Independent Contractors in the U.S.: New Trends from 15 years of Administrative Tax Data

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ABSTRACT

There is growing interest among policy makers and researchers in measuring the prevalence of independent contractors (ICs), partially due to concern that these workers do not enjoy the benefits provided to employees. However, identifying IC income is difficult because most existing datasets do not track it. We make two contributions to understanding changing patterns of IC income receipt. First, we translate the legal concept of an IC relationship into one that can be used to identify these relationships in tax data. Second, we use those data to establish several new empirical facts about individuals who receive IC income and the firms that contract them. We find that the share of workers with IC income has grown by 1.5 percentage points, or 22 percent, since 2001, pre-dating the rise of the gig economy and in line with previous estimates of IC growth. Independent contractor income receipt and its growth are not evenly distributed across workers. The largest share of workers with IC income are those in the top quartile of earnings who primarily receive wage income. But the fastest growing group are those in the bottom quartile of earnings who primarily receive IC income. Women saw more growth in IC income receipt than men, and smaller firms saw more growth in IC labor usage than larger firms. Together, these trends suggest that the long-run growth in IC labor in the U.S. cannot solely be attributed to individuals seeking supplemental income, or to the rise of a few online platform firms, but may represent a structural shift in the labor market, particularly for women.

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1. Introduction

U.S. workers can supply labor to firms either as employees or as independent contractors (ICs): self-employed individuals who typically provide labor services to multiple firms. The legal relationship of a worker has a number of important regulatory consequences. Employees are entitled to multiple protections, including minimum wage and unemployment insurance, to which ICs are not. Contractors retain greater control than employees over how they carry out their work, and are eligible to deduct expenses from their taxable income. Recently, there has been growing policy interest in whether firms and workers are shifting away from traditional employee relationships and toward IC relationships, and in identifying factors that might contribute to this shift.

Despite these and other serious differences in how employee and IC relationships are treated, it is difficult to study IC income receipt empirically. Surveys of workers typically do not distinguish IC income from other self-employment income, and individuals who are contractors might incorrectly identify themselves as employees due to the often similar nature of their relationship with a firm. Most administrative datasets also do not separately track those who receive IC income. This is in part due to legal ambiguity surrounding the definition of ICs, which depends on the extent to which the firm controls how the work is completed, including whether it provides tools, dictates the timing of work, and has financial control over the worker.

To overcome some of these challenges, we use data from U.S. tax filings to study recent changes in IC income. First, we develop a methodology for consistently identifying workers in the tax data who receive IC income. Conceptually, these are individuals who are being compensated primarily for providing labor services to a firm, but who are not employees of that firm. In addition to identifying these workers, we are able to link self-employed contractors with the firms that contract them, allowing us to track the evolution of firm use of ICs as well. Finally, by linking workers to their individual income tax returns, we can observe information relevant to the nature of the firm-worker relationship, such as the degree to which the worker relies on income from the firm, the length of time a worker has been associated with a specific firm, and whether or not the same worker has switched classification while working for the firm. These characteristics are important for understanding how these two types of firm-worker relationships—employers-employees and firms-contractors—have evolved over time.

Our paper makes two contributions. First, we translate the concept of an IC relationship into one that can be used to identify these relationships in tax data, and we show that applying this definition has a substantial effect on the measured prevalence of IC income. Specifically, we distinguish individuals who provide labor services to firms from other self-employed individuals. We do this by examining the type of information reports individuals receive, the nature and magnitude of their self-employment deductions, and whether or not they are themselves employers. We find that the share of workers with IC income has grown by 1.5 percentage points, or 22 percent, since 2001. This increase is driven almost exclusively by individuals who meet our preferred IC definition. The rise pre-dates the so-called "gig" or sharing economy and corroborates previous findings (Jackson et al. (2017), Katz and Krueger (2019), Collins et al. (2019)).

Our second contribution is to establish several new empirical facts about individuals and firms in IC relationships. At the individual level, linkage to primary tax filings allow us to identify several important trends in IC income earners' sources of labor and household income.[1] First, we find that the fastest growing group of workers with IC income are those for whom it is their primary type of income, rather than a supplement to wage income. Second, growth in IC income receipt has been more rapid among women than men, especially women who are the primary earners in their households. Third, receipt of IC income has increased the most among tax filers in the bottom income quartile. While the largest number of IC income earners locate in the top income quartile, growth in IC income among the bottom of the distribution has significantly outpaced mid and high-earning households. Taken together, these findings suggest that the growth in IC income has been concentrated among lower-income workers where it represents a significant source of household income. Additionally, many of these workers do not have wage earnings and are therefore unlikely to receive employee benefits from another job.

The linkage between firms and workers in the tax data allow us to study firms' use of IC labor over time and across firm characteristics, something that previous work has not been able to do. Our firm level analysis shows that growth in the use of IC labor, as measured by multiple metrics, is concentrated among small firms, which we define as those with few employees. We find that the fraction of firms with at least one IC worker grew by nearly 20 percent, and that, on average, firms are increasing the number of ICs relative to the number of employees. However, the share of firms' total labor compensation paid to IC workers has remained relatively flat, suggesting that, for the average firm, compensation per IC worker has declined relative to employees. This finding potentially suggests relatively high growth of lower-skilled ICs, a pattern consistent with the individual-level finding that IC workers are increasingly likely to come from the bottom of the income distribution.

We find little evidence that firms are increasingly reclassifying existing employee relationships as IC relationships, but suggestive evidence that firms are hiring more new workers as ICs rather than as employees. We leverage the panel nature of the tax return data to track transitions into and out of contracting as the primary source of labor income. Within firms, we find little change in the likelihood that a firm has employees who transition to IC status, but we do find evidence that more firms have contractors who transition to employees particularly following the Great Recession.

This paper focuses on ICs specifically because the legal distinction between an IC and an employee is the relevant distinction for income tax treatment and a variety of regulatory requirements. On average, workers classified as ICs should have more control over their work process than employees; however, in practice, there will be overlap between the two groups as many employees have flexible schedules and a large amount of autonomy in completing their work. There is some concern that workers classified as ICs are actually misclassified employees. This may occur because there is a great deal of legitimate legal ambiguity created by the holistic, fact intensive nature of the legal rule defining contractors.[2] Additionally, there is an incentive for firms to deliberately misclassify employees as ICs

[1] Throughout the paper we use the term household generally, but it is identified here by the tax filing unit, which may or may not coincide with the concept of household used in other data sources.

[2] There are two primary sources of this legal ambiguity. First, there is substantial heterogeneity in the standard itself by jurisdiction. While, in effect, these tests are aimed at understanding the degree of behavioral and economic control, the language and application of standards by various states and various federal agencies may differ, making it difficult or…

to reduce their regulatory compliance costs.[3] Our analysis will not be able to determine whether individuals who are compensated as contractors are in fact misclassified employees, but we do provide evidence that firms in industries with historically high levels of worker misclassification are more likely to hire ICs.

Previous papers that have focused on ICs in particular, or, self-employment in general, have found mixed results regarding recent trends. Our results on the individual side are broadly similar to those found in papers using administrative data, which show increases in both the prevalence of ICs and self-employed individuals since the early 2000s (Abrahams et al. (2018), Jackson et al. (2017), Collins et al. (2019)). The limited survey data focusing on ICs has also suggested strong increases between 2001 and 2005, and a decline or slower increase since 2005 (U.S. Bureau of Labor Statistics (2018), Katz and Krueger (2019)).

Our findings do not suggest a simple explanation for why more firms are using ICs and more workers are receiving IC income. Contractors are a diverse set of individuals who likely have varied motivations for entering into IC relationships, and we cannot attribute the increase we observe to changes in firm demand for contractors or individuals' desire to be contractors. Previous research finds that self-employment and other alternative work arrangements decline during periods of strong economic growth, suggesting that at least some of these workers may prefer an employee position (e.g. Schuetze (2000), Katz and Krueger (2019)). The welfare implications of greater IC income receipt depends, in part, on whether this is mostly supplementary income, perhaps made possible by technological changes, or whether this represents the primary earnings for low-income households. Our results show that over 60 percent of ICs in the bottom half of the income distribution, where IC growth has been fastest, receive the majority of their labor earnings from IC work. Although it appears that firms are increasing contractor use through new hires, we also see higher rates of workers switching from contractor to employee within firms. Further work on the career trajectories of IC workers could shed light on whether these positions are a stepping stone to earnings growth either as an IC or employee, or if they represent inferior arrangements for many workers seeking to be employees. Understanding the role of IC work within a career is particularly important given that ICs are increasingly female, in the bottom half of the income distribution, and have IC income as a primary earnings source.

…confusing for employers to understand which standard applies in which context. For example, under the Fair Labor Standards Act (FLSA), courts have applied an "economic realities" test, with six factors to assess the relationship between the worker and business. See McFeeley v. Jackson St. Entm't, LLC, 825 F.3d 235, 241 (4th Cir. 2016) (citing Schultz v. Capital Int'l Sec., Inc., 466 F.3d 298, 304–05 (4th Cir. 2006)). Contrast this guidance to that offered by the EEOC manual, which states "[t]he question of whether an employer-employee relationship exists is fact-specific and depends on whether the employer controls the means and manner of the worker's work performance." 2 Equal Employment Opportunity Comm'n, EEOC Compliance Manual, § 2–III, at 5716–17 (2008)). The second source of ambiguity arises from the nature of the rule itself as a multi-factor balancing test, which does not view any one factor as decisive. Instead, the arbiter is supposed to weigh the relative importance of these factors or their absence on a case by case basis. While this nuanced approach may be more accurate than a bright-line rule, it can be difficult, ex-ante, for employers to apply this nuance consistently to their own relationship.

[3] There may also be strong tax incentives for workers to instigate or collude in this misclassification, for example, to assert inappropriate deductions that will increase after-tax compensation relative to wages.

2. Background

In this section, we provide additional detail on the legal distinction between IC and employee relationships and discuss the regulatory consequences of this distinction. In general, there are stark differences between employees and IC in the treatment of their income under the tax system, the applicability of labor protections, and their access to social insurance programs. These differences highlight the need to develop criteria to empirically identify and study IC relationships.

The legal distinction between an employee and an IC originates from common law principles of vicarious liability, which distinguish circumstances in which the contracting firm is legally responsible for the actions of their workers (employees) from circumstances in which the firm is not responsible (ICs). In the U.S., the establishment of an employer-employee relationship depends to a large extent on the level of control the purchaser of services has over how the work is completed, such as whether or not the purchaser provides tools, dictates the timing of work, and the extent to which the purchaser has financial control over the service provider.

These factors have been codified, with minor variations, into state laws as a multi-factor test weighing the relative importance of several features of the relationship to determine whether the worker is an employee. A similar approach has been adopted by a number of state and federal agencies for regulatory purposes. Enforcing the distinction in this context has proved difficult because evaluating the holistic nature of the relationship between a worker and her firm is factually intensive and requires significant commitment of agency audit resources.[4]

Several features of the tax code depend on worker classification. ICs are treated as sole proprietors and are entitled to claim "above the line" business expense deductions, and they are not subject to payroll or income tax withholding. Many other federal regulations intended to protect workers apply only to employees. Major anti-discrimination legislation, intended to protect workers, such as the Anti-Discrimination Act and Fair Labor Standards Act have this feature, as do several laws that places requirements on employers for the benefit of employees, e.g. Unemployment Insurance programs, the Family Medical Leave Act and the Affordable Care Act. While by no means exhaustive, these examples suggest the vast, and largely implicit, impact that worker classification has on the costs—and benefits—of a given worker-firm relationship.

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[4] Consider the guidance provided by the IRS to potential employers in deciding whether a worker is an independent contractor:

> Businesses must weigh all these factors when determining whether a worker is an employee or independent contractor. Some factors may indicate that the worker is an employee, while other factors indicate that the worker is an independent contractor. There is no "magic" or set number of factors that "makes" the worker an employee or an independent contractor, and no one factor stands alone in making this determination. Also, factors which are relevant in one situation may not be relevant in another.
>
> "Independent Contractor (Self-Employed) or Employee?" *Internal Revenue Service.*. U.S. Department of the Treasury. https://www.irs.gov/businesses/small-businesses-self-employed/independent-contractor-self-employed-or-employee. *Accessed July 16, 2019.*

3. Literature

In this section, we contrast our approach with those taken by recent papers on ICs, and with the broader literature on self-employment. We highlight differences in study populations and methodologies that may explain differences in the estimates.

Our work relates to a number of recent studies that document trends in the prevalence of workers outside of traditional employee-employer relationships. However, the worker population in our analysis differs from the existing literature in at least two important—yet subtle—respects. First, conceptually, we construct our preferred definition of IC to adhere as closely as possible to workers' *legal* classification. We do this deliberately because the legal dichotomy between employee and IC determines the tax treatment of income, and a number of other regulatory requirements. By using the type of form that reports the compensation to the worker to distinguish ICs and employees, we can identify whether the worker is treated as an IC or employee by the firm for tax purposes. There may be workers who are legally misclassified according to this definition. For example, some workers may receive IC income, but, if audited, would likely be considered by the IRS to be an employee. Our analysis cannot identify these individuals, although we provide evidence that firms in industries with historically high levels of worker misclassification are more likely to issue their workers Form 1099-MISC/Ks. Second, our sample includes all individuals who are subject to information reporting on income on Form 1099-MISC/K, rather than self-employed individuals more generally.

Previous work can be coarsely divided into four categories based on two criteria; first, by the data source—collected by survey or in an administrative process, and second, by the population focus--ICs or self-employed. Generally, survey sources show no change or small declines in ICs or self-employment rates more broadly, while administrative sources show increases in recent decades. Abraham et al. (2018) combine the two types of data to show that there has been a rise in the types of self-employment income reported in tax data that would not be well captured in surveys. For example, IC work that may represent a secondary job, which is not reported in some surveys, or IC work where the individual may not consider herself self-employed and may either report no employment or characterize the income to the surveyor as wage income.

Only the Bureau of Labor Statistics' (BLS) contingent worker survey (CWS) and Katz and Krueger's CWS replication have asked explicitly about IC work separately from self-employment more generally. Both of these surveys only record information on the individuals' main job, which based on earnings would only include around half of our ICs. Katz and Krueger's (2019) preferred estimate suggests a very small increase in ICs between 2005 and 2015 (0.2 percentage points) while the CWS suggests a decrease over a slightly longer period, between 2005 and 2017; however, the CWS does find a large increase in IC use between 2001 and 2005 (0.9 percentage points). The paper with the most similar approach to ours is that used by Collins et al. (2019), who use administrative tax data to identify individuals receiving a Form 1099-MISC/K with a specific focus on those working for an online platform economy firm. They find increases in the number of Form 1099-MISC/K recipients and an increase in the share of the workforce receiving a Form 1099-MISC/K between 2000 and 2016 of around 1.9 percentage points. They argue that recent increases after 2013 are driven almost entirely by online platform economy activity.

Another set of studies has focused on an overlapping, but distinct group of individuals characterized as the self-employed. Conceptually, our population is at once both broader and narrower than this group; our population includes individuals who would not identify themselves as self-employed on a survey, and will likely exclude some individuals who would, as shown in Abrahams et al. (2018). Furthermore, both Abrahams et al. (2018) and Jackson et al. (2017) use filing a Form Schedule SE as their administrative data measure for self-employment. Our sample will exclude some of these individuals because they are not issued a Form 1099-MISC/K , or, because they do not meet our definitions of an IC. Although individuals who receive Form 1099-MISC/Ks are taxed as sole proprietorships, many do not file a Schedule C or Schedule SE—either because they fall below the threshold for income tax filing, or because they fail to report the income on the correct form. In consequence, these individuals will be in our sample but not in the "self-employed" population of previous papers.[5] Jackson et al. (2017) identify small increases in self-employment, and attribute this increase to individuals with low-levels of business deductions, which is consistent with our general findings. Similar to our results, they find that these increases in self-employment pre-date the introduction of online platform economy companies such as Task Rabbit, Uber, and Lyft.

Finally, a number of papers have focused on a much broader population called "alternative" workers, which generally include ICs, temp agency employees, workers at contracting firms, and on-call workers. The idea behind grouping these labor arrangements together is that they may share substantive economic features, such as flexible hours, or finite duration. These papers find mixed results regarding the growth of such alternative workers, reflecting the sensitivity of findings to the data source and exact definition of non-traditional work being used. For example, using data from a survey they administer, Katz and Krueger (2019) find a 1-2 percentage point increase in alternative work between 2000 and 2015 while the BLS CWS finds no increase in alternative work between 2005 and 2017 (U.S. Bureau of Labor Statistics (2018)). Our paper examines a subset of these workers, those whom we characterize as ICs.

4. Data

In this section, we first describe our methodology to identify IC income using administrative tax data, which involves three steps to delineate workers receiving contracting income that is primarily for labor services provided to firms. First, we identify potential IC labor transactions using Forms 1099-MISC and 1099-K. Next, we distinguish the type of taxpayer based on the recipient identifier (individuals are identified by SSN, businesses by EIN) and link them to their respective tax filings.[6] Finally, we use information on the amount and nature of deductions to exclude businesses that we do not consider ICs because they do not appear to receive payment mainly for labor services provided

[5] A recent paper by Collins et al. (2019) highlights the differences between the two populations, finding that around 40 percent of Form 1099-MISC recipients in 2016 did not file a Schedule SE and that around 45 percent of those with a Schedule SE do not receive a Form 1099-MISC, meaning that these individuals will be in our sample but not in the "self-employed" population of previous papers.

[6] Individuals file a Form 1040, while businesses file a Form 1120, 1120-S or 1065.

by the owner. Each of these steps results in a significant change in levels of IC workers, but not in trends.

Next, we provide information on our sampling methodology for the individual and firm level analyses. A major advantage of using tax return data is that we can link workers to firms, which allows us to use our individual level definition of ICs aggregated up to the EIN level to provide information on firm use of ICs.[7] While other sources, like the integrated Longitudinal Employer-Household Dynamics (LEHD) – Longitudinal Business Database (LBD) infrastructure, provide a panel of firm-employee relationships, sole proprietorships and partnerships, it is not possible to link the subset of sole proprietors who are unincorporated ICs to the firms that pay them.

4.1 Identifying Independent Contractor Income using Administrative Tax Data

We start with a sample of recipients with positive amounts of non-employee compensation, which is reported on Form 1099-MISC, box 7. The IRS requires that businesses issue Form 1099-MISC to individuals, or other businesses, for services provided by someone who is not an employee of the issuing business.[8] We start with a 1 percent annual cross section of all recipients (i.e. making no initial restrictions) for each tax year 2001-2016. However, because we are trying to identify individuals providing services, we refine our sample to exclude Form 1099-MISC recipients who employ others. We do this for two reasons. First, conceptually, we consider employer businesses to not be ICs because their activity rises above merely an individual providing their own labor services to a firm. Second, we would have no way to determine whether the employee or the owner was providing labor services to the Form 1099-MISC issuing business. For example, a Form 1099-MISC could be issued to a catering company with many employees or to a law firm for attorney services.

Form 1099-K was introduced in 2011 as an information report on credit card transactions and third party payments that exceed both $20,000 and 200 transactions in a year.[9] ICs who receive compensation in the form of credit card payments may have part or all of their contract income reported on Form 1099-K rather than Form 1099-MISC. In order to include ICs for whom all of their contract income is reported on a Form 1099-K, we draw a separate 5 percent random sample of Form 1099-K recipients in each year from 2011-2016.[10] Many Form 1099-K recipients will not be considered ICs because these forms are issued to any business that accepts credit cards as payment for goods or services, an issue which underscores the importance of using additional information on recipients to define ICs. For sampled Form 1099-MISC recipients, we also link to any 1099-Ks that they receive in

[7] As we discuss below an important caveat to our analysis is that firms can have multiple EINs so our EIN level analysis may differ from an analysis at the parent firm level using a different data source such as the LEHD-LBD.

[8] In general, these forms are not required to be issued to corporations. Exceptions include fish purchases for cash, attorneys' fees and payments by a federal executive agency for services, which can generate a Form 1099-MISC issuance to a corporation and are reported in box 7.

[9] Although these are the legal threshold requirement to issue a Form 1099-K, many firms issue the forms to recipients with fewer transactions or lower dollar values.

[10] An example of an independent contractor that would receive all or most of their income on Form 1099-K as opposed to Form 1099-MISC would be a ride share driver who receives their payments directly from customers using credit cards/electronic payments as mediated through the ride share app.

order to count total contractor income for individuals that receive both forms. Analogously, for sampled Form 1099-K recipients, we link to any Form 1099-MISCs received. This also allows us to account for those who receive both forms so we can avoid double-counting this group across samples.

Figure 1 shows that the total number of Form 1099-MISC/K recipients has increased over our sample period. The number of Form 1099-MISC recipients increased from approximately 18 to 26 million from 2001 to 2016. When including Form 1099-Ks, there are over 30 million recipients in 2016.

4.2 Moving from Form 1099-MISC and 1099-K Recipients to Independent Contractors

To refine the sample to focus on ICs, we match the Form 1099-MISC/K recipients to their income tax returns to eliminate recipients that are employer businesses or businesses with large levels of deductions. Specifically, we do not consider businesses with total deductions excluding car and travel that exceed $10K in 2001$ to be ICs under our preferred definition. As we show below, each step of the methodology to get from Form 1099-MISC/K recipients to our preferred IC definition decreases the size of the IC labor force; however, the trend over our sample period is driven by individuals who meet our IC definition.

We distinguish between two types of Form 1099-MISC/K recipients: individuals and non-sole proprietorship businesses. Individuals are defined as recipients who have a Form 1099-MISC or K issued to a social security number (SSN) or to a business's employer identification number (EIN) that matches with a sole-proprietorship Schedule C. Non-sole proprietorship businesses are recipients with a Form 1099-MISC/K that is issued to an EIN that does not match a Schedule C EIN. Individuals make up the majority (82 percent in 2016) of recipients as shown in Figure 1 and Appendix Table A1. Additionally, we see that there are almost 5 million recipients receiving a Form 1099-K but no Form 1099-MISC as of 2016, and just under half of these recipients are non-sole proprietorship businesses. Because Form 1099-Ks may be issued to any individual or business receiving substantial credit card or electronic payments, we expect that many Form 1099-K recipients are businesses using these payment methods for transactions underscoring the need to use additional information to identify ICs.

For individual recipients, we pull information from the household tax return Form 1040 for those who filed. Additionally, we find information on the income and expenses of the business on the Form 1040, Schedule C for those who filed a Schedule C.[11] The group of individuals who filed Form 1040s but not Schedule Cs may have reported their Form 1099-MISC/K income elsewhere on their tax return, or failed to report it. Focusing on individual recipients, the majority (approximately 85 percent in 2016) can be matched with a Form 1040 tax return. Those who cannot be matched with a Form 1040 may represent non-filers or those who incorrectly provided taxpayer identification numbers (TINs).

Individuals may not be required to file a Form 1040 if they have very low levels of income or receive most of the income from social security. In our sample, 99.7 percent of non-filers in a given

[11] The Schedule C nominally reports profits or losses from sole-proprietorship businesses, but all Form 1099-MISC payments received by an individual as business or self-employment income should be reported on a Schedule C.

year have filed a 1040 in some other year. The average and median age of non-filers is about 40 years, and the 25th and 75th percentiles of age are about 28 and 51 years respectively, so it is unlikely that they mostly represent retirees receiving social security benefits. The median Form 1099-MISC/K earnings for non-filers is about $4,000-5,000, with an average of approximately $14,000. Therefore, most non-filers earn relatively small, but not nominal amounts of IC earnings.

We exclude non-filers for the remainder of the analysis as we explore income and demographic trends in contract labor, but future examination of this group would be beneficial for statistical and tax compliance analyses. If we were to include non-filers in our analysis, we would calculate an increase in share of the workforce with IC income of 2.5 percentage points, or 32 percent. By excluding non-filers, we are conservative with respect to the overall growth in IC labor over this period; however, non-filers are likely to be relatively low-income, which would support the trends we present in Section 5 showing a large relative increase in ICs in the bottom half of the income distribution.

While the majority of individual filers can be matched to a Schedule C as shown in Appendix Table A1, a substantial proportion, about 28 percent, cannot be matched. Since Form 1099-MISC box 7 income should be reported on Schedule C, this implies that many tax filers may be incorrectly reporting their Form 1099-MISC income, or potentially are not reporting it at all, and that many are not claiming any Schedule C deductions for their contract labor. This mismatch is also documented using tax data in Collins et al. (2019).

For non-sole proprietorship business recipients, income and expense information is found on Form 1120 for C corporations, Form 1120-S for S corporations, or Form 1065 for partnerships. We match the EIN recipients to each of these forms and use information from the business returns on the number of owners and amount and type of deductions to further characterize whether the owners may be ICs.

