THE US EMPLOYMENT SITUATION USING THE YALE LABOR SURVEY

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The US Employment Situation Using the Yale Labor Survey[1,2,3]

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Abstract

This study presents the design and results of a rapid-fire survey that collects labor market data for households in the United States. The Yale Labor Survey, or YLS, uses an online panel from YouGov to replicate the Current Population Survey (CPS), which is the source of the government's monthly household statistics. Questions in the YLS concern current and retrospective employment, hours, and income. Because the YLS draws upon an existing pool of potential respondents, it can generate responses inexpensively and quickly (within 24 hours). Moreover, the YLS can develop new questions in real time to study unusual patterns of work and unemployment during the pandemic. Results from the YLS track those from the CPS over the period of April through June of 2020, with relatively accurate estimates of employment but greater difficulty capturing unemployment. The major issue statistical issue dealt with in this paper is the sample weighting required to overcome the bias in using an online panel.

I. Introduction and Overview

This study presents the design and results of a rapid-fire survey that collects household labor market data for the United States. The Yale Labor Survey, or YLS, uses an online panel to replicate the Current Population Survey (CPS), one of the main government surveys that covers the labor market.[4] Like the CPS, the YLS asks a battery of questions concerning current and past employment, hours, and income. It is fielded using a large online panel of respondents maintained by YouGov, a survey firm specializing in online surveys. Because the YLS draws upon an existing panel of potential respondents, it can obtain responses inexpensively and quickly (within 24 hours). The YLS is also more flexible than the CPS. Although it models its major questions on related ones in the CPS, the YLS includes questions that relate to the unusual nature patterns of work and unemployment during the pandemic. It can also put new questions in the field quickly as labor market circumstances evolve.

The YLS began with some small pilot surveys during the week of March 29-April 4, 2020, and has been conducted regularly since then. This report covers 13 consecutive weeks, ending with the survey week of June 28-July 4. Three of those 13 weeks were also weeks when the CPS was conducted, so YLS results can be compared with CPS results for April, May, and June. The YLS comes closest to the CPS estimate of the *employment-to-population ratio,* as the YLS ratio is within 2 percentage points (ppts) of the CPS ratio for each of the three months. A comparison of YLS and CPS *unemployment rates* is complicated by recent difficulties that the CPS has encountered in characterizing joblessness during the pandemic. To facilitate an apples-to-apples comparison, we use CPS microdata to construct an unemployment measure that we call "U3-alt" and describe in detail below.[5] The YLS unemployment rate matches U3-alt more closely than it matches the official unemployment rate, but the YLS still exceeds U3-alt by 1 ppt on average for the three CPS survey months. Finally, the estimates of the labor force participation rate are 3 ppts too high for the survey months of April, May, and June.

The study has three principal purposes. The first is to determine *whether it is feasible* to provide rapid-turnaround estimates of the state of the national labor market. The second goal is to improve national economic policy and planning by *providing more timely estimates* of the state of the labor market. The third goal is to

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[4] The CPS is a joint product of the Bureau of the Census and the Bureau of Labor Statistics (BLS). It is the source of official monthly household labor market statistics, such as the unemployment rate, labor force participation rate, and employment-to-population ratio.
[5] "U3" is another name for the official unemployment rate. As we explain below, our U3-alt measure essentially replicates an unofficial measure that the BLS has constructed to account for recent measurement error in U3.

test the reliability of online panels, which are a relatively new platform for performing population surveys.

On the goal of feasibility, online surveys are promising because they can be conducted quickly and inexpensively. Online surveys draw from a specific group of people – those willing to take online surveys for modest compensation – so their samples are not representative of the US population. However, with careful selection and weighting of the observations, we can ensure that results from the YLS are as close as is feasible to those from a representative sample. Specifically, we apply survey weights to ensure that the YLS reflects not only the demographic makeup of the US population, but also that the YLS approximates the population's average level of labor force attachment.[6]

On the second goal, timeliness, there is a heightened need for timely economic data in a time of unprecedentedly rapid developments. Unfortunately, there is a significant lag time between when government surveys are conducted and when their results are published. A clear example of a publication lag occurred when the pandemic shock hit the US labor market in March. The monthly Employment Situation report, which draws both from the CPS and from a large survey of firms and establishments, covers labor market data over reference periods that include the 12th of each month.[7] Thus the reference week for the March CPS was March 8–14. The CPS was conducted during the following week, and the results were published on April 3. Because the March CPS covered the week of March 8-14, it did not show how badly the labor market had deteriorated during the last half of March. This deterioration was finally revealed by the April CPS, which was published in early May – almost six weeks after the major employment shock took place.

Other economic data, such as the gross domestic product report, have an even longer lag.[8] Data on initial claims for unemployment insurance are available in near-real-time, and these data did indicate a rapid and massive decline in the labor market as the pandemic took hold. But changes in laws and regulations for unemployment insurance under the CARES Act in 2020 meant that UI claims figures were only imperfectly correlated to the state of the labor market.

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[6] As explained below, questions in the YLS about respondents' labor market activities *before* the pandemic occurred (for example, their work behavior in February) help ensure that average labor market attachment in the YLS is close to that of the overall population.

[7] There is a slight difference in the timing of the CPS and the establishment survey (which is conducted by the BLS's Current Employment Statistics [CES] program). The CPS asks households about their labor market activities during the week that includes the 12th of the month. The CES asks firms and establishments about the workers on their payrolls during the pay period that includes the 12th of the month. Because some firms pay monthly, bi-weekly or under some other non-weekly schedule, the CPS and CES are not timed in exactly the same way.

[8] The second-quarter GDP report – where most of the economic fireworks will take place – will not be published by the Bureau of Economic Analysis until July 30.

The third aim of this study is to test the reliability of online panels for demographic and labor market information. As noted, an online panel is a set of individuals who have agreed to complete surveys through the internet. Panelists are recruited online and receive points or money for taking surveys. In the present context, the major advantages of online surveys are that they are inexpensive, that they can be run continuously, and that they can produce answers quickly – in a single day if the questions have already been coded into survey software. The specific procedures we use for the Yale Labor Survey are discussed in sections II and III.

Online surveys have become widely used in the last two decades, particularly in market research and election polling. However, they have seldom been used to measure labor-market activity or more complicated population characteristics. Moreover, particularly for demographic and economic surveys, there is sparse evidence on the reliability of online surveys as compared to phone, mail, in-person, and mixed formats. Because the YLS parallels the gold-standard CPS, we can gain such evidence by comparing results from the YLS to the CPS.

