work characteristic values would be closer to 100. For example, physicians, judges, and magistrates have the highest values for oral comprehension importance (91–100) and level (71), whereas textile workers and vehicle cleaners show the lowest values for oral comprehension importance (38) and level (29–39).

We selected the work characteristics from O*Net that best measure various aspects of team production, coordination, and separability of outputs. The selected work characteristics are as follows:

1. *Communicating with supervisors, peers, or subordinates:* How important is it to provide information to supervisors, co-workers, and subordinates by telephone, in written form, through e-mail, or in person?

- Occupations that place greater importance on or require a higher level of communication with team members indicate team production and coordination. Such occupations are thus less likely to be offered through gig economy platforms.

2. *Coordinating the work and activities of others:* How important is it to get members of a group to work together to accomplish tasks?

- Occupations that place greater importance on or require a higher level of coordinating work activities indicate team production and coordination. Such occupations are less likely to be offered through gig economy platforms.

3. *Guiding, directing, and motivating subordinates:* How important is it to provide guidance and direction to subordinates, including setting performance standards and monitoring performance?

- Occupations that place a greater importance on or require a higher level of directing and monitoring indicate team production and coordination. Such occupations are less likely to be offered through gig economy platforms.

4. *Coordinating or leading others:* How important is it to coordinate or lead others in accomplishing work activities in the job?

- Occupations that place greater importance on coordinating and leading others indicate team production and coordination. Such occupations are less likely to be offered through gig economy platforms.

5. *Working with a work group or team*: How important is it to work with others in a group or team in the job?

- Occupations that place greater importance on working with others in a work group or team indicate greater team production and coordination. Such occupations are less likely to be offered through gig economy platforms.

6. *Taking responsibility for outcomes and results of other workers:* How responsible is the worker for work outcomes and results of other workers?

- Occupations where workers are responsible for the outcomes of others indicate team production, coordination, and less separability of individual output. Such occupations are less likely to be offered through gig economy platforms.

7. *Making decisions that affect co-workers or company results:* What results do the workers' decisions usually have on other people or the image, reputation, or financial resources of the employer?

- Occupations where workers' decisions have a significant effect on other workers indicate team production, coordination, and less separability of individual output. Such occupations are less likely to be offered through gig economy platforms.

The first three selected work characteristics have a measure of both importance and level (i.e., communicating with supervisors, peers, or subordinates; coordinating the work and activities of others; and guiding, directing, and motivating subordinates), while the remaining characteristics measure only importance. Importance may measure, for example, "How important is communicating with supervisors, peers, or subordinates to the performance of your current job?," whereas level measures "What level of communicating with supervisors, peers, or subordinates is needed to perform your current job?" Table 1 presents descriptive statistics for the seven selected work characteristics across all occupations in the O*Net database.

Table 1. Summary Statistics of Work Characteristics

Work characteristic	Obs.	Mean	Std. dev.	Min.	Max.
Communicating with supervisors, peers, or subordinates					
Importance	967	74.404	11.210	26	96
Level	968	61.723	11.647	24	88
Coordinating the work and activities of others					
Importance	961	52.412	14.262	4	97
Level	968	49.196	13.668	11	88
Guiding, directing, and motivating subordinates					
Importance	954	46.747	15.900	0	90
Level	968	42.840	15.685	0	86
Coordinating or leading others	968	63.536	13.973	10	94
Working with a work group or team	967	79.297	11.827	25	100
Taking responsibility for outcomes and results of other workers	968	57.158	15.483	6	96
Making decisions that affect co-workers or company results	967	70.895	12.431	24	100
Independent work index	950	60.108	10.205	24.2	86.6

Note: Not all work characteristics measure both importance and level. In the absence of a distinction, the work characteristics measure importance. The independent work index is a simple mean of the selected work characteristics.

4.2 Independent vs. Nonindependent Work Occupations

To systematically examine the differences in the importance and level of these work characteristics between independent work and traditional employment, we first classified occupations as independent or nonindependent work occupations. We created a list of available digital platforms in the United States, including companies such as Uber, Fiverr, Upwork, Etsy, and TaskRabbit, along with any occupational roles offered through those platforms that also appear in the O*Net database. Any O*Net occupation that is available through at least one digital platform we classified as independent work. All other O*Net occupations were classified as nonindependent work. This classification process excluded from the independent work category any alternative labor arrangements that are not currently offered through a digital platform.

Independent workers found in these digital platforms include musicians, actors, ride-sharing drivers, maintenance contractors such as electricians and plumbers, and high-skilled contractors such as software developers. Multiple platforms sometimes offer the same occupational role. For instance, Uber, Lyft, and Via drivers are all matched with the O*Net occupation of Taxi Drivers and Chauffeurs, which is classified as independent work. Care.com and UrbanSitter nannies are similarly matched with the O*Net occupation of Nannies.

Appendix A lists all 100 digital platforms.[43] Appendix B lists all 122 occupational roles available through digital platforms along with their corresponding O*Net occupation. In contrast, appendix C contains a partial list of 50 selected occupations that were classified as nonindependent work.

[43] These are, to the best of our knowledge, all the digital platforms active in the United States as of February 2020.

4.3 Differences in Work Characteristics between Independent and Nonindependent Work

We tested the differences in average importance or level of each of the work characteristics indicating team production, coordination, and separability of individual output between independent and nonindependent work occupations. We also took the simple mean of these work characteristics to create an independent work index. This index allowed us to roughly aggregate for each occupation the overall importance and level of work characteristics indicating team production, coordination, and separability of outputs. We tested the differences in the independent work index between independent and nonindependent work occupations.

We used a bivariate ordinary least squares (OLS) regression with robust standard errors for each of our tests of differences; the results are in table 2. Our results suggest significant differences in the importance and level of each individual work characteristic between independent and nonindependent work occupations. While the level of *coordinating the work activities of others* is not statistically significant, its sign is consistent with that of the importance measure of this characteristic. Table 2 also shows a statistically significant difference in the independent work index between independent and nonindependent work occupations. Overall, these differences suggest that independent work occupations generally exhibit less team production, coordination, and separability of individual outputs relative to nonindependent work occupations.

Our results suggest that there are significant differences in the nature and work context between independent and traditional work that go beyond the latter's relative "stability of work." The average difference in *taking responsibility for outcomes and results of other workers*, for instance, suggests that a movement from a nonindependent to an independent work occupation would decrease a typical worker's responsibility for the outcomes and results of other workers by

approximately 5.1 points. This difference is equivalent to about a third of a standard deviation and is comparable to shifting a worker from a nurse practitioner role to a makeup artist.

