Independent Contracting, Self-Employment, and Gig Work: Evidence from California Tax Data

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July 2022

Abstract

We use de-identified data from California personal income tax returns to measure the frequency and nature of independent contracting and self-employment work in California. We identify this work by the presence of a Schedule C on the tax return and/or the receipt of a Form 1099 information return. We estimate that 14.4% of California workers aged 18-64 in tax year 2016 had some independent contracting or self-employment income; about half of these workers also had earnings from traditional W-2 jobs during the year. We find that only a small share (1.4%) of workers had earnings from online labor platforms (often called gig work). Workers with low earnings were significantly more likely to earn independent contracting or self-employment income and to rely primarily or exclusively on that income. We explore the characteristics of workers engaging in independent contracting and self-employment and their distribution across family type, geography, and industry.

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*We are grateful to Charles Davis, Samantha Fu, Nick Gebbia, John Iselin, Patrick Kennedy, Robbie Linden, Ian Eve Perry, Sarah Thomason, and Dario Tortarolo for excellent research assistance. We are also grateful to Julie Moreno, Sean McDaniel, Chad Angaretis, Xudong Chen, Bud Flynn, and Jeff McTygue for helping us understand the tax data. This project was funded in part by the United States Department of Labor Scholars Program (under contract DOL-OPS-15-C-0060), the Alfred P. Sloan Foundation, and the Ewing Marion Kauffman Foundation. Nothing in this paper is an official position of the Franchise Tax Board. The contents of this publication and views expressed are solely the responsibility of the authors and should not be attributed to FTB, DOL, or other funders, nor does mention of trade names, commercial products, or organizations imply endorsement of same by FTB or any funders of the work.

I. Introduction

Most labor market policy in the United States is designed for long-term employment relationships. Self-employed workers, including independent contractors and on-demand platform ("gig") workers, are excluded from wage and hour laws, occupational safety and health regulations, unemployment insurance (prior to COVID), and employer-provided health insurance and retirement programs. They are also poorly covered by our tax collection system, which relies heavily on employer reporting of worker earnings for enforcement. Growth in independent contracting thus threatens to undermine many labor market arrangements, with implications for regulation, tax collection, and worker wellbeing.

We have little consistent, rigorous evidence about the prevalence and nature of independent contracting (Government Accountability Office 2015; Casselman 2018; National Academies of Sciences, Engineering, and Medicine 2020). Anecdotes and non-representative samples sometimes indicate large increases in freelance work (Freelancers Union, Upwork, and Edelman Intelligence 2016), but these are not always mirrored in more representative data (Abraham et al. 2020). Moreover, even official surveys rely on worker self-reports, which do not always align with workers' status under employment and labor laws (Abraham et al. 2020; de Silva et al. 2000). The primary worker survey on this topic, the Current Population Survey Contingent Worker Supplement (CWS), shows no growth in alternative work arrangements from 2005 to 2017, but as we discuss below it may miss a substantial fraction of independent contractor work. Employer surveys and many administrative data sources are of little help, as they are oriented toward traditional jobs.

This paper uses California tax data to provide an alternative lens on many of the outstanding empirical questions about independent contracting and self-employment. California is

a particularly interesting location to study this work. It is the birthplace of on-demand platforms and adoption in the state occurred earlier and at higher rates than in other parts of the country (Farrell, Greig and Hamoudi 2018). California is also the world's fifth largest economy (if viewed as a nation) and is home to roughly 40 million people, more than the smallest 21 states combined.

Tax data provide important advantages over other sources (Bernhardt and Thomason 2017). In particular, they distinguish between earnings from traditional jobs, reported on W-2 forms, and those from sole proprietorships and independent contracting relationships, reported on Schedule Cs and Form 1099s. The tax distinction aligns closely with the core distinction in US employment and labor laws between employees, who are covered by a wide range of employment protections, regulations, and safety net programs, and independent contractors and the self-employed, who are not. Tax data also include information about earnings from both traditional and non-traditional employment for a given tax filer, both within a year and over time. This makes it possible to measure how workers combine traditional and non-traditional work, a topic that cannot be fully explored in worker surveys that ask only about the main job at a point in time. The implications of a side gig as a freelancer, supplementing a main job with an employer, are different from the implications of workers relying on independent contracting for their main source of income. Similarly, the implications of a short six-month spell as an Uber driver are different from multi-year reliance on independent contracting income.

For these reasons, tax data are crucial to advancing our understanding of the 21st century labor market. We use de-identified, individual-level data from California personal income tax returns for tax years 2012 through 2017 to measure the prevalence and nature of self-employment and independent contracting. We explore the prevalence of independent contracting and self-employment (hereafter, IC for short) earnings, how individuals combine this work with traditional

jobs, and how participation in IC work varies with worker demographics and geography. We build on previous work with tax data (most notably Jackson, Looney, and Ramnath 2017 and Collins et al. 2019) in several ways, including by exploring more thoroughly the extent to which workers combine traditional and IC work both within and across years, and by investigating which segments of the labor market (defined by industry, earnings level, and geography) are most reliant on IC work.

II. Defining terms

Drawing on previous research on the changing organization of work (e.g., Abraham and Houseman 2021; Bernhardt and Thomason 2017; Cappelli and Keller 2013; Kalleberg 2011), we focus on independent contracting and self-employment as our primary analytic and empirical object. We use a tax-based measure, identifying workers who receive 1099 forms indicating the presence of non-employee compensation and/or file Schedule C tax forms reporting income from unincorporated self-employment.[1] This definition aligns with the fundamental distinction between employees and non-employees in US employment and labor laws, determining access to a wide range of rights, benefits and social insurance programs for workers. IC workers include online platform workers (such as Uber drivers or TaskRabbits), non-platform workers paid via contract (e.g., consultants, real estate agents), and self-employed workers paid directly by customers (e.g., hair stylists) or selling goods or services to businesses. However, insofar as employers misclassify

[1] The research literature currently uses a range of measures and labels to identify non-W-2 workers who earn self-employment income but are unincorporated. For example, some authors (e.g., Collins et al., 2019) would classify workers paid by many individual customers rather than by clients who issue 1099s as self-employed, not as independent contractors. We include these workers in our study in order to capture the full range of non-W-2 workers who are not incorporated businesses; often in public policy debates the lines between the various subcategories become blurred. An example is California's debates about AB5, a law that establishes criteria for classifying workers as employees or independent contractors (Lin 2019).

traditional employees as independent contractors (see, e.g., National Employment Law Project 2020), our analysis will overstate the prevalence of independent contracting relative to a legal definition.

Following Collins et al. (2019), we define online platform work narrowly: An online platform worker is one who receives a 1099 from one of a set of identified Employer Identification Numbers (EINs) in the online platform economy (OPE). We developed a list of such firms, including the well-known rideshare companies Uber and Lyft as well as TaskRabbit, Fiverr, Varsity Tutors, Postmates, and others, and can identify 1099s issued by these firms in our data.[2] Where Collins et al. (2019) emphasize measuring trends in the size of the online platform and independent contracting sectors, we focus more on understanding the role that this work plays in the labor market – how workers mix IC work with traditional jobs, and the distribution of IC work across workers of different ages, family structures, incomes, industries, and geographies within California.[3]

An advantage of tax data is that we can identify workers with IC income that serves as a supplement to their traditional W-2 job. This contrasts with the main survey source of evidence on non-traditional work, the 2017 BLS Contingent Worker Survey (CWS), which counts only those for whom independent contracting is the main job. Other survey evidence does include supplementary jobs. For example, the "Freelancing in America" survey conducted by the Freelancers Union, Upwork, and Edelman Intelligence (2016) counts anyone who had any amount of independent contracting income as a "gig" worker.

[2] We do not include firms where payments are not primarily for labor delivered, such as Airbnb or Paypal.
[3] Lim et al. (2019) undertake a similar exercise using IRS data. They include 1099-Ks from all payers, but not Schedule Cs without associated 1099s. They also impose several additional restrictions aimed at excluding small businesses from their IC definition.

This distinction may help to explain conflicting findings. National studies using the CWS find that the rate of unincorporated self-employment as a main job has declined slightly over the past several decades (Bureau of Labor Statistics 2018). But studies using tax data to examine the number of 1099 forms or Schedule C filings show clear increases since the early 2000s (Katz and Krueger 2016, 2019; Collins et al. 2019; Abraham et al. 2020). One potential explanation is that independent contracting for supplemental income has increased, while the rate of independent contracting as a main job has remained steady (see, e.g., Koustas 2018). Collins et al. (2019) show that the IC share of all employment has grown but that the growth is less impressive if only relationships paying above some minimal level are counted. Lim et al. (2019), however, find that the growth of workers with only IC earnings has been faster than that of workers with IC income overall.

We divide workers with IC income into four groups, based on the share of their total earnings that comes from IC work: Those who are exclusively IC workers, with no W-2 earnings at all; those who have W-2 earnings but derive 85% or more of their earnings from IC work; those who have both W-2 and IC earnings and derive at least 15% of their total annual earnings from each; and those for whom IC work is a small supplement to W-2 work, accounting for less than 15% of the total. As we show, this final group is large, and the characteristics of primarily and exclusively IC workers are quite different from those of the broader population of workers with any IC income.

III. Data

We use the population of individual tax returns in California over several years, as maintained by the Franchise Tax Board (FTB), the state's tax authority.[4] We link information from several different tax forms. The "backbone" of our database is the California tax return, the 540 form (or variants, such as the 540-2EZ). This provides information on family structure, age, and total family income. We link this at the individual level to federal Schedule C forms and to three forms filed by employers to report payment of labor earnings. The Schedule C contains detailed information about unincorporated self-employment and sole proprietor income, expenses, and profits. We have access to Schedule Cs only for those who e-file their taxes; for others, we observe only a return-level indicator for the presence of a Schedule C. Accordingly, most of our analysis is restricted to e-filers. We discuss implications of this below. We also use Forms W-2, 1099-MISC, and 1099-K for e-filers.[5] Form W-2 provides earnings from traditional jobs; Form 1099-MISC is used for most IC work, and is required whenever a firm or individual pays a self-employed IC worker more than $600; and Form 1099-K is used by many online platform employers (e.g., Uber, Lyft, TaskRabbit) to report payments to those who work through their platforms.[6,7]

Both the 1099-MISC and the 1099-K are used for multiple purposes. On 1099-MISCs, we consider only "non-employee compensation" as IC earnings.[8] To distinguish OPE workers

[4] We access these data through a collaboration with the FTB. All of the data we work with are de-identified, but linkable across sources and over time. We exclude non-resident and part-year resident filers. In some cases, we rely on FTB's internal analysis of files that it was not able to share with us directly.

[5] The 1099 files that we use are from the Information Return Master File (IRMF) database provided by IRS to FTB.

[6] We see many information returns, particularly 1099s, with no associated Form 540. It is not clear whether these represent real California workers, are issued in error, or are sent to people outside of California. We exclude these information returns from our analyses. This means that our analysis excludes workers (generally very low income) who do not file tax returns.

[7] Rideshare firms typically report base earnings on a 1099-K and other payments (bonuses, toll reimbursements) on a 1099-MISC. Workers often receive both.

[8] Since the period covered by our data, the IRS has introduced a new form, the 1099-NEC, to capture non-employee compensation that would previously have been reported on the 1099-MISC.

receiving 1099-Ks from business transaction recipients – the 1099-K was created for use by payment processors such as MasterCard and Paypal – we focus on 1099-Ks issued by a group of 55 Employer Identification Numbers (EINs) associated with OPE firms.[9] These forms are required only when cumulative payments in a year exceed $20,000, though some OPE firms have at times adopted the practice of issuing 1099-Ks to all workers.[10] This was the case for the largest OPE firms in tax year 2016, the primary focus of our analysis; after 2016, following guidance from the IRS, OPE firms began to adhere to the $20,000 threshold (National Academies of Sciences, Engineering, and Medicine 2020, p. 115).

Similarly, Schedule Cs may be used to report earnings from small businesses, the proprietors of which we do not consider to be IC workers. Accordingly, we exclude from our IC definition anyone whose Schedule C includes deductions for wages paid or for contract labor expenses, as these likely indicate the presence of a small business rather than self-employment or independent contracting. **Appendix Tables A-6** and **A-7**, in the online appendix, compare the included and excluded Schedule Cs; those that we exclude for the presence of labor expenses have much higher average receipts and profits, with average labor expenses above $50,000, consistent with them being small businesses.

In principle, all IC earnings should be reported on Schedule C, whether or not there is third-party reporting, but many workers may not report fully. To account for this, we define gross IC receipts as the maximum of gross receipts as reported on the Schedule C, if present, and total 1099

[9] Collins et al. (2019) use a similar strategy. We compiled a list of 84 OPE platforms (available upon request). FTB identified a list of 55 Employer Identification Numbers (EINs) corresponding to platforms on this list. It then identified for us which records in our data (in which employers' and individuals' identifying information is masked) correspond to this group of EINs. This enables us to identify the OPE sector but not individual firms.

[10] The law also requires issuance of 1099-Ks when there are more than 200 transactions, even if they total less than $20,000.

earnings, summed across both forms and all employers. Of course, insofar as workers have earnings that are not captured by either third-party reporting or self reporting, we will not observe them. The IRS estimates that nearly two-thirds of income without third-party reporting is not reported (Internal Revenue Service 2016). Fortunately, in the 2016 tax year that was the focus of our analysis (though not more recently) many of the major platform employers, including Uber and Lyft, issued 1099-Ks to all of their workers above a low earnings threshold, even when this was not legally required. This leads us to believe that the under-coverage in our data is not severe outside of the cash-based economy.

Our computed gross IC receipts are not directly comparable to W-2 wages, as employment expenses are typically paid by the employer for W-2 workers but by the IC worker him- or herself (Parrott and Reich 2018). Thus, to measure IC earnings comparable to W-2 earnings we must net out expenses associated with IC work. We use for this the total reported expenses on the Schedule C. This leads to two potential errors. Many IC workers may over-report their expenses to reduce their tax burdens.[11] On the other hand, we expect that workers who do not report 1099 gross earnings on their Schedule Cs also do not report the associated expenses.[12] This would lead us to overstate net IC earnings for these workers.

We construct net IC earnings as adjusted gross earnings, as defined above, less Schedule C expenses. Most of our analyses do not count those with zero or negative net IC earnings as IC workers, though we present some statistics on the prevalence of this group.

[11] There is an important category of workers – potential recipients of the Earned Income Tax Credit – who have an incentive to *underreport* expenses in order to inflate their taxable earnings. See Online Appendix B.