We believe that the first two goals of the study were met. The project developed and delivered estimates of the state of the national labor market. Additionally, the results were delivered in a timely fashion, within ten days of the survey week. On the third goal, reliability, the jury is still out and will have to sift through more evidence.

II. Brief description of methods

The next four sections describe the survey data, instrument, panel, and weighting. For those who would like to skip to the results, they begin with section V on p. 16.

A. Background on the CPS

The following is a description of the CPS, which is sponsored jointly by the Census Bureau and the Bureau of Labor Statistics (BLS). The Census Bureau administers the CPS using a probability-selected sample of about 60,000 occupied households.[9] Questions in the CPS concern labor market activities during the *reference week* that includes the 12th of the month. The fieldwork is typically conducted during the subsequent *survey week* that includes the 19th of the month.

The core CPS questions separate the adult civilian non-institutional population (POP) into three groups: employed (E), unemployed (U), and not in the labor force

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[9] The CPS is a survey of households and is often called the household survey. The other main government employment survey, conducted by the Current Employment Statistics (CES) program, gathers data from establishments. Monthly results from both the CPS and the CES are released on the same day, typically the first Friday of every month.

(NILF). These three groups are exhaustive and mutually exclusive, so POP = E + U + NILF. The labor force (LF) is defined as E + U. The paper will examine primarily three main labor force statistics: the employment-population ratio (E/POP), the unemployment rate (U/LF), and the labor force participation rate (LF/POP).

Measuring unemployment during the pandemic has been particularly challenging because the CPS was not designed with pandemic-induced lockdowns in mind. In particular, the CPS has incorrectly classified many unemployed persons as "employed, but temporarily absent from work." Using microdata from the CPS, and following a method suggested in recent BLS publications, we create an alternative unemployment measure, *U3-alt,* to correct for the misclassification. This corrected unemployment rate is conceptually similar to the unemployment rate generated by the YLS. A description of the methods is contained in Appendix C.

The CPS uses a complex design involving both stratification and multistage selection of housing units. CPS initial contacts are in-person with some recontacts by phone. Historically, the CPS response rate has been around 90%, but with a declining trend recently. The average response rate for the 12 months ending in February 2020 was 83%. However, the response rate declined to 73% in March 2020 and to 65% in June 2020 (US Bureau of Labor Statistics, 2020). It is not clear whether the weightings undertaken by the BLS-Census have adequately dealt with the massive non-response issues in recent months.

B. The Yale Labor Survey panel

A brief description of the YLS is as follows. The survey is designed to capture the major employment aspects of the CPS and to illuminate unusual aspects of the labor market stemming from the COVID-19 pandemic that shook labor markets beginning in March 2020.

YLS questions used to define labor market status are similar but not identical to those in the CPS, as explained below. To better understand special features of the pandemic labor market, the YLS also includes several COVID-related questions. Examples include questions asking whether respondents worked at their normal workplaces or at home, whether they were paid by their employers even though they did not work, and whether they have applied for or are receiving unemployment insurance. We also ask standard questions about recent hours of work, incomes, and when respondents held their last jobs.

YLS is administered by YouGov, a UK-based market research and survey firm.[10] After two pilot tests, the survey was conducted in three to five times per week in waves of 1000 – 2000 respondents for up to 5000 respondents per week. This report discusses 39 waves with a total of 43,000 respondents covering 13 weeks.

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[10] The study was conducted through YouGov, of which Rivers is Chief Scientist.

C. The YouGov panel

The present section provides a brief overview of the YouGov panel and YLS methods, with additional detail provided in the next section. In contrast to the CPS, the YouGov panel is an opt-in sample, and all interviews are conducted online. These features ensure rapid turnaround and low cost, but they also risk imparting selection bias to the resulting sample. Consequently, the YLS relies upon adjustments that correct for differences between panel participants and the US population. These adjustments are based on statistical models and are therefore difficult to test.[11] As noted, one motivation for this study is to determine whether the results from a fast, inexpensive survey can provide useful insights before and between waves of expensive, slower, gold-standard surveys like CPS.

There are two critical elements for obtaining representative estimates from the YouGov panel. The first is the procedure that selects YouGov panel members for inclusion in a YLS sample. The YouGov panel itself is clearly not representative of the population on some characteristics (such as age, race, education, and even employment status). But a more-representative sample can be pulled from the YouGov panel through the application of appropriate sampling procedures. For the YLS survey, the sample was chosen to be representative of adults in terms of age, gender, education, and race using quota sampling. Specifically, the sampling frame includes 96 strata, or cells, and respondents were selected from each cell approximately in proportion to the frequency of that cell in the February 2020 CPS. This month was chosen because the economy and the labor market were relatively stable, so we could match users to population data.

The second critical element needed to make YLS results representative is the construction and application of sample weights. Although quota-based sampling is intended to generate a sample that is broadly representative of the target population, in practice it can rarely generate a sample that exactly matches multiple population targets simultaneously. A "raking" procedure is therefore used to construct weights that align the YLS sample across six demographic characteristics (age, gender, education, race, marital status, and the presence of children) as well as a labor market variable next described.[12]

This labor market variable is needed because people who agree to participate in the YouGov panel may not be representative of the US population in terms of their labor market attachment, and this problem is not solved by weights generated

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[11] Note the last two of these demographic characteristics, marital status and the presence of children, are not used in the quota-based sampling step.

[12] See the next section for details of the raking procedure. The six demographic variables included in this procedure are either collected in the survey, are in the respondent's YouGov user profile, or both.

solely from demographic data. Sample weights in the YLS therefore incorporate a seventh factor that pertains to respondents' labor market status in February 2020 (FLMS). Information on this seventh factor, FLMS, comes from one of two sources:

- Labor market data provided by the respondent in the October 2019–February 2020 period, collected by YouGov as part of its data collection on its panel participants, or
- A recall question in the YLS that asked respondents about February 2020 labor market status and additional questions about current status.[13]

Because the match between the recall questions and previous market status is imperfect (either conceptually or in response), we recognize that FLMS may have significant measurement error. However, this particular error will result in incorrect weights, not in incorrect current estimates of a respondent's labor market status for the week covered by the YLS.