Table 2. Differences in Average O*Net Characteristics in Independent vs. Nonindependent Occupations

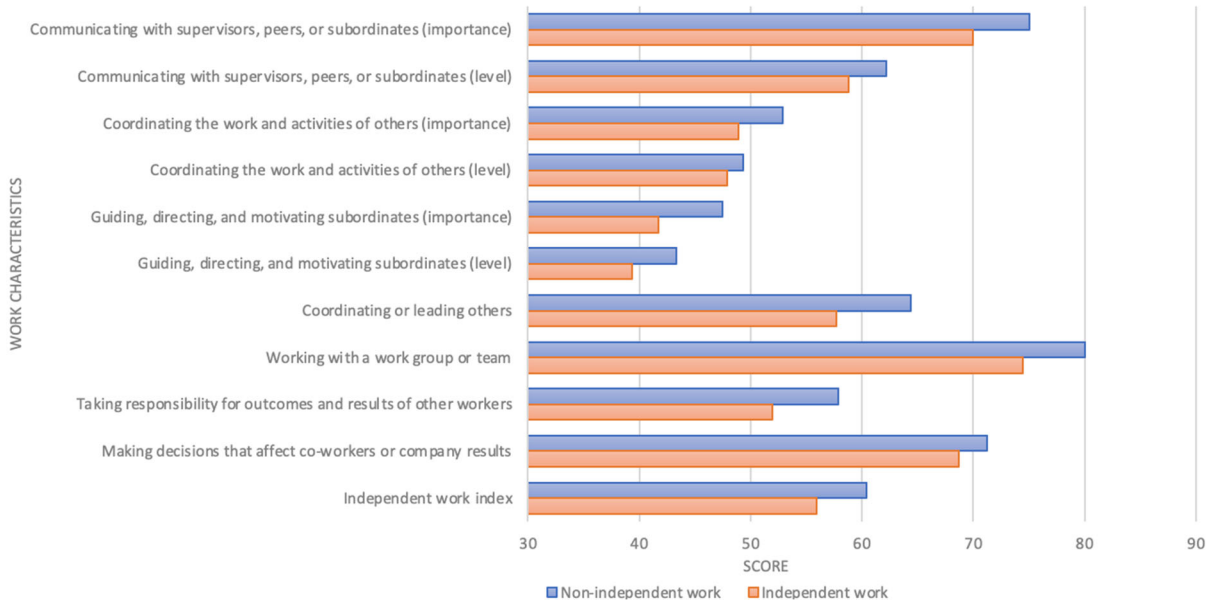
Work characteristic	Gig	Std. error	Obs.
Communicating with supervisors, peers, or subordinates			
Importance	−4.148***	1.253	968
Level	−2.366*	1.238	967
Coordinating the work and activities of others			
Importance	−3.144**	1.491	968
Level	−0.808	1.449	961
Guiding, directing, and motivating subordinates			
Importance	−5.009***	1.559	968
Level	−3.405**	1.550	954
Coordinating or leading others	−5.603***	1.402	968
Working with a work group or team	−4.476***	1.348	967
Taking responsibility for outcomes and results of other workers	−5.095***	1.387	968
Making decisions that affect co-workers or company results	−2.074*	1.173	967
Independent work index	−3.328***	1.049	950

Note: Not all work characteristics measure both importance and level. In the absence of a distinction, the work characteristics measure importance. Data are taken from O*Net. OLS with robust standard errors reported in each row. The independent work index is a simple mean of the selected work characteristics. Coefficient on binary variable *IndependentWork* equal to 1 if the occupation is considered an independent work occupation reported in first column. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Similarly, the average difference in *coordinating or leading others* suggests that a movement from a nonindependent to an independent work occupation would decrease the importance of a typical worker coordinating or leading others by approximately 5.6 points. This difference is equivalent to about 0.4 of a standard deviation and is comparable to shifting a worker from a human resource manager position to an electrician.

Figure 1 illustrates the differences in average work characteristics across independent versus nonindependent work.

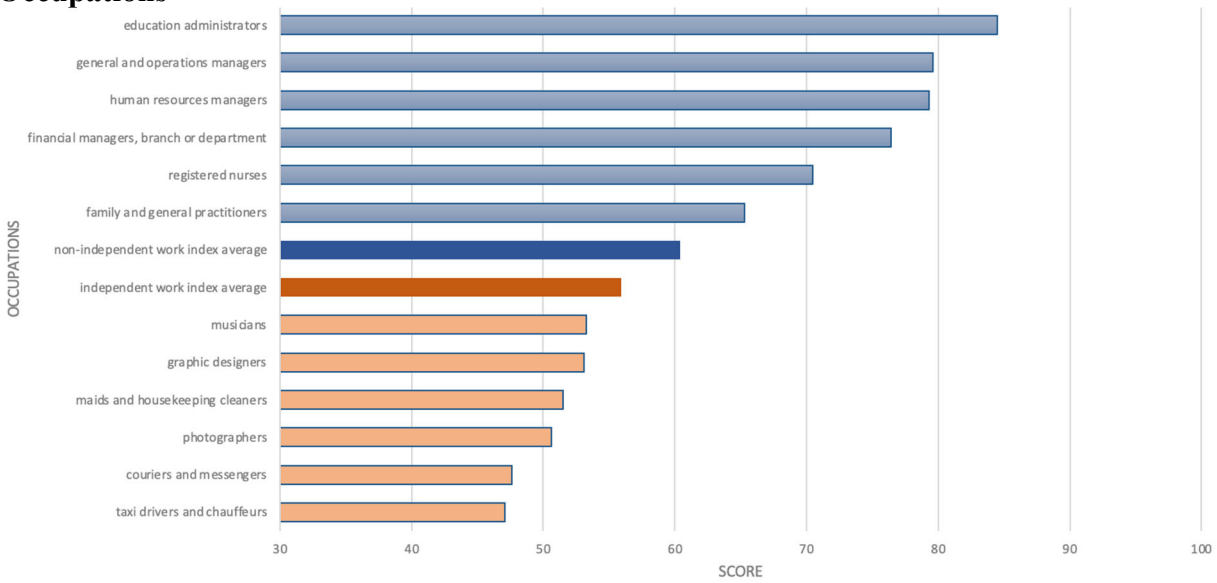
Figure 1. Differences in Average Work Characteristics across Independent vs. Nonindependent Work



Moreover, our independent work index helps summarize the overall differences in work characteristics indicative of team production, coordination, and separability of individual output. A movement from a nonindependent to an independent work occupation reduces the index by approximately 3.3 points. This difference is comparable to shifting a worker from a financial quantitative analyst to a personal care aide. To further illustrate the differences in the independent work index, figure 2 depicts these work characteristics across some common examples of independent work (in orange) and nonindependent work occupations (in blue). We chose examples from the more extreme ends of the independent work index and ones that would be well known to most readers. For independent workers who scored lower in our index, we selected three typical gig jobs (taxis and chauffeurs, maids and housekeeping cleaners, messengers and couriers) and three typical freelance jobs (photographers, musicians, and graphic designers). As examples of nonindependent work occupations, we included human resources managers, education administrators (elementary and secondary school), registered

nurses, general and operational managers, financial managers, and family and general practitioners.

Figure 2. Independent Work Index across Selected Independent vs. Nonindependent Work Occupations



Note: blue = nonindependent work; orange = independent work.

As a reference point, we include the average independent work index for each group. As figure 2 depicts, occupations such as taxi drivers, couriers, and messengers are well below the independent work group average—meaning that these are occupations that have much less reliance on team production and coordination and have greater separability of individual outputs relative to nonindependent work occupations. If we compare the extremes, education administrators score almost twice as high as taxi drivers and chauffeurs in the independent work index (84.5 versus 41.7).