Next, we use the information on the matched tax returns to establish a sufficiently narrow and consistent concept that can be informative for economic analysis of a coherent group of workers as ICs. We focus on two definitions of ICs: first a "broad definition" and second our "preferred definition", which applies additional restrictions. The broad definition includes all individual recipients who matched to a Form 1040, and all non-sole proprietorship business recipients that matched to an S-corporation tax return reporting one owner and no employees. The restrictions on the non-sole proprietorship business Form 1099-MISC/K recipients are designed as the broadest way to identify incorporated ICs.[12] Our preferred IC definition uses the deductions claimed by the Form 1099-MISC/K recipient as a way of differentiating between small businesses and ICs. In this definition, we exclude individual Form 1099-MISC/K recipients with greater than $10,000 (2001$) in Schedule C deductions, excluding car and travel related deductions, and non-sole proprietorship business Form 1099-MISC/K recipients with greater than $10,000 in total deductions reported on their business tax return.[13] We do not include car and travel deductions on the Schedule C because these are common deductions for ICs and are becoming even more relevant with the prevalence of contracting through

[12] We focus on S corporation owners because partnerships by definition have multiple owners. C corporations generally do not receive Form 1099-MISCs except in certain circumstances, and we cannot identify their owners in our data; however, they comprise a small fraction of Form 1099 recipients.

[13] Vehicle and travel expenses are separately reported on the Schedule C, but are not similarly on the Forms 1120-S, 1120, and 1065.

online platforms. These restrictions are designed to remove businesses that have substantial capital investments in order to focus on ICs who are receiving income mainly from their labor services.[14]

Figure 2 plots time series for these two definitions of ICs. In Figure 1, we saw that between 14 and 18 percent of Form 1099-MISC/K recipients were non-sole proprietorship businesses. Figure 2 shows that the majority of these businesses do not meet either of our definitions of ICs; less than 10 percent meet the broad definition in 2016, and less than 3 percent meet our preferred definition. As seen in Figure 2, using our preferred definition, the IC levels and trends are indistinguishable regardless of whether we include non-sole proprietorship businesses. For this reason, going forward we exclude non-sole-proprietorship EIN recipients from our main analyses.

We find that restrictions based on the level of deductions play an important role in determining the number of ICs but have little effect on the qualitative time trend. The majority, about three-quarters, of the broadly defined ICs have less than $10,000 in deductions. Additionally, the contractors who meet our preferred definition constitute over 75 percent of the total increase in individual Form 1099-MISC/K recipients over this period. The deductions restriction removes the discontinuous jump in the number of recipients in 2011 caused by the introduction of the Form 1099-K. We take this as evidence that the restriction is likely effective in removing businesses from our IC population, allowing for a more consistent definition of IC labor.

The deduction restriction, though somewhat arbitrary, was selected to allow for a reasonably large level of deductions for an individual providing labor services while also removing recipients who are likely receiving compensation for capital investments as well as their labor. Figure 3 explores the sensitivity to this restriction. Panel A shows car and travel deductions as a share of total deductions for sampled Form 1099-MISC/K recipients, where each point represents a binned average. For those with relatively low total deductions, car and travel deductions make up a large fraction of their total deductions. Because ICs may incur large car and travel expenses, we do not want to exclude those individuals from the analysis even if the car and travel expenses are relatively large. For businesses with high levels of deductions, car and travel is a relatively small expense. Panel B shows the distribution of total deductions less car and travel in our sample. We see that our $10,000 deductions threshold choice is consequential for how many ICs are included in the definition. The distribution begins to flatten out at $10,000 so increasing the deductions limit is only slightly more inclusive. For example, if we increase the limitation to $15,000, 94 percent of those ICs meet the under-$10,000 restriction as shown in Table 1. Finally, Panel C shows time series of ICs for different deductions limits and shows that time trends are very similar regardless of the level of the deduction restriction so the trends analysis is not very sensitive to the level of the restriction around this range.

To further understand how the deduction restrictions relate to the IC labor concept, we analyze the number of distinct payers from which a contractor receives a Form 1099-MISC/K. We expect that individuals providing labor contract services, on average, contract with fewer firms than do businesses that may sell goods and services as broadly as possible. This distinction is more relevant for Form 1099-MISC recipients than Form 1099-K because a recipient could receive one Form 1099-K from one payment processor that represents payments from many customers. Table 1 disaggregates

[14] See Knittel et al. (2011) as a precedent for using deductions to differentiate small businesses from contractors and large businesses, and for treating car and travel deductions differently.

the different potential IC definitions by the number of distinct payers from which the individual receives a Form 1099-MISC/K. It shows that ICs that meet our preferred definition have fewer Form 1099-MISC/K payers than those meeting the broader definition, and the profiles are very similar regardless of whether using the $10,000, $5,000 or $15,000 restriction level. For these definitions, 98 percent of ICs have fewer than five distinct payers.

Our definitions of ICs are imperfect and will certainly include some Form 1099-MISC/K recipients who are not ICs and exclude some who are. We include recipients that match to a Form 1040 but have no Schedule C. For these individuals, we do not have information on the deductions or activities associated with the non-employee compensation so they may not be ICs. However, we believe it is unlikely that these individuals have large deductions associated with their IC income because they failed to file a Schedule C in order to claim those deductions. Additionally, Form 1099-MISC/K information reports are sent directly to the IRS, creating a high risk of detection for a business owner with substantial business income who would avoid filing a Schedule C in order to evade taxes.

In our preferred definition, we use information from the Schedule C to exclude owners with large levels of deductions under the assumption that the deductions are associated with the business receiving the Form 1099-MISC/K. It is possible that the Schedule C does not reflect the activity of the individual receiving the Form 1099-MISC/K for two reasons. First, the individual taxpayer may have multiple sole proprietorships in which case the Schedule C deductions may represent deductions from various contracting activities and not only the activity associated with the given Form 1099-MISC/K. In this case, the deduction restriction is conservative in that we only count an individual as an IC if they have a less than $10,000 deductions *in total*. Second, prior to 2007, Schedule Cs did not identify the individual owner of the sole proprietorship for joint filers. In order to provide continuity in our methodology, we restrict on the *total household* Schedule C deductions throughout our sample.[15] Again, the restriction is conservative because ICs with individual-level deductions under $10,000 but with total household deductions exceeding $10,000 will be excluded based on the deduction restriction. Finally, in our sample, there are a non-trivial percentage of Form 1099-MISC/Ks that do not match to an individual or a business entity. These forms could represent instances where an individual is acting as an IC but either provided an incorrect SSN or EIN or did not file a tax return, and we would fail to include them in our definition.

For the remainder of the paper, we will report results using our preferred definition of ICs: individual Form 1099-MISC/K recipients reporting less than $10K in deductions, excluding car and travel expenses, and with no employees. We will occasionally compare our preferred definition with the broader definition of individual Form 1099-MISC/K recipients with no deductions restriction in order to highlight the differences or similarities between these concepts. Additionally, we will generally group together Form 1099-MISC and Form 1099-K recipients under these definitions.

[15] See Appendix Table A1 for information on the share of Schedule C's that could only be matched to the spouse after 2007; it remains roughly constant at 2 percent.

4.3 Employee and Worker Datasets

In order to place our IC results in context, we also create a sample of traditional Form W-2 wage earning employees. We randomly sample a repeated cross section of 0.2 percent of all Form W-2 recipients, 2001-2016. In Section 5, we use this dataset to examine changes in the prevalence of IC income, employee income, and both types of labor income.

To study worker-level transitions between IC and employee status, we draw a 0.2 percent random sample of all taxpayers for each year 2001 to 2016. For each sampled taxpayer, we link Forms 1099MISC/K, W-2, Schedule C and 1040 information for the subsequent and prior year. In section 6, we study transitions based on the status of the individual from the prior year to the sampled year.

4.4 Construction of the Firm-Level Dataset

We construct a firm-level dataset to study businesses' use of IC workers using the definitions developed in Section 4.1. The dataset is constructed by drawing a 2 percent random sample each year from 2001-2016 from the universe of employer identification numbers (EINs) that issue at least one Form W-2 in that year.[16] Firms are identified by their TINs, as they appear on Form W-2 (for employees) or Form 1099-MISC or Form 1099-K (for independent contractors). Linked to each sampled EIN are all employees who receive a Form W-2 and all workers issued a Form 1099-MISC or Form 1099-K from that EIN in the sample year. The ideal unit of analysis for our paper is the level at which labor demand decisions are being made within a firm. Unfortunately, we are not able to easily construct a firm level concept using the tax data so our analysis will be at the EIN level. For convenience, we will use the term firm throughout the paper, but an important caveat to our analysis is that firms can have multiple EINs. In practice, an EIN is likely to be associated with some boundary within the firm. For example, if one EIN is used for payroll and another for general operations, our analysis would be unaffected. However, if one EIN is used to pay contractors and another to pay employees, our analysis would fail to pick up on the substitution between the two types of employment at that firm.

The sample contains approximately 130,000 EINs per tax year. We measure firm size as the number of employees issued a Form W-2. The size distribution of firms follows a power law distribution, with very few large firms in the population. As a result, within each tax year, the sample contains approximately 3,000 EINs with over 100 employees, or 2 percent of EINs. We discuss our firm level results in Section 7. Table 10 reports number of observations and means for each of these variables in each tax year. We build out from this same cross-sectional sample in the analysis in Section 8 (i.e. the cross-sectional sampled EINs form the longitudinal spline for studying work transitions.).

In Section 8, we focus on the extent to which firms have the same workers changing classification over time. We expand the year-stratified sample of firm EINs used in our Section 7

[16] This restriction is partly for convenience: all firms with at least one employee is in the cleaned SOI Databank, which is already linked to Form W-2 workers. Additionally, this definition mirrors the definition of an employing firm that would be identified in other datasets and that has analyzed in previous literature.

analysis to include worker-level panel information. First, for each firm-year in the sample, we identify all individuals issued a Form W-2 or Form 1099-MISC/K by that firm in that year. Then, for each individual identified in the previous step, we pull information from Forms 1040, Schedule C, W-2, and 1099-MISC/K for the previous and subsequent tax years. In each tax year, an individual is characterized as having one of three mutually exclusive relationships with the sampled firm: (1) an IC, (2) an employee (3) no relationship.[17] Individuals who receive both a Form W-2 and a Form 1099-MISC/K in the same tax year from the same firm are characterized by whichever form reported higher compensation.[18] Transitions are then defined as movements from one type of primary income (e.g., IC) to another type (e.g., employee) in consecutive tax years. We also use the dataset to study the classification of new hires at firms.

5. Individual Trends in Independent Contractor Income Receipt

In this section, we document growth in the number of workers receiving IC income, by state, industry and place within the income distribution. We also examine the dependence of the individual and their tax unit on IC income. We pay particular attention to women ICs, who have driven much of the overall growth in the IC workforce. Unless otherwise stated, our analysis relies on our preferred definition of ICs set out in Section 4—individual Form 1099-MISC/K recipients who are not employers and claim less than $10,000 in Schedule C deductions, excluding car and travel deductions.

5.1. Long-run Trends in IC Income in the U.S. Economy

We estimate that share of workers characterized as ICs has increased by 1.5 percentage points between 2001 and 2016. The share of workers with any IC earnings has increased by 22 percent over this period, while the share of the workers with only Form W-2 earnings has decreased by approximately 1.5 percent.[19] The majority of the growth (69 percent) occurred prior to 2011, and individuals who receive the majority of their labor income from contracting represent 78 percent of the growth. These aggregate results are similar in magnitude to those reported in Collins et al. (2019) who find a 1.9 percentage point increase in the "1099 workforce"; however, they find that half of that increase occurred after 2013. The BLS CWS finds an increase of independent contractors of around

[17] We only consider income earned from sampled firms. Individuals who receive no information returns, or who receive only a Form 1099-MISC or Form 1099-K but fail to meet our IC definition are characterized as having no relationship with that firm in that year. This restriction is consistent with our focus on individuals providing labor services to a firm and on ICs that are close substitutes for employees.

[18] Employees should generally only receive a Form W-2 from their employer while contractors should receive a Form 1099-MISC/K. If the worker changes status during the year, they could receive both forms that year. In the data, however, around 7.6 percent of firms in 2016 issue both forms to at least one worker. Of those 7.6 percent of firms, the vast majority (81 percent) issue both forms for at least two consecutive years to the same worker and 40 percent issue the two forms to the same worker for three consecutive years.

[19] The total workforce (ICs plus employees) can be found by summing across the 4th through 6th columns of Table 2. Shares are derived by taking the total of those with any IC income (the sum of columns 4 and 5) and those with only W-2 labor earnings (column 6) and dividing by the total workforce.

0.9 percentage points (from 6.1 percent to 7 percent) between 2001 and 2005. Our preferred definition shows that ICs make up 6.6 percent of the workforce in 2001 and 8.1 percent in 2005. The levels are a bit higher than those found in the BLS survey, and we see growth between 2005 and 2015 that the CWS does not. As discussed by Abraham et al. (2018), there has been an increasing divergence between administrative and survey data in measuring self-employment, which may explain why we find increases in ICs between 2005 and 2016 while the CWS does not. Additionally, we include ICs whose main job is likely a wage and salary position. These individuals would not be considered ICs in the CWS because the survey only asks about main jobs.

The steady increase in IC income receipt from 2001-2016 described in Section 4 contrasts with slower growth among individuals receiving traditional Form W-2 wages. Figure 4, Panel A presents the percentage growth between 2001 and 2016 for three groups of workers: those with Form W-2 income only; those with IC income only, and those with both types of income. Incidence of IC income has grown substantially faster than Form W-2 income since 2001, with the fastest growth among ICs with no W-2 earnings (50 percent by 2016). In contrast, growth among workers who only receive Form W-2 income has been much slower, although these workers make up over 90 percent of workers, as shown in Table 2. Interestingly, we find diverging trends in the years after the Great Recession with Form W-2 only recipients declining while workers with any IC earnings continued to grow. These findings suggest that the Great Recession may have intensified the growth of IC income earners relative to Form W-2 recipients, a finding that is consistent with the evidence in Section 8 that after the Great Recession firms were much more likely to hire new workers as ICs rather than employees.

5.1.1 Trends in IC income growth by state and industry

Next, we compare the growth in ICs across industries and states. We find that the increase in ICs varies greatly across states, from negative growth to over a 90 percent increase (Figure 5).[20] When comparing the relative growth in ICs to employees, we find that ICs have had larger percentage increases than employees in almost all states. Though correlated, state-level growth in ICs does not simply follow employment growth in a state. There are many states where IC growth is well above average but employee growth is below average, and some states had negative employment growth but increases in IC labor. This pattern may be partially explained by better economic conditions leading to lower levels of contracting as argued in Katz and Krueger (2019).

The industries with the most ICs are the "professional, scientific, and technical services" followed by "other services" and "health care," and all three of these industries have had large increases in the number of ICs hired between 2001 and 2016 (Figure 6). [21] There was strong growth across most industries in ICs with the exception of "Manufacturing", "Finance and Insurance",

[20] Appendix Figure A1. shows the corresponding levels for contractors in 2001 and 2016.

[21] We were only able to match 75 percent of independent contractors to valid industry codes of the employing firms, so the sum of IC across industries does not equal the total number of IC in the population. Industries are categorized by 2-digit NAICS codes.

"Public Administration", and "Wholesale Trade," where the percentage growth in ICs has been relatively small.[22]

Much of the growth in ICs by industry corresponds with industries that have also been growing rapidly in terms of employment. According to the Bureau of Labor Statistics (BLS), the largest growing major industries from 2001 to 2016 in terms of employment were "Education and Health Care Services" and "Professional and Business Services."[23] The former includes the industry with the third largest absolute growth in ICs (health care and social assistance) and the latter includes the industry with the largest absolute growth (professional, scientific and technical services) and an industry which doubled in ICs (administrative and support and waste management). In contrast the industry with the second largest growth in ICs, "other services," has had almost no growth in total employment so the growth in ICs may represent restructuring of work in this group of service industries which includes repair and maintenance, personal and laundry services, private households, and religious, grant making, civic and professional organizations. It would be useful to analyze occupations in addition to industry, for example, to know whether the ICs in the professional, scientific and technical services are the scientists or administrative assistants. Unfortunately, occupation information is not available in our data, so the survey data discussed in Section 3 are a better source for analyzing occupational changes among contractors.

5.2 Demographic and Economic Characteristics of ICs

Policymakers' interest in the rise in IC work often stems from a concern about lower levels of job protection and benefits. In this section, we explore the demographic and economic characteristics of ICs and how they have changed between 2001 and 2016. Our results suggest that ICs have varied experiences and backgrounds, but that the fastest growing groups are relatively more economically vulnerable populations. First, we find that long-run growth has been fastest among ICs who receive the majority of their labor income from contracting, while there has been a more recent increase among those for whom IC earnings are a secondary labor income source. Second, within the broader distribution of taxpayers, IC earners are disproportionately likely to occupy the top and bottom quartiles. In levels, the plurality in each tax year are located in the top quartile, but the number of IC earners in the bottom quartile grew the fastest, implying that an increasing share of the contractor workforce are in relatively low-income households. Finally, we show a large increase in the growth of female contractors relative to female employees or male contractors. The relative growth was concentrated among women whose primary source of labor income is IC earnings, who are their households' primary earner, and who are in the bottom of the income distribution. These patterns suggest that the long-run increases in IC labor provide important sources of household income and that many of these workers do not have employee relationships with worker benefits and protections outside of their contracting relationships.

[22] Appendix Figure A2. shows the percent change in IC from 2001 to 2016 by industry.
[23] BLS statistics are from their website, https://www.bls.gov/charts/employment-situation/employment-levels-by-industry.htm

5.2.1. IC income earners within the U.S. income distribution

Within the broader distribution of taxpayers, IC earners are disproportionately likely to occupy the top quartile of the income distribution based on adjusted gross income (AGI), as shown in Figure 7. Throughout our sample period, all AGI quartiles saw an increase in IC earners, but the fastest growth occurred in the bottom half of the income distribution, implying that an increasing share of the contractor workforce comes from relatively low-income households. Reassuringly, the results are very similar if we use our broader definition of ICs, which does not include the deductions restriction. This alleviates concern that this restriction could introduce differential selection that eliminates high AGI ICs (Figure 7, Panel B).

Next we compare IC and wage earners to understand the relative economic position of IC earners. The mean AGI and taxable income are higher for ICs than employees in both 2001 and 2016, but the medians are lower (Table 3). Further, the median AGI of ICs has fallen by over $5,000 in real terms between 2001 and 2016. Although the median has decreased, mean IC income has increased for ICs, which could suggest an increase in inequality of earnings among ICs but appears to be reflective of a structural shift in labor markets as discussed later in this paper. The mean wage and salary earnings for ICs were almost as high as for employees in 2001, but the median was much lower.[24] In 2016, wage earnings of ICs fell—both in real terms, and relative to employees—commensurate with the increasing share of ICs with predominately IC income.

5.2.2 IC income relative to individuals' and households' other income sources

To investigate the importance of IC income to individuals, we divide ICs into those for whom IC earnings are the primary income source (IC income exceeds 75% of labor income) and those for whom IC earnings are a supplemental (IC income is less than 25% of labor income). We define the share of IC labor income as: *total 1099 earnings / (total 1099 earnings + W-2 earnings).*[25] Panel A in Figure 8 shows that these are the largest groups of ICs and it is relatively rare for ICs to receive around half of their income from each source. The number of ICs in these categories has grown rapidly since 2001, with each growing by almost 50% (Figure 8, Panel B). There has been a steady long-run increase in workers with IC earnings as a primary income source, and the number of workers with IC earnings as supplemental labor income has grown particularly fast after 2011, coinciding with the growth of the platform economy. The rapid growth in the two distinct groups of ICs, workers who supplement existing wage income and workers who rely primarily on IC income, suggests that the aggregate trend

[24] Mean wage and salary earnings are calculated including zeros. I.e. those with no wage and salary income are coded as having zero Form W-2 earnings.

[25] Form 1099-MISC/K income and Form W-2 income are not, in general, directly comparable income concepts. Form 1099-MISC and 1099-K represent gross income paid to a contractor, but do not necessarily represent net income or profits, as net income can be lower than gross receipts after accounting for various applicable deductions. Income represented on a Form W-2 has already been adjusted for some pre-tax deductions and thus more closely approximates a net income concept, although the employee may still claim additional deductions. Because our preferred definition of independent contractors only included those with less than $10K in deductions, this distinction makes very little difference for our results. We have reproduced the results using a conservative net income concept, Form 1099-MISC/K income minus total Schedule C deductions, and the results are almost identical.

masks underlying heterogeneity in the type of work and workers involved in these contract relationships. The results also likely imply that the overall rise in ICs has differential implications for the stability of the labor relationships and access to worker protections across these groups.

Table 4 shows that, in general, ICs have relatively low median Form 1099-MISC/K earnings at the individual level, and perhaps surprisingly the levels are similar across AGI quartiles. IC income represents a much greater share of household income for lower-income households relative to those in the top of the AGI distribution (Cols 1 and 4), and this is particularly true for those with IC earnings as a primary labor income source (Col 5). While some of the low-income households with primarily IC earnings may be retirees, this is unlikely to be the whole story, as the average age in the lowest quartile is 43 years. Earners in the bottom quartile are also less likely to claim dependents, and less likely to be married. While this difference is partly a mechanical feature of measuring AGI at the household level, it nonetheless highlights that ICs at the bottom of the income distribution are more likely to be using IC earnings as their primary income source, while for ICs at the top of the income distribution, IC earnings are more likely to be supplemental – either supplemental income earned by the primary earner or primary earnings for a secondary earner.[26]

5.2.3 Independent Contractor Growth for Primary and Secondary Earners

Next, we explore the growth in IC participation among primary and secondary earners within a household. We divide ICs into four categories: i) primary earners with the majority of their income from IC earnings, ii) primary earners with the majority income from Form W-2, iii) secondary earners with the majority of their income from IC earnings, and iv) secondary earners with the majority of their income from Form W-2 earnings. "Primary earners" are individuals whose labor income contributes more than half of total household labor income. "Secondary earners" are married individuals whose labor income contributes less than half of total household labor income.[27] "IC Primary" are ICs with more than half of their individual labor income as IC income, and "IC Secondary" are ICs with a majority of their individual labor income from Form W-2s.

The largest group of ICs is primary earners for whom IC income is a secondary income source, at approximately 45 percent in 2016 (Figure 9 Panel A). The second largest category is primary household earners for whom IC income is their primary labor income source comprising almost 33 percent of ICs in 2016. Secondary earners for whom IC income is their primary income source make-up 14 percent of ICs, and secondary earners with secondary IC income make-up the remaining 8 percent. We find that the fastest growth has been among primary earners with primarily IC earnings (Figure 9, Panel B). The slowest growth has actually been among workers with IC as a secondary income source, though there has been fast growth amongst this group since 2013 perhaps attributable

[26] Categorizing workers by whether the majority of their labor income is IC income shows the demographic distinctions even more sharply. These workers are more likely to be in the bottom half of the income distribution, and in the bottom half of the income distribution almost all of household income comes from Form 1099-MISC/K income (Table 4).

[27] An IC is a "primary earner" in their household if the sum of their individual 1099 and W-2 income is greater than half of the sum of total household 1099 plus W-2 income, or $(1099\ income_i + W\text{-}2\ income_i)/(1099\ income_{hh} + W\text{-}2\ income_{hh}) > 0.50$ where i indexes the IC and hh indexes their household. For non-married ICs, this will always be true and for married ICs $1099\ income_{hh} = 1099\ income_i + 1099\ income_s$ and $W\text{-}2\ income_{hh} = W\text{-}2\ income_i + W\text{-}2\ income_s$ where s indexes the IC's spouse.

to the rise of the platform economy. The results suggest that the long-run growth in IC labor cannot simply be attributed to the rise of the platform economy providing new opportunities for individuals and households to pick-up supplementary income. Over a long horizon, for an increasing number of individuals, IC labor is their primary income source even though the median worker has relatively low IC earnings.

Table 5 shows summary statistics for each of these groups. The fastest growing group - primary household earners with IC income as their primary labor income source (shown in the second set of columns) – has substantially larger IC income than the each of the other groups. The median IC earnings for this group is over $15,000 gross (or $9,500 net of Schedule C deductions), while for the largest group of ICs, primary earners whose IC income is a secondary income source (shown in the first set of columns), the median IC earnings is $2,500 gross (or $1,300 net of Schedule C deductions). At the same time, primary earners with primarily IC labor income are much more likely to be in the bottom quartile of the AGI distribution, with almost 50 percent of this group in the bottom quartile and only 17 percent in the top quartile. In contrast, 35 percent of primary earners with supplemental IC labor earnings are in the top quartile of the income distribution, and only 16 percent are in the bottom quartile.

The results suggest that policy concerns associated with the "1099 economy" are likely to be varied. The largest share of ICs receive the majority of their income from wage and salary employment and are in the top quartile of the income distribution, which mitigates concerns about a loss in labor protections and fringe benefits. On the other hand, the fastest growth in ICs has been among those who receive their primary income from contracting. For these individuals the loss in protections and benefits are more concerning, particularly since the majority of these individuals find themselves in the bottom quartile of the income distribution.