The validity of estimates after selecting the sample and applying weights depends upon certain model-based assumptions; in particular, it assumes that selection is on observables. In other words, survey variables (such as June employment) are assumed to be conditionally independent of sample inclusion given the variables used for selection and weighting. Further, the weighting procedure also places restrictions upon higher-order interactions among the weighting variables. These are strong assumptions and almost certainly do not hold exactly. In ideal circumstances, however, it is usually possible to find a set of variables that make the sample selection mechanism "missing at random" given these variables.

III. Detailed Description of the Panel and Statistical Methods

This section provides additional detail on the source and selection of respondents for the study, how the sample was weighted, the calculation of standard errors, and assumptions needed for valid inferences.

A. Source of respondents

Respondents were drawn from YouGov's opt-in online research panel. YouGov's panel is similar to other "access panels" that are commonly used for market research and public opinion polling (Sudman and Wansink, 2002). YouGov recruits participants using internet-advertising campaigns (primarily Google Adwords, Facebook, and banner ads on popular websites, but also using co-registration,

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[13] Respondents were asked, "During the first two weeks of February 2020, did you do any work for pay or profit?" Those responding "Yes" were deemed employed in February 2020. Those responding "No" or "Not sure" by those currently employed were classified as unemployed in February 2020. Those who responded "No" and not currently employed were allocated their current situation, with categories being one of employed, unemployed, retired, disabled, student, homemaker, and other.

visitors to YouGov's home page, and referrals from existing panelists). After confirming their email addresses ("double opt-in"), the individuals provided personal and demographic information to become registered panelists. There is no well-defined sampling frame or established probabilities of selection for panelists. The panel is simply a pool of respondents available for conducting individual research studies. People who join online panels exhibit biases that are similar to those who answer random telephone surveys (for example, they are older, more likely to be white, and have more schooling). Unlike phone surveys, however, online panelists are approximately balanced on gender.

The issue of selection bias has become increasingly severe for both government and private surveys in recent years. We noted above that the May CPS had a response rate of only 65% in June 2020, which is below the US government's statistical standard. Pew estimates that response rates in telephone surveys declined from 36% in 1997 to 6% in 2018. (Pew Research Center 2019)

Additionally, over time it has become increasingly difficult to reach target audiences. Most random-digit-dial phone surveys conducted today do not use random selection to choose respondents within a household. To reduce the number of women and older respondents in the sample, either explicit quotas or other procedures are employed to reduce selection bias. For example, the interviewer might first ask, "Out of all the people age 18 or older who are at home now, may I please speak to the youngest male?" If no male lives in the household, the interviewer might then ask, "May I speak to the youngest female?"

The major point here is that an accurate representation of the population can no longer assume that the responding sample has an equal probability of selection for all members of the target population. Rather, surveys must use procedures to weight individuals in the sample, and therein lies the modern art of survey research.

B. Selection of panelists for this study

Samples for individual studies, like this one, are selected from the YouGov panelist pool that contains the target population (in this case, the US population 18 or older). The size of YouGov's panel is much larger than the sample size needed for any individual study, but the company is conducting many studies simultaneously. At the time of this project, there were 454,493 active panelists in the United States. [14] YouGov uses quota sampling to select respondents from the panel for receiving invitations and an allocation algorithm to assign responding panelists for particular studies, which we describe now.

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[14] An active panelist is defined as having completed a survey in the last six months and responding to at least one of the past ten surveys to which they were invited.

Panelists were allocated to 96 quota cells, based upon the cross-classification of their age (18-29, 30-44, 45-64, or 65+), gender (male or female), education (high school or less, some college, college degree, post-graduate degree), and race (white, black, or Hispanic).[15] For each cell, a target number of respondents was selected that is proportional to the number of adults in the February 2020 CPS. For each panelist, a probability of response is estimated based upon past rates of participation and demographics. Panelists in each quota cell are randomly selected for being sent invitations until the expected number of responses in each cell equals the target number. The invitations do not describe the subject of the study, nor do they guarantee that the panelist will be assigned to any particular study.

Panelists who click on links in their email invitations are routed to one of the available studies according to an algorithm until the target number for the survey is reached, or until the field period (24 hours) ends. The algorithm assigns a value to each panelist for each study that the respondent qualifies for. The value is based upon the number of additional respondents needed to fill the respondent's quota cell, divided by the length of time remaining for fielding the survey. (Each wave of this study was fielded over a 24-hour period.)

As compensation for participating in this study, panelists receive points which can be converted to cash after a minimum threshold has been reached. For this study, each respondent was awarded the equivalent of $0.50 in points. The median time to complete the survey was 10 minutes.

C. Weighting

Respondents were selected from YouGov's panel to join the study to be representative of all US adults in terms of four demographic variables (age, gender, education, and race). Due to non-response, the realized sample does not match the population targets exactly. In any event, we would like to adjust the sample for a larger set of variables, including February labor market status (FLMS). In all, we used seven weighting variables: the four demographic variables used in the quota-based sampling (age, gender, education and race) along with marital status, presence of children, and FLMS.

The purpose of weighting in this context is to adjust the sample to better represent the target population. Each respondent is assigned a positive weight, so that the counts from the weighted sample match control totals from a census or other reliable estimate. The assumption is that by applying the same weights for

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[15] YouGov includes "Hispanic" as an answer option for the question "What best describes your race?" The Current Population survey asks separate questions about the respondents' race and origin. In the CPS, we have grouped whites of Hispanic origin as Hispanic and blacks of Hispanic origin with Blacks. Whites include any non-Hispanics who are not black, including those identifying as Native American, Asian, Middle Eastern, and mixed race.

computing means and proportions of other sample variables, this procedure will correct for differences in the characteristics between the sample and the target populations.

In the simplest case, both the sample and population can be partitioned into a set of mutually exclusive and exhaustive categories according to some characteristic. For example, if it is known that 52% of adults are female, and 48% are male, while the sample is 60% female, weighting women by 52/60 and men by 48/40 will adjust the sample proportions to match the population proportions for gender.

The general principle is to weight sample observations by the ratio of the population and sample proportions in each category. This ensures that the weighted sample proportions in each category will agree with the corresponding population proportions, and we say that the sample has been "balanced" or "calibrated" on this characteristic. Cell weighting works well so long as the sample fractions in each category are not too small. For example, if a particular age-race-education-gender category has zero people in the sample, it is not possible to use a (finite) multiplicative weighting to attain the population proportion.