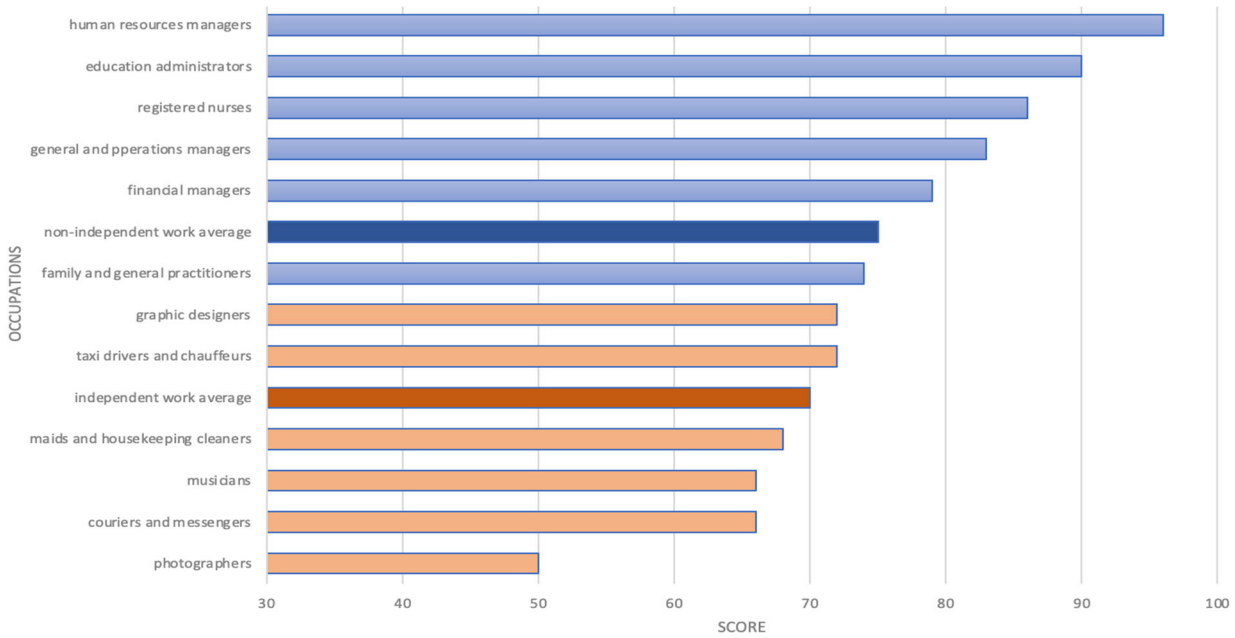
Figure 3 provides a selection of four work characteristics across those same examples of occupations, independent versus nonindependent work. We also include the average score for each group as a reference point. Panel C, "Taking responsibility for outcomes and results of

other workers," for instance, again shows the extremes of education administrators scoring twice as high for this work characteristic compared with taxi drivers and chauffeurs (90.1 versus 41.0). Couriers and messengers, in contrast, even though they are independent workers, score above the nonindependent work group average for this work characteristic.

Although our approach is straightforward and by no means definitive, our results are consistent with the literature and suggest that occupations requiring greater team production and coordination and exhibiting low separability of individual output are more likely to be employment-based than contractor-based.

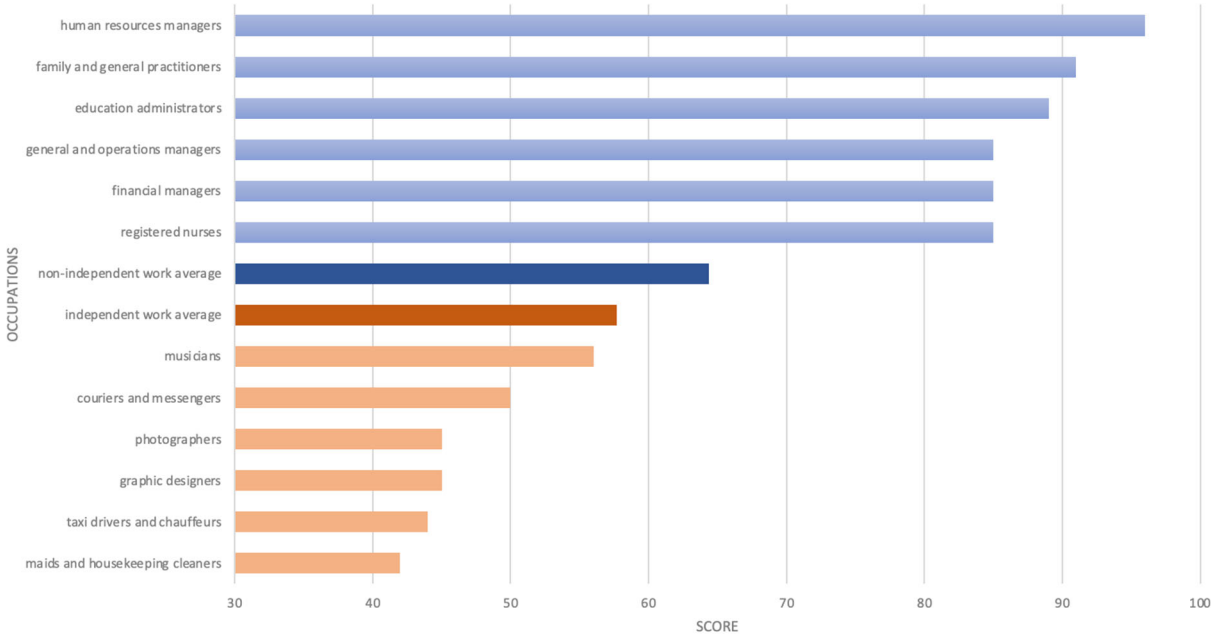
Figure 3. Work Characteristics across Selected Independent vs. Nonindependent Occupations

Panel A: Communicating with supervisors, peers, or subordinates (importance)



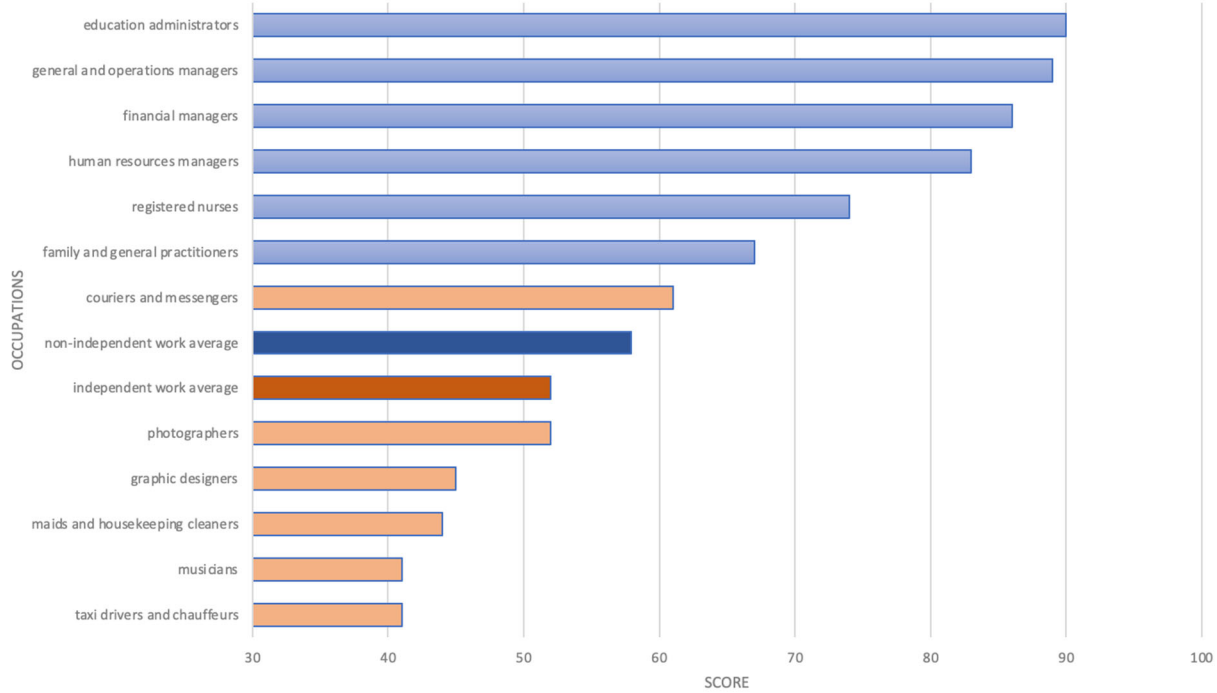
Note: blue = nonindependent work; orange = independent work.