5.2.4 IC Trend and Characteristic Differences by Sex

We find that growth in aggregate IC labor was disproportionately driven by an increase in female ICs, and that the aggregate trend cannot be easily characterized by the rise of a single type of IC relationship. As with ICs in general, the majority of female ICs have contractor income that is supplemental to Form W-2 earnings, but the largest growth in female ICs was among those whose primary source of labor income is IC earnings. For the majority of the latter group IC income represents the primary household earnings source, and these households are disproportionately in the bottom quartile of the income distribution. This section also explores historically important factors that determine female self-employment and labor supply more generally including the presence of children, eligibility of the EITC, marital status, and other household income to shed light on the potential mechanisms behind the increase in female ICs. We find that, demographically, female ICs tend to be similar to female employees, but are lower in the income distribution, and that the largest increases have been in service industries.

Approximately 55 percent of the growth in independent contracting from 2001 to 2016 is attributable to the increase in female ICs. Women saw a 68 percent increase in the number of ICs while men saw a 37 percent increase (Figure 10, Panel B). The share of the female workers (ICs plus

employees) who are ICs increased from 5.4 percent to 7.5 percent from 2001 to 2016, while the IC share of the male workforce remained essentially constant over this period. Figure 10, Panel C shows that the increase in female ICs is similar under the broader definition suggesting that the rise in female Form 1099-MISC/K recipients does not represent an increase in female owned businesses but is driven by women providing contract labor services. Additionally we find that over half of the increase in female ICs is among women who receive the majority of their labor income from IC earnings (Panels A and C). Though female ICs who earned the majority of their labor income from IC earnings were only 17 percent of ICs in 2001, this group contributed almost 30 percent of the total growth in ICs, male and female, from 2001 to 2016 (Appendix Table A.2).

When we compare the demographic characteristics of female ICs to those of male ICs and female employees, we find that most demographic trends are relatively flat over time and track relatively evenly between men and women, providing no clear evidence of compositional changes among female ICs over time along these dimensions. Female ICs are more likely to have children than employees, but this gap does not grow over time, suggesting that movements to contracting resulting from a desire for flexible work among mothers is not likely a major contributor to the rise in female ICs (Figure 11, Panel B).[28] Female ICs are older on average than employees, and the share of women 55 and older participating in the labor force increased from 12.6 to 22.2 percent from 2000 to 2016 (U.S. Bureau of Labor Statistics (2017)). It could be that independent contracting provides a pre-retirement option for women and that the increasing share of women ICs is related to the increasing working age for women in the labor market in general. This trend could also be more broadly related to the finding that, on average, male and female IC are getting older over this period, as seen in Panel A.

We find that the fraction of female ICs receiving the EITC is growing faster than female employees. This is consistent with previous research finding that increasing EITC generosity increases self-employment (LaLumia (2009), Lim and Michelmore (2018)) and that the self-employed may have a greater ability to target their income to receive a higher EITC (Saez (2010), Chetty et al. (2013), Mortenson and Whitten (2018)). Further research is needed to understand the extent to which changes to EITC policies have contributed to the increase in female ICs over this time period.

Next, we examine whether certain industries were responsible for the growth in female ICs. Figure 12 shows that female and male ICs are concentrated differently across industries and that the growth in ICs from 2001 to 2016 was differential across industries for men and women. Panel A shows that there have been large increases in female ICs in the fast growing professional services and health care industries, industries that started with high levels of female ICs in 2001. Panel B shows that there is heterogeneity in the increase in female and male ICs across industries. The professional and other service industries saw substantial growth for both men and women, though with larger absolute increases for women. Yet, in the fastest growing sector over this period, health care, social assistance and educational services, the aggregate growth in ICs has been dominated by increases in female ICs. Also, the increases ICs in retail and trade has been dominated by women, even as total employment in this sector has been almost flat over this period (BLS). These patterns suggest that

[28] We could see an increase in female ICs if the flexibility of contracting work increased relative to wage and salary employment or if there was a change in preferences among women resulting in a greater desire for flexibility.

aggregate service industry growth likely contributed to the increases in IC labor, but that there remains heterogeneity across industry and between men and women, which is potentially related to differences in occupations within industry.

Next, we locate female ICs in the income distribution and investigate the contribution of their IC earnings to total individual and household income, following the analyses described in Section 5.2.1 and Section 5.2.2. As with ICs in general, female ICs have relatively constant median IC earnings throughout the distribution (Table 6). Even though the median level of net IC earnings is low, around $2,000, almost 50 percent of female ICs receive the majority of their labor income from contracting, as do 47 percent of male ICs. Approximately two-thirds of female ICs in the bottom quartile of the income distribution are primarily IC earners, and IC earnings make-up essentially all of AGI for this group.

We find that the largest percentage increase in female ICs is among those who receive a majority of their labor income from IC labor, across all quartiles ("primarily IC income", Figure 13, Panel B). Relative to male ICs, there has been more growth across all AGI quartiles for female ICs and the growth has been more clearly concentrated in the bottom half of the income distribution. This is particularly true amongst those who receive a majority of their labor earnings from IC income. The absolute rise in female contracting at both ends of the household AGI distribution, displayed in Panel A, suggests multiple changes over this time period encouraging women to become ICs.

To investigate differences between male and female ICs by the contribution of IC earnings to individual and household income, we divide male and female ICs into the same four categories as in Section 5.2.3: i) primary household earners, primarily IC income, ii) primary household earners, secondary IC income, iii) secondary household earners, primarily IC income, and iv) secondary household earners, secondary IC income. Overall we see that the percentage growth of ICs for women has greatly outstripped that for men in every category, except for secondary household earners for whom IC income is a secondary income source (Figure 9). Table 7 shows that the two largest contributors to the total growth in ICs are female primary earners for whom IC income is a secondary income source, contributing 22 percent, and female primary earners with primarily IC earnings, contributing 19 percent. These groups also have the largest relative growth; women who are primary earners in their household and have primarily IC earnings increased by over 90 percent since 2001 (Figure 9). The next largest contributors to the overall trend were men of these same types, contributing 19 percent (primary earner, secondary IC) and 16 percent (primary earner, primarily IC) respectively. We do not find evidence that the rise in female ICs is driven by secondary earners, who perhaps would not otherwise work but are finding new opportunities to enter the labor market through contracting.

Table 5 shows that female primary earners with primarily IC labor earnings, the group with the largest relative growth between 2001 and 2016, are also the most likely to be in the bottom quartile of the AGI distribution, with 51 percent in the bottom quartile and only 15 percent in the top quartile (second set of columns). Female primary earners with IC earnings as a secondary labor income source, which make-up the majority of female ICs and have experienced particularly rapid growth since 2012, are much more equally represented across the income distribution, though they more likely to be in the bottom half of the distribution than are male ICs of this type (first set of columns).

Taken together, we find that the largest share of ICs uses contracting income as a supplementary labor income source, and that this group has grown fastest since 2012, which is consistent with previous work (e.g. Collins et al. (2019)). But, we also show that to characterize the long-run growth in IC labor in the U.S. as individuals seeking supplemental income, may miss a more structural shift in the labor market, particularly for women. Importantly, the fastest growth has occurred among those for whom IC income is their primary individual and household income source, and the absolute growth in IC labor is dominated by an increase in female ICs.

6. Worker Transitions into and out of Independent Contracting

In this section, we explore transitions by individuals between primarily earning IC income and primarily earning wage income over time. We find that there is growth in the number of workers who consistently receive IC income across years, and in the number of individuals moving from no labor earnings to IC income. Consistent with our other findings in this section, a majority of the growth in IC income is among those transitioning into states where all labor income is from IC labor.

Using our sample of all taxpayers described in Section 4.3, we define a transition based on the status of that individual in year *t-1* and year *t*. In Figure 14, we show the number of individuals making transitions between employment statuses each year: "IC any to IC any" are those who had some IC labor income in year *t-1* and some IC labor income in year *t*; "W-2 to IC only" are those with Form W-2 income in year *t-1* and IC income but no W-2 income in year *t*; "IC only to IC only" are those with only IC labor income and no W-2 earnings in both years; and "None" represents having no W-2 or IC income in a year.

Our results suggest that the majority of the growth in IC income is attributable to more individuals entering the labor force as ICs and to an increase in the number of individuals who continue IC work year to year. Both of these patterns result in IC income being the primary labor income source for the worker suggesting that the rise in IC income does not simply reflect increases in the number of people picking-up supplemental labor income as ICs. As Figure 14 shows, there has been a large increase in the number of people who have some IC income year over year, "IC any to IC any." Approximately half of the increase in this group can be attributed to those who that have only Form 1099MISC/K labor income from year to year, "IC only to IC only." We also find that, following the Great Recession, there has been an increase in those transitioning from having no employment income to having IC earnings. The majority of the increase is among those who transition from having no earnings to having only IC earnings and no W-2 earnings, "No to IC only."

Table 8 presents summary statistics for individuals changing worker statuses in 2014. We also use our sample to identify trends in the incidence and characteristics of transitions between contractor and employee income received from the same firm. We find an increase in the number of individuals switching from IC to W-2 labor within their firm, up by 36 percent from 2002, while there has been a slight decrease (3 percent) in those switching from W-2 to IC workers within their firm.

7. Trends in Firm use of Independent Contractors Labor

In Section 5, we presented trends in individuals' receipt of IC income, changes economists typically associate with "supply side" market forces. In contrast, the focus of this section and the next is on trends broadly (if simplistically) considered relevant to the "demand side." This section explores how firm use of IC labor, and the characteristics of the firms that use IC labor, have changed over time. We define and track measures of both extensive and intensive use of ICs, and find that, while, in levels, high wage and large firms are more likely to use ICs, and use them more intensively, throughout the series, growth during this period was driven by small and low-wage firms.

7.1 Cross-Sectional Time Trends

We define two broad measures of IC usage by firms. We define extensive margin IC usage using an indicator for whether a firm hired at least one IC in a given tax year. It is likely that hiring at least one worker as an IC represents a significant fixed cost to the firm relative to the marginal cost of hiring an additional IC, as IC contracting is governed by different tax and labor regulations that require some consultation, or at least active decision by the firm. Extensive margin usage provides information on the prevalence of IC labor usage.

We define intensive margin usage as a continuous ratio which captures the firm's comparative reliance on ICs *relative to employees* in a given tax year. We define the "Worker Ratio" as the ratio of ICs to the total number of workers (ICs and employees). The "Compensation Ratio" is calculated as the ratio of IC compensation (from Form 1099-MISCs and Form 1099-K) to aggregate worker compensation (the sum of compensation to ICs and employees).[29] While conceptually similar, the "Worker Ratio" is informative about the composition of a firm's workforce, while the "Compensation Ratio" can be interpreted as the relative allocation of a firm's labor expenses.

7.1.1 Extensive Margin Usage of Independent Contractors

Extensive margin usage increased for nearly every type of firm, but subtle differences in trends and levels merit discussion. Figure 15, Panel A plots extensive margin IC usage for two categories of ICs, those fitting our preferred definition and for a broad definition which includes all individual Form 1099-MISC/K recipients that can be matched with a Form 1040. The trends presented in this figure yield two insights. First, the trend in IC usage using the broad definition tracks the trend in our preferred IC definition closely, suggesting that the overall observed increase in extensive use is driven by hiring of ICs providing labor services, rather than an increase in contracting relationships with other firms. Second, with our preferred definition, we find that there has been a large increase in the fraction of firms with at least one IC; the fraction has increased by 5 percentage points, or by 20

[29] The compensation from the Form 1099-MISC/Ks represents gross earnings, while Form W-2 wages can more closely approximate net income; however, this distinction is much less important for our preferred IC definition because those individuals have low levels of deductions by construction.

percent, from 2001 to 2015. The overall fraction of firms using contractors peaked in 2012 and has been relatively steady since then.

Figure 16, Panel A shows the change in firms' extensive margin IC usage by quartiles of the firm's median wage using our preferred IC definition.[30] Extensive margin IC usage rose consistently from 2001 to 2012 for firms in all quartiles. By 2015, extensive margin IC usage rose by almost 20 percent for firms in the top three wage quartiles, and by 28 percent for firms with lowest median wages, relative to 2001 levels. Figure 17, Panel A shows that the increase in extensive margin IC usage was also shared across firms of different sizes, though relative growth was highest in small firms with four or fewer employees. Extensive margin use is higher throughout the series for large firms, i.e. firms with more than one hundred employees. Appendix Figure A3, Panel A plots extensive use by industry. Most industries exhibit a modest upward trend, excepting manufacturing services, which increases sharply after 2010.[31]

7.1.2 Intensive Independent Contractor Usage Trends

Figure 15, Panel B plots the average *worker ratio*, defined as the number of ICs divided by the number of workers (ICs plus employees). As with the extensive margin, it appears that the increase in the share of contractors per firm is most pronounced when contractors are defined using our preferred definition, ICs likely to be supplying labor services. In contrast, for our preferred definition, the average compensation-ratio, defined as total Form 1099-MISC and 1099-K compensation issued by the firm to ICs divided by total worker compensation (IC Form 1099-MISC/K compensation plus employee wage and salary compensation), is flat over this period (Figure 15 Panel C). This trend is notable given that Form 1099-MISC/K compensation is a gross of business expense deductions, and so might be expected to grow faster than the worker-ratio. The results imply that ICs are lower paid than employees either because they work fewer hours or because they have a lower hourly compensation rate.

The comparatively rapid growth in extensive margin IC usage by small and low wage firms resonates with the trends in intensive margin use. Larger and higher wage firms have higher levels of IC use, smaller and lower wage firms grew rapidly in the *intensity* with which they used ICs. Figures 16 and 17, Panels B and C show analogous information but for intensive margin usage. Although higher-paying firms use contractors more intensively throughout the series, low wage firm intensive margin use, as measured by worker ratio, grew more rapidly. For firms with median wages in the highest quartile, the worker-ratio grew by approximately 15 percent from 2001 to 2015 compared to firms in the lowest quartile, which grew by 22 percent. The compensation ratio, in contrast, grew only 1 percent for high wage firms and 3.4 percent for low wage firms. This could be consistent with several scenarios: firms could be hiring a larger number of ICs but using each contractor to perform less work; firms could be shifting employees from part-time or part year to full time; or firms could be increasing

[30] Firms are assigned to quartiles based on their median employee compensation within the tax year. Similar results obtain when assigning firms to quartiles based on their average, 25th percentile, 75th percentile, or 90th percentile employee compensation.

[31] Data limitations caution against inferring too much here. NAICS codes are missing for approximately one-third of the firm-level sample, particularly among smaller firms, which are growing quickly in IC use.

hiring of relatively low skilled IC. Likewise, small firms with fewer than twenty employees saw their intensive IC usage (worker-ratio) grow by over 10 percent, on average, between 2001 and 2015, about twice as fast as medium firms (20-100 employees) and a third faster than very large firms (more than 100 employees). The share of labor compensation fell slightly for all but the smallest firms (i.e. those with fewer than 4 employees.) Overall, the worker ratio was upward trending for most industries, but more noticeably so for service sectors (Appendix Figure A3, Panel B).

In short, virtually all types of firms were more likely to use ICs, and to use more of them, in 2015 relative to 2001. However, while high wage and large firms use more ICs on both the intensive and extensive margin throughout the series, the increase for these firms was small during this period relative to the growth in small and low wage firms. This differential in growth is particularly pronounced on the extensive margin, where IC use among firms in the bottom median wage quartile grew at nearly twice the rate as those in the top quartile, and firms with fewer than 4 employees increased 22 percent relative to an approximately 10 percent increase among firms with more than 100 employees.

7.2 Trends in IC compensation within firm's wage distribution

The question of where independent contractors fall within the distribution of their payer's wage distribution is complicated by the nature of compensation data available in annual tax filings: we do not observe an hourly wage, but rather, the annual aggregate compensation issued to each worker (Form W-2 for employee; Form 1099-MISC/K for IC). The worker could have provided services part year, or part time, and, complicating distributional questions, could be receiving compensation from several other firms. In addition, compensation issued to ICs is, at least in theory, "gross" i.e. inclusive of costs that the IC will deduct as business expenses. In contrast, employees are allowed very few business deductions on the theory that essential expenses will be reimbursed by the employer.

Form-level compensation refers to the amount of cash wages issued to an employee on Form W-2, or the amount of gross compensation issued to a contractor on Form 1099-MISC. Although Form 1099-MISC compensation is gross, rather than net, most contractors that meet our preferred definition do not have substantial business related deductions, rendering their form compensation closer to a net measure than the average Form 1099-MISC recipient.

We construct a comparative statistic of within firm compensation using the same two percent cross-sectional sample. Using all Form W-2s associated with a given EIN in a given tax year, we calculate five statistics for the wage distribution for each firm: the minimum, 25th percentile, 50th percentile, 75th percentile and maximum. We then assign each contractor to a sextile of the wage distribution, based on their Form 1099-MISC compensation. Figure 18 plots the average share of contractors that fall into each of these six bins over time. While the number of contractors vary year to year, the largest share come from the bottom quartile of the wage distribution and below. This is potentially consistent with the individual finding that the fastest growing group of workers is located in the lowest AGI quartile/total labor compensation distribution, where many workers are lower-skilled.

8. Trends in Transitions between IC Income and Wages within Firms

In this section, we explore the dynamics of a given firm-worker relationship over time. As described in Section 4.2, we expand the firm-level sample used in Section 4 to include longitudinal information about workers, which allows us to identify transitions between contractor and employee income received from the same firm. We identify two types of transitions within a firm: a *contractor transition* is a transition from earning primarily wages in one year to earning primarily IC income in the following year; the opposite transition, from primarily IC to employee income, is referred to as an *employee transition*.

A rise in the fraction of firms with contractor transitions may indicate that the increase in IC income we found in Section 5 arises from firms potentially reclassifying employment income as IC income, perhaps to avoid taxes or other regulatory costs. However, in the aggregate, we see modest evidence of the opposite trend: an increase in firms with employee transitions. We also find that firms are more likely to hire new workers as ICs rather than employees, which suggests that the rise in overall IC income is driven by new hires rather than contractor transitions.

8.1. Trends in Transitions: Main Results

As in section 7, we report both extensive and intensive margin results for worker transitions within the firm. On the extensive margin, we find that the fraction of firms with at least one employee transition is consistently higher than the fraction of firms with at least one contractor transition. Figure 19 plots these fractions separately for our preferred definition of IC and for the broader set of all Form 1099-MISC/K recipients who file a Form 1040. The trends are largely similar for these two groups, but the more expansive definition suggests a higher level of transitions.[32] Interestingly, the two types of transitions appear to be negatively correlated over our sample period. Employee transitions increased relatively sharply in the post-Great Recession years while contractor transitions saw a slight decline. Also notable, at the firm-level, transitions appear to go in one direction: Panel B shows that only 0.3 percent of firms have both types of transitions in the same tax-year.

Employee transitions are also higher than contractor transitions on the intensive margin. Figure 20 shows the average fraction of workers making employee (contractor) transitions relative to the total number of workers at a firm. Echoing the extensive margin trends in Figure 19, a greater proportion of each firm's labor force completes an employee transition than a contractor transition, though both fractions are modest in absolute terms. Using our preferred definition, the average firm has seen an increase in employee transitions over the period, from 0.35 to 0.43 percent of workers. In contrast, employee transitions have held steady at approximately 0.17 percent.

Neither figure suggests that there has been an increase in existing employees being reclassified as ICs by their employers. Indeed, there appears to be a modest increase in ICs becoming employees;

[32] Our sample is a representative cross-section of EINS that issue W-2s, so we show statistics on transitions for workers in the year that the firm with which the worker is associated is sampled.

a trend driven primarily by an increase in permanent transitions.[33] One potential explanation for this trend is that IC relationships constitute a comparatively low-commitment way for a firm to learn about a worker's productivity, after which the firm can confer employee status, in order to retain the most productive contractors. Additional work on IC income receipt over the life cycle and whether it leads to employee status and future earnings increases could shed light on how this practice affects workers' earnings trajectories.

Rather than a shift in the status of existing workers, we find that the upward trends in firm IC use identified in Section 7 are better explained by an increasing propensity to hire new workers as ICs.[34] We define new hires as individuals who are either an employee or IC (using our preferred definition) in the year in which the firm was sampled, but who had no relationship with the firm in the year prior. Figure 21 plots new hires by type, for both extensive and intensive measures. Panel A shows that the fraction of firms that hired at least one new employee was between 55-65 percent over the study period; it dropped precipitously during the Great Recession, then recovered, though not to pre-2008 levels. In marked contrast, the fraction of firms hiring a new IC rose slightly between 2001 and 2016, with a particularly strong increase in the post-recession years. In 2016, 18 percent of firms hired a new IC.

In Panel B, we show the average fraction of a firms' total workers who are new employees or new ICs. The patterns mirror those in Panel A. While the average fraction of workers who are new ICs has held steady, at around 4 percent, the average fraction of new employees has fallen from 31 percent (in 2001) to 26 percent (in 2016), exhibiting a sharp decline in 2009. Initial classification of new hires as ICs is also consistent with firms learning about worker productivity before committing to employee status, as articulated above; however, an alternative explanation is that individuals looking for new employment are hired as ICs and are overall less likely to enter formal employer-employee relationships. Further work to distinguish between these explanations would provide information to help understand the importance of addressing concerns about the lack of social safety net programs for ICs.

8.2. Trends in Transitions by Firm Size and Industry

Next, we examine transitions by firm size and industry. We uncover substantial heterogeneity, finding that overall trends are disproportionately driven by small firms, and transitions are concentrated in industries with previously documented high levels of worker misclassification. Our results may help identify characteristics of firms with a higher propensity to misclassify workers and could inform the design of future, targeted protections for contract workers (Harris and Krueger (2015)).

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[33] We define "permanent" transitions as those that endure for at least two consecutive years. For example, a permanent contractor transition is defined as three consecutive tax years in which the worker is an employee in the first year, becomes a contractor in the second year, and remains a contractor in the third year. In contrast, we consider the transition "temporary" if the worker reverts to the original relationship or leaves the firm in the third year.

[34] Initial classification of new hires as IC is also consistent with firms learning about worker productivity before committing to employee status, as articulated above.

Figure 22 plots employee and contractor transitions by firm-size, binned by the number of Form W-2 recipients.[35] Panels A and C show the extensive measure of transitions of either type rises strongly with the size of the firm; however, this could be a largely mechanical effect—larger firms with more workers can be expected to be more likely to have at least one worker transition. Indeed, when normalized to 2001 levels in Panel B, growth in extensive margin contractor transitions does not appear to systematically differ by firm size. The same cannot be said for extensive margin growth in employee transitions. Panel D shows that the fraction of firms with at least one employee transition is increasing most in percentage terms for the smallest firms. Panels B and D of Figure 23 tell a largely similar story for new hires. The fraction of firms hiring a new IC increased while the fraction of firms hiring a new employee decreased, virtually across the board. Similar to our findings in Section 7, the trends are most pronounced among small firms.

Given that levels of both worker misclassification and self-employment--of which independent contracting is a substantial part-- differ substantially by industry (Pew 2015), we anticipate significant heterogeneity along this dimension. We link sampled EINs to NAICS industry codes at the two-digit level.[36] As an important caveat, we are unable to identify industry for approximately one quarter of firms, which may substantially affect our results.[37] Table 9 shows the fraction of firms with any workers switching statuses in 2016 and the fraction of firms making any new hires of each type of worker in 2016 by industry. Firms in the information and education sectors are the most likely to have employee transitions and new hire ICs, while firms in accommodations or food services are the least likely. This variation could simply reflect higher use of contractors in those industries. However, the incidence of transitions by industry is closely aligned with the conclusions of worker classification audit studies, which have found that information and education sectors had relatively high rates of misclassification compared to leisure and hospitality industries, which had some of the lowest (Carré and Wilson (2004)).

9. Conclusion

This paper uses administrative tax data to identify a group of workers as "independent contractors"-- individuals who provide labor services to firms outside of an employment relationship – and to investigate trends in IC labor usage and characteristics of IC workers over a fifteen-year period, from 2001 to 2016. We begin by developing our preferred definition of ICs using individual tax returns and information reports. We focus on individual Form 1099-MISC or Form 1099-K recipients with less than $10,000 in Schedule C deductions, excluding deductions for vehicle and travel, who are not employers. We show that the deductions restriction is important for accurately establishing the size of the IC workforce, by helping to exclude small businesses which may supply goods or services to firms in transactions that are conceptually distinct from ICs. This restriction is

[35] We divide firms into size categories based on their number of W-2 employees. This size measure has the benefit of not changing across different potential definitions of independent contractors, and it more closely matches the definition of firm size that can be developed using other data sources such as unemployment insurance records.
[36] The variable we link to is contained in CDW's BRTF table, a longitudinal entity-level database maintained by the IRS.
[37] We keep the closest year match to the entity file with a limit of 10 years difference. The match rate generally increases over time from around 68 percent in 2001 to 79 percent in 2016.

particularly important for identifying ICs that receive Form 1099-K. Using our preferred definition, we corroborate previous studies using survey or administrative data sources, finding that the share of the workforce with some IC income grew substantially between 2001 and 2016, by 1.5 percentage points, or 22 percent. We find that much of this growth occurred prior to the rise of the major online platform businesses after 2010.