[12] We effectively assume that 1099 income in excess of Schedule C gross earnings is not offset by any expenses. Collins et al. (2019) make the opposite assumption, that any unreported 1099 earnings are fully offset by unreported expenses.

To measure workers' total earnings, we add together net IC income with W-2 earnings. We then measure the share of total earnings coming from IC work. As noted earlier, we consider someone who gets 85% or more of their earnings from one type of work (W-2 or IC) to be primarily of the dominant type, and those who get between 15% and 85% from each to be "mixers." In some analyses, we combine primarily (85-99%) W-2 workers with exclusively (100%) W-2 workers, and similarly for primarily and exclusively IC workers, to form three categories: Primarily or exclusively W-2 workers, mixed earners, and primarily or exclusively IC workers.

To assign W-2 workers to industries, we use the industry of the issuing firm. Schedule Cs include a field for taxpayers to report the industry in which the business operates. We assign IC work to this industry, when it is available, and otherwise to the industry of the 1099 issuing firm. When a worker receives multiple W-2s or multiple 1099s, we use the one with the largest gross earnings.

Although 2016 is our focus, we also construct analogous estimates for tax years 2014 and 2015. These allow us to measure short-term time trends in IC work and mixing of IC work with traditional jobs. A worker might have both IC and W-2 income in 2016 because she held both roles simultaneously, or because she switched from one to the other mid-year. Comparisons to prior years can help distinguish these. We do not have access to complete 1099 files either before 2014 or after 2016, but we can get a sense of time trends by measuring the share with Schedule Cs from 2012 through 2017. This was a period of steady economic recovery in California. The state was hit harder by the Great Recession than the nation as a whole, with an unemployment rate that peaked at 12.6% (vs. a national peak of 10.0%), and the state unemployment rate fell from 11.2% in January 2012 to 4.5% in December 2017.

As noted above, we have Schedule Cs only for those who e-file taxes, and we thus limit our analyses to this subpopulation. **Table 1** shows characteristics of California tax units in 2016, first overall and then for the e-filer and paper-filer subpopulations. Only 13% of tax units file paper returns. Paper filers are older and have lower incomes than e-filers, and are more likely to be single. The lower portion of the table shows return-level (i.e., for each filing unit) summaries of the types of earnings reported.[13] We report these using both our preferred definitions, available only for e-filers, and alternative definitions that we can compute for both paper filers and e-filers. For the latter, we count all Schedule Cs, including those with negative or zero net income and those with reported labor expenses, and we use the wage earnings line of the 540, rather than W-2s, to identify wage earnings.

Using the common definitions, earnings patterns differ non-trivially between the two populations. Paper-filed 540s are 5.4 percentage points less likely to include wage earnings than are e-filed returns, and 3.4 percentage points less likely to include Schedule Cs (though they are slightly more likely to link to 1099s). However, because paper filers are such a small share of the total, the e-filer distribution is quite similar to the full population distribution.

Columns 4 and 5 of Table 1 present estimates that use the e-filer sample but weight it to resemble either the paper filer population (column 4) or the full population (column 5). We construct weights based on a propensity score model for paper filing, using as predictors only variables observed for both paper and e-filers.[14] The reweighted e-filer population closely

[13] For paper filers, we observe an indicator for the presence of a Schedule C, but not its contents. In Table 1, we count any tax unit with a Schedule C as having IC income, regardless of whether net income is positive or there are labor expenses reported.

[14] We use a logistic regression. Explanatory variables are number of dependents, filing status indicators, metropolitan area indicators (for Los Angeles, San Diego, and San Francisco), fraction of filers in the zip code who paper file, and flexible functions of age and AGI, all interacted with marital status. We generate a predicted probability, p, for each observation in the e-filer subsample. We reweight e-filers by p/(1-p) to match the paper filers and by 1/(1-p) to match the all-filer population.

resembles the paper filer and all filer populations on demographics. However, even after reweighting, the e-filers have notably higher rates of Schedule C filing than paper filers. This suggests that e-filers are not selected so much on observable as on unobservable determinants of IC work, implying that our analysis based on e-filers may overstate the prevalence of IC work. However, given the large share of e-filers in the population, this is unlikely to introduce major error. We measure the sensitivity of our main results to selection into e-filing by presenting some analyses based on this reweighting below.

Table 2 provides detail about our construction of our IC measure. Here, we conduct the analysis at the individual rather than tax unit level and limit the analysis to e-filers. 15.5% of California e-filers file Schedule C forms, while a partially overlapping 5.0% receive 1099-MISC or 1099-Ks indicating IC earnings. Of the Schedule C filers, about one in ten report having labor expenses, so are excluded from our IC count (see **Appendix Table A-6**). Another one in five report expenses that equal or exceed their gross reported earnings. Some of these may in fact have positive net IC earnings but overstated expenses, but because we cannot verify the reported expenses we exclude these workers from our IC tabulations. The remainder, 10.8% of filers, have Schedule Cs that we count as indicating IC work. Only about one-third of those with Schedule Cs receive 1099-MISC or 1099-K forms (many Schedule C filers are reporting income received directly from customers). An additional 1.3 percent of filers receive 1099s but do not file Schedule Cs. About one-third of these filers receive 1099-Ks, a notably larger share than among Schedule C filers with 1099s, suggesting that 1099-K recipients are less likely to file Schedule Cs than are 1099-MISC recipients.

Table 3 compares our estimates with those that Collins et al. (2019) report for California from IRS data. There are several differences in the measures used. First, Collins et al. (2019) use

the Schedule SE to measure self-reported self-employment income, where we focus on the Schedule C.[15] For paper returns, we are not able to tie either Schedule Cs or W-2s to individuals, and we cannot observe Schedule C net profit amounts. We assume that when a married couple files a paper return with W-2s or Schedule Cs attached, both members of the couple have that type of earnings. Third, we rely on a different 1099 file than the one that Collins et al. (2019) use at the IRS. Taxpayers provide 1099 data to the IRS, and by agreement the IRS shares data for payees with California addresses with FTB. We rely on tabulations performed by the FTB of these data.

Table 3 includes four columns. Column 1 reports estimates for California from Collins et al. In column 2, we report estimates for all California tax filers from the FTB data, using definitions that can be applied equally to paper- and e-filers. This means including all Schedule Cs, including those with negative net earnings, and allocating them to both members of married couple filing units. Entries in the table affected by this are indicated by italics. Perhaps as a result, we count somewhat more individuals with Schedule Cs than do Collins et al. We see many fewer individuals with 1099s. We have not been able to explain this difference, which must reflect differences in the 1099 data files that we and Collins et al. use. In any event, Collins et al. find high overlap between Schedule SE filers and 1099 recipients, and as a result our overall IC prevalence estimate of 18.9% of those with positive earnings comes close to their estimate of 20.5%. Columns 3 and 4 report estimates for the subpopulation of e-filers, for whom we have more information: Column 3 uses the definitions from column 2, while column 4 uses our preferred definitions, excluding negative-net-earnings Schedule Cs and assigning those with positive net earnings only to the relevant individual.

[15] Most independent contractors with positive IC earnings should file both Schedule C and Schedule SE. However, those with net earnings under $400 need not file SE. In our data, 5% of Schedule Cs show net income between $1 and $400.

IV. Prevalence of independent contracting

Table 4 aggregates the relevant cells from Table 2 to present our estimates of the overall prevalence of independent contracting and self-employment in the California labor market in 2016. 12.1% of 18-64-year-old e-filing tax filers have IC earnings, about evenly divided between those who also have W-2 earnings and those who do not. We find that 5.9% of the population, and 7.0% of those with positive earnings, have exclusively IC earnings. For comparison, 77.9% have W-2 earnings, including the 6.2% with both W-2 and IC earnings. Recall that these workers may or may not hold multiple jobs at the same time; some may have transitioned from a W-2 job early in the year to an IC job later, or vice versa. We return to this below.

Table 4 also breaks out OPE workers, defined as those with any OPE 1099s during the tax year regardless of the presence or amount of other earnings. Only 1.4% of all workers with positive earnings, or about one-tenth of all workers with IC earnings, have OPE earnings. Among those whose earnings come exclusively from IC work, only 5% have OPE earnings.

Table 5 explores several alternative measures of IC prevalence. The first column repeats estimates from Table 4. The second column adds back into the IC group those who were excluded from our initial classification due to zero or negative profits on their Schedule Cs, or to expenses that led us to classify them as business proprietors rather than independent contractors. This increases the prevalence of IC work somewhat, from 12.1 to 13.6% of the population, with a larger impact on the IC only category than on mixed IC and W-2 workers. Columns 3 and 4 expand the scope to include those aged 65-80. The number of W-2 workers declines by more than the number of IC workers after age 65, so including older individuals raises the IC share of those with earnings slightly, driven by the IC-only category.

Figure 1 shows the share of taxpayers with independent contracting and self-employment income over time. We have complete 1099 data for only three years, from 2014-2016, but can look over six years at the prevalence of Schedule Cs. We therefore show series using our preferred definitions for the shorter period, and show a series for all Schedule Cs for 2012-2017. We also show series, in dashed lines, for IC-only workers and for OPE workers.[16]

The picture is remarkably stable. The share of IC workers rose slightly, from 14.0% to 14.4%, between 2014 and 2016, while the share whose earnings came exclusively from IC work declined from 7.3% to 7.0%. The share receiving OPE income more than quadrupled between 2014 and 2016 but from a very low base, from just 0.3% to 1.4%. Over the longer window, the share of workers with Schedule Cs rose slightly, from 12.4% in 2012 to 12.9% in 2017, while the share with Schedule Cs but no W-2 earnings declined slightly from 7.0% to 6.9%.

These estimates are broadly consistent with what others have found. The most comparable estimates come from analyses of IRS data. Garin, Jackson, and Koustas (2022, Tables A.3 and A.4) find that the share of federal taxpayers reporting self-employment income (via Schedule SE) was essentially flat at around 11.7% between 2012 and 2017. The share with 1099 income not reported on the tax return grew a bit less than 1 percentage point between 2012 and 2017, with about 0.6 percentage points of this due to people with OPE earnings but no other 1099 earnings. Collins et al. (2019) find that about 1.1% of the workforce had OPE earnings in 2016, up from less than 0.2% in 2014. 16.8% had at least some IC income.[17] One difference in our results is that while

[16] Prior to 2016, we are not confident that all OPE firms were filing 1099-K forms for all workers (as opposed to only for workers earning over the $20,000 threshold). Therefore, we may be somewhat underestimating the share of workers with OPE income in 2014 and 2015.

[17] Abraham et al. (2021) find growth in self-employment between 2013 and 2015 in the Current Population Survey and in an analysis of Social Security records (which for self-employment ultimately derive their information from Schedule SE filings). However, their series ends in 2015; moreover, they rely on not-yet-complete Social Security data for that year.

our estimate of the increase in OPE work in 2016 is similar to that of Collins et al. (2019), Collins et al. find that this leads to a comparable increase in total IC work (suggesting that most of the new OPE workers do not have other IC earnings), where we find no increase in total IC prevalence.

We now examine the share of earnings coming from IC work for those with IC earnings, using our preferred IC definition and the 18-64 age range. As seen in Table 4, nearly half of those with IC earnings have no W-2 income. **Figure 2** shows the distribution of the share of earnings coming from independent contracting and self-employment among the other half of IC workers, those who mix W-2 and IC income. A large majority of workers with both sources of earnings obtain the bulk of their earnings from their W-2 jobs; for the median worker with both sources of earnings, IC work accounts for only 10.6% of total earnings. There is substantial heterogeneity here, however; a long tail of workers obtains much larger shares from IC work.

We adopt a simple classification of workers with both IC and W-2 income, whom we refer to as "mixers," into three subgroups: Those who are primarily W-2 workers with some IC work (accounting for 15% or less of total earnings) on the side; those who are primarily IC workers with a small amount of W-2 income (again, 15% or less of total earnings); and those who have significant shares of both W-2 and IC work. **Table 6** shows the distribution of workers across categories, expanding the mixed group into these three subgroups. Over half of mixers fall into the first subgroup, with more than 85% of their earnings from their W-2 jobs; these account for nearly one-third of all workers with IC earnings. Most of the rest, accounting for 37.1% of mixers, 19.1% of IC workers, and 2.8% of the total workforce, derive substantial portions from each sector. Only 6.5% of mixers, accounting for 3.3% of all workers with IC earnings and 0.5% of the overall workforce, are primarily IC workers with a bit of W-2 earnings on the side. We also examine the presence of OPE earnings within each category of workers. Over half of those with OPE income

are primarily W-2 workers. These are the classic moonlighters, with regular jobs but some platform work on the side. Only 0.7% of those in the workforce, or less than half of OPE workers, have OPE income and receive more than 15% of their earnings from IC work.[18] About half of these have only IC earnings.

Appendix Table A-1 (in the online appendix) repeats Table 6, reweighting the e-filer sample to resemble the full filing population, as in Table 1. This has little impact on the results.

As noted above, the presence of both W-2 and IC income in a single tax return could reflect transitions between sectors for workers who never combine the two forms of work at the same time. Because we observe earnings only at an annual frequency, a worker who switches sectors entirely in the middle of a year will appear as a mixer that year. To assess this, we examine year-to-year stability of workers' earnings shares. In **Table 7**, we tabulate workers' status in tax year 2016 against their status in tax year 2015, using the same five categories as in Table 5, plus non-employment. The first row shows workers with just W-2 income in 2015: 93% of these workers remain in the same status in 2016, while a plurality of the remainder have no earnings at all in 2016. Just over four percent have any IC income in 2016; of these, most obtain less than 15% of their 2016 earnings from independent contracting and self-employment. The story is similar, but in reverse, for those who had only IC earnings in 2015. Fully 75% of these workers remain in the same status in 2016. Only about 12% had any W-2 earnings in 2016, and a third of those had transitioned fully out of IC work to the "W-2 only" category.

The middle categories are the most interesting, and speak to the interpretation of mixed incomes in the cross section. Of those who earned between 15% and 85% of their income from

[18] This tabulation counts *workers*, not *earnings*. Reich and Parrott (2020) emphasize that full-time Uber drivers – who likely fall in the "IC only" category here – account for a much larger share of Uber earnings or miles driven than they do of Uber drivers.

independent contracting and self-employment in 2015, only about one-third were still in this category the following year. Nearly as many shifted to exclusively W-2 work, while another sizable share shifted to exclusively IC. Similarly, among those who were primarily W-2 or primarily IC workers in 2015, large shares shifted to work exclusively in that sector in the following year.