The problem of zero-member cells limits the number of demographic characteristics that can be included in a quota-based sampling procedure. For example, consider a survey that must be balanced along multiple demographic characteristics (e.g., age/education/race/region/gender). A naive approach would be to form a cross-classification using all characteristics, and then do cell weighting using the full cross-classification. This high-dimensional plan fails in practice because the number of cells in a cross-classification grows quickly with the number of dimensions. For example, if there are four age categories (18-29, 30-44, 45-64, 65+), four education categories (high school or less, some college, college graduates, and post-graduates), three race categories (white, black, Hispanic), four regions, and two genders, the cross-classification contains $4 \times 4 \times 3 \times 4 \times 2 = 384$ cells. If any of these cells are empty in the sample, then it is impossible to set its weight as some positive number and match the corresponding share in the population. Even if there are at least one or two sample observations in every cell, the corrective weights can become large, making the resulting sample estimates unstable.

Therefore, for the YLS, we use quota-based sampling using only four categories (gender, race, education, age). We then construct sample weights that further refine the sample along those characteristics, and also incorporate marital status, the presence of children, and February employment status.

D. Raking in theory

The procedure used to create weights is "raking," which was proposed by Deming and Stephan (1942) to balance samples on multiple characteristics at

once. Raking requires only the marginal distributions of the control totals and can be computed quickly using the *iterative proportional fitting* (IPF) algorithm. We provide a brief description.

To fix ideas, first, consider cell weighting by a single covariate with K categories. The population proportion in category k is t_k and the the number of sample respondents in category k is n_k, where $n_1 + \cdots + n_K = n$. The proportion of sample respondents in category k is $s_k = n_k/n$, so the ratio of population to sample proportions is $w(k) = t_k/s_k$. If respondent i is in category $x_i = k$, then they are assigned weight $w_i = w(x_i) = t_{x_i}/s_{x_i}$. It follows that

$$\sum_{i=1}^{n} w_i = \sum_{k=1}^{K} n_k\, w(k) = n \sum_{k=1}^{K} t_k = n$$

and the weighted proportion of sample observations in category k is

$$\hat{t}_k = \frac{\sum_{i=1}^{n} w_i\, \mathbf{1}(x_i = k)}{\sum_{i=1}^{n} w_i} = \frac{n_k\, w(k)}{n} = t_k,$$

so the weights w_i do indeed adjust the sample margins to the control totals. Note that the function "$\mathbf{1}(x_i = k)$" is an indicator function which takes the value = 1 when $x_i = k$ and = 0 otherwise.

Raking extends this procedure to balance multiple variables to their control totals simultaneously. We seek a set of non-negative weights $w_i = w(x_{1i}, \ldots, x_{Ji})$ $(i = 1, \ldots, n)$ which sum to sample size and satisfy the *marginal constraints,*

$$\hat{t}_{jk} = \frac{\sum_{i=1}^{n} w_i\, \mathbf{1}(x_{ji} = k)}{\sum_{i=1}^{n} w_i} = t_{jk} \quad \text{for } j = 1, \ldots, J \text{ and } k = 1, \ldots, K_j$$

J of these constraints are redundant, since both the sample and population proportions sum to one. If the marginals t_{jk} are consistent and none of the sample marginals is zero when the corresponding population marginal is non-zero, there will be multiple solutions that satisfy the marginal constraints. Thus, we desire weights which are "close" to the unweighted sample while satisfying the marginal constraints. Different definitions of closeness lead to different solutions. Ireland and Kullback (1968) suggested that we choose weights to minimize the Kullback–Leibler (KL) divergence between the weighted and unweighted sample distributions,

$$\mathrm{KL}(\hat{p}^{w}, p) = \sum_{x_1, \ldots, x_J} \hat{p}^{w}(x_1, \ldots, x_J) \log \frac{\hat{p}^{w}(x_1, \ldots, x_J)}{p(x_1, \ldots, x_J)}$$

subject to the marginal constraints, where $\hat{p}^{w}(x_1, \ldots, x_J)$ and $p(x_1, \ldots, x_J)$ are the weighted and unweighted sample proportions in cell $(x_1, \ldots, x_J)$. A result from

information theory implies the existence of a unique minimizer obeying the marginal constraints that is of the form

$$p^*(x_1, \dots, x_J) = p(x_1, \dots, x_J) \prod_{j=1}^{J} \lambda_{j,x_j} = p(x_1, \dots, x_J) w^*(x_1, \dots, x_J),$$

where

$$w^*(x_1, \dots, x_J) = \prod_{j=1}^{J} \lambda_{j,x_j} = \frac{p^*(x_1, \dots, x_J)}{p(x_1, \dots, x_J)} \quad \text{for } j = 1, \dots, J \text{ and } x_j = 1, \dots, K_j$$

This shows that the effect of weighting by w^* is to balance the sample, since p^* satisfies the marginal constraints.

Iterative proportional fitting (IPF) is a simple iterative algorithm to calculate w^*. Initially, take each weight equal to one. Starting with the first marginal constraint, calculate the ratio $\lambda_{1k}^{(1)}$ of the control total t_{1k} to the weighted sample proportion for that margin (using the current weights). Adjust the weight by multiplying by the weights by $\lambda_{1k}^{(1)}$. This is referred to as *raking* the first sample margin; $\lambda_{j,x}^{(1)}$ is the multiplier which adjusts the first margin to its control total. Using the updated weight, rake the second sample margin to its control variable and cycle through the remaining margins to obtain a set of J raking factors $\lambda_{1,x_j}^{(1)}, \dots, \lambda_{J,x_J}^{(1)}$. Iterate this process until all of the raking factors $\lambda_{jk}^{(N)} \overset{N \to \infty}{\to} 1$. Ireland and Kullback show that the rate of convergence is geometric. The name "raking" derives from the picturesque analogy of raking sand first horizontally and then vertically and repeating until it is evenly distributed.

E. *Raking in the YLS*

Raking in the YLS used the seven variables discussed in the weighting section above. These included to begin with key demographic variables: Age, gender, race, education, marital status and presence of children. To these was added February labor market status, FLMS. Several cross-classifications were also used.

Weights were computed for each day's or week's sample. The weights are not exactly equal to the ratio of the population to sample proportion in each cell because we do not weight on all the cross-classifications. In fact, it is impossible using the raking algorithm to match all the cross-classifications with the daily samples because some cells in the full cross-classification are empty on particular days.