We find that the growth of the IC workforce is not associated with a single type of worker or labor relationship, implying that there are likely a number of contributing explanations for why individuals are increasingly working as ICs. Approximately equal shares of ICs make almost all of their labor earnings from contracting or have IC earnings as a small supplement to wage and salary employment. Both of these groups have been growing over time, with almost 50 percent growth from 2001 to 2016. We find steady long-run growth among those who are primarily contractors and more recent fast growth among those with IC earnings as supplementary labor income, suggesting that the trend cannot merely be explained by individuals picking up side contracting jobs to supplement their main earnings.

Additionally, we find that women account for approximately 55 percent of the total increase in the number of ICs from 2001 to 2016, a period over which female employment has been relatively flat. We find that the largest group of ICs earn relatively small amounts of IC income as supplemental labor income, the majority of which are in the top half of the income distribution. Yet, the fastest growing type of ICs is those whose primary household income source is contractor earnings, over 50 percent of which are in the bottom quartile of the income distribution. These trends are particularly pronounced among female ICs.

Next we examine firms' use of ICs and find a 4.9 percentage point, or 17 percent, increase in the fraction of firms hiring any ICs between 2001 and 2015. By 2015, ICs make up 11 percent of the workers at the average firm up from 8.9 percent in 2001. We find that virtually all types of firms were more likely to use ICs, and to use more of them. High wage and large firms with many employees use more ICs, but the increase in IC usage was fastest for small and low wage firms. We also find that over our sample period the fraction of firms hiring a new contractor grew by 1 percentage point while the fraction hiring a new employee has fallen by 5 percentage points. Again, these trends were strongest for the smallest firms.

To understand whether workers are being re-classified, we examine the extent to which workers switch employment types with the same firm each year. In 2016, we find that only 4 percent of firms have at least one worker changing statuses within the same firm. While the number of individuals switching status within firm are low, we find that firms in the information and educational services industries are the most likely to have workers switching statuses, corresponding with audit evidence suggesting that these industries have relatively high rates of worker misclassification (Carré and Wilson (2004)).

Together, these trends suggest that the long-run growth in IC labor in the U.S. cannot solely be attributed to individuals seeking supplemental income, or to the rise of a few online platform firms, but may represent a broad-based, structural shift in the labor market, particularly for women. We do not determine whether these trends are driven by an increase in demand for these types of workers or an increase in supply, but our findings suggest that the growth in contracting may be attributable to

multiple factors, and that policy concerns associated with the "1099 economy" are also likely to be varied. Further research to disaggregate the supply and demand side factors and the implications for individual career paths and business trajectories associated with these trends will certainly be an important line of inquiry moving forward.

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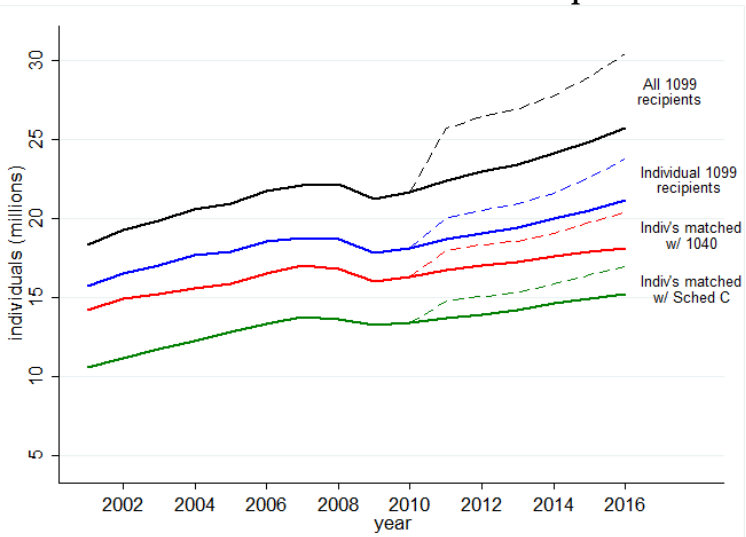
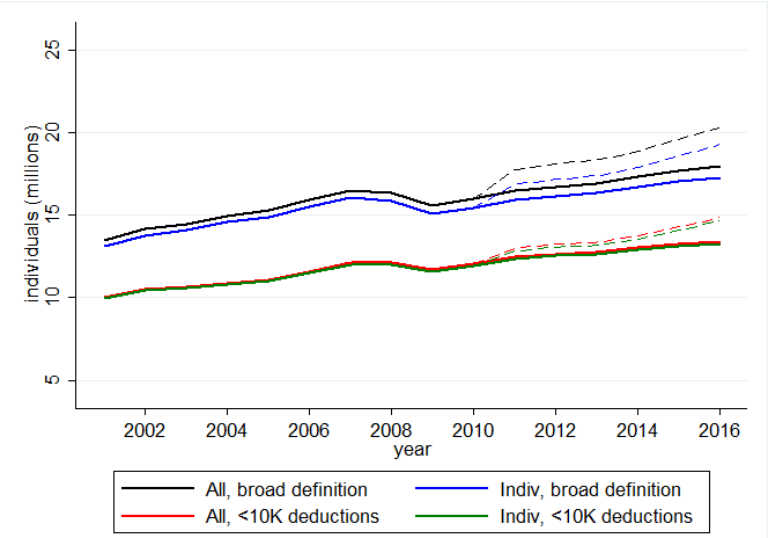
Figures and Tables

Figure 1: Form 1099-MISC and Form 1099-K recipients in the U.S.



Notes: The solid lines represent Form 1099-MISC, Box 7 income recipients and the dashed lines show the sum of all Form 1099-MISC and/or Form 1099-K recipients. The black series represents all unique Form 1099-MISC/K recipient TINs. The blue represents "individual Form 1099-MISC/K recipients", those with an SSN or an EIN that can be matched to a Schedule C. The red series represents individual Form 1099-MISC/K recipients which can be matched to a Form 1040 tax return. The green series represent individual Form 1099-MISC/K recipients which can be matched to a Schedule C.

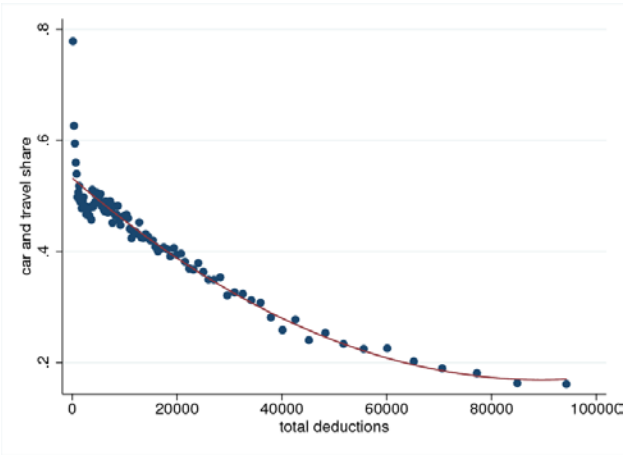
Figure 2: Independent Contractors: Broad and Deduction Restricted Definitions



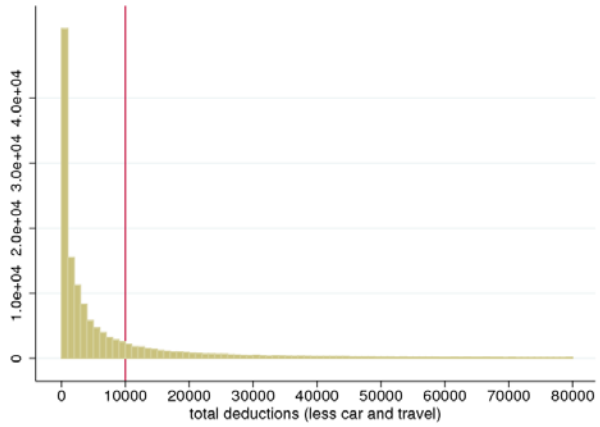
Notes: The solid lines represent Form 1099-MISC recipients and the dashed lines show the sum of Form 1099-MISC and/or Form 1099-K recipients. The black series is all Form 1099-MISC/K recipients which are potential ICs: i) individual Form 1099-MISC/K recipients which can be matched to a Form 1040 or a Schedule C and are non-employers (do not declare any employment deductions) and ii) potential incorporated ICs, defined as EIN recipients that match with a business income return Form 1120S, have only one owner and are non-employers. The blue series shows individual Form 1099-MISC/K recipients and excludes potential incorporated IC. The red series contains the subset of all potential IC which declare less than $10K in total deductions, excluding car and travel deductions, and the green series includes only the individual ICs with less than $10K in total deductions. The differences between the black and blue series and between the red and green series represent the potential incorporated ICs.

Figure 3: Sensitivity to Deduction Restrictions

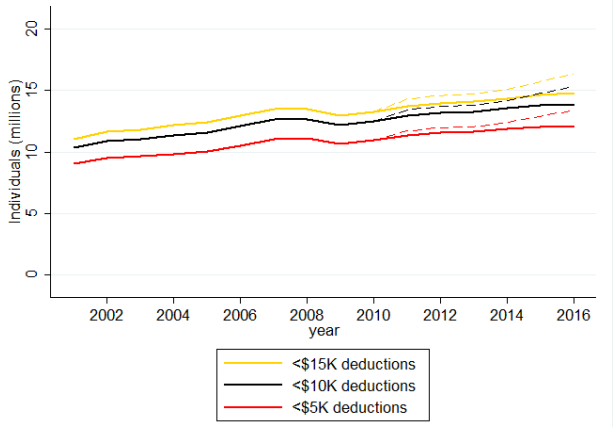
Panel A: Car and Travel as Share of Total Deductions



Panel B: Distribution of Deductions



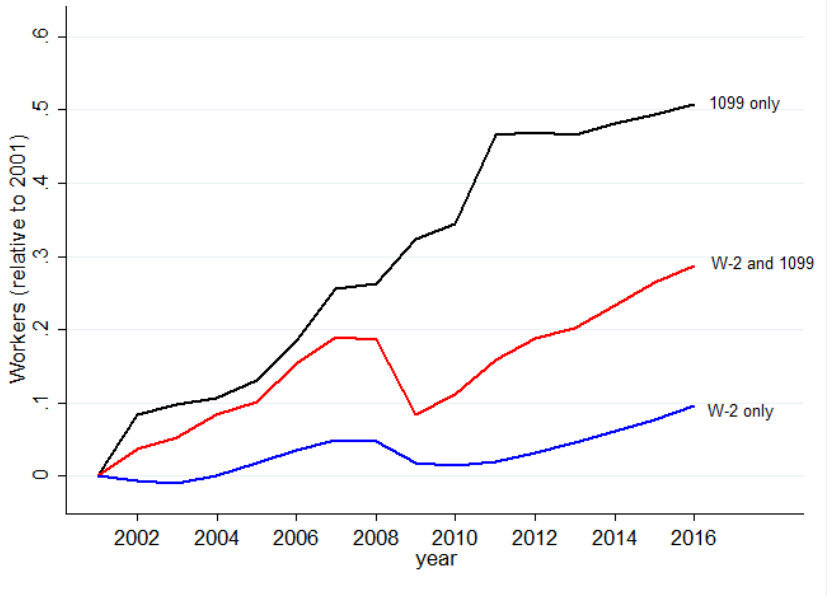
Panel C: Time Series, Various Restrictions



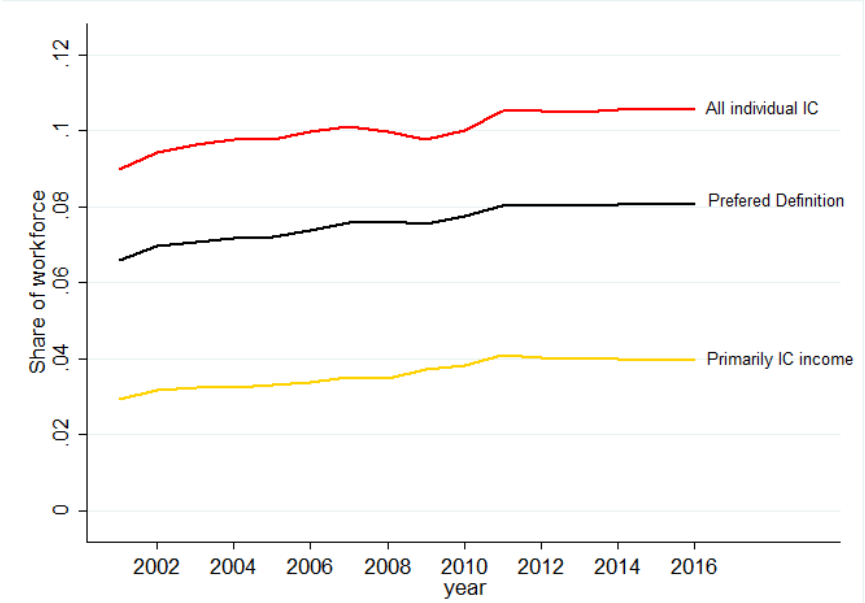
Notes: Panel A is a bin scatter plot of car and travel deductions as a share of total household Schedule C deductions. Each point represents the average share for those within a given range of total deductions. Panel B shows the frequency distribution of total Schedule C deductions less car and travel deductions for our sample. Panel C shows the time series of Form 1099 recipients at various deduction levels. The solid lines represent Form 1099-MISC recipients and the dashed lines show all Form 1099-MISC and/or Form 1099-K recipients.

Figure 4: Independent Contractors Relative to Employees over Time

Panel A: Changes in Composition of the Workforce Relative to 2001

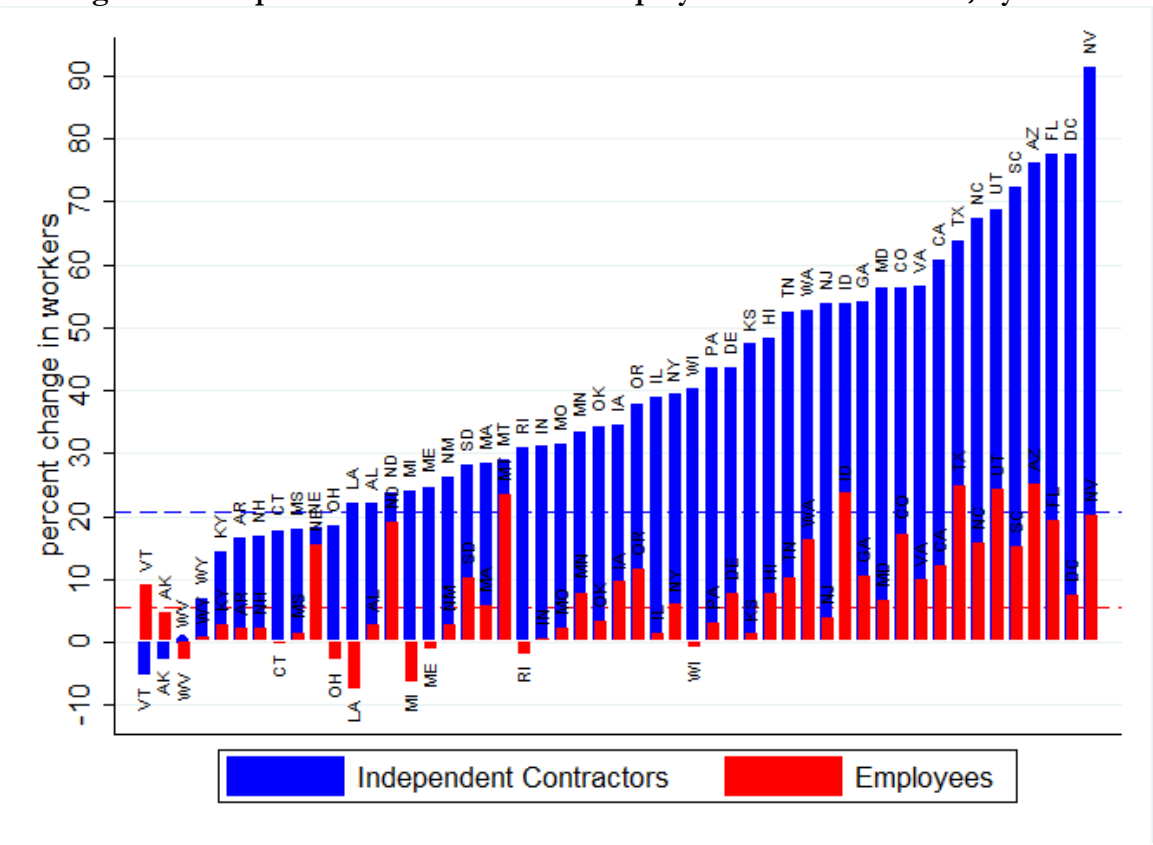


Panel B: Independent Contractors as a Share of the Workforce



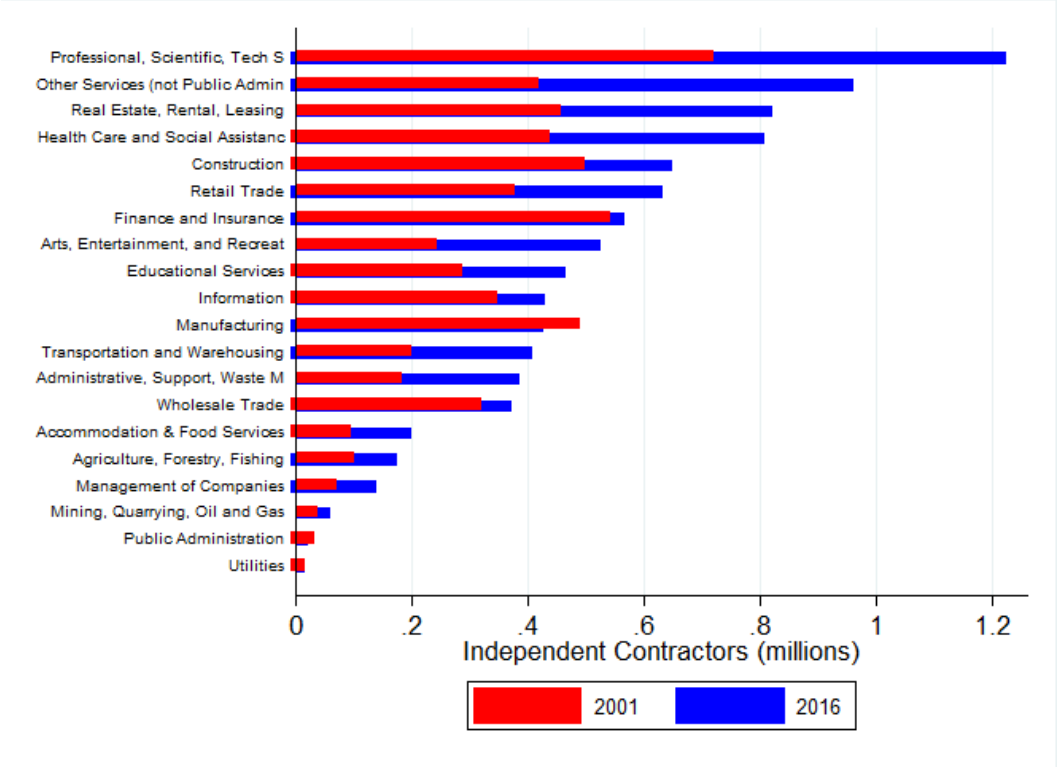
Notes: This figure shows Form 1099-MISC/K recipients as a share of the total workforce including ICs and employees. Panel A shows the growth in workers over time relative to 2001 levels. The black series represents ICs with no Form W-2 earnings; the red series are those with both Form W-2 and IC income; the blue series are those with only Form W-2 earnings. Panel B shows ICs as the share of the total workforce, (ICs+employees), for various definitions of ICs. The red series shows the share of the workforce that are individual Form 1099-MISC/K recipients matched with a Form 1040; the black series shows the share of the workforce that are ICs by our preferred definition; and the yellow series shows the share of the workforce that are the subset of ICs (by our preferred definition) that earn the majority of their labor income from Form 1099-MISC/K income, or with *(1099 income / (1099 + W-2 income))>0.5*.

Figure 5: Independent Contractor and Employee Growth 2001-2016, by State



Notes: This figure shows the percent change in independent contractors (IC) and employees from 2001-2016 by state. The blue bars show the percent change in IC, where IC are defined as Form 1099-MISC/K recipients that report less than $10K in deductions on a Schedule C, excluding car and travel expenses. The red bars show the percent change in employees, defined as those who receive a Form W-2 with positive income. The horizontal blue dashed line represents the average growth rate in IC across states; the red dashed line represents the average growth rate in employees across states.

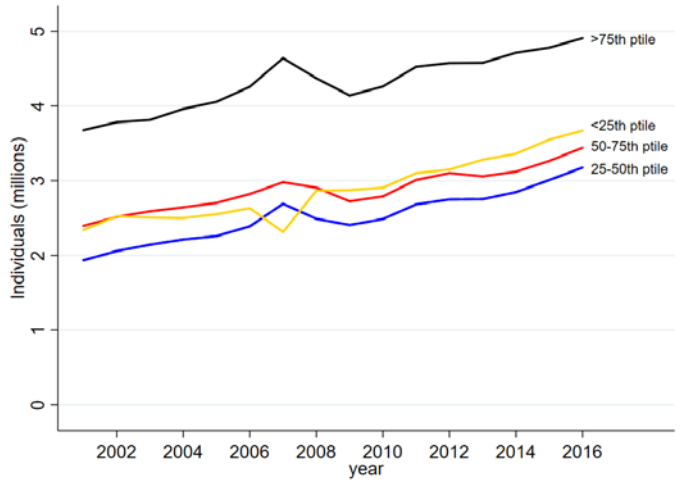
Figure 6: Number of Independent Contractors by Industry, 2001 and 2016



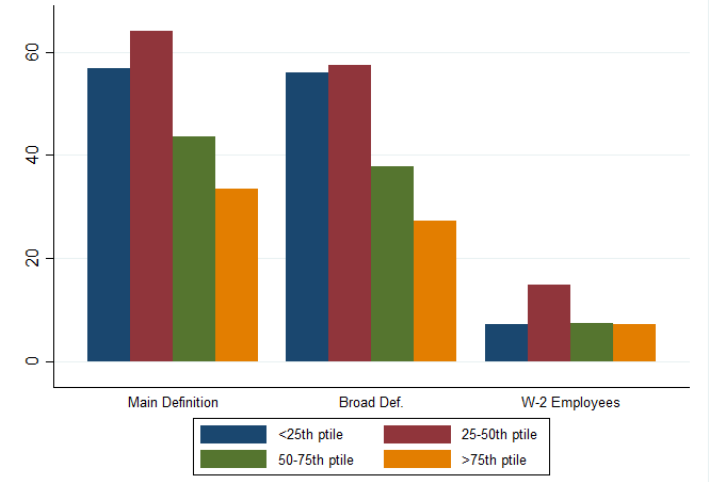
Notes: This figure shows the number of ICs by industry of the Form 1099-MISC/K issuing firm for the years 2001 and 2016. ICs are defined according to our preferred definition, Form 1099-MISC/K recipients that report less than $10K in deductions on a Schedule C, excluding car and travel expenses. Industries are defined as two-digit NAICS categories are reported on the firm's income tax return.