This pattern suggests that many workers who appear to be mixing IC and W-2 work are not really doing so but rather appear to be because they transitioned from one sector to the other mid-year. To shed further light on this, **Appendix Table A-2** shows three-year transitions, from 2014 to 2015 to 2016. Only 1.6% of individuals had both W-2 and IC earnings (at any ratio) in each of these three years, much less than the 3.5% who were exclusively IC workers in all three years or the 8.2% who had both W-2 and IC income at some point during the three-year period.

V. Worker and Job Characteristics

A. Demographics

Table 8 shows statistics on the prevalence of IC work by individual demographics. For parsimony, we combine exclusively W-2 with primarily W-2 workers and exclusively IC with primarily IC workers. All statistics are limited to the population with earnings.

The first panel shows age breakdowns. Consistent with other research (e.g., Ramnath, Shoven, and Slavov 2021), IC income is much more prevalent among older than among younger workers. There is no indication that traditional jobs are disappearing for young people, 94% of whom earn all or nearly all of their money from W-2 jobs and only 9.4% of whom have any IC earnings at all. There is little difference across age groups in the rate of mixing work in the two

sectors; the entire age difference comes from those with few or no W-2 earnings. Workers aged 26-40, however, are more likely than older or younger workers to have OPE earnings.

The second panel shows results by filing status, and the third by geographic region. There are few big differences here. Married workers are slightly more likely to engage in IC work. IC work is more prevalent in the Los Angeles area than elsewhere in the state, but the differences are not enormous.

The fourth panel shows results by filing unit Adjusted Gross Income, adjusted for family size,[19] while the fifth panel shows results by individual earnings. IC workers are significantly overrepresented among low-earnings workers and low-income households. This is especially true for primarily or exclusively IC earners and for OPE workers. That said, even among the lowest quartiles of individual earnings and family income, the percent with OPE income is still quite small, at 2.4 and 2.6 percent, respectively.

Finally, we divide filers by the average income of the zip code in which they live. This shows a different pattern: IC work is somewhat more common in high-income zip codes, driven largely by IC moonlighting and mixing. Primary reliance on IC work and OPE work are fairly evenly distributed.

B. Earnings distribution

Figure 3 shows the distribution of total earnings for each of the five groups of workers shown in Table 6, as well as for a composite group that combines all workers with positive shares of both W-2 and IC earnings. Earnings are substantially higher for W-2-only (median=$38,400)

[19] Following common practice (e.g., Kochhar and Cohn, 2011; OECD, 2011), we equivalize incomes across families of different sizes by dividing by the square root of the number of people in the filing unit.

than for IC-only (median=$12,500) workers.[20] Mixers who derive the vast majority of their earnings from W-2 work have higher earnings (median=$46,700) than the W-2 only workers, while primarily-IC mixers resemble the IC-only workers (median=$17,600). The true mixers, with more than 15% of their earnings from each sector, are intermediate (median=$20,700). See also **Appendix Table A-4**, which reports average earnings by source for each type of worker.

In **Figure 4**, we divide workers into deciles based on their total earnings, and measure the prevalence of different types of IC work in each. (Exact numbers are in **Appendix Table A-3**.) Workers with low earnings are significantly more likely to have IC income and to rely primarily or exclusively on that income. In the bottom three deciles, 12-24% of workers rely primarily or exclusively on IC income, as compared with less than 4% in all deciles above the median. OPE earnings are also more prevalent among low earners, though less dramatically so. This implies that when we compute the share of total earnings obtained by workers in different categories, as distinct from the share of workers in each category, the IC-only category is much smaller than what we reported in Table 6 (see **Appendix Table A-5**).

C. Geography

Figures 5-8 explore geographic patterns. **Figure 5** shows the prevalence of IC earnings by zip code. IC workers are overrepresented in the coastal population centers and in the sparsely populated Sierras and northwest coast. The state's agricultural areas have proportionally fewer IC workers. Closer inspection of the Los Angeles and San Francisco Bay areas (**Figures 6A and 6B**) indicates that IC work is especially prevalent in higher-income suburban and edge cities such as

[20] In the "Exclusively IC" panel, there appears to be a large spike at zero earnings. This is not actually at zero, as those with zero net earnings are excluded from our IC definition, but corresponds to those with earnings between $1 and $999.

Marin County and Berkeley near San Francisco and Malibu and the San Fernando Valley near Los Angeles.

The geographic distribution of IC work in Figures 5 and 6 correlates with area income. **Figure 7** illustrates this more systematically. Here, we divide zip codes into twenty groups based on the average AGI of tax filers and plot the share with IC income in each group. IC shares are modestly higher in the high-income zip codes than in lower-income areas (though the IC share is also high in the lowest-income zip codes). The highest income zip codes have IC rates about one-fifth higher, on average, than do zip codes in the second through sixth deciles. This is entirely a phenomenon of those who use IC work to mix with or supplement W-2 work; there is a zero or negative trend across zip code income in the share of workers who rely exclusively or primarily on IC work.

Figure 8 shows smoothed versions of the IC-zip code mean AGI relationship separately for three major metropolitan areas and for the rest of the state. Los Angeles has higher IC rates throughout the zip code income distribution, but IC work is rising with zip code mean income in every area. As before, the zip code income gradient is driven by mixers (panel B); there is a weak relationship of zip code income with the share of primary IC workers in Los Angeles, but not (except at the lowest income levels) in the other areas of the state. Panel C shows the share of OPE workers. In the San Francisco area, OPE shares are highest in the lowest-income zip codes, but in other areas the highest shares are seen in middle-income areas.

Taken together, Figures 4-8 illustrate a kind of Simpson's paradox: IC work is more common in higher-income zip codes, but less common among higher-income families and workers. Evidently, across zip codes the higher income areas have a higher prevalence of IC work

as a supplement to main work, but within zip codes we see lower income people more likely to have IC income, and to use it as their primary source of earnings.

D. Industries

In **Table 9**, we explore the distribution of IC work across industries. To do so, we compare the industry distribution of W-2 employment, both from the Quarterly Census of Employment and Wages and from W-2 workers in our sample[21], to that of IC workers. Industry definitions may differ across sectors: W-2 workers are assigned to the industry of the employing firm, while IC workers are, when possible, assigned based on the industry that they list on their Schedule C. To illustrate, a person working as a handyman for a large retailer would be assigned to the retail trade sector if classified as a W-2 worker but to the repair and maintenance sector if an independent contractor.[22]

IC workers are concentrated in a few industries, with the top five (professional services; personal and laundry services, which includes both personal care services and hairdressers; administrative services; transportation; and health care and social assistance) accounting for over half of all IC workers but only one-quarter to one-third of W-2 workers. Industries vary in whether IC workers are generally doing this as their sole job (e.g., in construction, where three-quarters of IC workers rely on this work for more than 85% of their total earnings) or are mixing with traditional jobs (e.g., professional services and the arts, where the shares are under one-half). One can see the influence of platform ridesharing here as well: Ground transportation accounts for 5.3 percent of IC workers, with only 39% – among the lowest across all sectors – relying on IC work

[21] The QCEW counts all jobs, whereas our W-2-based count counts workers. These would differ for multiple job-holders.
[22] When an IC worker does not file a Schedule C or does not report a valid industry code we use the industry associated with the 1099-issuing firm, just as with W-2 workers.

for nearly all of their earnings. Finally, OPE work is even more concentrated than IC work overall, with fully 36% employed in ground transportation.

VI. Potential overreporting of IC income

Many taxpayers with low earnings face negative effective tax rates: Due to refundable tax credits like the EITC, their total income tax burden may be negative, leading to refunds rather than tax bills. At sufficiently low incomes, these taxpayers even face negative *marginal* tax rates: Each additional dollar that they earn qualifies them for a larger tax credit and thus a larger refund. This creates an incentive to over-report income. Previous national evidence suggests that many taxpayers seem to report just enough self-employment income to qualify for the maximum available Earned Income Tax Credit (Saez 2010; Chetty, Friedman, and Saez 2013). Garin et al. (2022) use a regression discontinuity strategy based on children born on either side of January 1st to measure the extent to which incentives drive the reporting of self-employment income, and find large effects, with strategic reporting accounting for as much as half of the measured growth in self-employment rates over time.

Online Appendix B presents several analyses aimed at understanding the scope of strategic income reporting, and the degree to which it influences our earlier estimates. We indeed find that people with IC income are disproportionately likely to have reported income close to the EITC kink, consistent with earlier work. However, we see the same disproportionate "bunching" near the EITC kink for those whose Schedule C gross revenues align with their 1099 information reports. This suggests that the bunching is not driven by people manufacturing fictional income. It may reflect real work behavior, or simply under-reporting of IC expenses. We show in online **Appendix Table B-1** that, whatever the explanation for bunching, it does not importantly affect

our main conclusions about either the prevalence of IC work or the income distribution of IC workers.

VII. Conclusion

This paper uses tax data to overcome measurement issues associated with understanding the prevalence of independent contracting and self-employment. By categorizing jobs by the presence of (unincorporated) self-employment income, the share of the worker's total earnings, the type of work, and the industry in which it is performed, we provide important context on the extent to which workers rely on IC work in addition to other sources of income. Tabulations of these measures by region and examination of their variation over time shed light on the growth and distribution of independent contracting and self-employment, including gig work, in California.

This work has important policy implications for both tax administration and labor regulation (of course, our results only apply to California's labor market, but may point the way toward similar investigations in other states). Identifying trends in which firms use particular tax forms can help tax authorities devise policies to enforce accurate tax reporting. By providing new evidence on the number of workers excluded from traditional labor market protections due to their participation in non-standard work arrangements, our work can also inform efforts to change labor regulations to better serve such workers. The need for changes was put into sharp relief during the COVID-19 pandemic, when self-employed workers and independent contractors who lost work

were initially left without a safety net, and only temporarily gained access to unemployment insurance benefits via a hastily created, temporary federal program. [23]

Tax data on the prevalence and characteristics of IC work should in the future be a central source of information for policymakers responding to changes in the organization of work in the US. The growth of on-demand labor platforms such as Uber and TaskRabbit have fueled the concern that gig work could replace traditional jobs and result in lower wages and chronic economic instability. In particular, worker advocates have long been concerned about the misclassification of workers as independent contractors. As policymakers work to devise policy solutions, it is vital that they have a thorough and nuanced understanding of the diverse independent contractor workforce, including the very different ways that workers use income from independent contracting and self-employment to support themselves and their families.

As the economy moves out of the pandemic emergency, the policy focus on independent contracting will only continue. For example, numerous media outlets have reported on unemployed workers setting up small businesses and investing in freelancing skills, but it is unclear whether this is a permanent shift or a temporary way of generating income.[24] Others speculated that uncertainty about the recurring waves of COVID infections might lead businesses to hire independent contractors rather than permanent workers as the economy opens up again. The future size of on-demand platforms is also unclear, with some seeing steep drops in demand

[23] We are only beginning to assess the impacts, which have likely been stronger in communities of color; for example, black self-employed workers, especially women, experienced larger employment losses during the pandemic than other self-employed workers (see Wilmoth 2020).
[24] Census Bureau data show that monthly business applications increased significantly in 2020 and continued to increase in 2021 (US Census Bureau 2021).

while others such as grocery delivery grew rapidly.[25] In all cases, an accurate understanding of prevalence and trends will be critical to ensure coherent policy responses.

The primary limitation in our work is that we rely on individual self-reports to measure independent contracting and self-employment expenses, and on self-reports and third-party reporting to identify IC income. This means that we do not observe IC income that is not reported to tax authorities; that we may over- or under-state the share of IC gross earnings offset by actual business expenses; and that we are not able to identify misclassification of workers as independent contractors (or vice versa). A high priority objective for future work should be to obtain better estimates of the impact of over- and under-reporting on tax-based measures of the prevalence and nature of independent contracting and self-employment, and to adjust reporting structures to enable better tax enforcement for this sector.

[25] See JP Morgan Chase Institute's recent report on platform work during the pandemic (Greig and Sullivan 2021).

References

Abraham, Katharine G., John C. Haltiwanger, Kristin Sandusky, and James R. Spletzer. 2020. Measuring the Gig Economy: Current Knowledge and Open Issues. In *Measuring and Accounting for Innovation in the 21st Century*, edited by C. Corrado, J. Haskel, J. Miranda, and D. Sichel. Chicago: University of Chicago Press.

Abraham, Katharine G., John C. Haltiwanger, Claire Hou, Kristin Sandusky, and James R. Spletzer. 2021. Reconciling Survey and Administrative Measures of Self-Employment. *Journal of Labor Economics* 39(4): 825-860.

Abraham, Katharine G. and Susan N. Houseman. 2021. What Do We Know About Alternative Work Arrangements in the United States? A Synthesis of Research Evidence from Household Surveys, Employer Surveys, and Administrative Data. Report to the U.S. Department of Labor, September 2021. https://www.dol.gov/sites/dolgov/files/OASP/evaluation/pdf/Alternative_Work_Arrangements_Abraham_Houseman_Oct_2021_508c.pdf.

Bernhardt, Annette, and Sarah Thomason. 2017. What Do We Know About Gig Work in California? An Analysis of Independent Contracting. Center for Labor Research and Education. http://laborcenter.berkeley.edu/what-do-we-know-about-gig-work-in-california/ (November 2021).

Bureau of Labor Statistics. 2018. Contingent and Alternative Employment Arrangements, May 2017. https://www.bls.gov/news.release/conemp.toc.htm.

Cappelli, P., and J. Keller. 2013. Classifying Work in the New Economy. *Academy of Management Review* 38(4): 575–96.

Casselman, Ben. 2018. Maybe the Gig Economy Isn't Reshaping Work After All. *The New York Times*, June 7. https://www.nytimes.com/2018/06/07/business/economy/work-gig-economy.html.

Chetty, Raj, John N. Friedman, and Emmanuel Saez. 2013. Using Differences in Knowledge Across Neighborhoods to Uncover the Impacts of the EITC on Earnings. *American Economic Review* 103(7): 2683-2721.

Collins, Brett, Andrew Garin, Emilie Jackson, Dmitri Koustas, and Mark Payne. 2019. Is Gig Work Replacing Traditional Employment? Evidence from Two Decades of Tax Returns. Internal Revenue Service. https://www.irs.gov/pub/irs-soi/19rpgigworkreplacingtraditionalemployment.pdf

De Silva, Lalith, et al. 2000. Independent Contractors: Prevalence and Implications for Unemployment Insurance Program, prepared by Planmatics, Inc. for U.S. Department of Labor, Employment and Training Division, at https://wdr.doleta.gov/owsdrr/00-5/00-5.pdf.