Panel B: Coordinating or leading others



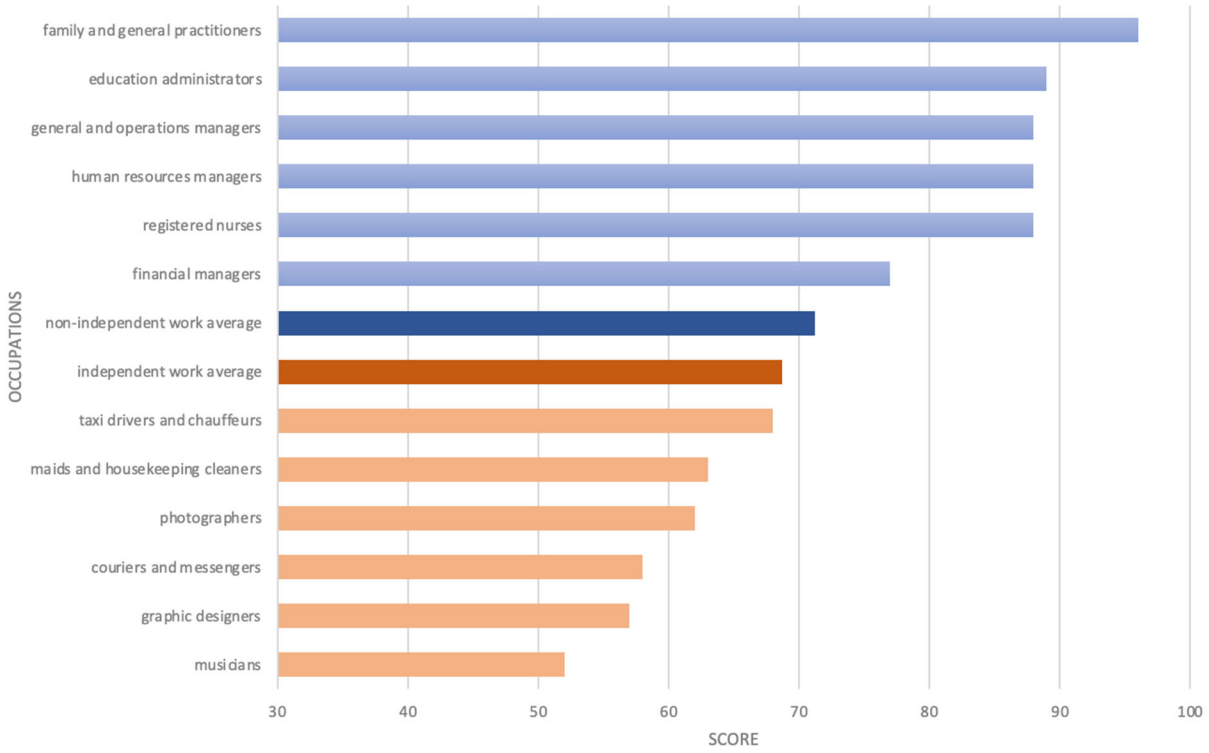
Note: blue = nonindependent work; orange = independent work.

Panel C: Taking responsibility for outcomes and results of other workers



Note: blue = nonindependent work; orange = independent work.

Panel D: Making decisions that affect co-workers or company results



Note: blue = nonindependent work; orange = independent work.

4.4 Robustness Checks for Differences in Work Characteristics between Independent Work and Nonindependent Work

Our comprehensive yet simple classification of independent versus nonindependent work occupations results in a broad category of occupations that constitute independent work and is thus likely overly inclusive. For example, if one can contract with an accountant through a digital platform, we classify that occupation as independent work, even though most accountants may be traditional employees. This would bias the tests performed against finding significant differences in work characteristics between independent and nonindependent work occupations by including some of the nonindependent work occupations into the independent work category.

The distinction between independent versus nonindependent work is, of course, not actually binary, but continuous. Within each of the 122 occupations that we have broadly

classified as independent work, some fraction of workers will be employed through digital platforms as independent contractors, freelancers, and so forth, whereas the remaining workers will be employed in traditional work arrangements. We thus provide four alternative methods of narrowing the categories of occupations that are more likely to compose the independent workforce:

1) Using data on the percentage of workers who report being self-employed, we maintain as independent work only those occupations in our existing independent work category with an above-median percentage of workers who report being self-employed. We also create a similar but even narrower category of independent work occupations by using the 75th percentile instead of the median.
2) Using data on the percentage of workers who report being self-employed and unincorporated, we maintain as independent work occupations only those occupations in our existing independent work category with an above-median percentage of workers who report being self-employed and unincorporated. We also create a similar but even narrower category of independent work occupations by using the 75th percentile instead of the median.
3) Using data on the percentage of workers who report being independent contractors, we maintain as independent work occupations only those occupations in our existing independent work category with an above-median percentage of workers who report being independent contractors. We also create a similar but even narrower category of independent work occupations by using the 75th percentile instead of the median.
4) Using data on the percentage of workers who report being independent contractors and having no employees, we maintain as independent work occupations only those

occupations in our existing independent work category with an above-median percentage of workers who report being independent contractors and having no employees. We also create a similar but even narrower category of independent work occupations by using the 75th percentile instead of the median.

Methods 1 and 2 use data from the February 2020 basic Current Population Survey—the latest available figures before the COVID-19 pandemic. Methods 3 and 4 use data from the May 2017 Current Population Survey's Contingent and Alternative Employer Arrangements—the latest available figures from this survey.[44]

Table 3, panel A, shows qualitatively similar results to those in table 2, with statistically significant differences in the importance of each individual work characteristic indicating team production, coordination, and separability of outputs, as well as a statistically significant difference in the independent work index between independent and nonindependent work occupations. In fact, the magnitude of such differences between independent and nonindependent work occupations is larger than under the broader independent work category, consistent with the fact that a broader classification of occupations into independent work would bias the results against finding significant differences.

Similarly, table 3, panel B, shows qualitatively similar results to those of panel A, using the even narrower classification of independent work occupations with the 75th percentile rather than the median percentage of workers reporting self-employment, unincorporated self-employment, independent contracting, and independent contracting with no employees. These results should be interpreted with additional caution because the independent work category becomes so narrow that only 30 occupations out of the total 968 are classified as independent work.

[44] Sarah Flood et al., Integrated Public Use Microdata Series, Current Population Survey: Version 8.0 [dataset] (Minneapolis, MN: IPUMS, 2020), https://doi.org/10.18128/D030.V8.0.

5. Implications for Policy and Labor Law

Most individuals working as independent workers broadly, and through the gig economy specifically, are considered "independent contractors" or "1099 workers" or "self-employed" individuals. Traditional employees are instead considered "W-2 workers." These terms come from an Internal Revenue Service distinction that requires those who hire employees to file a W-2 form and those who hire contractors to file a 1099 form.

There are also regulatory differences for these two types of workers. Companies must meet a set of labor requirements for employees but not for contractors who are working with them. Some of these labor laws include the Fair Labor Standards Act, which requires employers to meet minimum wage and overtime requirements for their employees; the Employment Retirement Income Security Act, which regulates the standards employers must meet for aspects of employees' benefit plans, typically in the context of retirement; and the Family Medical Leave Act, which requires employers to provide eligible employees with up to 12 weeks of unpaid leave per year when those employees face vital life circumstances. Employers do not have to meet any of these requirements for workers who are contractors with the company.