Figure 7: Independent Contractors in the Income Distribution

Panel A: Number of Independent Contractors by AGI Quartiles



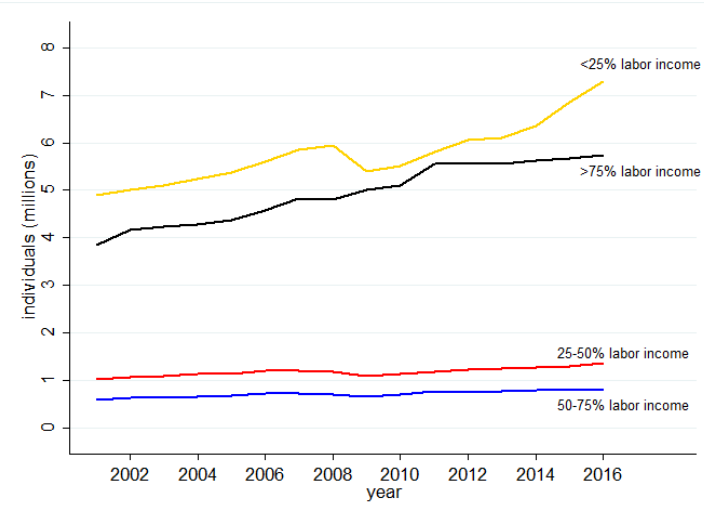
Panel B: Percent Growth in IC by AGI Quartile and Worker Category (2001 to 2016)



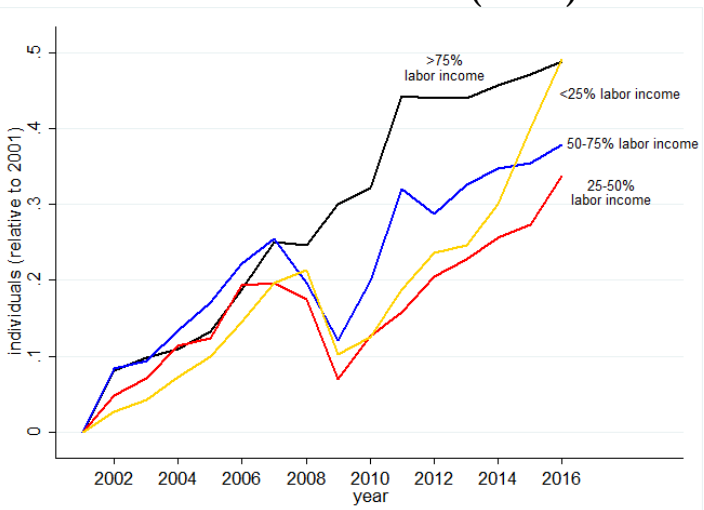
Notes: These figures show ICs by their position in the AGI distribution by year, categorized by their position in each quartile of the AGI distribution where the distribution is taken over the universe of taxpayers in each year. Panel A shows the number of contractors in each quartile by year and uses our preferred definition of ICs, those with less than $10K in Schedule C deductions, excluding car and travel. Panel B shows the percent change in the number of ICs in each quartile from 2001 to 2016 for various definitions of IC labor. "Main Definition" corresponds with our preferred definition; "Broad Def." are all individual Form 1099-MISC/K recipients matched with a Form 1040, with no deductions restriction; and the last set of bars shows the change for Form W-2 employees.

Figure 8: Dependence on Form 1099-MISC/K Income

Panel A: Form 1099 Income as a Share of Total Labor Income



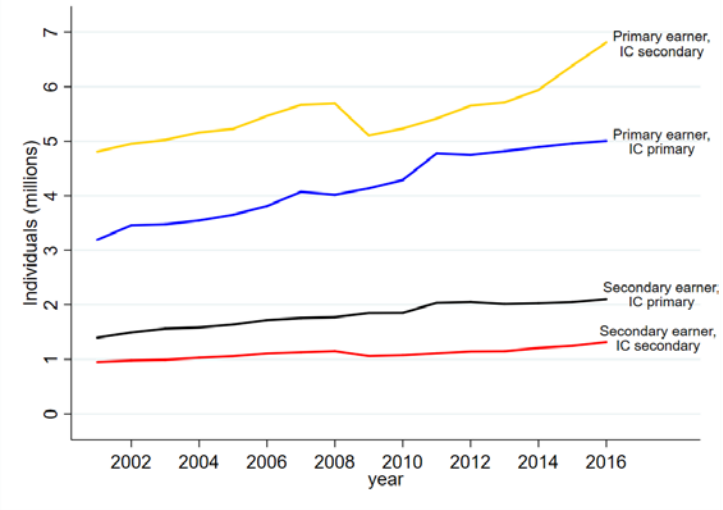
Panel B: Form 1099 Income as a Share of Total Labor Income (trends)



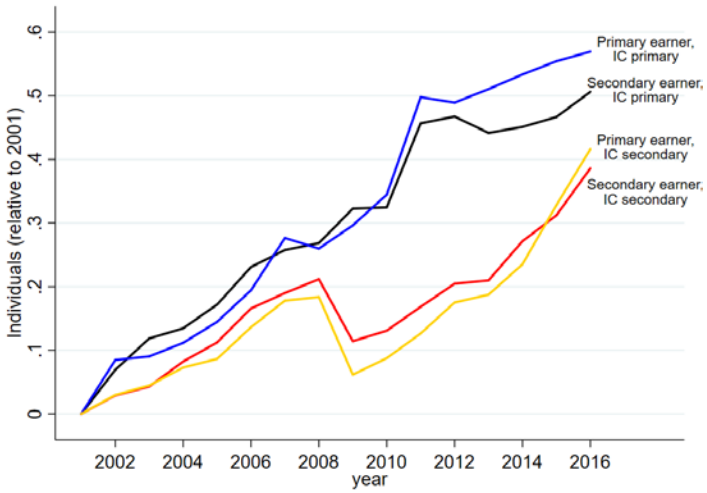
Notes: These figures explore IC income as a share of total labor income and total household income. Panel A shows. In each panel we define ICs according to our preferred definitions, individual Form 1099-MISC/K recipients with <$10K in Schedule C deductions excluding car and travel. Panel A shows the number of ICs by individual IC income as a share of total income, or Form 1099-MISC/K income / (1099 + W-2 income). The yellow series are those for whom the IC income share is less than 25% of labor income; the black series are those with a greater than 75% share; the red series are those with a 25-50% share; and the blue series a 50-75% share. Panel B shows trends for these groups, relative to the 2001 level.

Figure 9: Independent Contractor Growth by Primary or Secondary Income

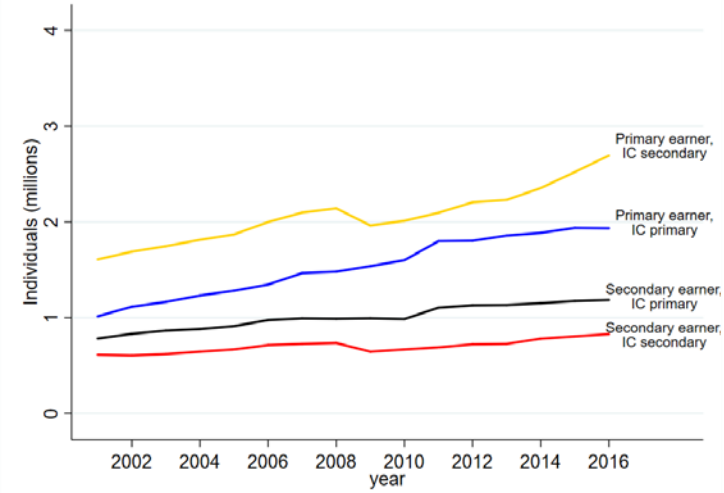
Panel A: All Independent Contractors (Levels)



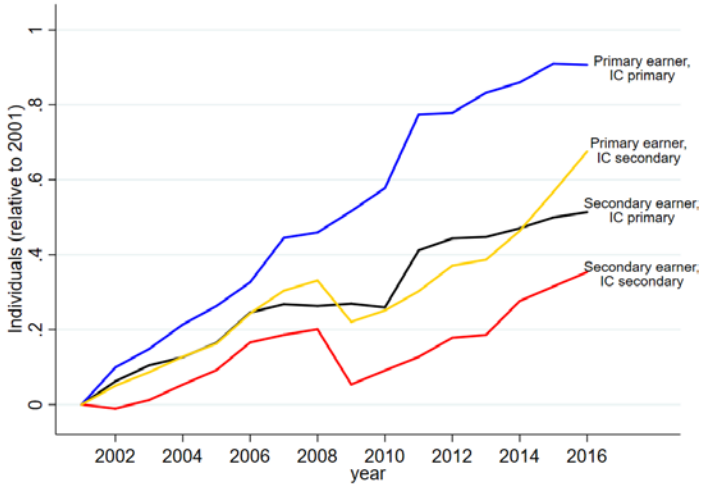
Panel B: Independent Contractors (relative to 2001)



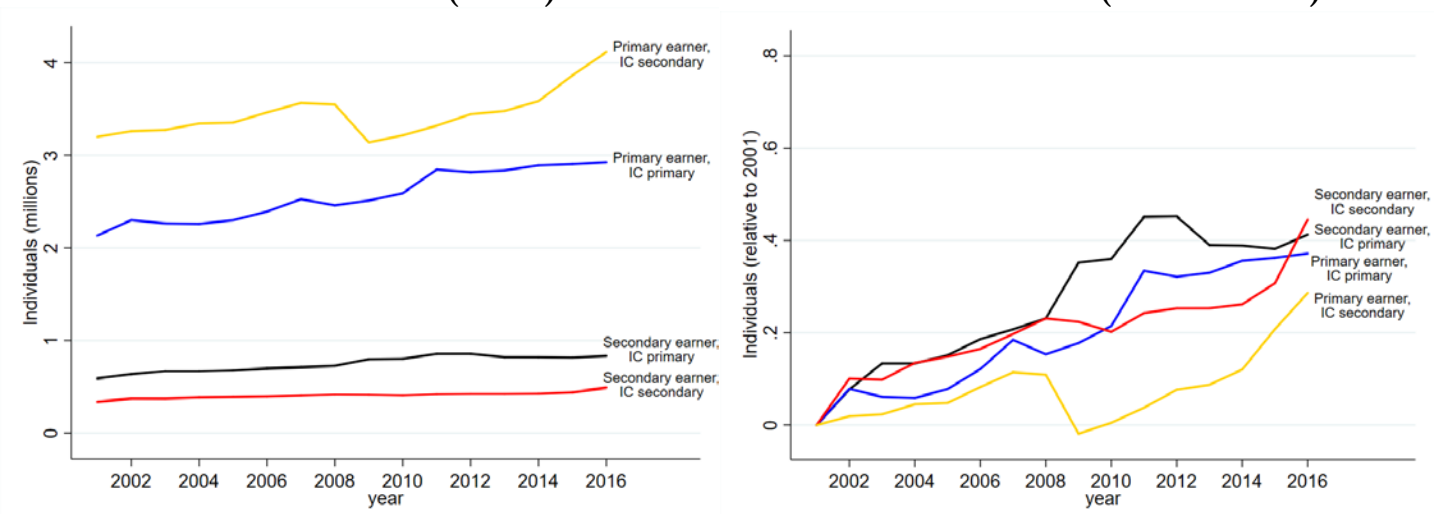
Panel C: Female ICs (Levels)



Panel D: Female ICs (relative to 2001)



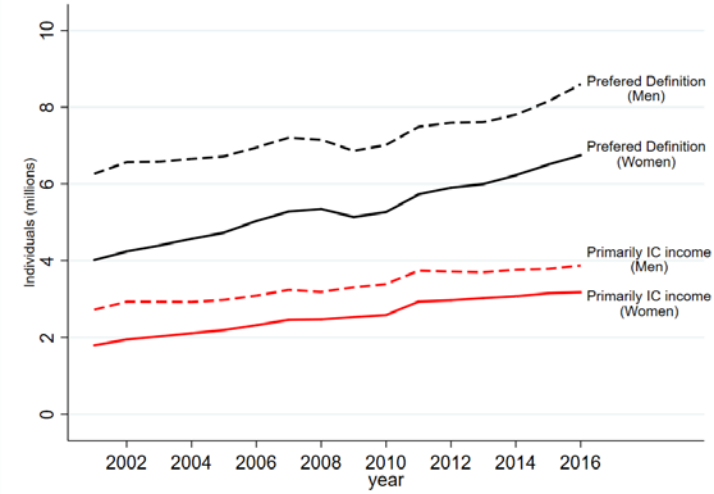
Panel E: Male ICs (Levels) **Panel F: Male ICs (relative to 2001)**



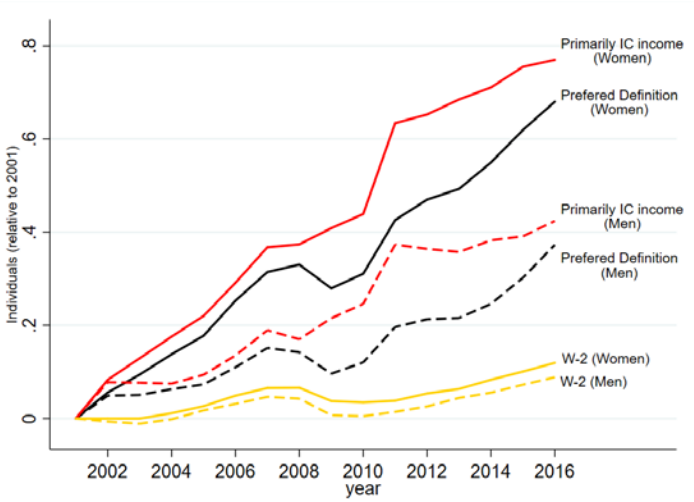
Notes: This figure show the time series for independent contractors by whether they are primary or secondary earners in their households and by whether their primary labor income source is IC income. "Primary earners" are primary earners in their household defined as having individual labor income (1099 + W-2 income) more than 50 percent of household labor income, or $(1099\ income_i + W\text{-}2\ income_i)/(1099\ income_{hh} + W\text{-}2\ income_{hh})>0.50$ where *i* indexes the IC and *hh* indexes their household.. "Secondary earners" are married and with labor earnings less than half of household labor earnings. "IC primary" are ICs that earn the majority of their labor income from IC earnings, $(1099\ income\ /\ (1099 + W\text{-}2\ income))>0.50$. "IC secondary" are ICs who earn the majority of their labor income as Form W-2 earnings. All ICs correspond to our preferred definition, individual Form 1099-MISC/K recipients with less than $10K in Schedule C deductions, excluding car and travel. Panels A, C, and E show the number of contractors, and Panels B, D and F show the number relative to 2001 to show relative growth.

Figure 10: Male v. Female Independent Contractor Growth

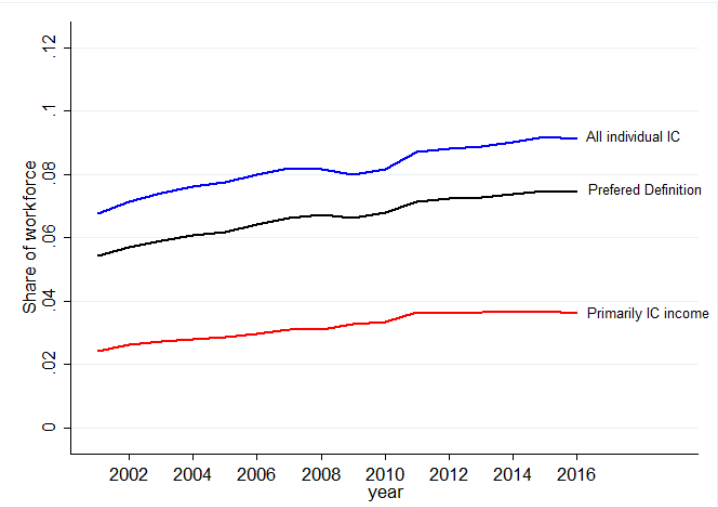
Panel A: Levels



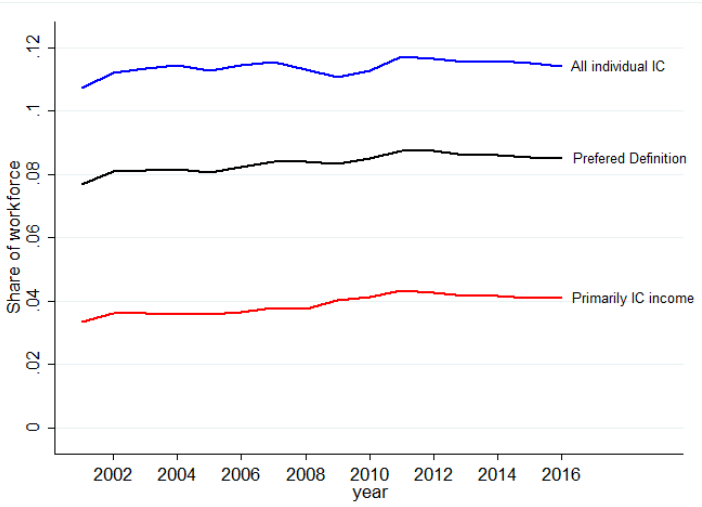
Panel B: Relative Growth



Panel C: Female IC as Share of the Female Workforce



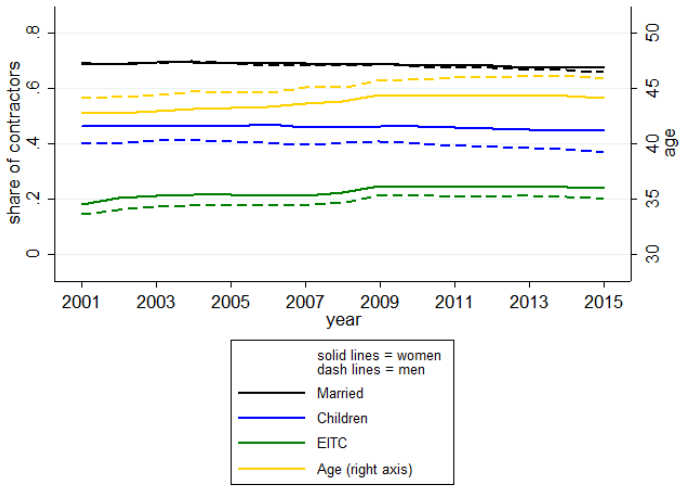
Panel C: Male IC as Share of the Male Workforce



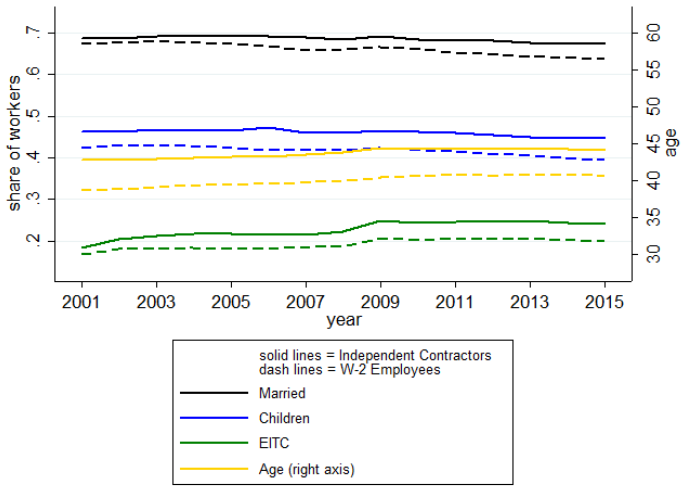
Notes: These figures show time trends in IC labor for men and women separately. Panel A shows the level trends. The solid series represent female workers recipients and the dashed series males. The black series represents all individual Form 1099-MISC/K recipients; the blue series represents our preferred definition of IC, Form 1099-MISC/K recipients with less than $10K in Schedule C deductions excluding car and travel; the red series shows the subset of our primary IC definition that receives the majority of their labor income from Form 1099-MISC/K income, *(1099 income /(1099 + W-2 income))>0.5*. Panel B shows the number of contractors relative to 2001 to highlight relative the relative increases in each group. It also includes a series (in gold) for Form W-2 employees as a comparison. Panel C shows the share of the female workforce (ICs plus employees) that are ICs, for various definitions. The black shows all individual Form 1099-MISC/K recipients as a share of the female workforce; the blue series shows the share of the female workforce that are ICs by our preferred definition; the red series shows the subset of our primary IC definition that receives the majority of their labor income from Form 1099-MISC/K income. Panel D repeats the exercise for male ICs.

Figure 11: Demographic Trends in Female IC

Panel A: IC Women v. IC Men Panel



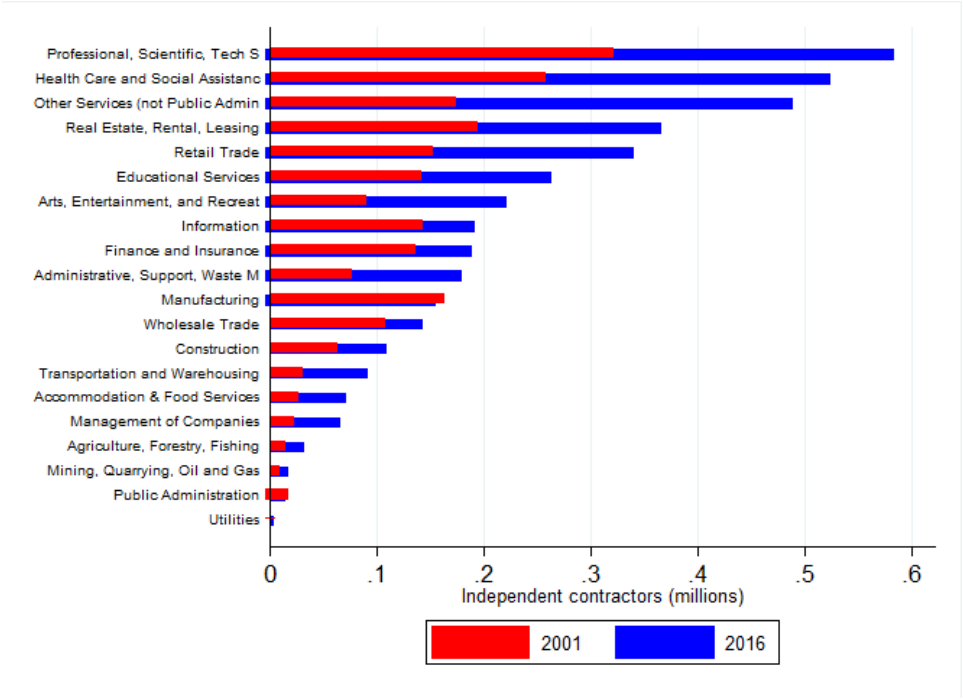
B: IC Women v. Employee Women



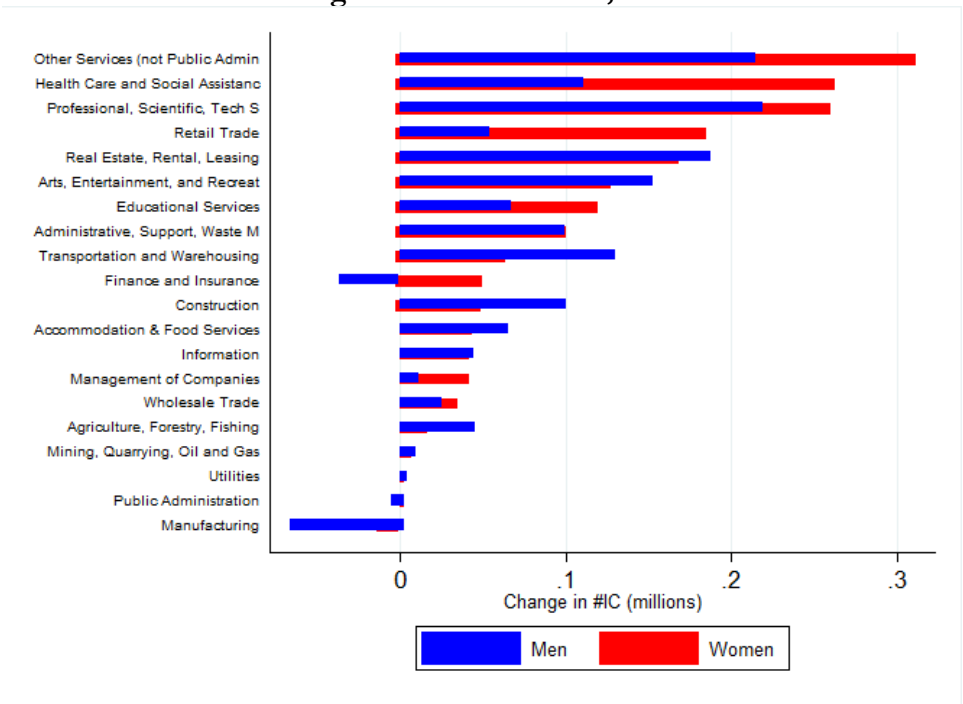
Notes: These figures show trends in select demographic characteristics for female ICs. Panel A compares trends in female ICs to male ICs and Panel B compares trends female ICs to female employees. In each panel the left axis represents the share of workers with a given characteristic and the right axis represents the average age for the workers. "Married" is an indicator equal to one for married individuals; "Children" is an indicator for claiming a dependent child on Form 1040 in that year; "EITC" is an indicator for receiving the earned income tax credit. In both panels, the solid series are female IC and the dashed series are the comparison group.