Farrell, Diana, Fiona Greig, and Amar Hamoudi. 2018. The Online Platform Economy in 2018. JP Morgan Chase & Co Institute. https://www.jpmorganchase.com/corporate/institute/document/institute-ope-2018.pdf.

Freelancers Union, Upwork, and Edelman Intelligence. 2016. Freelancing in America: 2016. Business. https://www.slideshare.net/upwork/freelancing-in-america-2016/1.

Garin, Andrew, Emilie Jackson, and Dmitri K. Koustas. 2022. New gig work or changes in reporting? Understanding self employment trends in tax data. University of Chicago, Becker-Friedman Institute working paper no. 2022-67, May.

Government Accountability Office. 2015. Contingent Workforce: Size, Characteristics, Earnings, and Benefits. Report to the Committee on Health, Education, Labor, and Pensions, US Senate Report #GAO-15-168R. http://www.gao.gov/assets/670/669766.pdf.

Greig, Fiona, and Daniel M Sullivan. 2021. "The Online Platform Economy through the Pandemic." JP Morgan Chase & Co Institute. https://www.jpmorganchase.com/institute/research/labor-markets/online-platform-economy-through-the-pandemic.

Harris, Seth D., and Alan B. Krueger. 2015. A Proposal for Modernizing Labor Laws for Twenty-First Century Work: The Independent Worker. The Hamilton Project. http://www.hamiltonproject.org/assets/files/modernizing_labor_laws_for_twenty_first_century_work_krueger_harris.pdf

Internal Revenue Service. 2016. Federal Tax Compliance Research: Tax Gap Estimates for Tax Years 2008-2010. Publication 1415 (rev. 5-2016). https://www.irs.gov/pub/irs-soi/p1415.pdf

Jackson, Emilie, Adam Looney, and Shanthi Ramnath. 2017. The Rise of Alternative Work Arrangements: Evidence and Implications for Tax Filing and Benefit Coverage. Working Paper 114. Department of the Treasury, Office of Tax Analysis.

Kalleberg, Arne L. 2011. *Good Jobs, Bad Jobs: The Rise of Polarized and Precarious Employment Systems in the United States, 1970s to 2000s.* New York: Russell Sage Foundation.

Katz, Lawrence F., and Alan B. Krueger. 2016. The Rise and Nature of Alternative Work Arrangements in the United States, 1995-2015. NBER Working Paper No. 22667. http://www.nber.org/papers/w22667

Katz, Lawrence F., and Alan B. Krueger. 2019. Understanding Trends in Alternative Work Arrangements in the United States. NBER Working Paper No. 25425. https://www.nber.org/papers/w25425.pdf

Kochhar, Rakesh, and D'Vera Cohn. 2011. "Fighting poverty in a tough economy, Americans move in with their relatives." Pew Research Center report, October 3.

Koustas, Dmitri. 2018. Consumption Insurance and Multiple Jobs: Evidence from Rideshare Drivers. Working paper, October 31.

Lim, Katherine, Alicia Miller, Max Risch, and Eleanor Wilking. 2019. Independent Contractors in the U.S.: New Trends from 15 Years of Administrative Tax Data. IRS, Washington, DC. https://www.irs.gov/pub/irs-soi/19rpindcontractorinus.pdf.

Lin, Judy. 2019. "Who's in, who's out of AB 5?" *CalMatters*, September 11. https://calmatters.org/economy/2019/09/whos-in-whos-out-of-ab-5/ (accessed July 5, 2022).

National Academies of Sciences, Engineering, and Medicine. 2020. M*easuring Alternative Work Arrangements for Research and Policy*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25822.

National Employment Law Project. 2020. "Independent Contractor Misclassification Imposes Huge Costs on Workers and Federal and State Treasuries." National Employment Law Project. https://www.nelp.org/publication/independent-contractor-misclassification-imposes-huge-costs-workers-federal-state-treasuries-update-october-2020/.

OECD. 2011. *Divided we stand – why inequality keeps rising*. Paris.

Parrott, James, and Michael Reich. 2018. An Earnings Standard for New York City's App-based Drivers: Economic Analysis and Policy Assessment. NY: Center for New York City Affairs, The New School.

Ramnath, Shanthi, John B. Shoven, and Sita Nataraj Slavov. 2021. Pathways to retirement through self-employment. *Journal of Pension Economics & Finance* 20(2): 232-251.

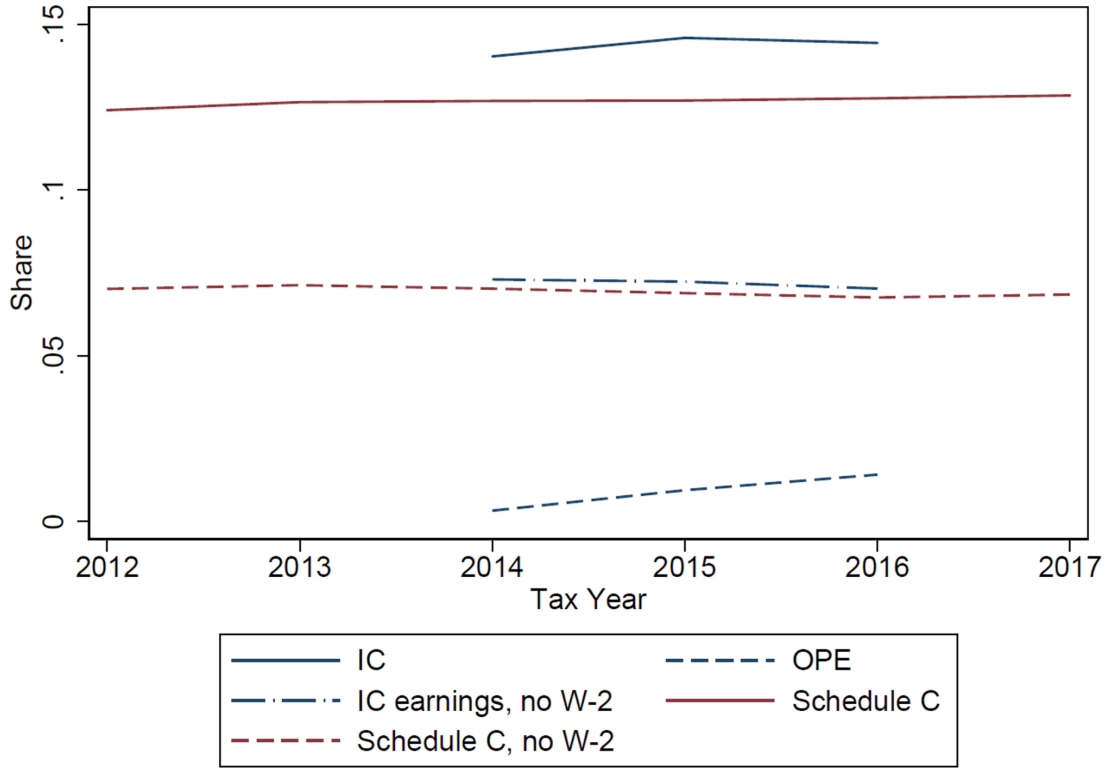
Reich, Michael and James Parrot. 2020. A Minimum Compensation Standard for Seattle TNC Drivers. Berkeley, CA: Center on Wage and Employment Dynamics, Institute for Research on Labor and Employment.

Saez, Emmanuel. 2010. Do Taxpayers Bunch at Kink Points? *American Economic Journal: Economic Policy 2*(3): 180-212.

US Census Bureau. 2021. "Business Formation Statistics, October 2021." October 2021. https://www.census.gov/econ/bfs/pdf/bfs_current.pdf.

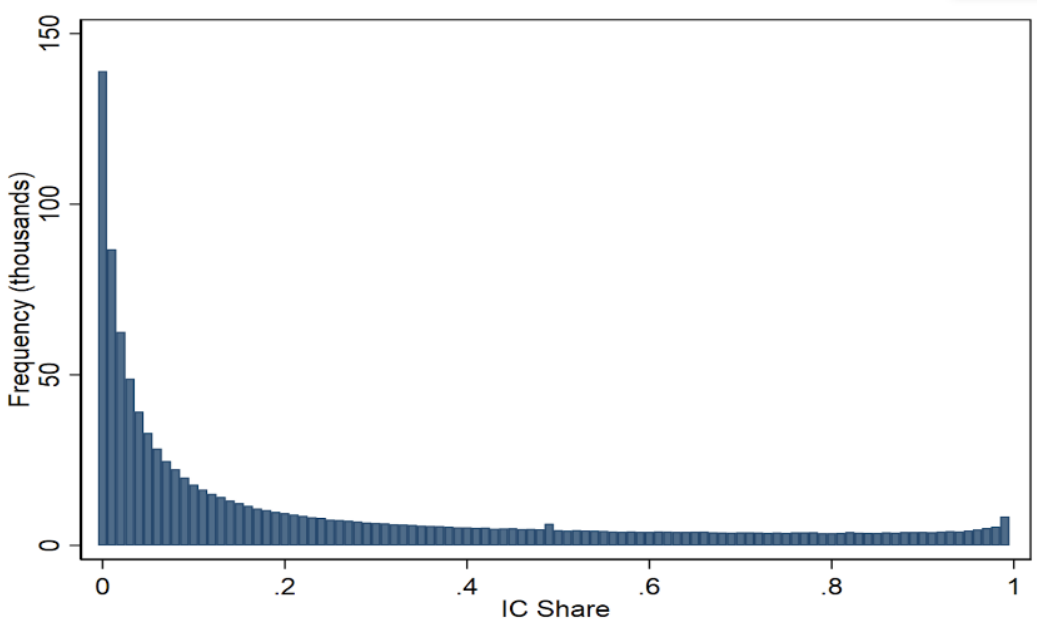
Wilmoth, Daniel. 2020. "Small Business Facts: Black Business Owners Hit Hard by Pandemic." US Small Business Administration Office of Advocacy. https://cdn.advocacy.sba.gov/wp-content/uploads/2020/08/31083212/Black-Business-Owners-Hit-Hard-By-Pandemic.pdf.

Figure 1. Share of workers with IC income, working-age e-filers, tax years 2012-2017



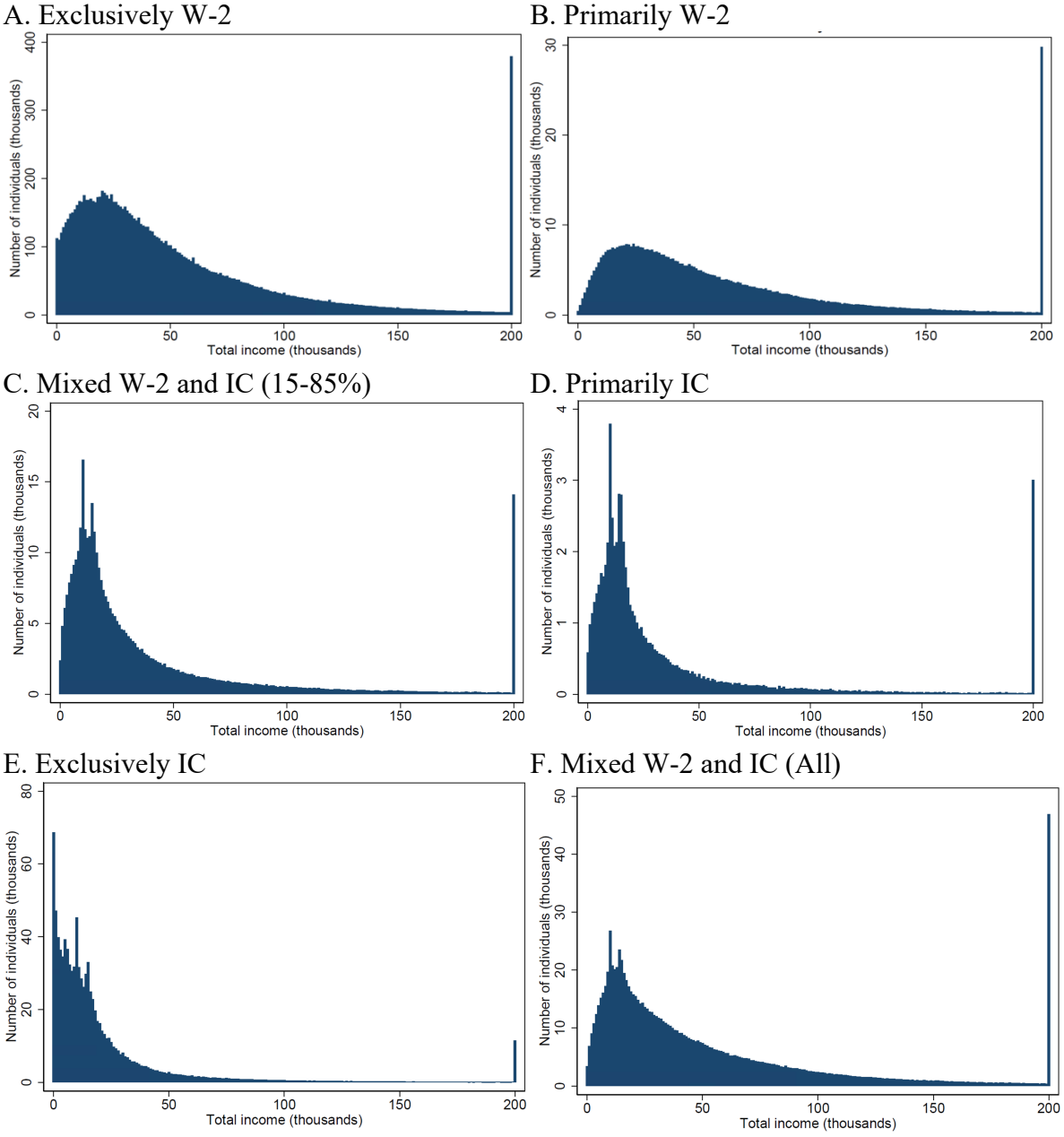
Notes: Sample is California resident e-filers, age 18-64, with earned income from W-2 and/or IC work. “Schedule C” series count individuals filing Schedule Cs with positive net profits. “IC” series uses our preferred definition (excluding Schedule Cs with labor expenses, including recipients of 1099s without Schedule Cs). "No W-2" series exclude individuals with W-2 earnings. “OPE” series includes only recipients of 1099s from identified OPE firms. 1099 forms are available only for 2014-2016, so corresponding series are missing outside that range.