Many gig economy platforms have experienced a wave of labor lawsuits that threaten the fundamental business structures of the on-demand economy. The problem regards the legal distinction between employees and contractors and the uncertainty surrounding whether some gig workers should be classified as contractors or employees. This problem has led to hundreds of class-action lawsuits across the country on the grounds of worker misclassification.

Table 3. Differences in Average O*Net Characteristics in Independent vs. Nonindependent Occupations According to Narrower Independent Work Classifications

Panel A: Independent occupations with above-median percentage of workers considered self-employed, unincorporated self-employed, independent contractors, and independent contractors with no employees

Work characteristic	Self-employed		Independent contractor		Obs.
	All	Unincorporated	All	No employees	
	(1)	(2)	(3)	(4)	
Communicating with supervisors, peers, or subordinates					
Importance	−7.325***	−7.542***	−7.111***	−8.213***	968
	(1.705)	(1.845)	(1.871)	(1.824)	
Level	−5.497***	−5.716***	−5.906***	−6.688***	967
	(1.650)	(1.740)	(1.793)	(1.756)	
Coordinating the work and activities of others					
Importance	−5.432***	−6.792***	−5.077**	−6.978***	968
	(2.088)	(2.226)	(2.123)	(2.115)	
Level	−3.802*	−4.367**	−3.40*	−5.438***	961
	(1.967)	(2.051)	(1.999)	(1.978)	
Guiding, directing, and motivating subordinates					
Importance	−5.807***	−7.438***	−6.162***	−7.246***	968
	(2.140)	(2.238)	(2.197)	(2.105)	
Level	−5.267**	−6.472***	−5.447***	−6.621***	954
	(2.061)	(2.126)	(2.074)	(2.000)	
Coordinating or leading others					
	−8.461***	−9.397***	−7.803***	−8.265***	968
	(2.051)	(2.038)	(2.118)	(2.143)	
Working with a work group or team					
	−8.046***	−8.168***	−6.998***	−8.082***	967
	(2.021)	(2.022)	(2.021)	(2.087)	
Taking responsibility for outcomes and results of other workers					
	−8.626***	−8.796***	−6.263***	−6.760***	968
	(2.043)	(2.131)	(2.204)	(2.190)	
Making decisions that affect co-workers or company results					
	−0.012	−1.566	−3.406**	−3.210*	967
	(1.623)	(1.714)	(1.656)	(1.733)	
Independent work index					
	−5.621***	−6.270***	−5.390***	−6.406***	950
	(1.485)	(1.519)	(1.516)	(1.505)	

Note: Data are taken from O*Net. OLS with robust standard errors reported in each cell. The independent work index is a simple mean of the selected work characteristics. Coefficient on four binary variables equal to one if the occupation is classified as an independent work occupation, *IndependentWorkA*, *IndependentWorkB*, *IndependentWorkC*, and *IndependentWorkD*, reported in each cell of columns (1) to (4) with standard errors in parentheses below.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Panel B: Independent occupations with 75th percentile or above percentage of workers considered self-employed, unincorporated self-employed, independent contractors, and independent contractors with no employees

Work characteristic	Self-employed		Independent contractor		Obs.
	All	Unincorporated	All	No employees	
	(1)	(2)	(3)	(4)	
Communicating with supervisors, peers, or subordinates					
Importance	−9.395***	−10.496***	−7.297***	−7.847***	968
	(2.698)	(2.624)	(2.525)	(2.433)	
Level	−8.039***	−9.897***	−4.943**	−5.115**	967
	(2.391)	(2.372)	(2.200)	(2.312)	
Coordinating the work and activities of others					
Importance	−6.067**	−6.170*	−3.590	−5.276**	968
	(2.772)	(3.221)	(2.674)	(2.680)	
Level	−5.191*	−5.251*	−2.610	−4.881*	961
	(2.763)	(2.858)	(2.691)	(2.598)	
Guiding, directing, and motivating subordinates					
Importance	−6.412**	−7.444**	−4.933**	−5.656**	968
	(3.198)	(3.310)	(2.463)	(2.811)	
Level	−7.784***	−8.014***	−5.203**	−6.201**	954
	(2.948)	(2.954)	(2.354)	(2.672)	
Coordinating or leading others					
	−8.190***	−9.635***	−7.020**	−7.400**	968
	(2.606)	(3.190)	(3.106)	(3.022)	
Working with a work group or team					
	−7.290**	−8.184**	−7.771***	−8.150***	967
	(3.008)	(3.200)	(3.020)	(3.143)	
Taking responsibility for outcomes and results of other workers					
	−7.800***	−9.485***	−6.045**	−6.593**	968
	(2.752)	(3.303)	(3.169)	(3.058)	
Making decisions that affect co-workers or company results					
	−1.921	−3.090	−0.545	−1.955	967
	(2.037)	(2.543)	(2.281)	(2.550)	
Independent work index					
	−7.109***	−7.107***	−5.295**	−6.200***	950
	(2.215)	(2.318)	(2.074)	(2.110)	

Note: Data are taken from O*Net. OLS with robust standard errors reported in each cell. The independent work index is a simple mean of the selected work characteristics. Coefficient on four binary variables equal to one if the occupation is classified as an independent work occupation, *IndependentWorkA*, *IndependentWorkB*, *IndependentWorkC*, and *IndependentWorkD*, reported in each cell of columns (1) to (4) with standard errors in parentheses below.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Uber alone, for example, has had more than 15 misclassification lawsuits in federal and California state courts. Lyft has similarly faced numerous misclassification lawsuits and settled a high-profile one in February 2016 with its California drivers. Handy, the "Uber for household cleaners," was also sued in California and Massachusetts for misclassification of workers.[45] HomeJoy, a company that provided similar on-demand household services, was sued multiple times after its launch. The former chief executive officer of HomeJoy cited the ongoing legal battles as one of the main reasons for shutting down the company. Instacart recently reclassified part of its workforce into part-time employees rather than contractors amid pressure from misclassification battles.[46] These are only a handful of examples illustrating the surge of misclassification lawsuits surrounding these gig companies.

California recently passed a bill (AB5) that would effectively require many independent contractors to become employees of the company instead.[47] Although the bill received significant pushback that led to exemptions for 57 types of independent contracting jobs and an exemption for gig economy platforms through the passage of California Proposition 22, other states may follow suit in the future.[48]

Our research indicates that there *are* real differences in the nature of work between these two types of jobs beyond the common perception that independent work or gig jobs are merely jobs that are mediated through a digital platform. These fundamental differences in the nature of work between independent workers and traditional employees perhaps appropriately justify why we see legal differences in worker classification between the two types of jobs, though they do

[45] For a list and detailed discussion of the employee–contractor misclassification lawsuits across gig economy platforms, see Palagashvili, "Disrupting the Employee and Contractor Laws."
[46] Carmel DeAmicis, "HomeJoy Shuts Down after Battling Worker Classification Lawsuits," *Vox*, July 17, 2015.
[47] For the status of AB5 and official document, see https://www.billtrack50.com/BillDetail/996562.
[48] For an overview of these exemptions, see Farren and Mitchell, "Exploring the Consequences of Worker Reclassification Proposals."

not imply that the worker classification categories should be binary.[49] Policies such as AB5 thereby overlook the diversity of work characteristics between independent work and employee jobs by attempting to fit both sets of jobs into the same legal worker classification, even when they exhibit intrinsic differences.[50]