Figure 12: Changes in Female Independent Contractors by Industry

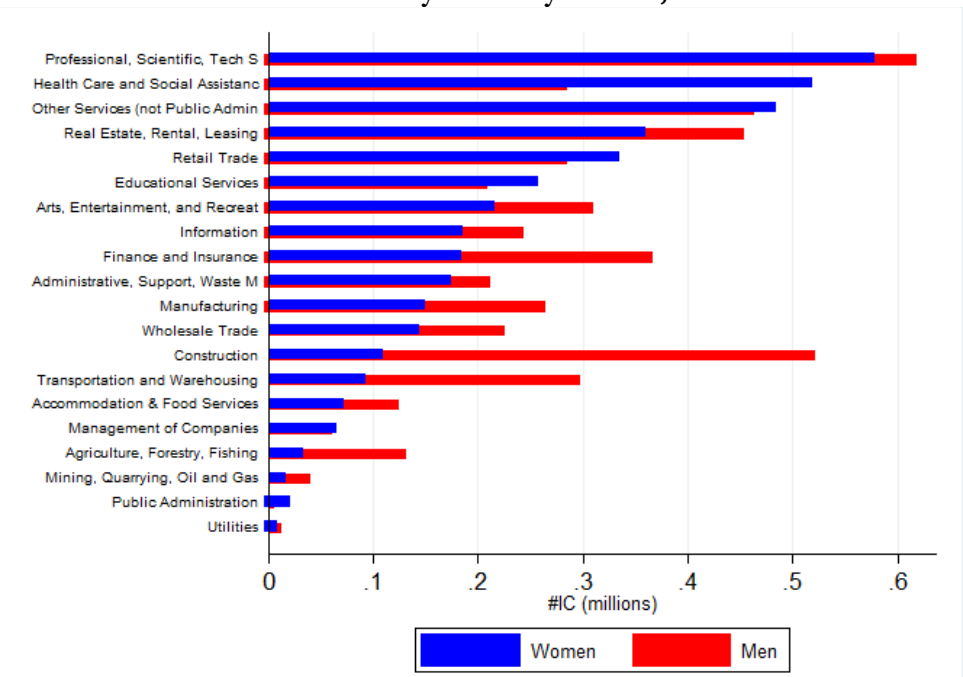
Panel A: Women IC in 2001 and 2016



Panel B: Change in IC 2001 to 2016, Men v. Women



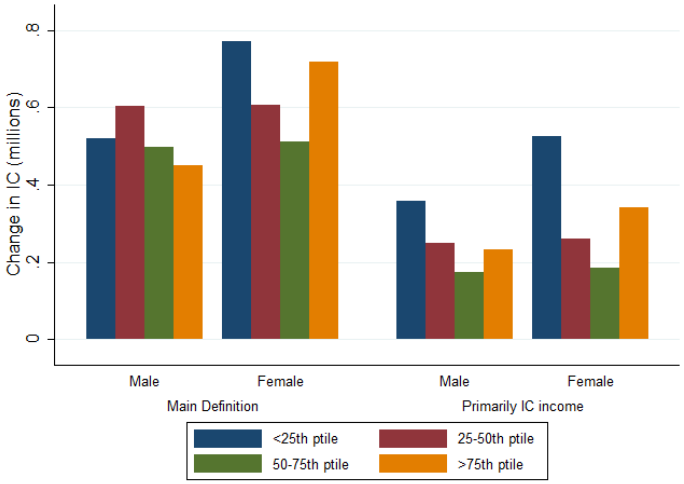
Panel C: Number of IC by Industry in 2016, Men v. Women



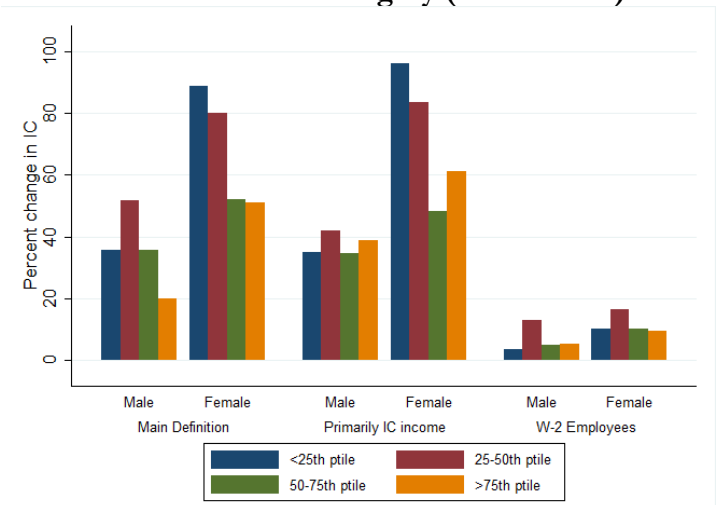
Notes: This figure displays female ICs by industry of the Form 1099-MISC/K issuing firm. Industries are defined as two-digit NAICS categories are reported on the firm's income tax return. Panel A shows the number of female ICs by industry in 2001 and 2016. Panel B shows the change in the number of ICs within an industry from 2001 to 2016 for men and women separately. Panel C shows the number of female and male ICs in each industry in 2016. ICs are defined according to our preferred definition, Form 1099-MISC/K recipients that report less than $10K in deductions on a Schedule C, excluding car and travel expenses.

Figure 13: Independent Contractors in the Income Distribution, Men v. Women

Panel A: Level Growth in IC by AGI Quartile and Worker Category (2001 to 2016)

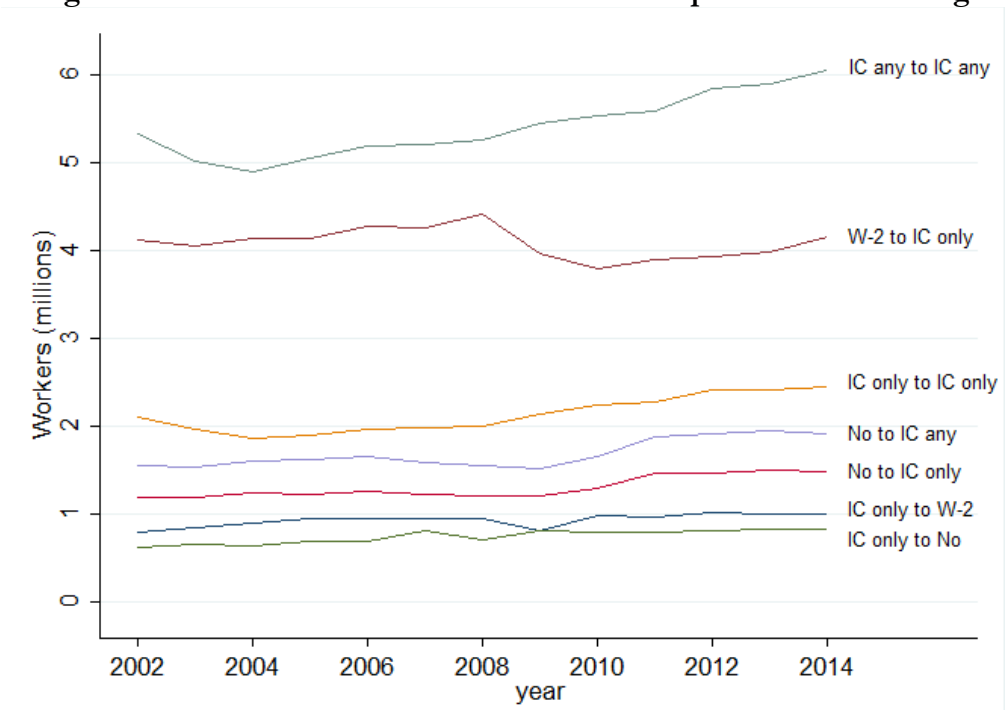


Panel B: Percent Growth in IC by AGI Quartile and Worker Category (2001 to 2016)



Notes: Panel A shows changes in the number of ICs in each quartile of the AGI distribution from 2001 to 2016, separately for male and female ICs. Individuals are categorized by their position in the AGI distribution where the AGI distribution is taken over the universe of taxpayers in each year. "Main Definition" is our preferred IC definition, individual Form 1099-MISC/K recipients with less than $10K in Schedule C deductions excluding car and travel; "Primarily IC income" are the subset of the main definition ICs receiving a majority of their labor income as IC income, *(1099 income /(1099 + W-2 income))>0.50*. Panel B shows the percentage change in workers within each quartile of the AGI distribution from 2001 to 2016. The last set of bars shows the change in each quartile for Form W-2 employees.

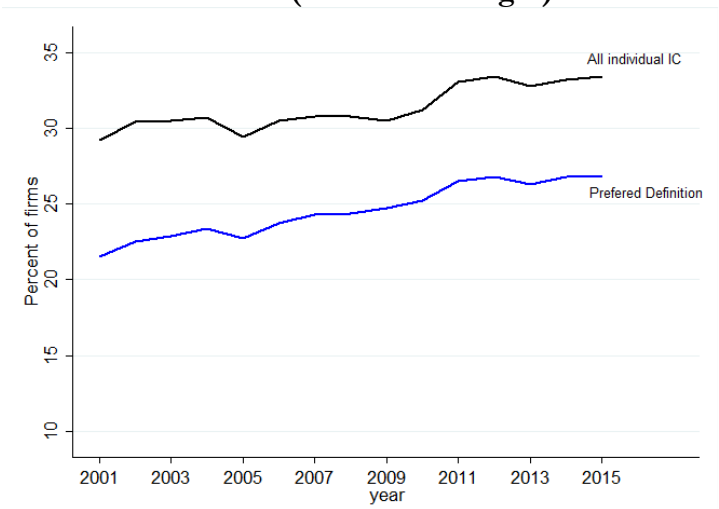
Figure 14: Worker Transitions in and out of Independent Contracting



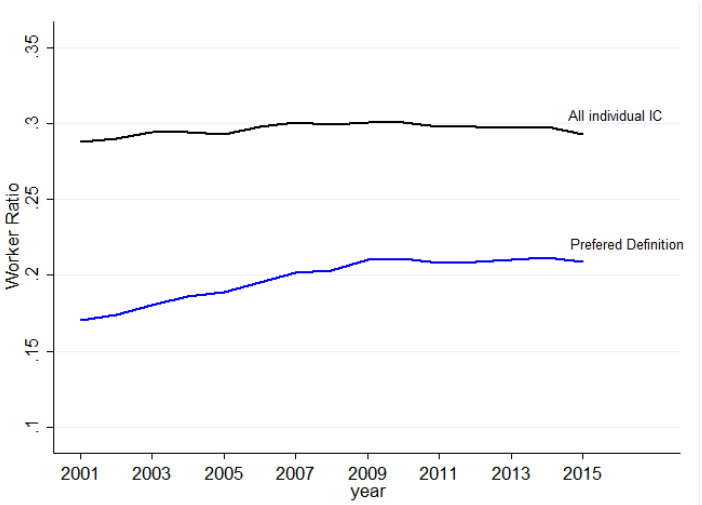
Notes: This figure shows the number of individuals transitioning in and out of IC labor by year. The statistics are derived from a randomly sampled repeated cross section of individual taxpayers. Each line represents a different type of transition between states, for transitions between IC labor and Form W-2 employment and between IC labor and no labor income, defined as no positive Form W-2 or Form 1099-MISC/K income. A transition in year *t* is defined as an individual who was in the first state in year *t-1* and in the new state in year *t*. ICs are defined as those meeting our preferred definition, Form 1099-MISC/K recipients with less than $10K in Schedule C deductions, excluding car and travel. "IC any" are those with some positive 1099 income, and "IC only" are those with 1099 income and no Form W-2 income.

Figure 15: Firm use of Independent Contractor Labor

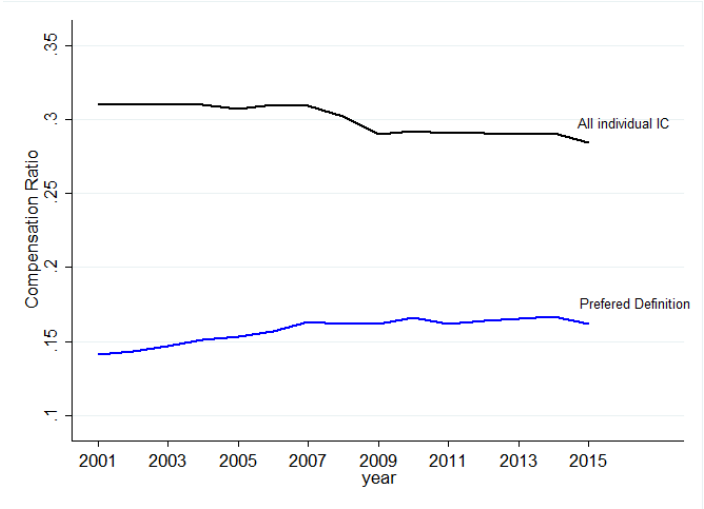
Panel A: Percent of Firms with any IC (Extensive Margin)



Panel B: Worker Ratio (Intensive Margin)



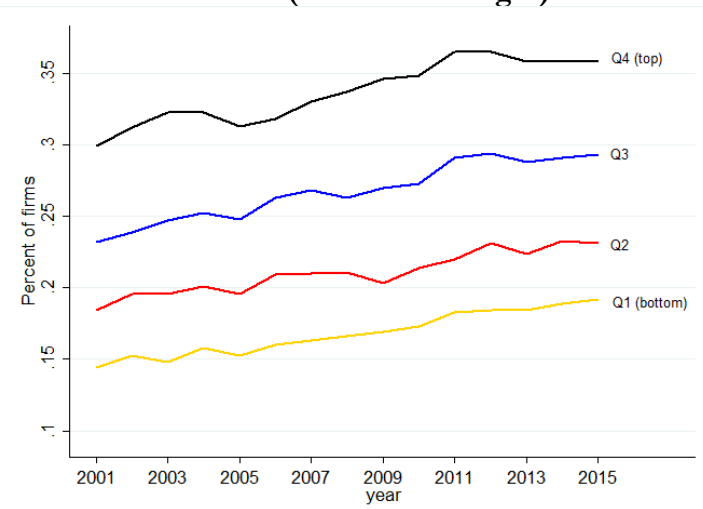
Panel C: Compensation Ratio (Intensive Margin)



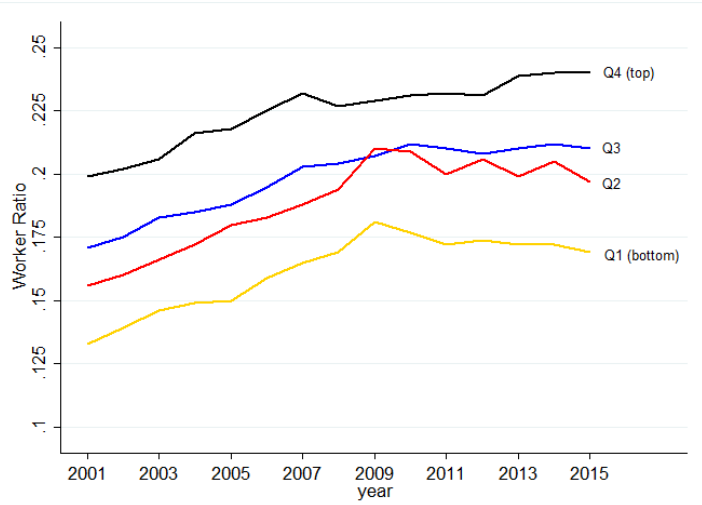
Notes: Panel A plots the average extensive margin measure "Any IC" which is equal to one if the firm has hired at least one independent contractor in the given tax year. The series in black represents all individual Form 1099-MISC/K recipients which can be matched to a Form 1040. The blue series represents our preferred IC definition, individual ICs with less than $10K in Schedule C deductions, excluding car and travel expenses. Panels B and C plot intensive margin IC use among firms that hire at least one IC (i.e. Any IC=1). Panel B plots the average *worker ratio*, defined as the number of contractors divided by the number of workers (ICs plus wage and salary employees). Panel C plots the *compensation ratio*, defined as total Form 1099-MISC/K compensation issued by the firm divided by total worker compensation (IC Form 1099-MISC/K compensation plus employee wage and salary compensation).

Figure 16: Firm use of Independent Contractor Labor, by Firm Wage Quartile

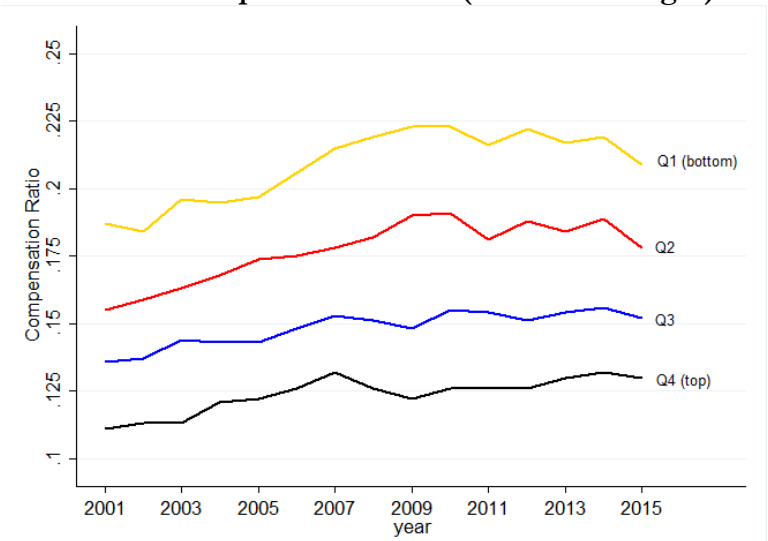
Panel A: Percent of Firms with any IC (Extensive Margin)



Panel B: Worker Ratio (Intensive Margin)



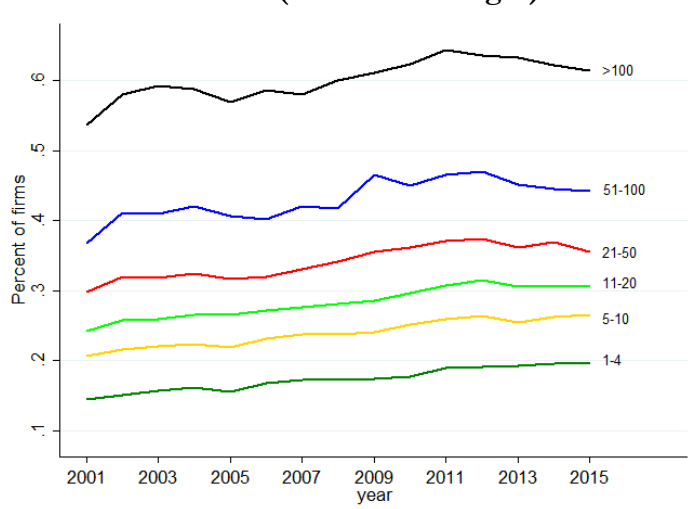
Panel C: Compensation Ratio (Intensive Margin)



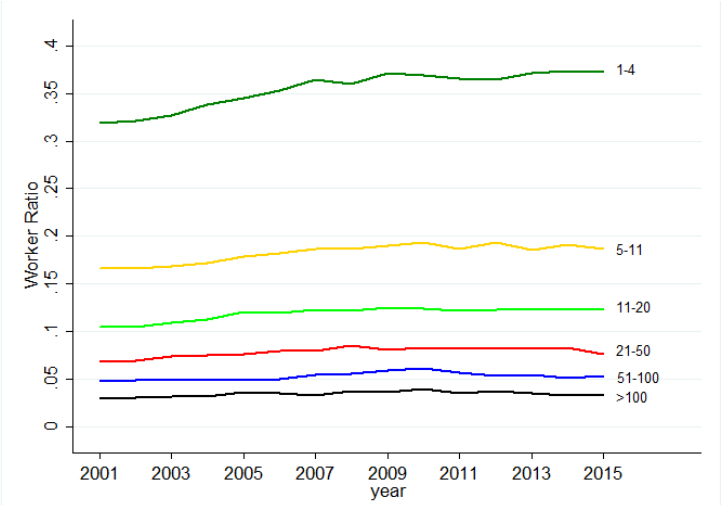
Notes: These figures decompose the extensive and intensive margin measures of firm IC as presented in Figure 15 by firms' median wage. Firms are categorized by their position in the distribution of firm median wages. Panel A shows the extensive margin; Panel B shows the intensive margin defined by the *worker ratio*; and Panel C the intensive margin as defined by the *compensation ratio*. Q4 represents average for firms in the top quartile of the median wage distribution, Q3 the 50-75th percentile, Q2 the 25-50th percentile, and Q1 the lowest quartile firms, or below the 25th percentile. ICs correspond with our preferred IC definition, individual ICs with less than $10K in Schedule C deductions, excluding car and travel expenses.

Figure 17: Firm use of Independent Contractor Labor, by Firm Size

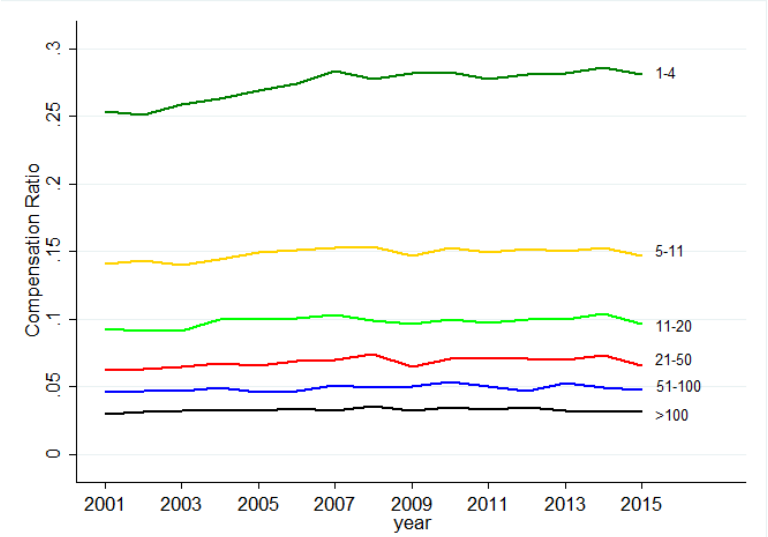
Panel A: Percent of Firms with any IC (Extensive Margin)



Panel B: Worker Ratio (Intensive Margin)

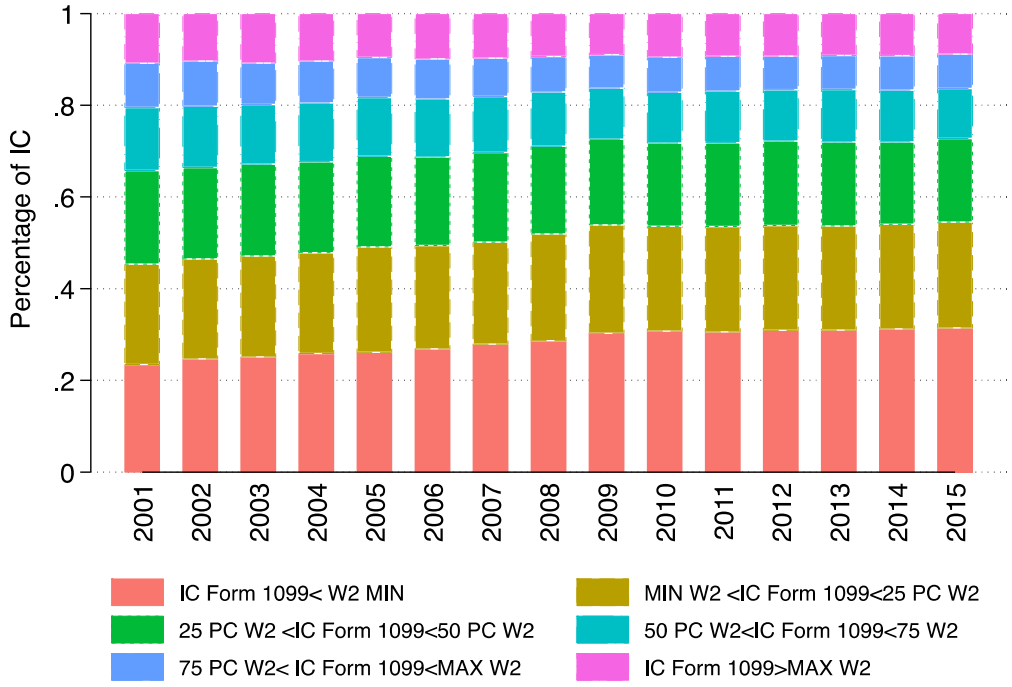


Panel C: Compensation Ratio (Intensive Margin)



Notes: These figures decompose the extensive and intensive margin measures of firm IC as presented in Figure 15 by firm size, defined by the number of Form W-2 employees. Panel A shows the extensive margin; Panel B shows the intensive margin defined by the *worker ratio*; and Panel C the intensive margin as defined by the *compensation ratio*. Each series corresponds to the average for firms within the range of the labeled number of employees. ICs correspond with our preferred IC definition, individual ICs with less than $10K in Schedule C deductions, excluding car and travel expenses.