Figure 2. Share of total earnings from IC work, working-age e-filers that mix W-2 and IC work, tax year 2016



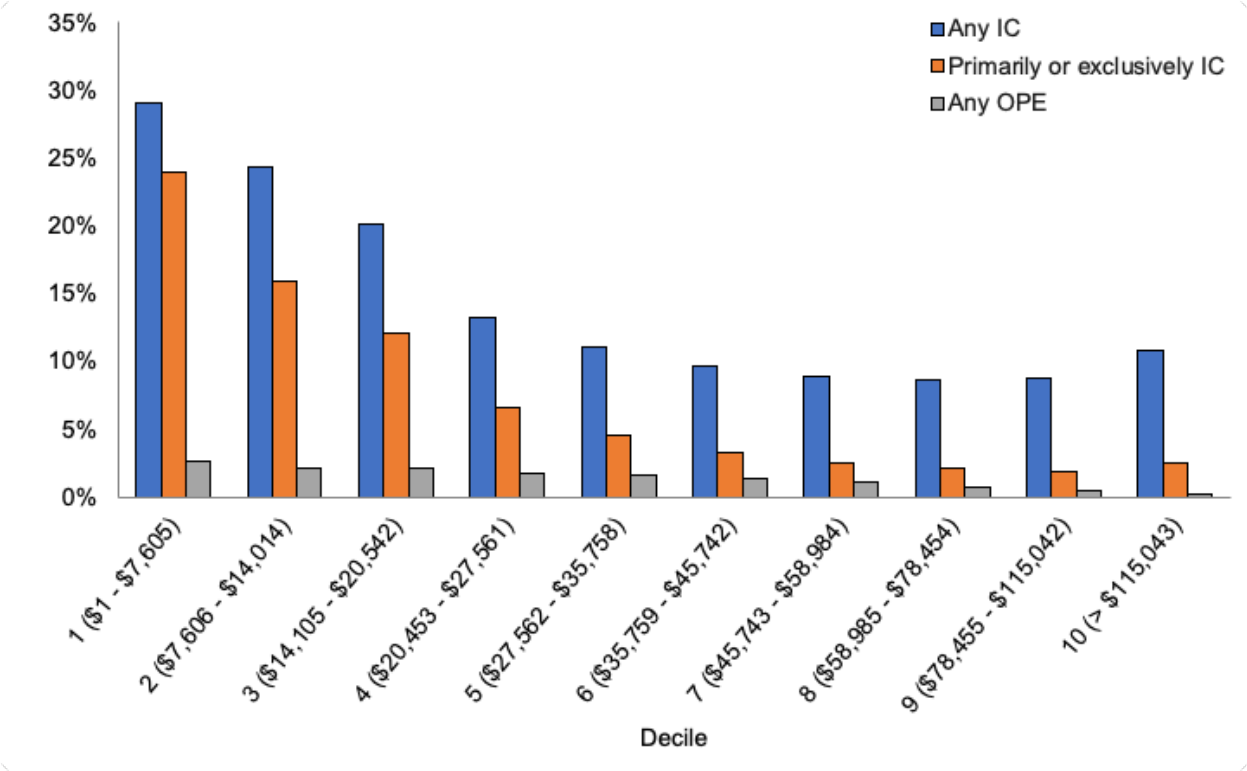
Notes: Sample is California resident e-filers, aged 18-64, with earned income from both W-2 and IC work. IC share is the share of IC plus W-2 earnings coming from IC.

Figure 3. Earnings distribution by earnings type, working-age e-filers, tax year 2016



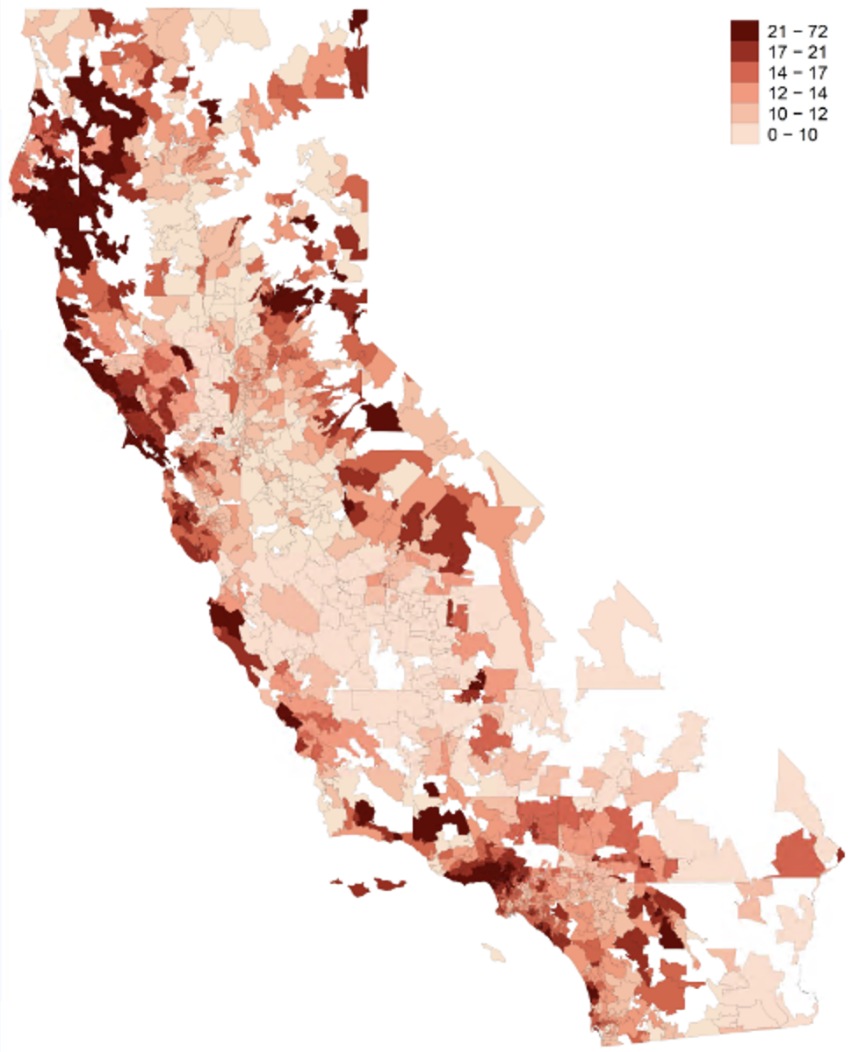
Notes: Sample is California resident e-filers, aged 18-64, with earned income. Each panel describes the distribution of total earnings in the indicated subgroup of workers. Subgroups displayed in panels A-E are mutually exclusive; panel F combines the subgroups from B, C, and D. Earnings are censored at $200,000.

Figure 4. Prevalence of IC earnings by decile of total earnings, working-age e-filers, tax year 2016



Notes: Sample is California resident e-filers, aged 18-64, with earned income. Workers are divided into deciles by total earned income. Figure shows the share of workers in each decile with the indicated form of income.

Figure 5. Fraction of workers with IC income by zip code, tax year 2016

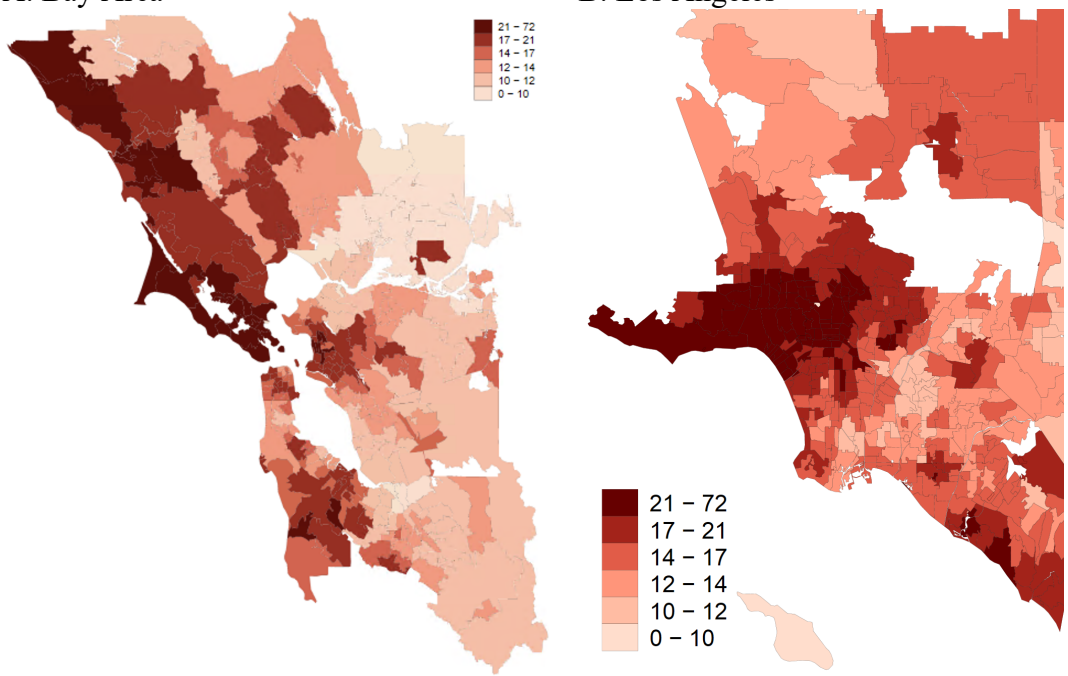


Notes: Map shows, in each zip code, the percentage of California resident e-filers, age 16-84, with positive IC earnings. Zip codes with fewer than 20 tax returns are excluded.

Figure 6. Fraction of workers with IC income by zip code, major metropolitan areas, tax year 2016

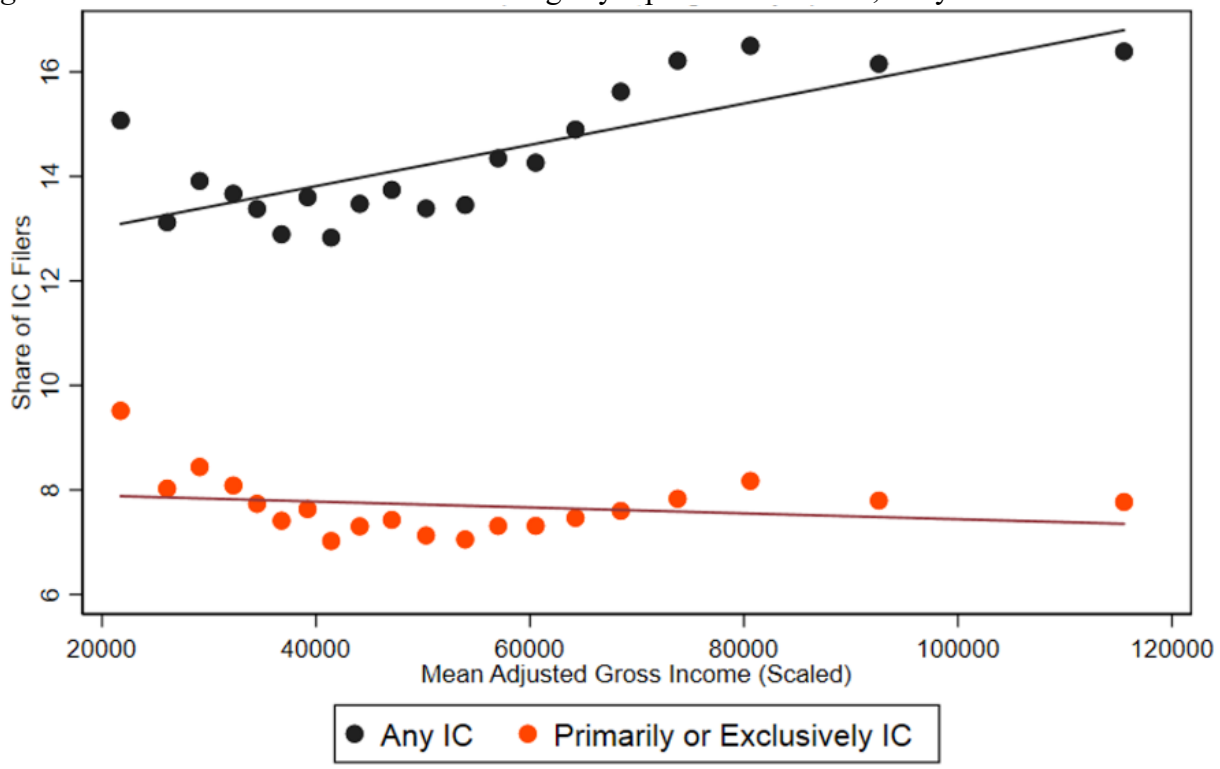
A. Bay Area

B. Los Angeles



Notes: See notes to Figure 5.

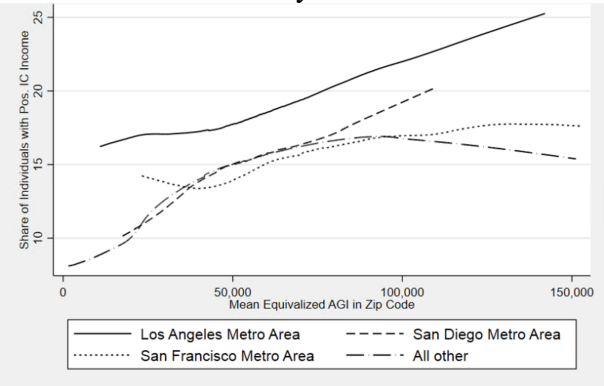
Figure 7. Fraction of workers with IC earnings by zip code mean AGI, tax year 2016



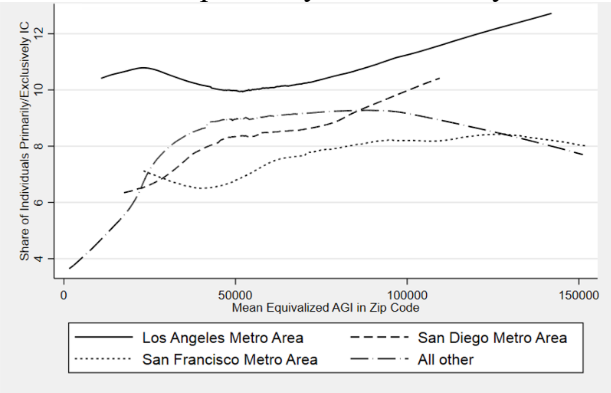
Notes: Figure plots, in each zip code bin, the percentage of California resident e-filers, age 16-84, with positive earnings who have IC earnings. Zip codes are weighted by the number of individuals in the sample, then divided into twenty bins based on mean AGI. AGI is equivalized by dividing by the square root of the number of people in the filing unit (taxpayer, spouse, and dependents).