There are also several reasons why limiting independent work characteristics may not result in a desirable outcome. A high-profile survey of self-employed workers found that the degree of flexibility that self-employed work offers seems to be the main driver of relatively high levels of satisfaction reported for this type of work.[51] The authors conclude that "one takeaway from these survey responses of gig workers is that policies which seek to regulate alternative work arrangements by limiting their flexibility may not be desirable."[52] The desire for work flexibility is a consistent theme among many different surveys on motivations for engaging in independent or gig economy work. This particular benefit is more pronounced for women, who may require more flexible work arrangements as primary caregivers.[53]

Moreover, research also suggests that individuals turn to independent work temporarily after the loss of income until they can find full-time employment. In a 2017 paper published in the *American Economic Review*, Katz and Krueger find that workers who "suffered a spell of unemployment are 7 to 17 percentage points more likely than

[49] Research has pointed to differences between "typical" independent contractors, as first defined by the Fair Labor Standards Act, and gig or freelance workers today. There have been several proposals to create a "third way" worker for gig or freelancers rather than try to fit gig and freelance workers into the independent contractor worker category.
[50] Among many others, the music industry in California began lobbying for an exemption to AB5 because of the problems it created for musicians, who tend to be freelancers. California recently approved an exemption for the music industry.
[51] Boeri et al., "Solo Self-Employment and Alternative Work Arrangements."
[52] Boeri et al., 182.
[53] HyperWallet, "The Future of Gig Work Is Female"; Manyika et al., *Independent Work*; Liz Hamel, Jamie Firth, and Mollyann Brodie, "Kaiser Family Foundation/New York Times/CBS News Non-Employed Poll," December 2014, 25; Janet H. Marler and George T. Milkovich, "Determinants of Preference for Contingent Employment" (CAHRS Working Paper No. 00-03, Center for Advanced Human Resource Studies, Ithaca, NY, January 2000).

observationally similar workers to be employed in an alternative work arrangement when surveyed 1 to 2.5 years later."[54] Their finding is consistent with several other papers' finding that individuals begin independent work after major reductions in income and use gig, freelancing, or contracting work as a way to smooth these temporary shocks to income.[55] Policies such as AB5 could eliminate this option and thereby worsen individuals' economic standing, especially during the COVID-19 pandemic.

Thus, instead of attempting to diminish the independent work opportunities that individuals choose because of their flexible arrangements or because of a recent loss to income, solutions could be reframed toward finding a way for these workers to obtain better worker benefits. For example, there have been discussions about creating a new category of workers who would be subject to some labor regulations but not others. Such a reform might include a separate tax classification. This idea is, in fact, not radical or even new. Countries such as Canada have already created two types of contractor categories, "dependent" and "independent," to better capture the different nature of the jobs. In the United States, there are already separate categories for certain types of workers who are exempt from some labor regulations. Wait staff, for example, have a different compensation structure and model, and as a category of workers, they have their own sets of rules and regulations that are separate from those of standard employees. Agricultural workers are also their own category of workers under the law and receive certain exemptions because the nature and compensation structure of their jobs do not fit neatly into the main two categories of employers versus contractors.

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[54] Lawrence F. Katz and Alan B. Krueger, "The Role of Unemployment in the Rise in Alternative Work Arrangements," *American Economic Review* 107, no. 5 (2017): 388.
[55] Dmitri K. Koustas, "What Do Big Data Tell Us about Why People Take Gig Economy Jobs?," *AEA Papers and Proceedings* 109 (2019): 367–71; Andrew Garin et al., "Is New Platform Work Different than Other Freelancing?" *AEA Papers and Proceedings* 110 (2020): 156–61; Dmitri K. Koustas, "Consumption Insurance and Multiple Jobs: Evidence from Rideshare Drivers" (working paper, October 2018), https://uchicago.box.com/v/DKoustas-Ride Smoothing-WP; Boeri et al., "Solo Self-Employment and Alternative Work Arrangements."

Former Deputy US Secretary of Labor Seth Harris and economist Alan Krueger have proposed a few guiding principles for how to classify the independent worker.[56] They provide an analysis of which labor law exemptions would make sense according to the nature of independent work. One of their guiding principles is the "immeasurability of work hours," and it refers to the challenges of gig economy workers in determining "work" and "nonwork" (and even "for whom work"). As a result, the authors argue that it makes little sense to apply hourly-based rules such as the minimum wage and overtime regulations. They conclude that "legal rules defining 'independent workers' can and should more closely reflect the actual experience of workers in that category than the current definitions of 'employee' and 'independent contractor.'"[57]

Other solutions should look to the broader underlying causes for a lack of benefits for independent contractors. Several scholars have pointed out that one obstacle to gig economy platforms providing health insurance and other benefits is that, if they did so, a legal factor that specifically looks for the presence of "benefits" for gig economy workers would threaten the business model for many of these platforms.[58] That is, if gig economy platforms provided benefits to their contractors, the IRS could use that fact as evidence that those contractors were in fact employees. To minimize risk to their business models, gig economy platforms may decide not to provide benefits. Several research papers now investigate a "middle category" that would address "portable benefits" for independent workers without having them reclassified as employees.

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[56] Harris and Krueger, "Proposal for Modernizing Labor Laws."
[57] Harris and Krueger, "Proposal for Modernizing Labor Laws."
[58] Harris and Krueger, "Proposal for Modernizing Labor Laws"; Liya Palagashvili, "Barriers to Portable Benefits Solutions for Gig Economy Workers" (Policy Paper No. 2020.010, Center for Growth and Opportunity at Utah State University, Logan, UT, October 2020); David Rolf, Shelby Clark, and Corrie Watterson Bryant, *Portable Benefits in the 21st Century* (Washington, DC: Aspen Institute Future of Work Initiative, 2016).

6. Conclusion

Independent work and the growing on-demand and crowdwork-based job opportunities facilitated by digital platforms that have emerged as the gig economy provide a unique opportunity to examine the differences in work context between alternative and traditional work arrangements. We provide results that suggest that these differences are significant by examining how three key factors—team production, coordination, and separability of output—vary across independent work versus traditional employment. Specifically, we find that gig and independent workers rely less on team production and coordination and have greater separability of individual work outputs.

Our paper contributes to the growing literature examining the nature of the gig economy and independent workers. It provides a richer context in understanding what work characteristics apply to independent and gig work versus traditional jobs, and it is a first attempt to create an independent work index that systematically categorizes job characteristics indicative of gig work, freelancing, contracting, and other types of external labor arrangements. This area of study can also be important in terms of speculation about the structural changes in labor markets: if more work becomes less team-production-based and more individual-output-based, will there be greater growth of independent work opportunities?

Our paper carries broad implications for policy and labor law. First, many digital platforms are currently facing legal challenges for misclassification of employees as 1099 contractors, and some state policies are attempting to severely limit independent work opportunities. Our findings, however, suggest that there are richer differences in work context beyond the fact that jobs are nonpermanent in nature for independent workers and others using alternative work arrangements. Such policies thereby overlook the diversity of work

characteristics across independent and traditional work arrangements by attempting to fit both types of jobs into the same legal worker classification, even when they exhibit intrinsic differences.

Second, the growth of independent workers presents a new challenge to significant portions of labor law because many, if not all, healthcare and retirement plan benefits associated with work are currently provided by employers. We believe further research on portable benefits policies may present a solution to this challenge posed by the growth in independent workers.