Figure 18. Form-level compensation—Firm aggregation

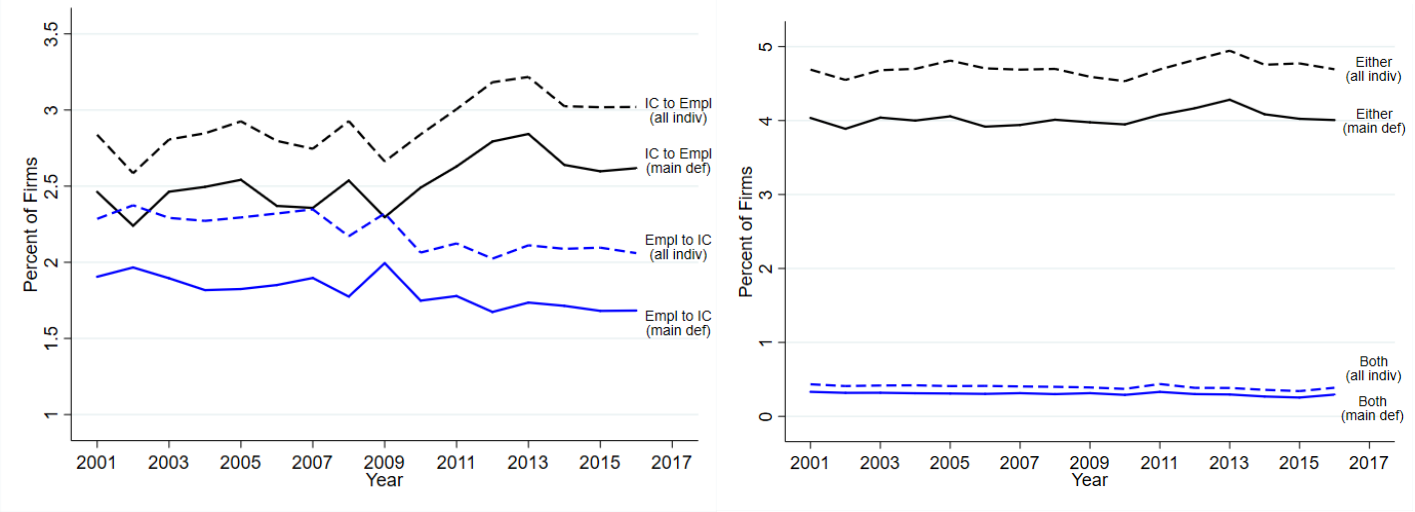


Notes: Figure 18 calculates the percentage of Firm N's contractors in each wage distribution sextile, and then averages over all firms. For example, if Firm X has 10 contractors, and 3 of them receive Form 1099-MISC/K compensation which exceeds the firm's maximum Form W-2 in year Y, Firm X would have a value of .3 for the "IC Form 1099>Max W-2" for year Y. The average value of "IC Form 1099>Max W-2" is then taken over all firms in year Y. This makes the resulting statistic more robust to sampling variation.

Figure 19: Share of Firms with Any Workers Switching Status within Firm

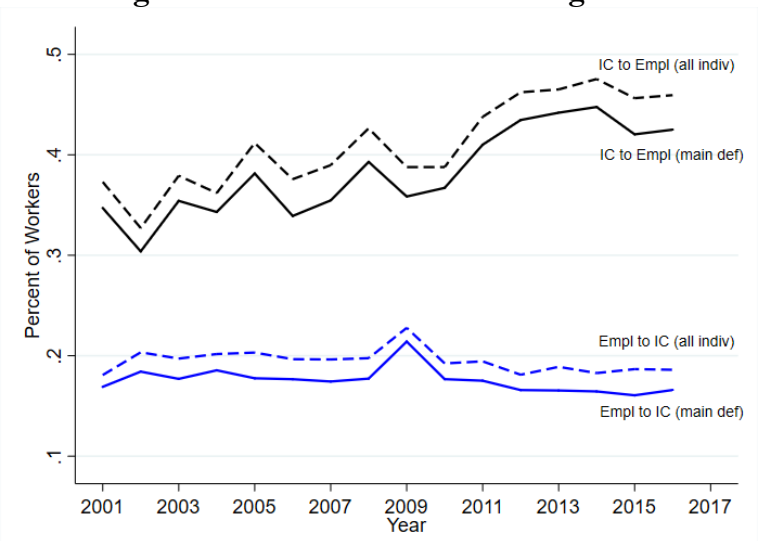
Panel A: Fractions by Type of Switching

Panel B: Fraction with Either or Both Types of Switching



Notes: Panel A shows the fraction of firms with at least one worker switching from IC to employee status in black and those with at least one worker switching from employee to IC status in blue. The dotted lines show the rates using a broader IC concept that includes all individual Form 1099-MISC/K recipients matched to a Form 1040 while the solid lines show the rates using our preferred IC definition of individuals with no Schedule C employee deductions and less than $10K in deductions excluding car and travel. Panel B shows the fraction of firms with either type of status change (black) or both in a year (blue) again for the two IC definitions.

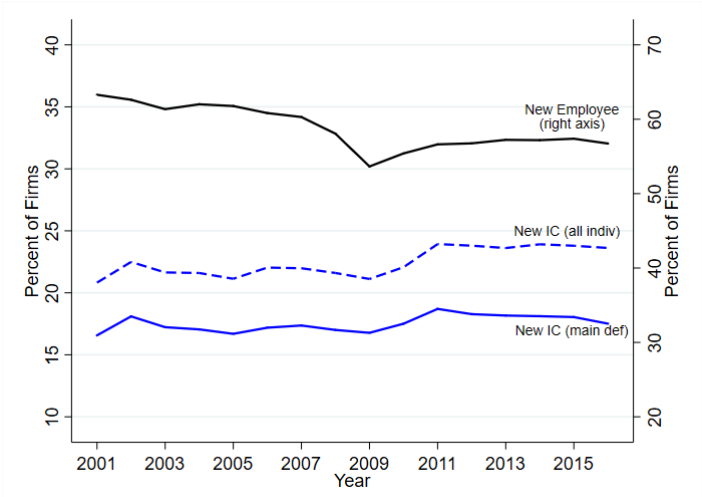
Figure 20: Average Fraction of Workers Switching Status within Firm



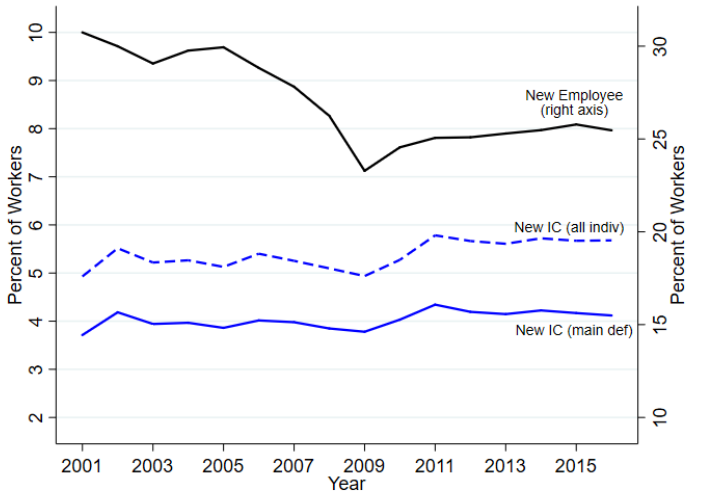
Notes: This figure shows the average of the fraction of workers who switch from IC to employee (black) and employee to IC (blue) across firms. The dotted lines show these fractions using a broader IC concept that includes all individual Form 1099-MISC/K recipients matched to a Form 1040 while the solid lines show the fractions using our preferred IC definition of individuals with no Schedule C employee deductions and less than $10K in deductions excluding car and travel.

Figure 21: Firms with New Employees or Independent Contractors

Panel A: Fraction of Firms with a New Employee or IC



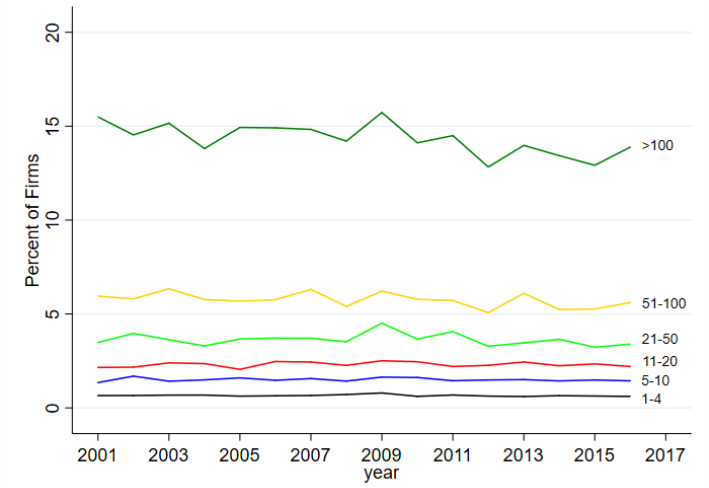
Panel B: Fraction of Workers that are New Employees or ICs



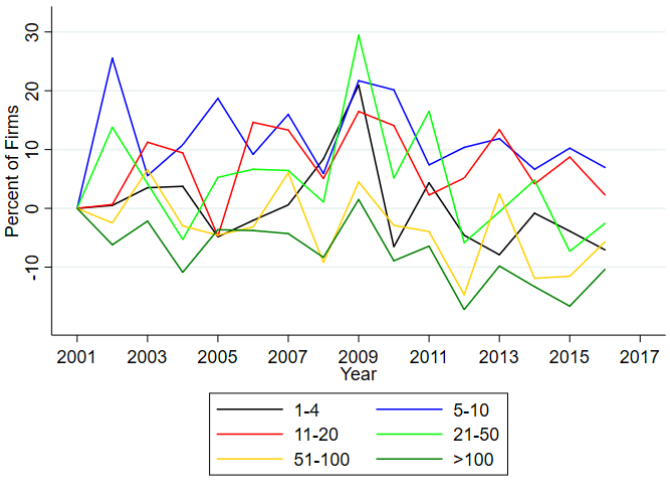
Notes: Panel A shows the fraction of firms with a new employee (black) or a new IC (blue). The dotted line shows the fraction using a broader concept that includes all individual Form 1099-MISC/K recipients matched to a Form 1040 while the solid line shows the fractions using our preferred IC definition of individuals with no Schedule C employee deductions and less than $10K in deductions excluding car and travel. Panel B shows the average fraction of workers who are new employees (black) or ICs (blue) across firms for the two IC definitions.

Figure 22: Share of Firms with a Worker Switching Statuses within Firm, by Firm Size

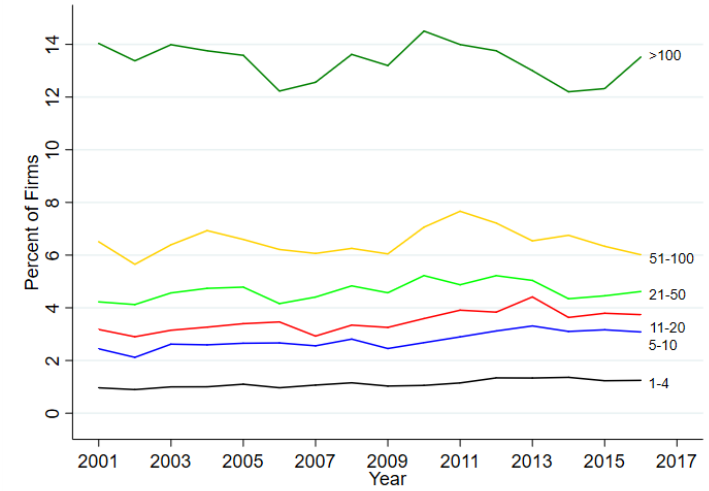
Panel A: Switching from Employee to IC



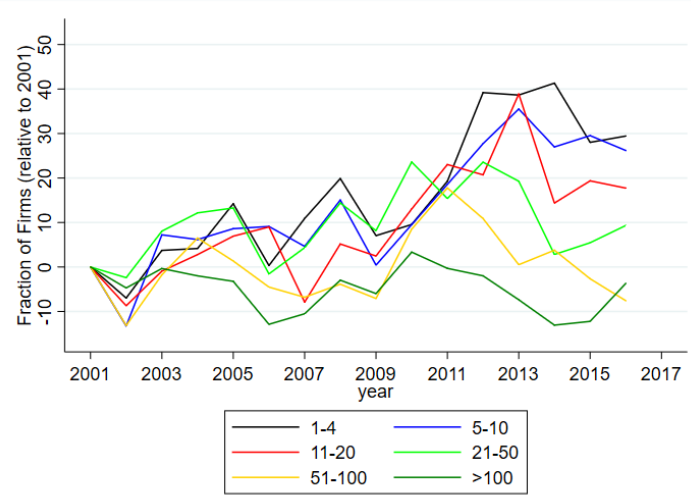
Panel B: Employee to IC (relative to 2001)



Panel C: Switching from IC to Employee



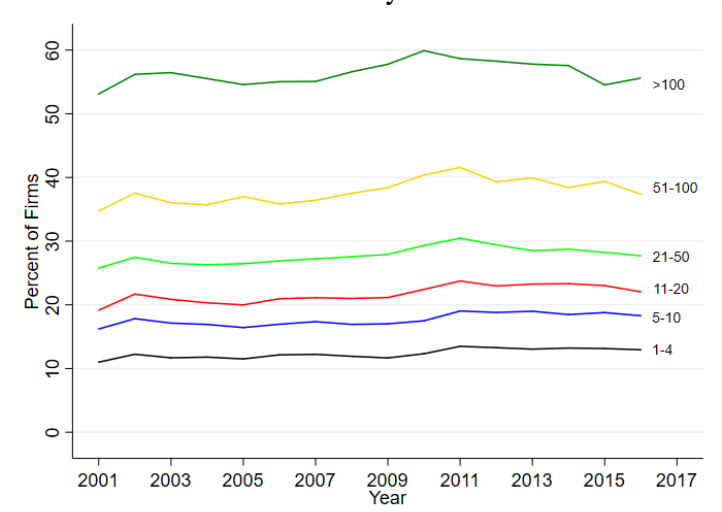
Panel D: IC to Employee (relative to 2001)



Notes: Panel A shows the fraction of firms with at least one worker switching from employee to IC using our preferred definition of individuals with no Schedule C employee deductions and less than $10K in deductions excluding car and travel by size of the firm measured as number of Form W-2s issued. Panel B shows the percentage change in this fraction since 2001. Pane C shows the fraction of firms with at least one worker switching from IC to employee by firm size and Panel D shows the percentage change in this fraction since 2001.

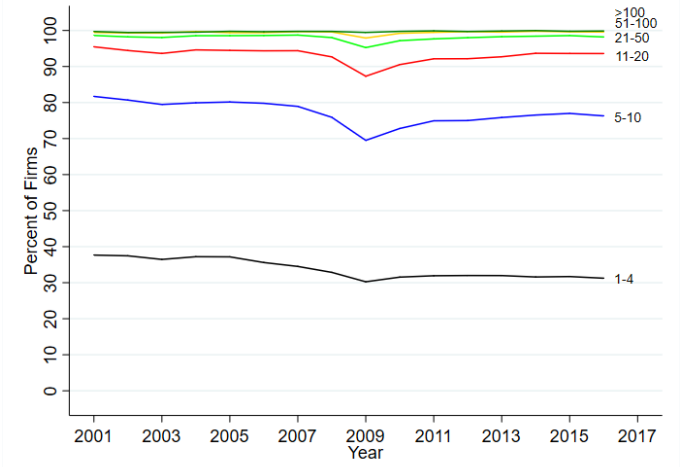
Figure 23: Share of Firms with New Independent Contractors or Employees, by Firm Size

Panel A: Any New IC

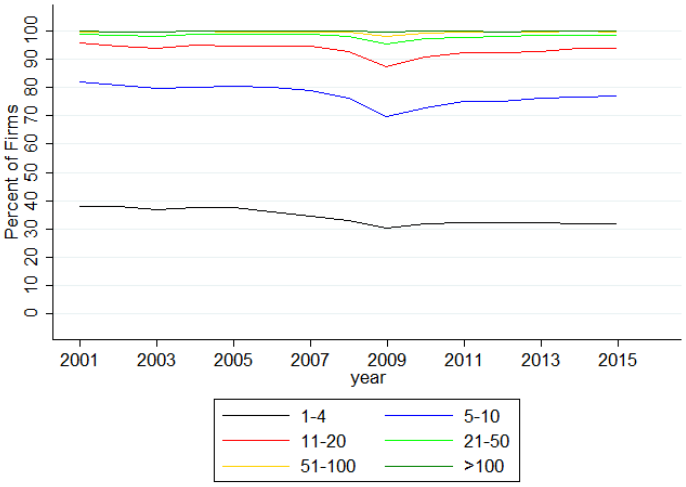


Panel B: Any New IC (relative to 2001)

Panel C: Any New Employee



Panel D: Any New Employee (relative to 2001)



Notes: Panel A shows the fraction of firms with at least one new employee by size of the firm measured as number of Form W-2s issued. Panel B shows the percentage change in this fraction relative to 2001. Panel C shows the fraction of firms with at least one new IC using our preferred definition of individuals with no Schedule C employee deductions and less than $10K in deductions excluding car and travel by firm size. Panel D shows the percentage change in this fraction since 2001.

Table 1: Independent Contractor Definitions and Distinct Payers (2016)

	All Form 1099-MISC/K recipients	Individual Form 1099-MISC/K recipients (broad definition)	Independent Contractors, <$10K deductions (main definition)	Independent Contractors, <$5K deductions	Independent Contractors, <$15K deductions
Total (millions)	24.60	17.77	13.79	12.07	14.67
<$10K deductions	56%	78%	100%	100%	94%
<$5K deductions	49%	68%	87%	100%	82%
1 distinct 1099 payer	67%	72%	78%	81%	77%
3 or fewer 1099 payers	89%	92%	96%	97%	95%

Notes: This table shows shares of Form 1099-MISC/K recipients by characteristics for 2016. Each column represents a different type of Form 1099-MISC/K recipients: the first is all Form 1099-MISC/K recipients; second is all individual Form 1099-MISC/K recipients that can be matched with a Form 1040; third is our preferred definition of independent contractors, individual Form 1099-MISC/K recipients with less than $10K in Schedule C deduction, excluding car and travel expenses; fourth and fifth are the subset of individual Form 1099-MISC/K recipients with less than $5K and less than $15K in Schedule C deduction, excluding car and travel expenses, respectively.

Table 2: Independent Contractors as Share of the Workforce, Various Definitions

	Share of Workforce			Number of Workers (millions)		
Year	All Individual 1099 Recipients	Preferred IC Definition	ICs w/ primarily IC earnings	IC income only	IC and W-2 income	W-2 income only
2001	0.0899	0.0661	0.0293	3.25	6.95	144.30
2002	0.0943	0.0696	0.0317	3.53	7.20	143.47
2003	0.0963	0.0708	0.0323	3.57	7.32	142.99
2004	0.0978	0.0717	0.0325	3.60	7.53	144.44
2005	0.0978	0.0720	0.0329	3.68	7.65	146.97
2006	0.0997	0.0739	0.0338	3.85	8.01	149.42
2007	0.1013	0.0759	0.0351	4.08	8.27	151.53
2008	0.0999	0.0762	0.0349	4.11	8.25	151.23
2009	0.0979	0.0755	0.0372	4.31	7.53	146.96
2010	0.1001	0.0776	0.0383	4.37	7.73	146.30
2011	0.1051	0.0804	0.0410	4.77	8.05	147.13
2012	0.1053	0.0807	0.0403	4.78	8.26	148.97
2013	0.1049	0.0803	0.0400	4.77	8.35	150.96
2014	0.1055	0.0807	0.0399	4.82	8.57	153.10
2015	0.1059	0.0809	0.0397	4.86	8.79	155.49
2016	0.1056	0.0807	0.0395	4.90	8.94	158.08

Notes: The first set of columns shows Form 1099-MISC/K recipients as the share of the workforce, defined as all Form 1099-MISC/K and/or Form W-2 recipients. The first column shows the share of all individual Form 1099-MISC/K recipients that can be matched with a Form 1040; the second column, ICs by our preferred definition as a share of the workforce; the third column is the subset of our preferred definition ICs that receive a majority of their labor income as Form 1099-MISC/K income, *(1099 income / (1099 + W-2 income))>0.50*. The next set of columns show the number of workers with and without IC income, where ICs are those corresponding to our preferred definition, or individual Form 1099-MISC/K recipients with less than $10K in Schedule C deductions, excluding car and travel. The first column are those with Form 1099-MISC/K income but no Form W-2 income in that year; the second those with both Form 1099-MISC/K and W-2 income; and the third, those with only Form W-2 income. These figures correspond to the series plotted in Fig4.

Table 3: Summary Statistics – Independent Contractors and Employees, 2001 and 2016

	Independent Contractors				Employees			
	Mean		Median		Mean		Median	
	2001	2016	2001	2016	2001	2016	2001	2016
AGI	94,376	91,810	48,990	43,890	74,183	80,577	49,610	48,050
Taxable income	70,953	73,824	26,720	22,630	53,435	60,944	29,520	28,410
Wages	37,886	33,649	12,030	8,840	44,982	47,799	31,580	31,880
Age	43.64	44.94	43	44	39.51	41.54	39	41
Female	0.39	0.45	0	0	0.49	0.50	0	0
Has children	0.42	0.40	0	0	0.40	0.36	0	0
Married	0.69	0.66	1	1	0.65	0.62	1	1
Receives EITC	0.16	0.22	0	0	0.13	0.16	0	0
1099-MISC income	22,835	31,808	4,520	4,220	1,382	6,861	0	0
# 1099-MISC payers	1.39	1.43	1	1	0.10	0.14	0	0

Note: This table presents summary statistics for independent contractors (IC) and employees for years 2001 and 2016. Dollar values are 2015 real U.S. dollars. IC are defined as 1099-MISC or 1099-K recipients that file a Form 1040 and report less than $10K in deductions on a Schedule C, excluding car and travel expenses Employees are defined as those who receive a Form W-2 with positive income. Medians represent the average of 10 individuals around the median so as not to disclose any individual taxpayer information. The variables "female," "has children," "married" and "receives EITC" are indicators for that characteristics so the mean represents the share of workers with that characteristic. All median dollar amounts have been rounded to protect taxpayer confidentiality.

Table 4: IC Characteristics by AGI Quartiles (2016)

	Independent Contractors (preferred definition)				Independent Contractors (primarily 1099 earnings)			
AGI Quartile:	<25th	25-50th	50-75th	>75th	<25th	25-50th	50-75th	>75th
Individuals (millions)	3.33	2.76	3.01	4.57	2.33	1.39	1.20	1.68
1099 income (median)	4,890	5,250	3,760	4,430	8,190	15,880	10,960	12,400
AGI (median)	8,070	23,960	53,170	127,720	7,300	23,140	52,740	128,370
Taxable Income (median)	0	6,190	31,180	94,330	0	2,150	28,400	94,190
Wages (median)	0	10,000	25,930	43,210	0	0	0	0
Age (mean)	40.24	42.16	45.58	50.27	43.48	46.71	50.90	54.80
Female (share)	0.46	0.44	0.46	0.45	0.44	0.40	0.47	0.52
Kids (share)	0.27	0.40	0.41	0.50	0.28	0.46	0.41	0.41
Married (share)	0.36	0.57	0.70	0.90	0.41	0.70	0.82	0.92

Notes: This table presents select summary statistics for independent contractors in 2016. The first set of columns present statistics for our preferred IC definition, individual non-employers with less than $10K in deductions excluding car and travel deductions. The second set of columns show statistics for a subset of these IC, those that earn the majority of their labor income from Form 1099-MISC/K, *(1099 income / (1099 + W-2 income))>0.5*. Statistics are presented by the IC's position in the AGI distribution in 2016, by quartiles of the AGI distribution. All median dollar amounts have been rounded to protect taxpayer confidentiality.

Table 5: Summary Statistics for Independent Contractors by Primary and Secondary Income (2016)

	Primary Earner, IC Secondary			Primary Earner, IC Primary			Secondary Earner, IC Primary			Secondary Earner, IC Secondary		
	All	Women	Men	All	Women	Men	All	Women	Men	All	Women	Men
IC (millions)	5.96	2.43	3.53	4.66	1.81	2.73	1.97	1.13	0.77	1.22	0.79	0.42
Total 1099 income (mean)	6,382	4,767	7,492	104,426	95,818	110,128	10,445	10,394	10,284	3,618	3,451	3,933
Total 1099 income (median)	2,570	2,130	3,000	15,510	12,970	17,360	4,950	4,770	5,100	1,900	1,780	2,100
Net 1099 income (mean)	3,672	2,306	4,611	97,599	90,242	102,472	4,872	5,529	3,914	966	990	922
Net 1099 income (median)	1,330	1,120	1,510	9,570	8,480	10,090	1,740	1,940	1,510	900	880	980
AGI (mean)	108,629	67,488	136,895	55,916	45,050	62,653	124,468	135,711	104,947	138,022	139,773	134,723
AGI (median)	50,230	40,160	59,260	17,710	15,580	19,230	73,470	81,310	60,910	106,060	106,990	104,070
Taxable income (mean)	83,593	48,117	107,966	60,139	32,071	79,225	90,833	100,754	73,314	104,266	104,519	103,789
Taxable income (median)	30,760	23,420	37,190	200	0	1050	43,790	49,550	33,460	74,050	74,760	73,230
Wages (mean)	70,406	46,988	86,496	3,006	2,354	3,432	737	829	599	34,108	32,284	37,543
Wages (median)	39,660	33,070	45,230	0	0	0	0	0	0	26,780	25,570	29,410
Share in <25th ptile AGI	0.16	0.20	0.14	0.47	0.51	0.44	0.09	0.08	0.11	0.02	0.02	0.02
Share in 25-50th ptile AGI	0.22	0.26	0.20	0.22	0.21	0.23	0.16	0.13	0.21	0.05	0.04	0.06
Share in 50-75th ptile AGI	0.27	0.28	0.26	0.14	0.13	0.15	0.27	0.26	0.29	0.22	0.22	0.23
Share in >75th ptile AGI	0.35	0.26	0.41	0.17	0.15	0.18	0.48	0.53	0.39	0.71	0.71	0.69
Share Female	0.41	1	0	0.40	1	0	0.59	1	0	0.65	1	0
age (mean)	42	41	43	49	48	49	48	45	52	44	43	46
Share w/ kids	0.4	0.38	0.41	0.34	0.38	0.32	0.47	0.58	0.35	0.57	0.62	0.49
Share w/ EITC	0.18	0.23	0.15	0.42	0.47	0.38	0.16	0.18	0.15	0.06	0.07	0.06

Notes: This table shows summary statistics for types of ICs, for men and women together ("All") and separately, in 2016. "Primary earners" are primary earners in their household defined as having individual labor income (1099 + W-2 income) more than 50 percent of household labor income, or $(1099\ income_i + W\text{-}2\ income_i)/(1099\ income_{hh} + W\text{-}2\ income_{hh}) > 0.50$ where i indexes the IC and hh indexes their household.. "Secondary earners" are married and with labor earnings less than half of household labor earnings. "IC primary" are ICs that earn the majority of their labor income from IC earnings, $(1099\ income\ /\ (1099 + W\text{-}2\ income)) > 0.50$. "IC secondary" are ICs who earn the majority of their labor income as Form W-2 earnings. All ICs correspond to our preferred definition, individual Form 1099-MISC/K recipients with less than $10K in Schedule C deductions, excluding car and travel. The means and medians are presented for all income variables. The shares of each type of contractor in each quartile of the AGI distribution are shown next, followed by the average age, the share claiming dependent children in that year, and the share receiving the earned income tax credit (EITC). All median dollar amounts have been rounded to protect taxpayer confidentiality.