Figure 8. Fraction of workers with IC income by metropolitan area and zip code mean AGI, tax year 2016

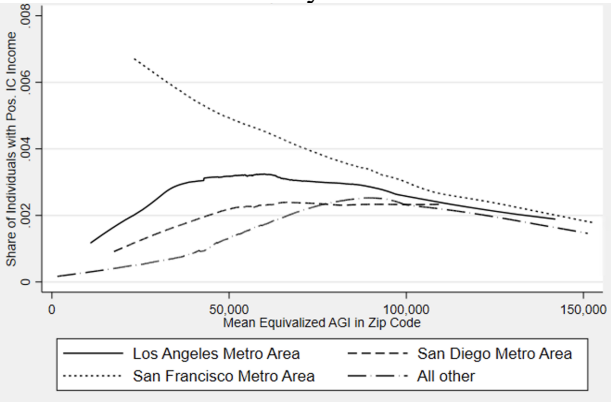
A. Percent with any IC income



B. Percent primarily or exclusively IC



C. Percent with only OPE income



Notes: Figures present lowess regressions of the relevant zip-code level dependent variable against the mean equivalized AGI in the zip code, separately for four regions of California. Dependent variables are the fraction with positive IC earnings (A), with more than 85% of earnings from IC work (B), or with exclusively OPE income (C), in each case out of all working-age California e-filers with positive total earnings.

Table 1. Summary statistics for e-filers and paper filers in working-age households, tax year 2016

	All filers	E-Filers (87%)	Paper filers (13%)	E-Filers reweighted to match paper filers	E-filers reweighted to match all filers
Number of filing units (1,000s)	14,111	12,335	1,776		
Age					
Mean	39.8	39.6	41.5	41.4	39.8
SD	13.5	13.4	14.0	5.3	14.4
Federal AGI					
Mean	70,048	70,976	63,335	63,670	70,095
SD	180,857	178,885	194,389	66,035	190,730
Family Status					
Single	47.3	46.8	51.2	51.1	47.3
Married	36.4	36.7	34.3	34.4	36.4
Head of Household	16.3	16.5	14.5	14.5	16.3
MSA					
Los Angeles	42.8	43.0	41.7	41.6	42.8
San Francisco	14.7	14.4	16.1	16.0	14.7
San Diego	8.3	8.4	7.8	7.7	8.3
Rest of state	34.2	34.2	34.4	34.4	34.2
Types of earnings					
Traditional employment					
Any wage earnings on 540	89.6	90.2	84.8	87.7	89.9
Any W-2 forms*	--	87.6	--	85.4	87.3
Independent contracting					
Schedule C	19.5	19.9	16.5	20.2	20.0
Schedule C with positive net profits*	--	15.5	--	15.8	15.5
1099	7.7	7.7	7.8	7.6	7.7
Any OPE 1099	1.8	1.9	1.6	1.8	1.9

Notes: Universe is California resident tax filers in tax year 2016 with at least one working age (18-64) member. All statistics are at the filing unit level; age is that of the head if between 18 and 64, and otherwise that of the spouse. Asterisks indicate measures observed only for e-filers; these are set to missing for populations including paper filers.

Table 2. Presence of different indicators of IC income, working age e-filers, tax year 2016

	Total	Schedule C			No Schedule C
		With labor or contractor expenses	No labor expenses		
			Negative/zero net earnings	Positive net earnings	
Total	100%	1.5%	3.2%	**10.8%**	84.5%
1099s					
None	95.0	1.5	3.2	**7.1**	83.2
1099-MISC	**4.3**	0.4	0.7	**3.3**	**1.0**
1099-K	**1.1**	0.0	0.2	**0.7**	**0.4**
Both	**0.4**	0.0	0.1	**0.4**	**0.0**
Either	**5.0**	0.4	0.8	**3.7**	**1.3**

Notes: Sample is California resident e-filers, age 18-64. All entries are percentages of the full sample; cells are not mutually exclusive. Those with Schedule Cs are separated by whether they report labor or contractor expenses and, for those that don't, by whether reported Schedule C expenses exceed adjusted gross receipts (defined as the maximum of Schedule C gross receipts and total 1099 earnings). Bold cells are included in our IC worker definition.

Table 3. Comparison of California tax year 2016 estimates to Collins et al. (2019)

	Collins et al. (2019) estimates for California (tax year 2016)	Our estimates (tax year 2016)		
		Full population	E-filers	
			Using full-population definitions	Using preferred definitions
Panel A: Individuals				
N (1,000s)	--	22,500	19,547	19,547
N with positive earnings (1,000s)	18,744	19,693	17,249	17,171
Among those with positive earnings, share with:				
Linked W-2s or Reported Wages	89.9%	*93.5%*	93.8%	94.4%
Schedule SE / Schedule C	15.1%	*17.4%*	16.9%	12.9%
1099	14.2%	6.2%	6.2%	6.2%
Any IC	20.5%	*18.9%*	18.3%	15.2%
IC Only	10.1%	*6.5%*	6.2%	5.6%
OPE 1099	1.8%	1.4%	1.4%	1.4%
Panel B: Filing units				
N (1,000s)		16,535	14,330	14,330
N with positive earnings (1,000s)		14,693	12,864	12,797
Among those with positive earnings, share with:				
Linked W-2s or Reported Wages		92.1%	92.2%	92.9%
Schedule SE / Schedule C		21.1%	21.4%	16.5%
1099		8.1%	8.0%	8.1%
Any IC		22.9%	23.0%	19.4%
IC Only		7.9%	7.8%	7.1%
OPE 1099		1.8%	1.8%	1.8%

Notes: Column 1 is from Collins et al. (2019), Table A1. Full population definitions (columns 2 and 3) use reported wages from California Form 540 and include all Schedule Cs, including those with negative or zero net profits. IC income in these columns corresponds to the presence of a Schedule C or any linked 1099. Both members of a married couple are assumed to have any form of earnings that appears on the return. Entries affected by this are italicized. Preferred definitions (column 4) use our preferred definitions, as discussed in the text, and tie all income to the specific individual receiving it; here, earnings from work only count schedule Cs with positive net profits.

Table 4: Prevalence of W-2 and IC work, working-age e-filers, tax year 2016

Earned income source	All filers		Filers with earned income		
			Total	No OPE	With OPE
	N (1,000s)	%	%	%	%
No earned income	2,698	16.2	--		
W-2 only	11,912	71.7	85.6	85.6	
W-2 and IC	1,032	6.2	7.4	6.3	1.1
IC only	979	5.9	7.0	6.7	0.3
Total	***16,621***	100.0	100.0	98.6	1.4

Notes: Sample is California resident e-filers, age 18-64, in tax year 2016.

Table 5. Sensitivity analysis on IC prevalence estimates, tax year 2016

IC definition	Ages 18-64		Ages 18-80	
	Baseline	**Include zero/negative profits & small businesses**	**Baseline**	**Include zero profits & small businesses**
Panel A: All e-filers				
No earned income	16.2%	15.2%	22.1%	21.0%
W-2 only	71.7	71.2	66.2	65.7
W-2 and IC	6.2	6.7	5.7	6.2
IC only	5.9	6.9	6.0	7.0
Panel B: E-filers with earned income				
W-2 only	85.6	83.9	84.9	83.2
W-2 and IC	7.4	7.9	7.4	7.9
IC only	7.0	8.1	7.7	8.9

Notes: Sample is California resident e-filers in tax year 2016. Column percentages sum to 100% within each panel and column.

Table 6. Proportion of earned income from W-2 work and IC work, working-age e-filers, 2016

Earned income source	N (1,000s)	Percent			IC workers, by presence of OPE income	
		Of all workers	Of workers with IC earnings	Of workers with W-2 & IC earnings	No OPE	With OPE
W-2 only	11,912	85.6%			--	--
Primarily (>=85%) W-2	581	4.2	28.9%	56.3%	3.4%	0.76%
Mixed earners (15-85% W-2)	383	2.8	19.1	37.1	2.5	0.28
Primarily (>=85%) IC	67	0.5	3.3	6.5	0.4	0.04
IC only	979	7.0	48.7		6.7	0.34
Total (age 18-64)	***13,923***	**100%**	**100%**	**100%**	**13.0%**	**1.42%**

Notes: Sample is California resident e-filers, age 18-64, with positive earned income in tax year 2016, and excludes individuals with zero earnings. Percentages in columns 5-6 are of all workers in column 1.

Table 7. Transitions between sources of income, working age e-filers, tax years 2015 and 2016

2015 status (row %)	2016 status: W-2 only	Primarily W-2 (>85%)	Mixed W-2 & IC	Primarily IC (>85%)	IC only	No earnings	Total (1,000s)
W-2 only	93%	3%	1%	0%	0%	3%	8,628
Primarily W-2	51	37	7	1	2	1	417
Mixed	34	13	34	4	13	3	265
Primarily IC	18	4	19	22	32	5	47
IC only	5	1	5	2	75	13	704
No earnings	10	0	0	0	4	85	1,957

Notes: Sample is California residents, age 18-64, who e-filed in 2015 and 2016. Entries show row percentages, with row counts in the final column. "IC only" workers have positive IC earnings but no W-2 income. Primarily IC, mixed earner, and primarily W-2 earners have both IC and W-2 earnings, with the proportion from W-2 <15%, 15-85%, or >85%, respectively. "No earnings" individuals have neither.

Table 8. Worker characteristics and IC work, working-age e-filers, tax year 2016

	Share with IC earnings				
	Any IC	**Any OPE**	**Primarily or exclusively W-2 (<15% IC)**	**Mixed (15-85% IC)**	**Primarily or exclusively IC (>85%)**
Age					
18-25	9.4%	1.8%	94.1%	2.9%	3.1%
26-40	14.4	4.0	90.4	3.0	6.6
41-55	16.5	2.2	87.8	2.7	9.5
56-64	17.7	0.6	86.0	2.5	11.5
Filing status					
Head of household	14.0	1.7	89.6	3.2	7.2
Married	15.5	1.5	88.8	2.5	8.7
Single	14.0	1.1	90.4	3.0	6.6
Region (MSA)					
Los Angeles	16.9	1.7	87.7	3.2	9.1
San Francisco	15.1	2.1	89.9	2.1	8.0
San Diego	15.1	1.6	91.4	2.3	6.4
Rest of state	15.1	0.8	90.4	2.6	7.0
Family income (equivalized AGI) quartile					
1st	24.8	2.6	78.0	5.0	17.0
2nd	12.4	1.7	91.8	2.4	5.8
3rd	10.7	1.0	94.1	1.8	4.1
4th	11.0	0.4	94.2	2.0	3.8
Individual earnings quartile					
1st	26.5	2.4	76.0	4.8	19.2
2nd	13.6	1.8	90.5	2.9	6.6
3rd	9.3	1.2	95.5	1.7	2.8
4th	9.6	0.4	96.0	1.8	2.1
Zip code mean family income (equivalized AGI) quartile					
1st	13.9	1.4	89.2	2.7	8.1
2nd	13.8	1.5	90.1	2.6	7.4
3rd	14.3	1.4	90.2	2.7	7.2
4th	16.8	1.4	88.6	3.3	8.0

Notes: Sample is California resident e-filers in tax year 2016, aged 18-64, with positive earned income. Percentages are row percentages. Columns 3-5 are mutually exclusive and add to 100%, but columns 1-2 overlap with them and with each other. Adjusted gross incomes (AGIs) are equivalized by dividing by the square root of the size of the filing unit**.**

Table 9. Industry distribution of W-2 work and IC work, working-age e-filers, tax year 2016

	QCEW	FTB data				
	Jobs	W-2 workers	Independent contractors, by IC earnings share			OPE workers
Industry (NAICS code)			Any IC income	IC share < 15%	IC share > 85%	
11: Agriculture, Forestry, Fishing and Hunting	2.5%	1.4%	0.4%	0.3%	0.5%	0.0%
21: Mining Quarrying, and Oil and Gas Extraction	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%
22: Utilities	0.6%	0.5%	0.1%	0.1%	0.0%	0.0%
23: Construction	4.7%	2.9%	6.1%	2.4%	8.7%	0.5%
31-33: Manufacturing	7.7%	7.6%	1.0%	1.1%	1.0%	0.1%
42: Wholesale Trade	4.3%	4.3%	1.8%	2.1%	1.8%	0.3%
44-45: Retail Trade	10.0%	9.2%	4.9%	4.7%	5.4%	0.9%
48-49: Transportation and Warehousing	3.7%	3.0%	9.9%	10.3%	9.7%	41.7%
485: Transit and Ground Passenger Transport	0.5%	0.4%	5.3%	7.7%	3.9%	36.2%
51: Information	3.2%	2.6%	2.8%	4.4%	1.6%	7.1%
52: Finance and Insurance	3.3%	3.4%	2.4%	2.3%	2.2%	0.8%
53: Real Estate and Rental and Leasing	1.7%	1.5%	4.9%	2.9%	6.2%	0.7%
54: Professional, Scientific, and Technical Services	7.3%	7.4%	14.2%	15.5%	12.8%	2.1%
55: Management of Companies and Enterprises	1.3%	0.3%	0.0%	0.0%	0.0%	0.0%
56: Administrative and Support and Waste Mgmt. and Remediation Svcs.	6.5%	6.0%	7.6%	4.2%	9.7%	1.2%
61: Educational Services	8.4%	6.3%	3.2%	6.2%	1.6%	0.5%
62: Health Care and Social Assistance	14.2%	9.3%	8.0%	6.4%	8.0%	0.8%
71: Arts, Entertainment, and Recreation	2.1%	1.4%	5.0%	6.6%	3.7%	1.0%
72: Accomodation and Food Services	9.6%	6.0%	1.3%	1.2%	1.4%	0.6%
81: Other Services (except Public Administration)	3.1%	3.4%	15.8%	8.4%	20.7%	4.5%
811: Repair and Maintenance	0.9%	0.8%	2.9%	1.1%	4.2%	0.4%
812: Personal and Laundry Services	1.0%	0.9%	12.0%	5.7%	15.9%	4.0%
92: Public Administration	4.9%	5.6%	0.3%	0.5%	0.2%	0.0%

99: Unclassified	0.6%	0.0%	0.1%	0.1%	0.1%	0.1%
Unmatched EINs		17.7%	10.1%	20.1%	4.6%	37.0%

Notes: Sample is California resident e-filers in tax year 2016, aged 18-64, with positive earned income in a given income category. Percentages are column percentages; entries for 2-digit NAICS codes sum to 100. Where 3-digit NAICS codes are listed, these are included in the relevant 2-digit total as well. Column 2 assigns workers to the NAICS industry for their highest-earnings W-2; workers with missing EINs are excluded. Columns 3-6 assign workers based on (a) the Schedule C industry, if valid, and (b) the employer issuing their largest 1099, if not. Column 6 limits to workers with positive OPE income.