There are different methods for estimating the variance of sample means and proportions using raking weights. Little and Wu (1991, p. 90, eq. 19) provide an asymptotic variance formula under non-random selection. Unconditional variance estimates can be obtained by treating raking as a special case of calibration weighting. (Chang and Kott, 2008) Alternatively, Canty and Davison (1999) discuss bootstrapped variance estimates and confidence intervals, which is conceptually simpler if finite population corrections are not necessary.

G. Statistical Inference

The primary purpose of post-stratification weighting with opt-in samples is to reduce bias caused by self-selection and non-response. In principle, weighting can remove bias if panel selection and within-panel non-response are conditionally independent of the weighting variables. This is Rubin's "missing at random" condition. (Little and Rubin, 2019)

However, raking weights are based upon a parametric response model that assumes that the log ratio of population proportions to sample selection probabilities obey a main-effects model without interaction. (Little and Wu, 1991, p. 87, eq. 5) That is, the only interactions relevant for selection bias involve variables whose population joint distribution is known. Nonetheless, even if raking does not eliminate all selection bias, it seems to perform reasonably well in practice when selection bias is not severe and sample sizes not too small. (A rule of thumb is to have at least 30 observations per cell.)

IV. Basic definitions

A. Labor market definitions

Like the CPS, our survey divides the US adult civilian non-institutional population into three groups: employed (E), unemployed (U), and not-in-the-labor-force (NILF). Because of survey limitations, we have generally limited our analysis to the population 20 and over.[16] Figure 1, taken from a BLS description of employment and unemployment concepts, illustrates the sequential rules that the YLS survey also sought to follow.

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[16] Persons under 18 cannot participate in the YLS because protection of human subjects requires parental consent. Note that the population ages 16–19 years have extremely low labor force participation and extremely high unemployment, so there can be significant differences between the 16+ and the 20+ populations.
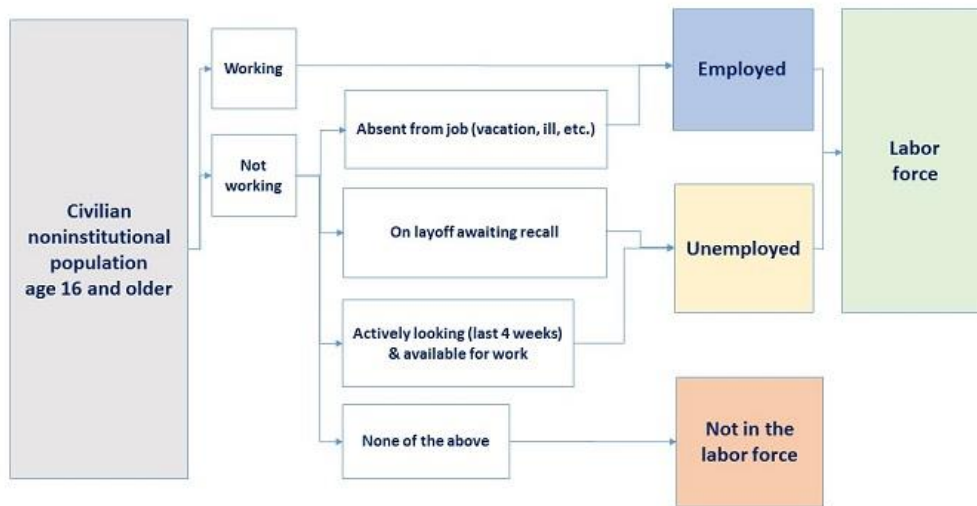
Figure 1. Labor Force Concepts in the Current Population Survey

(Source: BLS. Available at https://www.bls.gov/cps/definitions.htm)

- **Employed** persons worked for either pay or profit during the reference week. We added to this group respondents who answered that they received pay even though they did not work during the reference week (as explained in Appendix C).[17]
- **Unemployed** persons are those who did not work for pay but were on temporary layoff or actively looking for work. In the YLS survey, the unemployment pool is comprised of:
  - Respondents who actively searched for work in the last 4 weeks and were available for work within 7 days,
  - Respondents who were on layoff or furlough and expected to return to job.[18]
- Persons who are **not in the labor force (NILF)** are those who are neither employed nor unemployed.

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[18] Respondents could signal this expectation in two ways. One survey question asked non-working respondents about their present work situation, to which one possible answer was "laid off or furloughed from a job to which you expect to return." Respondents could also signal a job-recall expectation by answering yes to a separate question: "If you recently lost your job, have you been given any indication that you will be recalled to work within the next six months?"

B. Technical note on measuring employment

A central issue in assessing the CPS estimates in the pandemic concerns the potential misclassification of unemployed persons who did not work and did not get paid because they were displaced by the pandemic. The CPS questionnaire resulted in many such persons being misclassified as employed.

To be specific, the CPS first asks whether the respondent worked for pay during the survey week. The CPS then asks respondents who answer "no" to the initial work-for-pay question whether they "had a job" during the survey week, including a job from which they were temporarily absent. Many not-work-for-pay persons displaced by the pandemic answered "yes" to the second question, which resulted in them being classified as employed but absent from their jobs.

Because the YLS employment classification has a different structure, it is less susceptible to this classification error. The YLS first asks a work-for-pay question like the one in the CPS. It then follows up by asking all respondents to characterize their work situation. This "work-situation" question asks respondents if they worked in their usual place, if they worked at a different location, if they did not work but were still paid, or if none of these situations applied. Persons are classified as employed in the YLS if they answer yes to the initial work-for-pay question or if they indicate in the work-situation question that they either worked for pay or received pay. The YLS definition therefore avoids the ambiguity of whether someone who did not work and did not get paid should be counted as employed because they had a job from which they were temporarily absent.

In FAQs published with employment reports starting in March 2020, BLS suggested that one way to assess the degree of CPS classification error is to reclassify as unemployed those persons who are recorded as employed but absent from their jobs for "other reasons." These are reasons besides the usual ones (which include sickness, vacation, maternity/paternity leave, etc.). We follow this suggestion (with some minor differences) to create the CPS U3-alt rate. Because the constructed CPS U3-alt rate corrects for the CPS classification error, it provides an apples-to-apples comparison with the unemployment rate in the YLS, where the CPS classification error is much less likely to occur. For a further discussion, see Appendix C.

V. Results of the Survey

A. Overview

Table 1 provides a short summary of results for the three CPS survey weeks of March to June 2020. We have head-to-head comparisons for all but March. Our estimates are limited to the population aged 20 and over (see Appendix B).[19] We show both the standard U3 measure of unemployment and our preferred concept, U3-alt, which includes an adjustment for classification errors in the survey as described in the last section.