Table 6: Characteristics of Female Independent Contractors, by AGI Quartile (2016)

	Main Definition				Primarily IC income			
	<25th ptile	25-50th ptile	50-75th ptile	>75th ptile	<25th ptile	25-50th ptile	50-75th ptile	>75th ptile
Independent Contractors (millions)	1.503	1.205	1.376	2.027	1.012	0.547	0.546	0.847
Total 1099 income (median)	4190	4030	3010	3570	7309.5	13400	7700	9100
Net 1099 income (median)	2200	2010	1370	1690	4150	8000	3570	4950
AGI (median)	8560	23720	53510	125240	7890	22790	53840	129610
Taxable income (median)	0	6300	31670	92020	0	2150	28400	93850
W-2 income (median)	330	12310	21090	23930	0	0	0	0
Age	40	42	45	48	44	46	49	51
Children	0.34	0.44	0.43	0.54	0.35	0.49	0.47	0.52
Married	0.40	0.57	0.69	0.90	0.43	0.69	0.83	0.93
EITC	0.55	0.40	0.10	0.00	0.56	0.44	0.14	0.01
# 1099 payers	1.31	1.33	1.34	1.37	1.40	1.53	1.58	1.58
# W-2 payers	1.40	1.50	1.34	1.25	1.10	1.06	0.99	0.97

Notes: This table shows summary stats for female contractors by their position in the AGI distribution in 2016, by quartiles of the AGI distribution. The first set of columns shows statistics for our preferred IC definition, or individual Form 1099-MISC/K recipients with less than $10K in Schedule C deductions, excluding car and travel. The next set of columns shows statistics for the subset of the main definition that earn a majority of their labor income as IC earnings, *(1099 income / (1099 + W-2 income))>0.5*. All median dollar amounts have been rounded to protect taxpayer confidentiality.

Table 7: Share of Total Increase in IC Labor by Primary and Secondary Income, by Gender (2001 to 2016)

	Primary earners, IC primary	Primary earners, IC secondary	Secondary earners, IC primary	Secondary earners, IC secondary	Total change in IC (millions)
Shares of Total					
Women	0.19	0.22	0.08	0.04	4.89
Men	0.16	0.19	0.05	0.03	4.89
Shares by Gender					
All	0.37	0.41	0.14	0.07	4.89
Women	0.35	0.41	0.15	0.08	2.62
Men	0.38	0.44	0.12	0.07	2.10

Notes: This table shows the share of the increase in in independent contractors from 2001 to 2016 attributable to different types of ICs. "Primary earners" are primary earners in their household defined as having individual labor income (1099 + W-2 income) more than 50 percent of household labor income, or $(1099\ income_i + W\text{-}2\ income_i)/(1099\ income_{hh} + W\text{-}2\ income_{hh}) > 0.50$ where i indexes the IC and hh indexes their household.. "Secondary earners" are married and with labor earnings less than half of household labor earnings. "IC primary" are ICs that earn the majority of their labor income from IC earnings, $(1099\ income\ /\ (1099 + W\text{-}2\ income)) > 0.50$. "IC secondary" are ICs who earn the majority of their labor income as Form W-2 earnings. All ICs correspond to our preferred definition, individual Form 1099-MISC/K recipients with less than $10K in Schedule C deductions, excluding car and travel. The top panel, "Shares of Total," shows the share of the total increase in ICs attributable to each group. The last column shows the total increase in ICs, including men and women. The second panel, "Shares by Gender," shows the within gender share, or the share of the total change in the last column attributable to each group.

Table 8: Characteristics of Those Transitioning in and out of IC Labor (2014)

	Switchers (any)							Within Firm	
	W2 to IC only	IC to W-2	IC to IC only	IC to IC any	IC to no work	no work to IC only	no work to IC any	IC to W-2	W-2 to IC only
switchers (millions)	4.154	0.9965	2.448	6.0605	0.822	1.4815	1.9195	0.2985	0.2675
%change switchers from 2002	0.01	0.25	0.16	0.14	0.33	0.25	0.24	0.36	-0.03
age	40.2	39.7	51.9	48.1	52.8	45.3	43.1	39.7	44.3
female	0.44	0.43	0.39	0.40	0.47	0.44	0.43	0.44	0.42
married	0.62	0.57	0.72	0.70	0.77	0.67	0.62	0.58	0.68
kids	0.38	0.34	0.28	0.35	0.40	0.26	0.27	0.38	0.35
AGI (median)	40,610	21,550	31,680	52,230	28,680	19,930	18,790	36,130	57,060
Taxable income (median)	21,890	5,490	10,240	29,660	5,360	0	380	18,280	34,950
Wage and Salary (median)	15,190	7,150	0	980	0	0	0	19,480	6,460
1099 income (median)	2,540	1,330	14,100	8,650	0	3,500	3,130	1,080	6,920
<25th ptile AGI	0.20	0.31	0.24	0.18	0.33	0.25	0.28	0.18	0.15
25-50th ptile AGI	0.20	0.20	0.16	0.15	0.22	0.12	0.13	0.26	0.20
50-75th ptile AGI	0.20	0.14	0.15	0.19	0.19	0.10	0.10	0.21	0.18
>75th ptile AGI	0.27	0.16	0.22	0.33	0.26	0.13	0.13	0.25	0.36

Notes: This table presents summary stats for those transitioning in and out of IC labor in 2014. The statistics are derived from a random sample of individual taxpayers. The first set of columns reference transitions between IC labor and Form W-2 employment and between IC labor and no labor income (no Form W-2 nor IC income). The second set of columns represents within-firm transitions, or those that transition between IC labor and Form W-2 employment within the same firm from year *t-1* to year *t*. All median dollar amounts have been rounded to protect taxpayer confidentiality.

Table 9: Workers Switching or Entering Firms, by Industry (2016)

Industry	Fraction of Firms With: Employee to Contractor	Contractor to Employee	New Employee	New Contractor
Agriculture	1.5%	2.2%	50.0%	22.5%
Mining, Oil, Gas	3.1%	1.1%	41.6%	25.6%
Construction	1.4%	2.8%	60.6%	20.2%
Manufacturing	3.1%	3.5%	66.9%	24.1%
Wholesale Trade	2.3%	2.3%	53.1%	19.3%
Retail Trade	1.1%	1.9%	62.4%	12.0%
Transportation and Warehousing	1.8%	2.8%	56.7%	16.9%
Information	4.8%	6.2%	49.0%	30.8%
Finance and Insurance	2.1%	2.4%	51.3%	17.7%
Real Estate	1.8%	2.2%	43.6%	22.6%
Professional, Scientific, Technical Services	2.2%	3.2%	46.6%	21.1%
Administrative, Support, Waste Management	1.4%	2.6%	63.2%	17.4%
Educational Services	4.7%	5.5%	68.3%	29.1%
Health Care and Social Assistance	1.7%	3.1%	62.5%	19.5%
Arts, Entertainment, and Recreation	2.5%	3.6%	58.5%	27.6%
Accommodation and Food Services	0.6%	1.1%	83.1%	10.5%
Other Services	1.1%	2.7%	54.8%	16.5%

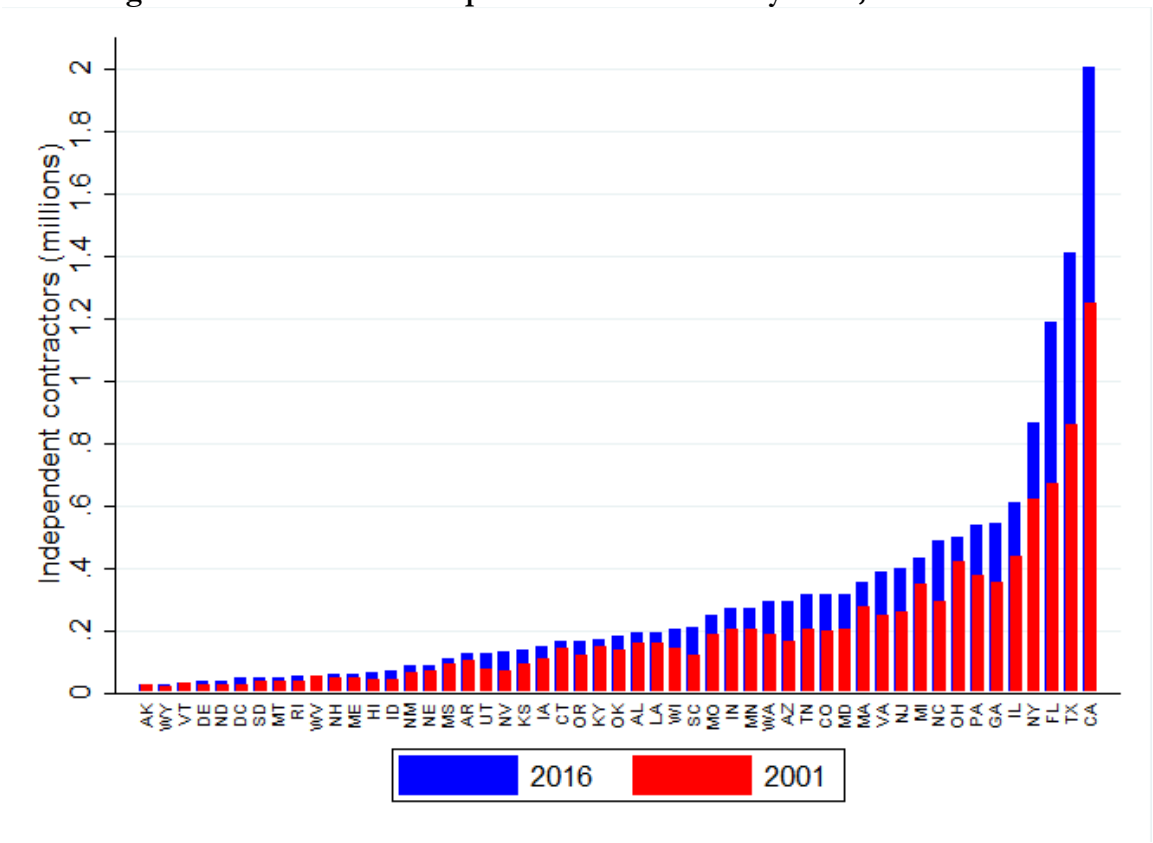
Notes: Firms are categorized according to the NAICS two digit sectors (https://www.census.gov/programs-surveys/economic-census/guidance/understanding-naics.html). Utilities, Management of Companies, Public Administration are not reported due to low sample sizes. Column 1 shows the fraction of firms with at least one worker switching from employee to IC using our preferred definition of individuals with no Schedule C employee deductions and less than $10K in deductions excluding car and travel. Column 2 shows the fraction of firms with at least one worker switching from IC to employee. Column 3 shows the fraction of firms with at least one new employee by size of the firm. Column 4 shows the fraction of firms with at least one new IC using our preferred definition

Table 10: Firm sample summary statistics by year (2001-2015)

	Any IC		Worker Ratio		Ratio Compensation	
Year	N	Mean	N	Mean	N	Mean
2001	114,535	0.297	114,535	0.089	114,535	0.096
2002	115,461	0.310	115,461	0.095	115,461	0.100
2003	116,736	0.313	116,736	0.097	116,736	0.102
2004	117,924	0.315	117,924	0.099	117,924	0.103
2005	120,668	0.301	120,668	0.094	120,668	0.098
2006	122,297	0.314	122,297	0.099	122,297	0.103
2007	122,297	0.315	122,297	0.100	122,297	0.102
2008	120,745	0.316	120,745	0.100	120,745	0.101
2009	117,864	0.313	117,864	0.100	117,864	0.096
2010	116,906	0.320	116,906	0.102	116,906	0.099
2011	116,891	0.340	116,891	0.108	116,891	0.104
2012	117,729	0.343	117,729	0.109	117,729	0.106
2013	118,531	0.339	118,531	0.108	118,531	0.105
2014	119,474	0.343	119,474	0.110	119,474	0.107
2015	120,393	0.347	120,393	0.110	120,393	0.107

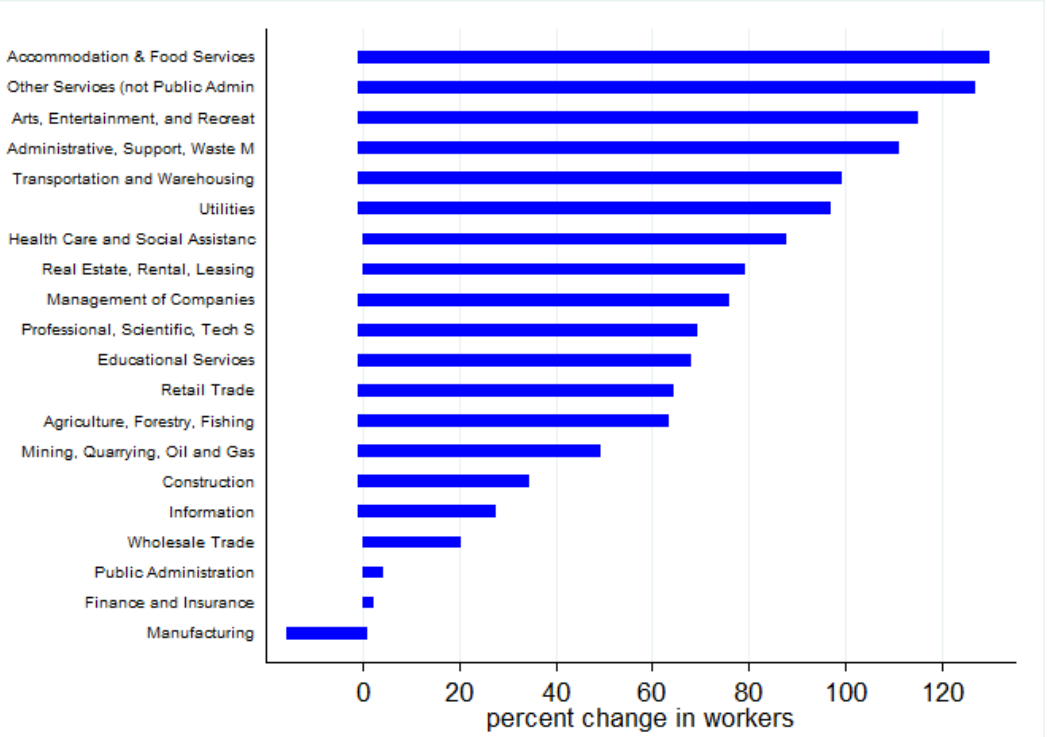
Notes. This table reports the summary statistics for the firm-level sample. The sample was drawn as a 2% repeated cross-section sample of all firms with at least one W-2 issue; observations are thus at thefirm-year level. "Any_IC" is a dummy variable equal to one if the sampled firm has at least one IC in that tax year. "Worker Ratio" is the ratio of a firms IC to W2 workers in a given tax year. "Ratio Compensation" refers to the ratio of total compensation for IC workers divided by the total numbers of all workers (IC and W2). IC were identified using our preferred criteria, detailed in Section 4.

Figure A1. Number of Independent Contractors by State, 2001 and 2016



Notes: This figure shows the number of independent contractors by state in 2001 and 2016. ICs are defined using our preferred definition, Form 1099-MISC/K recipients that report less than $10K in deductions on a Schedule C, excluding car and travel expenses.

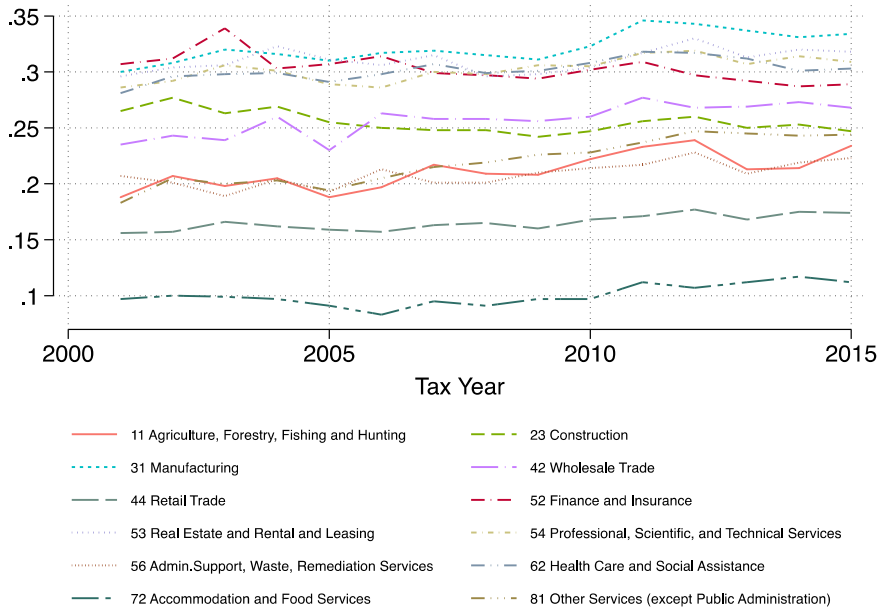
Figure A2: Percent change in Independent Contractors from 2001-2016, by Industry



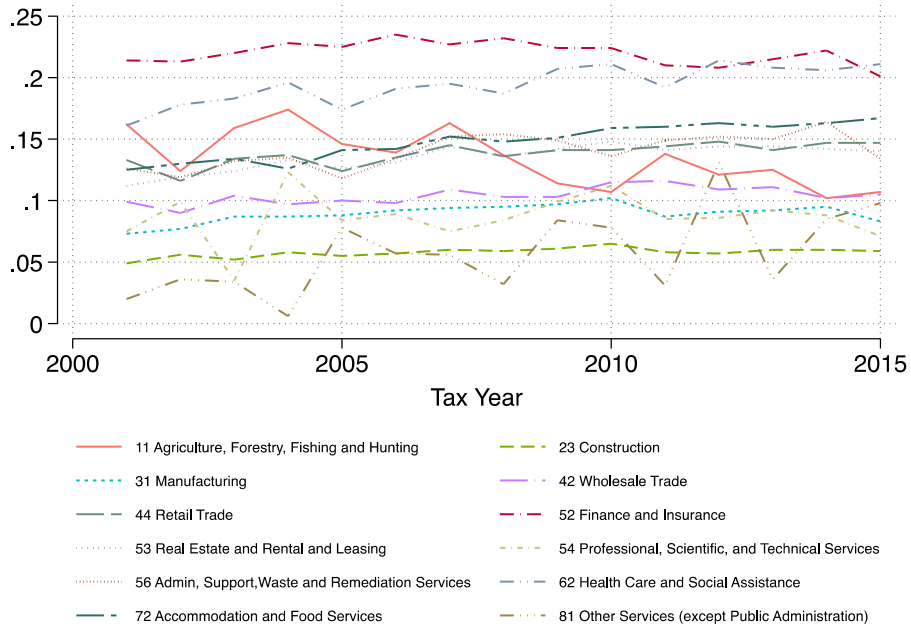
Notes: This figure shows the percent change in the number of ICs by the industry from 2001 and 2016. ICs are defined according to our preferred definition, Form 1099-MISC/K recipients that report less than $10K in deductions on a Schedule C, excluding car and travel expenses. Industries are defined as the two-digit NAICS categories as reported on the firm's income tax return.

Figure A3: Firm use of Independent Contractors, by Industry

Panel A: Percent of Firms with any IC (Extensive Margin)



Panel B: Worker Ratio (Intensive Margin)



Notes: These figures decompose the extensive and intensive margin measures of firm IC as presented in Figure 10 by 2-digit industry codes (NAICS). Only industries with over 1,000 observations per year are shown. Firms are categorized by their position in the distribution of firm median wages. Panel A shows the extensive margin; Panel B shows the intensive margin defined by the *worker ratio*. ICs correspond with our preferred IC definition, individual ICs with less than $10K in Schedule C deductions, excluding car and travel expenses.

Table A1: Match Rates for Form 1099-MISC Recipients

year	SSN match Sched C SSN	EIN match Sched C EIN	SSN match HH Sched C only	SSN match Form 1040 only	unmatched SSN	EIN not matched w/ Sched C
2000	0	0.04	0.03	0.01	0.78	0.14
2001	0	0.04	0.53	0.20	0.08	0.14
2002	0	0.04	0.54	0.20	0.09	0.14
2003	0	0.04	0.55	0.17	0.09	0.14
2004	0	0.04	0.56	0.16	0.10	0.14
2005	0	0.04	0.57	0.15	0.10	0.14
2006	0	0.04	0.57	0.14	0.10	0.15
2007	0.55	0.05	0.03	0.15	0.08	0.15
2008	0.54	0.05	0.02	0.14	0.09	0.15
2009	0.55	0.05	0.02	0.13	0.09	0.16
2010	0.54	0.05	0.02	0.14	0.09	0.16
2011	0.54	0.06	0.02	0.14	0.09	0.17
2012	0.53	0.06	0.02	0.13	0.09	0.17
2013	0.53	0.06	0.02	0.13	0.10	0.17
2014	0.53	0.06	0.02	0.12	0.10	0.17
2015	0.52	0.06	0.02	0.12	0.11	0.17
2016	0.51	0.06	0.02	0.11	0.12	0.18

Notes: This table shows the share of Form 1099-MISC recipients that match with various tax return forms. A Form 1099-MISC can be issued to an individual's Social Security Number (SSN), "SSN recipients," or to an Employer Identification Number (EIN), "EIN recipients." The first column shows the share of SSN recipients that can be matched with an SSN reported on a Schedule C. The second column shows the share of EIN recipients that can be matched to an EIN on a Schedule C. The third column shows the share of SSN recipients that can be matched to a household Schedule C, but not an individual Schedule C. Therefore, the first, second and third columns combined are the share of all Form 1099-MISC that were matched to some household Schedule C. The fourth column shows SSN recipients that can be matched to a Form 1040 but no corresponding Schedule C. The fifth column is the share of SSN recipients that cannot be matched to a Form 1040. The final column shows EIN recipients which are not matched to a Schedule C, but potentially to another business tax return.

Table A2: Male and Female Independent Contractors (millions)

	All ICs		ICs (primarily IC income)	
year	Female	Male	Female	Male
2001	4.017	6.261	1.797	2.723
2002	4.241	6.568	1.946	2.935
2003	4.396	6.578	2.029	2.932
2004	4.571	6.655	2.113	2.927
2005	4.730	6.719	2.193	2.978
2006	5.033	6.948	2.321	3.091
2007	5.280	7.209	2.458	3.239
2008	5.344	7.151	2.469	3.186
2009	5.139	6.862	2.531	3.309
2010	5.265	7.015	2.586	3.393
2011	5.728	7.490	2.936	3.739
2012	5.904	7.594	2.970	3.714
2013	5.996	7.611	3.028	3.696
2014	6.225	7.802	3.074	3.764
2015	6.505	8.151	3.154	3.787
2016	6.749	8.595	3.181	3.877

Notes: This table shows the number of male and female ICs over time (millions). The first set of columns shows the number of ICs using our preferred definition, 1099-MISC/K recipients with less than $10,000 in Schedule C deductions, excluding car and travel deductions. The second set of columns shows the number of ICs whose primary source of labor earnings is IC income, *(1099 income / (1099 + W-2 income))>0.5*. These data are underlying Figure 10 Panel A.