Appendix A. Additional results

We present several additional results in this appendix.

Table A-1 explores the role of paper filers in the overall independent contractor share. As discussed in the main text, we reweight the e-filer sample for which we have full data to match the observable characteristics of the entire population, inclusive of paper filers, and compute the IC share in the reweighted sample.[1] This has little impact on our estimates of IC prevalence.

Table A-2 presents the distribution of individuals across different employment types through three tax years, 2014, 2015, and 2016. Of interest here is the degree to which people observed mixing W-2 and IC income in a particular year are actually just in the process of transitioning from one sector to the other. We see some evidence for this: Of those who have only IC earnings in 2014 and have both IC and W-2 earnings in 2015, fully 40% have only W-2 earnings in 2016. This is a small group, however. The group that has only W-2 earnings in 2014 and both types of earnings in 2015 is more than five times as large, and we see very few people in this group transitioning to IC only in 2016.

Table A-3 presents the distribution of workers across earnings deciles, corresponding to Figure 4 of the paper.

Table A-4 shows mean W-2 and Schedule C earnings by type of worker. Schedule C earnings are relatively similar for mixed, primarily IC, and IC only workers, but lower for

[1] We use a logistic regression to predict paper filing. Explanatory variables are number of dependents, filing status indicators, metropolitan area indicators (for Los Angeles, San Diego, and San Francisco), fraction of filers in the zip code who paper file, and flexible functions of age and AGI, all interacted with marital status. We generate a predicted probability, p, for each observation in the e-filer subsample. We reweight e-filers by p/(1-p) to match the paper filers and by 1/(1-p) to match the all-filer population.

primarily W-2 workers. By contrast, mixed workers have much lower W-2 earnings than do W-2 only or primarily W-2 workers.

Table A-5 shows the earnings-weighted distribution of workers across categories, analogous to Table 6. We do not use individual earnings for this, due to complexities in FTB and IRS rules regarding the use of individual-level 1099 earnings data. Rather, we assign each worker to the midpoint of their corresponding decile from Appendix Table A-3, and weight by that. This substantially reduces the IC only share of the workforce.

Table A-6 compares Schedule C filings that do and do not contain wage or contract labor expenses. Recall that we use the presence of these expenses as a proxy for a small business rather than an independent contractor, and we exclude Schedule Cs containing such expenses. The table shows that these Schedule Cs have much higher gross receipts and total expenses than the ones that we include, consistent with them representing small businesses.

Table A-7 further compares the two groups of Schedule Cs, showing the most common industries on each. While there is some overlap – Professional, Scientific, and Technical Services is the most common industry of each type of Schedule C – there are also differences. Schedule Cs with labor expenses are more likely to be in the Specialty Trade Contractors and Ambulatory Health Care Services industries.

Table A-1. Proportion of earned income from W-2 and/or IC, working-age e-filers, tax year 2016

	E-filers			E-filers reweighted to match full population		
Earned income source	**%**	**IC workers, by presence of OPE income**		**%**	**IC workers, by presence of OPE income**	
		No OPE	**With OPE**		**No OPE**	**With OPE**
W2 only	85.6%	--	--	85.5%	--	--
Primarily (>=85%) W2	4.2	3.4%	0.76%	4.1	3.4%	0.75%
Mixed earners (15-85% W2)	2.8	2.5	0.28	2.8	2.5	0.28
Primarily (>=85%) IC	0.5	0.4	0.04	0.5	0.4	0.04
IC only	7.0	6.7	0.34	7.1	6.8	0.35
Total (age 18-64)	**100%**	**13.0%**	**1.42%**	**100%**	**13.1%**	**1.42%**

Notes: Sample excludes individuals with zero earnings.

Table A-2. Three-year transitions across earnings types, working age e-filers appearing in each of tax years 2014, 2015, and 2016

2014 status	2015 status	N (1,000s)	% of total	2016 status (row percentages)			
				No earnings	W2 only	Mixed	IC only
No earnings	No earnings	1,636	13.6%	89%	7%	0%	3%
No earnings	W2 only	201	1.7	19	76	4	1
No earnings	Mixed	16	0.1	8	49	30	13
No earnings	IC only	95	0.8	32	6	6	55
W2 only	No earnings	224	1.9	68	26	2	4
W2 only	W2 only	8,116	67.5	2	94	3	0
W2 only	Mixed	329	2.7	2	53	37	7
W2 only	IC only	39	0.3	17	18	17	49
Mixed	No earnings	13	0.1	52	22	7	19
Mixed	W2 only	275	2.3	2	81	15	2
Mixed	Mixed	326	2.7	1	32	60	6
Mixed	IC only	55	0.5	9	9	19	63
IC only	No earnings	84	0.7	64	8	2	25
IC only	W2 only	36	0.3	7	76	12	5
IC only	Mixed	57	0.5	3	40	38	19
IC only	IC only	515	4.3	10	3	6	81

Notes: "Mixed" status here counts anyone with positive W-2 and positive IC income. Only individuals observed filing in all three years are included.

Table A-3. Distribution across earning type, by total earnings decile, working age e-filers, tax year 2016.

	Share with IC earnings				
	Any IC	Any OPE	Primarily or exclusively W-2	Mixed	Primarily or exclusively IC income
Decile					
1 ($1 - $7,605)	29.0%	2.6%	72.4%	3.7%	23.9%
2 ($7,606 - $14,014)	24.3	2.2	78.6	5.5	15.9
3 ($14,105 - $20,542)	20.1	2.1	83.4	4.5	12.1
4 ($20,453 - $27,561)	13.3	1.8	90.6	2.8	6.5
5 ($27,562 - $35,758)	11.1	1.6	93.2	2.3	4.6
6 ($35,759 - $45,742)	9.6	1.4	94.9	1.8	3.3
7 ($45,743 - $58,984)	8.9	1.1	95.9	1.6	2.5
8 ($58,985 - $78,454)	8.6	0.8	96.5	1.5	2.1
9 ($78,455 - $115,042)	8.7	0.5	96.7	1.5	1.8
10 (> $115,043)	10.8	0.3	95.2	2.3	2.5

Notes: Percentages sum to 100 across columns 3-5. Columns 1 and 2 are not mutually exclusive.

Table A-4. Mean Schedule C and W-2 earnings by type of worker, working age e-filers, tax year 2016

Earned income source	Schedule C earnings	W-2 earnings
W-2 only	0	50,142
	(0)	(40,076)
Primarily W-2	2,157	56,740
	(2,516)	(41,503)
Mixed	6,951	23,720
	(3,072)	(31,559)
Primarily IC	8,756	2,976
	(2,077)	(9,634)
IC Only	7,528	0
	(3,203)	(0)

Notes: Cells report mean Schedule C earnings and W-2 earnings for workers in each category. IC earnings not included on a Schedule C are not included. Standard deviations in parentheses.

Table A-5. Earnings-weighted prevalence of W-2 and IC work, working age e-filers, tax year 2016

Earned income source	Earnings Weighted %
W-2 only	89.4
Primarily (>=85%) W-2	5.3
Mixed earners (15-85% W-2)	2.1
Primarily (>=85%) IC	0.3
IC only	2.8
Total	100.0

Notes: This table shows the distribution of workers across categories, weighting workers by (an approximation to) their total earnings. Specifically, we assign each worker to an earnings decile, as reported in Appendix Table A-3, and weight by the midpoint of that decile. For the top decile, we use $291,000 as the weight.

Table A-6. Comparing expenses of Schedule C filers with and without labor expenses

	Without Labor Expenses	With Labor Expenses
Net Profit	9,419	21,730
	(2,470)	(67,620)
Gross Receipts	28,346	113,162
	(44,907)	(80,685)
Contract Labor Expenses	0	15,630
	0	(86,365)
Wage Expenses	0	34,315
	0	(193,293)
Car and Truck Expenses	2,620	6,411
	(6,075)	(13,857)
Total Expenses	13,545	61,954
	(21,130)	(38,362)
Number of Schedule C Forms	1.06	1.12
	(0.28)	(0.39)
N (1,000s)	2,325	250

Notes: This table reports average Schedule C line items, summed across all Schedule Cs from the same filer, separately for those whose Schedule Cs do and do not include wage or contract labor expenses. The population consists of all Schedule C e-filers in tax year 2016.

Table A-7. Five most common three-digit NAICS codes for Schedule Cs with and without labor expenses

Three Digit NAICS		Frequency (1,000s)	Share of Schedule Cs in category
A. Schedule Cs without labor expenses			
Professional, Scientific, and Technical Services (541)		1,026	17.1%
Personal and Laundry Services (812)		799	13.3%
Administrative and Support Services (561)		467	7.8%
Performing Arts, Spectator Sports, and Related Industries (711)		389	6.5%
Real Estate (531)		388	6.5%
	Total	5,991	
B. Schedule Cs with labor expenses			
Professional, Scientific, and Technical Services (541)		131	16.9%
Personal and Laundry Services (812)		69	8.9%
Specialty Trade Contractors (238)		61	7.9%
Ambulatory Health Care Services (621)		53	6.8%
Administrative and Support Services (561)		50	6.5%
	Total	774	

Notes: This table reports the five most common three-digit NAICS industries among Schedule C e-filers in tax year 2016, separately for those with some type of labor or contract labor expense and those without such expenses. Percentages in column 2 are of the relevant group of Schedule Cs (without labor expenses in panel A, with in panel B).

Appendix B. Exploring whether bunching near the EITC kink reflects reporting or work responses

Many taxpayers who qualify for the EITC face incentives to report higher earnings, as these qualify them for more generous EITCs. This incentive only lasts until the point that the taxpayer reaches the maximum EITC eligibility, however, and Chetty et al. (2013) and Saez (2010) find that this leads to "bunching" of tax returns at the lowest reported income level that qualifies for this maximum EITC. This could reflect true labor supply responses, as workers work more up to the point that their EITCs are maximized and then stop. It could also reflect tax reporting behavior -- for example, workers might report more independent contracting income than they truly obtained in order to receive a higher EITC (which is large enough to more than offset the higher self employment taxes they would owe). Chetty et al. (2013) and Saez (2010) find that bunching is concentrated among filers with independent contracting income, supporting the hypothesis that it may reflect reporting rather than real responses. Garin, Jackson, and Koustas (2022) use a regression discontinuity strategy based on children born on either side of January 1st to measure the extent to which incentives drive the reporting of self-employment income, and find large effects, with strategic reporting accounting for as much as half of the measured growth in self-employment rates over time.

We present here several analyses aimed at understanding the scope of strategic income reporting, and the degree to which it influences the estimates in the main paper. We indeed find that people with IC income are disproportionately likely to have reported income close to the EITC kink, consistent with earlier work. However, we see the same disproportionate "bunching" near the EITC kink for those whose Schedule C gross revenues align with their 1099 information reports. This suggests that the bunching is not driven by people manufacturing fictional income. It

may reflect real work behavior, or simply under-reporting of IC expenses. Whatever the explanation for bunching, it does not importantly affect our main conclusions about either the prevalence of IC work or the income distribution of IC workers.

Figure B-1 shows the distribution of total reported income, separately for returns with Schedule Cs (Panel A) and without (Panel B). We scale income as a multiple of the smallest amount that would lead to a maximum federal EITC benefit for that household size. Thus, a value of 1 corresponds to a household with income exactly corresponding to the first EITC kink point. Panel A shows clear bunching around this point: There are about 50% more filers with incomes right at the kink than at levels just above or just below it. By contrast, Panel B shows no sign of bunching among those without Schedule Cs -- although the kink is close to the peak of the density, there are no more households right at the kink than one would expect from patterns nearby.

The EITC is more generous for families with more children. **Figure B-2** further divides the Schedule C filers into those without (panel A) and with (panel B) dependents. There is a small amount of bunching among those without dependents, but vastly more among those who would qualify for larger EITC credits.

Chetty et al. (2013) document substantial geographic variation in the rate of this type of overreporting. They report estimates of the bunching frequency at the 3-digit zip code group level. **Figure B-3** shows a scatterplot of the share of returns with IC income against Chetty et al.'s (2013) measure of bunching frequency. We see more IC work in high-bunching zip codes, consistent with the idea that a fraction of the IC work that we observe reflects misreporting, but the gradient is fairly shallow.

Although Chetty et al. (2013) find that this bunching sometimes reflects real work responses, the dramatic differences between Schedule C and non-Schedule C returns strongly suggest that much of the bunching in the former reflects income reporting. There are several potential types of misreporting that could contribute to this: Some taxpayers may report earnings from non-existent sources, may over-report earnings from sources from which they have true earnings, or may under-report (or reduce over-reporting of) expenses associated with IC work. Any of these may distort our estimates of the prevalence of independent contracting.

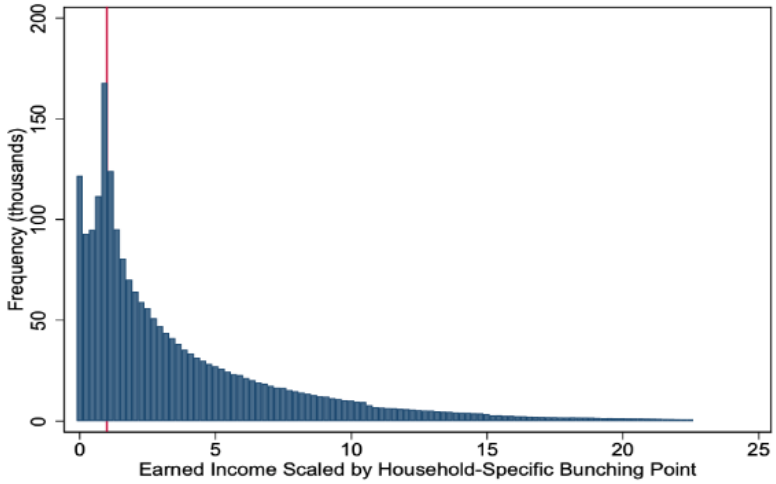
We take two approaches to assessing the impact of EITC-related misreporting on our estimates. First, we investigate whether it likely derives from over-reporting of IC earnings. Filers that over-report independent contracting income are unlikely to have third-party-reported 1099s to correspond to the full amount of their claimed income. In **Figure B-4**, we limit attention to Schedule C filers with dependents, and further separate them into those whose Schedule C gross revenues approximately match (to within 10%) the income that is reported on their 1099s and those for whom it does not match. Bunching is common in both groups, though more so in the latter group. We can be confident that the first group is not overreporting gross revenues, so the presence of bunching here indicates that this is not the entire explanation. Evidently, at least a portion of bunching derives either from actual work behavior or from underreporting of business expenses.