The major conclusion is that the YLS estimates closely parallels the labor market experience as described by the CPS. The estimates for employment are relatively accurate; those for unemployment tend to be slightly high; and consequently, the labor force participation rate is also higher than the CPS estimates.

Summary Statistics, 20 years and over (Not Seas Adj)

Labor Force Status	March 2020			April 2020			May 2020			June 2020		
	CPS	CPS-alt	YLS	CPS	CPS-alt	YLS	CPS	CPS-alt	YLS	CPS	CPS-alt	YLS
Fraction of population												
Employed	61.8	61.0	na	53.5	50.3	52.1	54.9	52.8	56.0	56.6	55.5	56.2
Unemployed	2.7	3.5	na	8.6	11.8	11.4	7.7	9.9	11.6	6.8	7.9	10.1
Not in Labor Force	35.5	35.5	na	37.9	37.9	36.5	37.3	37.3	32.5	36.6	36.6	33.7
Labor Market Status												
Unemployment Rate	4.2	5.5	na	13.9	19.0	17.9	12.4	15.8	17.1	10.7	12.5	15.3
Employment/Population	61.8	61.0	na	53.5	50.3	52.1	54.9	52.8	56.0	56.6	55.5	56.2
LF Participation Rate	64.5	64.5	na	62.1	62.1	63.5	62.7	62.7	67.5	63.4	63.4	66.3

Table 1. Basic results and comparison with CPS, March – June 2020

Figure 2 shows the weekly estimates of the unemployment rate for the YLS as the solid line, with the CPS-based estimates (the official U3 rate and our U3-alt rate) as the dashed lines. Table 2 shows the underlying data. The YLS unemployment rate tracks closely the U3-alt CPS rate, peaking in April and then declining by about 4 ppts through the latest survey week at the end of June.

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[19] Persons under 18 are excluded from the sample because the protection of human subjects requires parental consent to participate in a survey. Although persons aged 16 – 19 years have low labor force participation, they also have high unemployment rates, so there is a non-trivial difference between the 16+ unemployment rate and the 20+ unemployment rate. For the last two decades, the 16+ rate has been about ½ ppt higher than the 20+ rate, although this difference has trended lower since 2013.

The YLS unemployment rate is higher than the standard U3 unemployment rate. The explanation is that many workers were mistakenly classified as employed in the CPS, whereas they were correctly classified as unemployed in the YLS. The difference between U3 and U3-alt declined over the March – June period, and the ambiguity about the actual CPS unemployment rate similarly declined to about 1 ppt by June 2020.
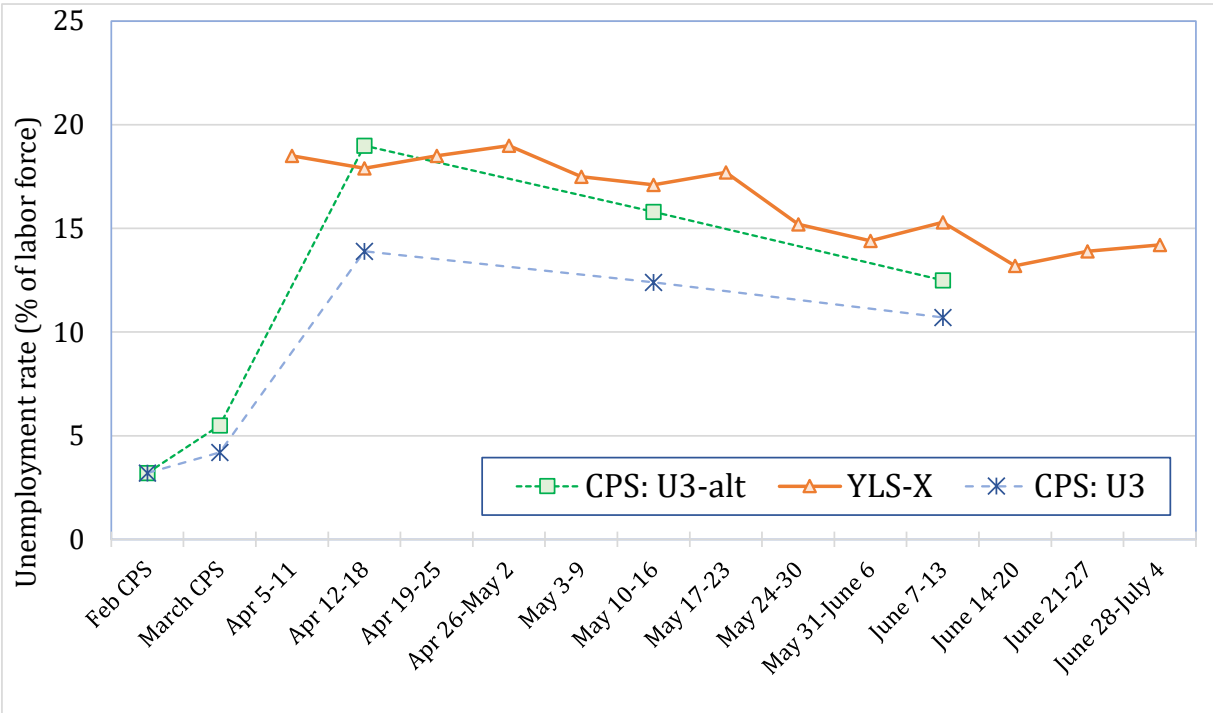
Figure 2. Unemployment rate according to CPS and YLS

YLS Labor Force Statistics by Reference Week, 20 years and over (Not Seas Adj)

	Apr 5-11	Apr 12-18	Apr 19-25	Apr 26-May 2	May 3-9	May 10-16	May 17-23	May 24-30	May 31-June 6	June 7-13	June 14-20	June 21-27	June 28-July 4
Labor Force Status	%	%	%	%	%	%	%	%	%	%	%	%	%
Fraction of population													
Employed	52.5	52.1	52.1	53.6	55.1	56.0	55.6	55.9	56.9	56.2	57.7	56.4	56.7
Unemployed	11.9	11.4	11.8	12.6	11.7	11.6	12.0	10.1	9.5	10.1	8.8	9.1	9.4
Not in Labor Force	35.6	36.5	36.1	33.8	33.2	32.5	32.4	34.0	33.6	33.7	33.6	34.5	33.9
Labor Market Status													
Unemployment Rate	18.5	17.9	18.5	19.0	17.5	17.1	17.7	15.2	14.4	15.3	13.2	13.9	14.2
Employment/Population	52.5	52.1	52.1	53.6	55.1	56.0	55.6	55.9	56.9	56.2	57.7	56.4	56.7
LF Participation Rate	64.4	63.5	63.9	66.2	66.8	67.5	67.6	66.0	66.4	66.3	66.4	65.5	66.1

Table 2. Results for weekly YLS labor market status

B. Unemployment rates for major groups

Next, we show the labor market status for different groups. Some summaries are shown in Figures 3 and 4. Tables 3 and 4 provide the numerical data. We concentrate on the comparison of the YLS and the CPS for April 2020, for which the YLS underestimated the CPS U3-alt unemployment rate.