Appendix A: Gig Economy Platforms List

1) Addison Lee
2) Airbnb
3) Airtasker
4) Amazon Flex
5) Amazon Mechanical Turk
6) Andela
7) Bellhop
8) Bird
9) Blacklane
10) BoltBus
11) Care.com
12) Cargomatic
13) Carma
14) Catalant
15) Caviar
16) Couchsurfing
17) Crowdspring
18) Dolly
19) DoorDash
20) Drizly
21) easyCar
22) Easy Taxi
23) EatStreet
24) Etsy
25) Expert360
26) Fancy Hands
27) Farmdrop
28) Favor
29) Feastly
30) Field Agent
31) Field Nation
32) FitnessTrainer.com
33) Fiverr
34) FlipKey
35) Freelancer.com
36) Getaround
37) Gigster
38) goPuff
39) Graphite
40) GreenPal
41) Grubhub
42) Guru
43) Handiss
44) Handy
45) Heal.com
46) HelloTech
47) Helpling
48) HireAChef
49) HomeAdvisor
50) HomeAway
51) HopSkipDrive
52) InnoCentive
53) Instacart
54) Just Eat
55) JustPark
56) Lawn Love

57) Lazada Group
58) LegalZoom
59) Lime
60) Luxe
61) Lyft
62) Munchery
63) 99designs
64) Onefinestay
65) Pager
66) PeoplePerHour
67) Postmates
68) Rocket Lawyer
69) Rover.com
70) Reedsy
71) Shipt
72) Shyp
73) Sittercity.com
74) Soothe
75) Spin
76) Table at Home
77) Takl
78) Talkspace
79) TaskEasy
80) TaskRabbit
81) The Glam App
82) Thumbtack
83) Tongal
84) Topcoder
85) Turo
86) Tutor.com
87) Uber
88) Uber Eats
89) Udemy
90) UpCounsel
91) Upwork
92) UrbanSitter
93) Via
94) VIPKid
95) Vrbo
96) Wag
97) Wingz
98) Workpath
99) YourMechanic
100) Zeel

Appendix B: Digital Gig Platforms and Matched O*Net Occupations

O*Net occupations	Gig economy platforms
Accountants	Airtasker, Catalant, Fiverr, Freelancer.com, Graphite, Guru, Upwork, PeoplePerHour
Acupuncturists	Airtasker, Thumbtack, Thumbtack, Zeel
Actors	Airtasker, Catalant, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Advertising and promotion manager	Catalant, Fiverr, Graphite, Guru, PeoplePerHour, Upwork
Aerospace engineer	Guru, Handiss, Upwork
Agents and business managers of artists, performers, and athletes	Fiverr, Guru, Upwork
Agricultural engineers	Guru, Handiss, Upwork
Animal trainers	Airtasker, AskforTask, Care.com, Rover, Takl
Architects, except naval	Guru, Handiss, Upwork
Automotive master mechanics	Airtasker, AskforTask, Takl, YourMechanic
Barbers	Fiverr
Cabinetmakers and bench carpenters	Airtasker, Etsy, Fiverr, Takl, TaskRabbit, Thumbtack
Carpenters	Airtasker, Etsy, Fiverr, Takl, TaskRabbit, Thumbtack
Carpet installers	Airtasker, AskforTask, Handy, Takl, TaskRabbit, Thumbtack
Chemical engineers	Guru, Handiss, Upwork
Chiropractors	Fiverr
Civil engineers	Guru, Handiss, Upwork
Computer programmers	Airtasker, Catalant, FancyHands, Fiverr, Freelancer.com, Guru, PeoplePerHour, Topcoder, Upwork
Computer systems engineers and architects	Airtasker, Catalant, Fiverr, Freelancer.com, PeoplePerHour, Topcoder, Upwork

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O*Net occupations	Gig economy platforms
Computer user support specialists	Airtasker, AskforTask, Expert360, Freelancer.com, Fiverr, Graphite, HelloTech, Catalant, PeoplePerHour, Upwork
Community health workers	Airtasker, Heal.com, Pager
Construction laborers	Airtasker, Handiss, Takl
Construction managers	Graphite, Handiss
Couriers and messengers	Airtasker, Fiverr
Cooks, private household	Airtasker, Feastly, Table at Home, Thumbtack
Copy writers	Airtasker, Catalant, CrowdSpring, Expert360, Field Agent, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Dancers and choreographers	Airtasker, Catalant, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Data entry keyers	Airtasker, Catalant, FancyHands, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Database architects	Airtasker, Catalant, Expert360, Fiverr, Freelancer.com, Guru, PeoplePerHour, Topcoder, Upwork
Desktop publishers	Airtasker, Catalant, Guru, PeoplePerHour, Topcoder, Upwork
Dietitians and nutritionists	Airtasker, AskforTask, Thumbtack, Upwork
Drafters	FancyHands, Fiverr, Guru, Upwork
Driver/Sales Workers	Addison Lee, Amazon Flex, Cargomatic, Caviar, DoorDash, Drizly, EasyCar, Easy Taxi, EatStreet, Farmdrop, Favor, GoPuff, Grubhub, HopSkipDrive, Instacart, Just Eat, Munchery, Postmates, Shipt, Takl, Uber Eats
Drywall installers, ceiling tile installers, and tapers	Airtasker, Fiverr, Takl
Editors	Airtasker, Catalant, FancyHands, Fiverr, Freelancer.com, Guru, PeoplePerHour, Reedsy, Upwork
Electrical and electronics engineers	Guru, Handiss, Takl, Upwork
Electricians	

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O*Net occupations	Gig economy platforms
Electronic home entertainment equipment installers and repairers	Airtasker, AskforTask, Field Nation, Handy, HelloTech, Takl, TaskRabbit,Thumbtack
Engineers, all other	Guru, Handiss, Upwork
Environmental engineers	Guru, Handiss, Upwork
Fence erectors	Airtasker, Fiverr, Takl, Thumbtack
Film and video editors	Airtasker, AskforTask, Catalant, Freelancer.com, Fiverr, Guru, PeoplePerHour, Tongal, Upwork
Financial analysts	Catalant, Fiverr, Graphite, Guru, Toptal, Upwork
Fitness trainers and aerobics instructors	Airtasker, AskforTask, FitnessTrainer.com, Thumbtack, Zeel
Floral designers	Airtasker, AskforTask, Thumbtack
Fundraisers	Catalant, Fiverr, Guru, Upwork
Graphic designers	Airtasker, Catalant, Crowdspring, Fiverr, Freelancer.com, Guru, 99Designs, PeoplePerHour, Reedsy, Upwork
Hairdressers, hairstylists, and cosmetologists	Airtasker, Fiverr
Heating and air-conditioning mechanics and installers	Airtasker, AskforTask, Handy, Takl, TaskRabbit, Thumbtack
Hotel, motel, and resort desk clerks	Airbnb, CouchSurfing, FlipKey, HomeAdvisor, HomeAway, One Fine Stay, Vrbo,
Home appliance repairers	Airtasker, AskforTask, Field Nation, Handy, HelloTech, Takl, TaskRabbit, Thumbtack
Industrial engineers, including health and safety	Guru, Handiss, Upwork
Interpreters and translators	Airtasker, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Jewelers and precious stone and metal workers	Etsy, Freelancer.com, PeoplePerHour
Laborers and freight, stock, and material movers, hand	Airtasker, AskforTask, Bellhop, Dolly, Takl, TaskRabbit, Thumbtack
Landscaping and groundskeeping workers	Airtasker, AskforTask, GreenPal, LawninLove, Takl, TaskEasy, TaskRabbit, Thumbtack
Locksmiths and safe repairs	Airtasker, Freelancer.com, Takl