Our second approach is to assess the impact of EITC-related misreporting on our estimates, by down-weighting returns showing Schedule C income right near the EITC kink. We identify the excess density of Schedule C filers right near the EITC-maximizing threshold, and weight returns with Schedule Cs near this threshold by the ratio of the expected density (based on a polynomial fit to points away from the threshold) to the observed density. Downweighting

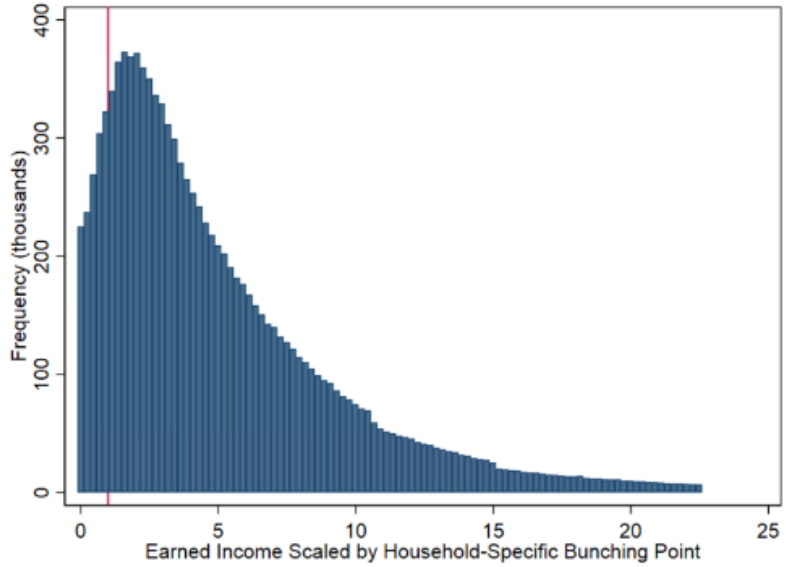
to eliminate bunching is an extreme approach, as it in effect assumes that the overreported returns would have had zero earnings without the overreporting. **Table B-1** reproduces the analysis from Table 6 with this adjustment. It has little effect on our overall conclusions – while overreporting is prevalent, it is not a large enough share of Schedule C returns to make much difference overall. **Table B-2** repeats the distributional analysis from Table A-3 with this reweighting.

Figure B-1. Distribution of earned income relative to household-specific EITC kink point, by presence of Schedule C, working age e-filers, tax year 2016

A: Tax units with Schedule Cs



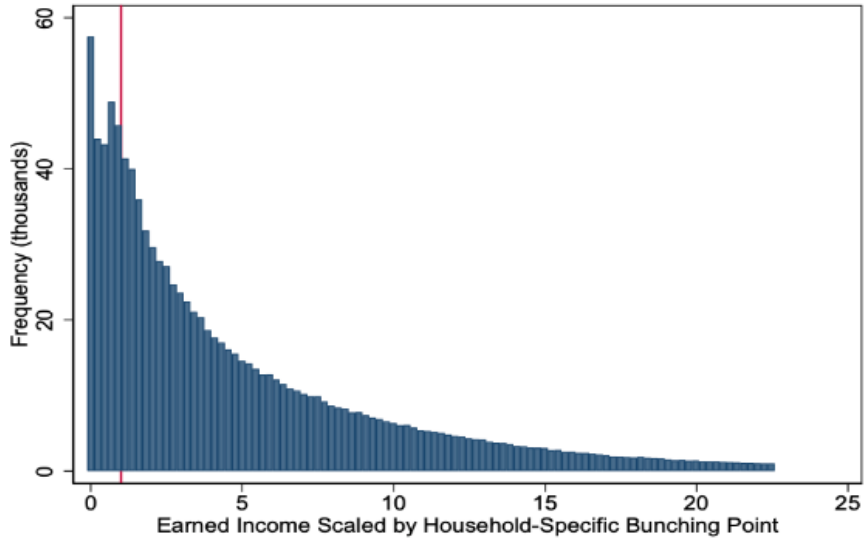
B: Tax units without Schedule Cs



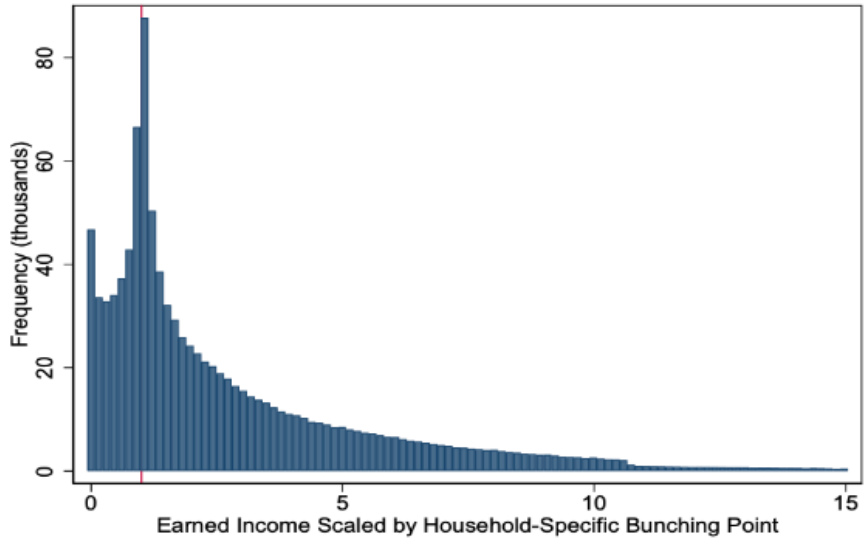
Notes: For each tax unit we use the tax unit size to identify the relevant federal EITC schedule. We then divide total earned income by the first kink point of that schedule, the minimum earnings at which the household would be eligible for the maximum EITC.

Figure B-2. Distribution of earned income relative to household-specific kink point among Schedule C filers, by presence of dependents, working age e-filers, tax year 2016

A: Tax units without dependents

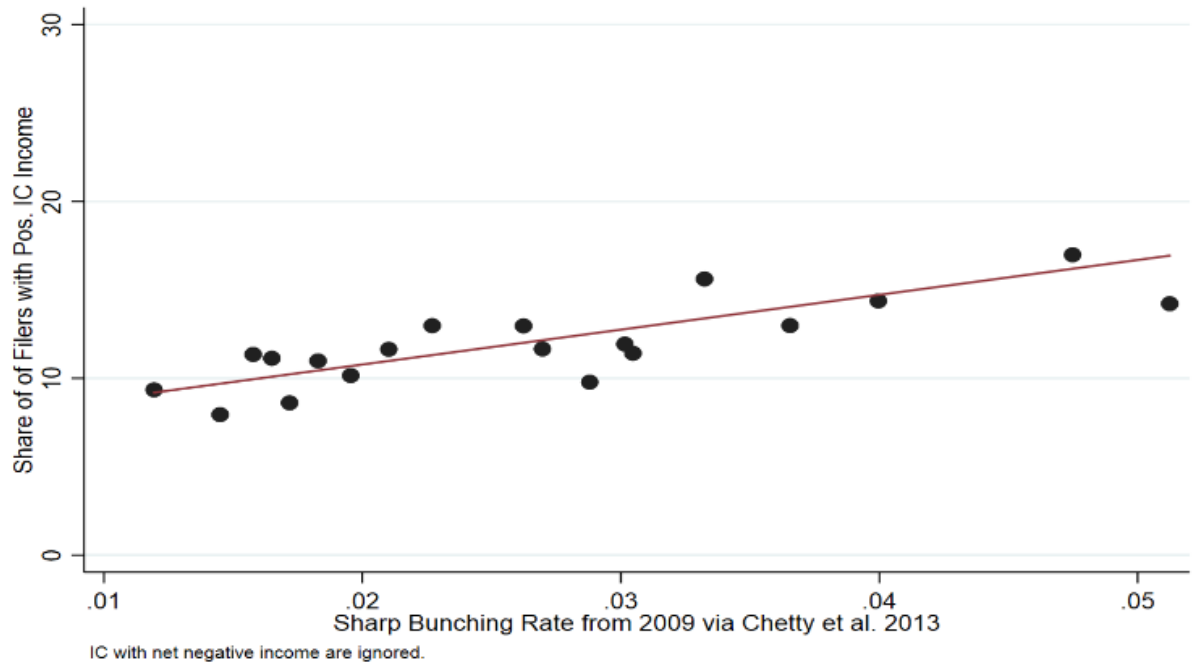


B: Tax units with dependents



Notes: See notes to Figure B-1.

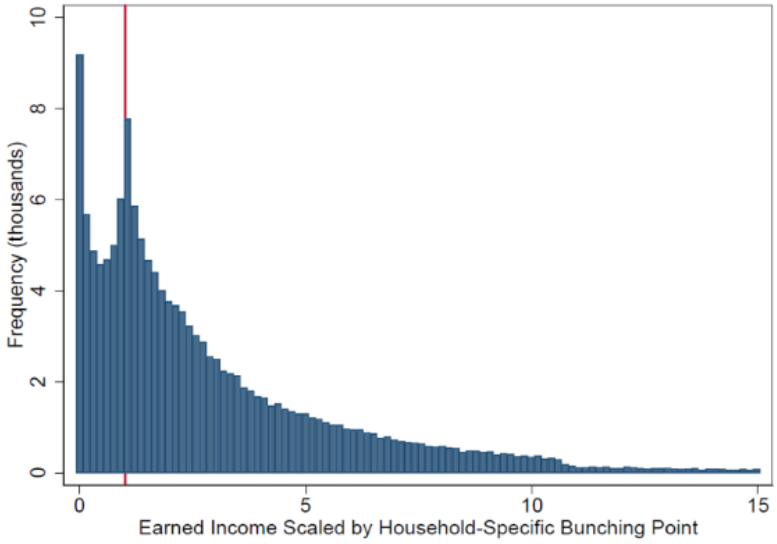
Figure B-3. Share of working age e-filers with positive IC income in tax year 2016, by Chetty et al. (2013) sharp bunching rate for 3-digit zip code area



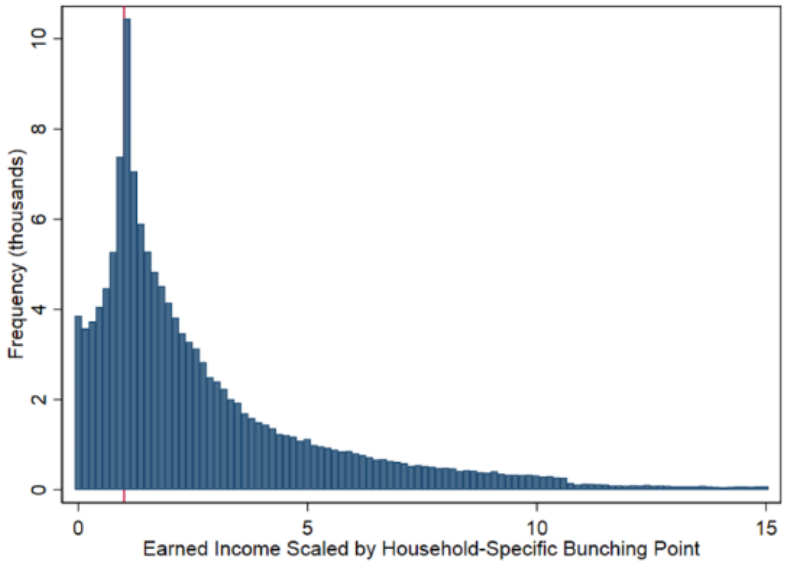
Notes: Each point represents an average for 5% of Zip-3 areas, selected based on the Chetty et al. (2013) sharp bunching rate. Vertical axis represents the share of tax units in the area that we classify as having positive IC earnings.

Figure B-4. Distribution of earned income relative to household-specific kink point among Schedule C filers with dependents, by ratio of total 1099 earnings to Schedule C gross receipts, working age e-filers, tax year 2016

A: Schedule C gross earnings within 10% of total 1099 compensation



B: Schedule C gross earnings not within 10% of total 1099 compensation



Notes: See notes to Figure B-1.

Table B-1. Proportion of earned income from W-2 and/or Schedule C, working-age e-filers, tax year 2016

Earned income source	E-filers		E-filers reweighted to remove bunching
	N	%	%
W-2 only	11,912	85.6%	86.0%
Primarily (>=85%) W-2	581	4.2	4.2
Mixed earners (15-85% W-2)	383	2.8	2.6
Primarily (>=85%) Schedule C	67	0.5	0.5
IC Only	979	7.0	6.7
Total (age 18-64)	***13,923***	**100.0%**	**100.0%**

*Notes: S*ample excludes individuals with zero earnings. Schedule Cs with zero or negative net profits are excluded. "Reweighted" column reweights returns with Schedule Cs and earnings near the EITC kink to eliminate the excess density there; see text for details.

Table B-2. Distribution across earnings deciles, by earnings type, after reweighting to remove bunching

	Distribution across deciles, by earnings type				Distribution across earnings types, by earnings decile		
	Prim. or excl. W-2	Any IC income	Prim. or excl. IC income	OPE wkrs	Any IC income	Prim. or excl. IC income	OPE wkrs
Decile							
1 ($1 - $7,605)	8.1%	20.2%	32.6%	18.3%	28.4%	23.4%	2.6%
2 ($7,606 - $14,014)	8.7	15.2	19.3	14.3	21.8	14.1	2.0
3 ($14,105 - $20,542)	9.3	13.4	15.5	14.4	18.9	11.2	2.0
4 ($20,453 - $27,561)	10.1	9.6	9.2	12.8	13.3	6.5	1.8
5 ($27,562 - $35,758)	10.4	8.0	6.4	11.8	11.1	4.6	1.6
6 ($35,759 - $45,742)	10.6	6.9	4.6	9.8	9.6	3.3	1.4
7 ($45,743 - $58,984)	10.7	6.4	3.5	8.0	8.9	2.5	1.1
8 ($58,985 - $78,454)	10.8	6.2	2.9	5.5	8.6	2.1	0.8
9 ($78,455 - $115,042	10.8	6.3	2.6	3.4	8.7	1.8	0.5
10 (> $115,043)	10.6	7.8	3.5	1.8	10.8	2.5	0.3

Note: Percentages sum to 100 within each of columns 1-4. Columns are not mutually exclusive. Columns 6-8 show row percentages.