Among demographic groups, the YLS tends to understate the unemployment rate for males, for young workers, for those with some college, and for married workers. For regions, it understates the unemployment rate for the Northeast and West relative to the South and Midwest. Occupations are poorly captured, perhaps because people are unsure of their occupations. (See the discussion on recall bias below.)

Among industries, the YLS accurately captures the change for the sector that is most severely impacted – leisure and hospitality – with an estimated unemployment rate of 54% as compared with the CPS estimate of 48% for the April CPS.
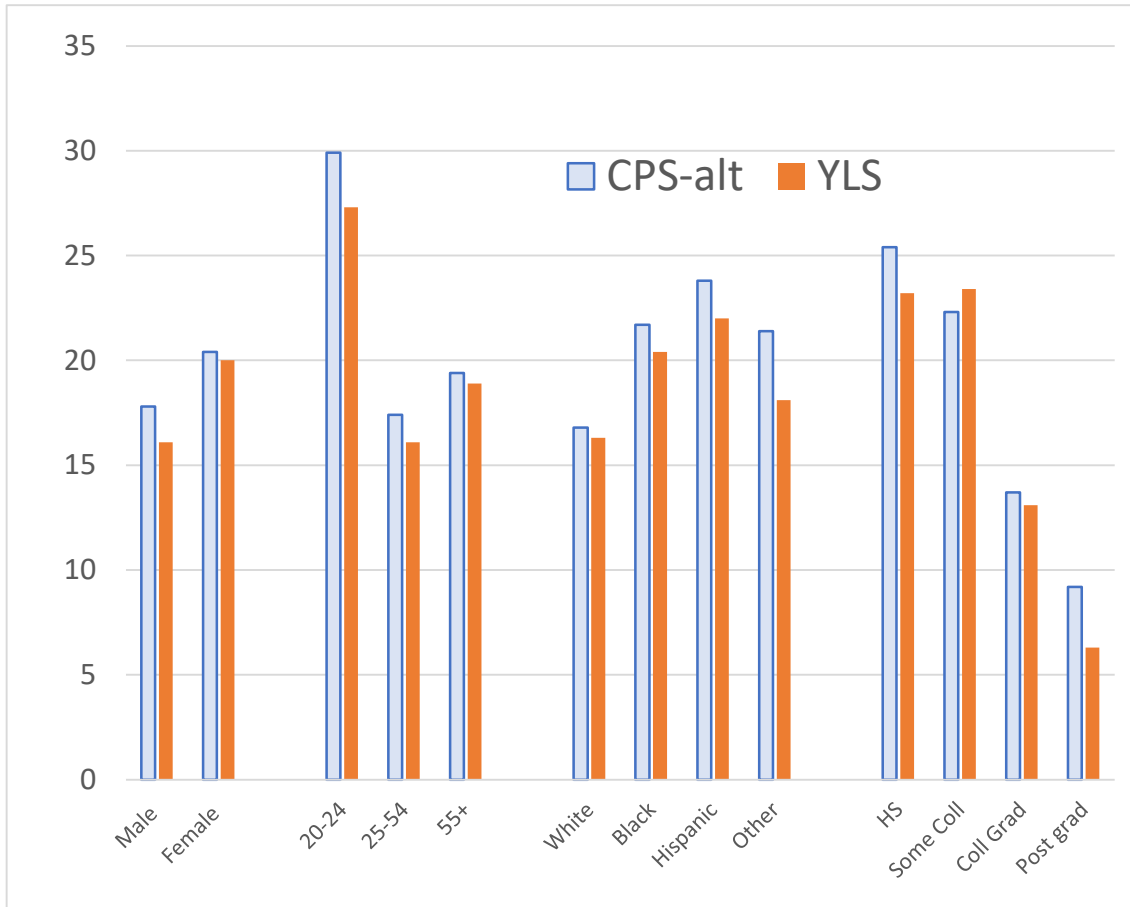
Figure 3. Unemployment rate by demographic group, April 2020, percent of labor force
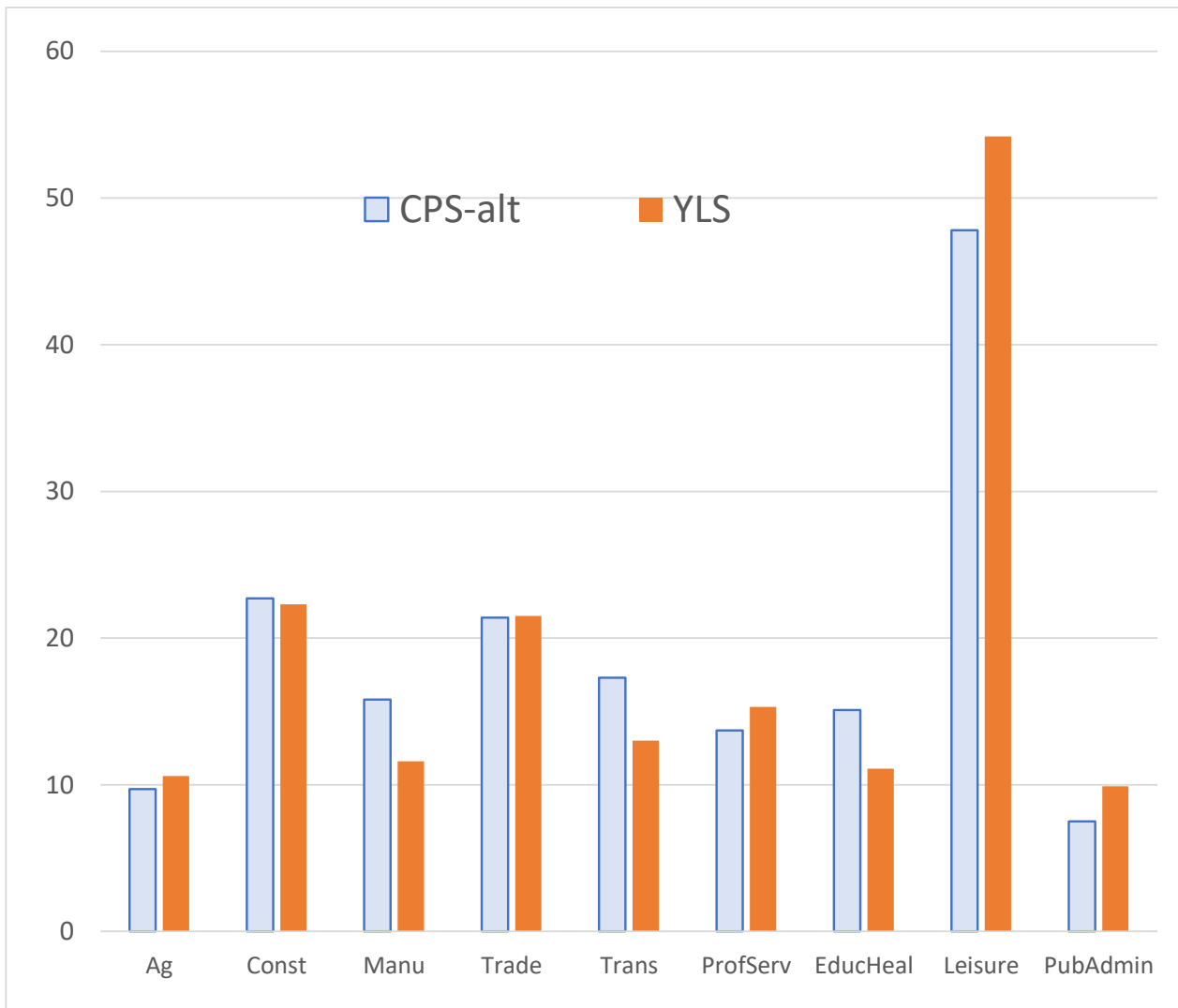
Figure 4. Unemployment rate by industry, April 2020