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O*Net occupations	Gig economy platforms
Maid and housekeeping cleaners	Airtasker, AskforTask, Handy, Helpling, Homejoy, Takl, TaskRabbit, Thumbtack
Makeup artists, theatrical and performance	Airtasker, AskforTask, Guru, TaskRabbit, The Glam App, Thumbtack
Management analysts	Catalant, Graphite, Guru, Upwork
Managers, all other	Catalant, Graphite, Guru, Upwork
Market research analysts and marketing specialists	Catalant, Fiverr, Freelancer.com, Guru, PeoplePerHour, Reedsy, Upwork
Marine engineers and naval architects	Guru, Handiss, Upwork
Marriage and family therapists	Fiverr, Talkspace, Thumbtack, Upwork
Mental health counselors	Airtasker, Fiverr, Talkspace, Thumbtack, Upwork
Massage therapists	Airtasker, Fiverr, Soothe, Thumbtack, Zeel
Materials engineers	Guru, Handiss, Upwork
Mechanical engineers	Guru, Handiss, Upwork
Meeting, convention, and event planners	Fiverr, Guru, Upwork
Mining and geological engineers, including mining safety engineers	Guru, Handiss, Upwork
Miscellaneous construction and related workers	Guru, Handiss, Takl, Upwork
Miscellaneous media and communication workers	Catalant, FancyHands, Fiverr, Guru, PeoplePerHour, Upwork
Miscellaneous personal appearance workers	Airtasker, AskforTask, Fiverr, TaskRabbit, The Glam App, Thumbtack
Miscellaneous vehicle and mobile equipment mechanics, installers, and repairs	Fiverr, Freelancer.com, PeoplePerHour, Takl
Models, demonstrators, and product promoters	Fiverr
Musical instrument repairers and tuners	Airtasker, AskforTask, Thumbtack
Musicians and singers	Airtasker, Catalant, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Nannies	Airtasker, AskforTask, Care.com, Sittercity.com, UrbanSitter

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O*Net occupations	Gig economy platforms
News analysts, reporters and correspondents	Fiverr, Upwork
Nuclear engineers	Guru, Handiss, Upwork
Operating engineers and other construction equipment operators	Guru, Handiss, Upwork
Online merchants	Carousell, Etsy, Lazada Group
Optometrists	PeoplePerHour, Upwork
Other healthcare practitioners and technical occupations	Airtasker, Freelancer.com, Upwork, Workpath
Other installation, maintenance, and repair work	Airtasker, AskforTask, Freelancer.com, Takl, Thumbtack
Painters, construction and maintenance	Airtasker, Etsy, Fiverr, Takl, Thumbtack
Painting workers	Airtasker, Etsy, Fiverr, Guru, Takl, Thumbtack
Paralegals and legal assistants	Airtasker, Catalant, Expert360, FancyHands, Fiverr, Freelancer.com, Guru, LegalZoom, PeoplePerHour, Rocket Lawyer, Thumbtack, UpCounsel, Upwork
Personal care aides	Airtasker, Care.com, Workpath
Petroleum engineers	Guru, Handiss, Upwork
Personal financial advisers	Catalant, Fiverr, Freelancer.com, Graphite, Guru, PeoplePerHour, Upwork
Phlebotomists	Workpath
Photographers	Airtasker, AskforTask, Fiverr, Freelancer.com, TaskRabbit, Thumbtack, Upwork
Plumbers, pipefitters, and steamfitters	Airtasker, Takl
Poets, lyricists, and creative writers	Airtasker, Freelancer.com, Guru, Tongal, Upwork
Proofreaders and copy markers	Airtasker, Catalant, Fiverr, Freelancer.com, Guru, PeoplePerHour, Reedsy, Upwork
Property, real estate, and community association managers	Catalant, Graphite, Guru, Upwork
Public relations specialists	Catalant, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork

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O*Net occupations	Gig economy platforms
Security and fire alarm systems installers	Airtasker, AskforTask, Freelancer.com, Takl, Thumbtack
Septic tank servicers and sewer pipe cleaners	Airtasker, Takl, Thumbtack
Shoe and leather workers and repairs	Airtasker, Etsy, Freelancer.com, PeoplePerHour, Upwork
Small engine mechanics	Airtasker, Freelancer.com, PeoplePerHour, Takl, Upwork
Software developers, applications	Airtasker, Andela, Catalant, Expert360, Gigster, Guru, Fiverr, Freelancer.com, PeoplePerHour, Topcoder, Upwork
Software developers, system software	Airtasker, Andela, Catalant, Gigster, Guru, Fiverr, Freelancer.com, PeoplePerHour, Topcoder, Upwork
Statistical assistants	Airtasker, Catalant, FancyHands, Fiverr, Freelancer.com, Graphite, Guru, PeoplePerHour, Upwork
Survey researchers	FancyHands, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Tailors, dressmakers, and sewers	Airtasker, Etsy, Freelancer.com, PeoplePerHour
Tax preparers	Airtasker, AskforTask, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Taxi drivers and chauffeurs	Addison Lee, Amazon Flex, Bridj, Cabify, HopSkipDrive, Lyft, Uber, Via
Television, video, and motion picture camera operations and editors	Guru, Upwork
Technical writers	Airtasker, Catalant, Crowdspring, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Textile knitting and weaving machine setters, operators, and tenders	Airtasker, Etsy, Freelancer.com
Textile, apparel, and furnishings workers, all other	Airtasker, Etsy, Freelancer.com
Therapists, all other	Upwork
Tutors	Airtasker, AskforTask, Care.com, Tutor.com, Udemy, Upwork, VIPKid
Tour and travel guides	PeoplePerHour, Upwork
Travel agents	PeoplePerHour, Upwork

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O*Net occupations	Gig economy platforms
Transportation workers, all other	Bird, Blacklane, BoltBus, Getaround, JustPark, Lime, Luxe, Spin, Takl, Turo, Via, Wingz
Upholsterers	Airtasker, Etsy, Freelancer.com
Video game designers	Airtasker, Fiverr, Freelancer.com, Guru, PeoplePerHour, Tongal, Upwork
Web administrators	Airtasker, Catalant, Expert360, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork
Web developers	Airtasker, Catalant, Expert360, Fiverr, Freelancer.com, Guru, PeoplePerHour, Upwork

Appendix C: Selection of Nonindependent Worker Roles

1) Airline pilots, copilots, and flight engineers
2) Ambulance drivers and attendants, except emergency medical technicians
3) Auditors
4) Billing, cost, and rate clerks
5) Broadcast news analysts
6) Cashiers
7) Chief executives
8) Compensation and benefits managers
9) Compliance managers
10) Concierges
11) Counter and rental clerks
12) Dentists, general
13) Dermatologists
14) Education administrators, elementary and secondary school
15) Elementary schoolteachers, except special education
16) Family and general practitioners
17) Financial managers
18) Flight attendants
19) General and operations managers
20) Hospitalists
21) Hosts, restaurant, lounge, and coffee shop
22) Human resources managers
23) Insurance underwriters
24) Investment fund managers
25) Judges, magistrate judges, and magistrates
26) Librarians
27) Loan counselors
28) Lodging managers
29) Medical secretaries
30) Nurse practitioners
31) Obstetricians and gynecologists
32) Occupational therapists
33) Optometrists
34) Pediatricians, general
35) Pharmacists
36) Physical therapists
37) Police patrol officers
38) Program directors
39) Property, real estate, and community association managers
40) Registered nurses
41) Sales managers
42) Secretaries and administrative assistants, except legal, medical, and executive
43) Social and community service managers
44) Spa managers
45) Surgeons
46) Technical directors or managers
47) Tellers
48) Transit and railroad police
49) Transportation managers
50) Veterinarians