Key to industries: Ag = Agriculture, forestry, fishing, and hunting, Const = Construction, Manu = Manufacturing, Trade = Wholesale and retail trade, Trans = Transportation and utilities, ProfServ = Professional and business services, EducHeal = Educational and health services, Leisure = Leisure and hospitality, PubAdmin = Public administration.

Summary Statistics, 20 years and over (Not Seas Adj)

Labor Force Status	February 2020			March 2020			April 2020			May 2020			June 2020		
	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X
Gender															
Male	3.8	4.2	na	4.5	5.6	na	12.9	17.8	16.1	11.3	14.3	15.9	10.0	11.5	14.4
Female	3.1	3.5	na	3.9	5.4	na	15.1	20.4	20.0	13.6	17.5	18.4	11.5	13.6	16.3
Age Category															
20-24	6.7	6.8	na	8.6	9.9	na	25.0	29.9	27.3	23.2	26.6	27.1	20.1	21.3	24.1
25-54	3.3	3.6	na	3.9	5.0	na	12.6	17.4	16.1	11.2	14.3	14.7	9.7	11.4	13.4
55+	2.8	3.4	na	3.5	5.1	na	13.4	19.4	18.9	11.5	15.8	18.6	9.7	12.1	16.5
Race															
White	2.8	3.3	na	3.2	4.4	na	12.3	16.8	16.3	10.2	13.4	14.8	8.6	10.4	12.6
Black	5.7	6.0	na	6.3	7.5	na	16.0	21.7	20.4	15.9	19.6	20.1	14.8	16.6	13.1
Hispanic	4.4	4.6	na	5.8	7.7	na	17.8	23.8	22.0	16.4	19.7	22.5	13.8	15.2	24.5
Other	3.3	3.8	na	4.6	6.2	na	14.5	21.4	18.1	14.7	19.8	18.8	13.2	15.4	19.2
Education Level															
HS or below	5.3	5.6	na	6.2	7.6	na	18.9	25.4	23.2	16.6	20.4	22.1	13.4	15.2	20.3
Some college	3.5	3.9	na	4.4	5.7	na	16.4	22.3	23.4	14.8	18.9	20.4	12.2	14.2	16.8
College grad	2.4	2.7	na	2.6	3.9	na	10.0	13.7	13.1	8.9	11.9	12.7	9.0	10.8	11.6
Post grad	1.6	2.0	na	2.3	3.5	na	6.3	9.2	6.3	5.3	7.4	8.9	5.3	6.7	9.5
Marital status															
Married	2.3	2.7	na	2.8	4.1	na	11.0	16.0	12.6	9.5	12.9	12.3	8.0	9.9	11.8
Widowed	3.6	4.9	na	4.8	6.1	na	15.9	22.6	18.3	15.7	20.0	20.0	11.3	14.6	15.5
Divorced	3.8	4.2	na	4.5	5.7	na	13.9	19.4	22.0	11.8	15.3	21.3	10.0	12.3	17.1
Separated	6.7	6.9	na	9.0	10.7	na	19.4	26.3	19.1	16.8	21.0	15.8	14.2	16.1	13.3
Never Married	5.4	5.7	na	6.3	7.5	na	18.8	23.8	24.1	17.4	20.8	22.6	15.6	16.9	20.0

Table 3. Unemployment rates for YLS and CPS, different demographic groups, February – June CPS

Summary Statistics, 20 years and over (Not Seas Adj)

Labor Force Status	February 2020			March 2020			April 2020			May 2020			June 2020		
	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X	CPS	CPS-alt	YLS-X
Census Region															
Northeast	3.8	4.4	na	4.3	5.8	na	15.0	22.0	19.1	13.9	19.2	17.7	13.3	15.7	16.7
Midwest	3.3	3.6	na	3.9	5.0	na	14.5	18.3	17.8	12.4	14.7	16.9	10.1	11.6	14.2
South	3.3	3.5	na	3.9	5.1	na	12.2	17.2	17.6	10.9	14.0	18.0	9.0	10.7	14.6
West	3.8	4.3	na	4.9	6.4	na	15.2	20.3	17.7	13.5	17.0	15.5	11.8	13.6	15.8
Occupation															
Management, business, and financial	1.8	2.2	na	2.2	3.1	na	6.2	9.7	10.5	5.0	7.4	11.2	4.8	6.2	9.6
Professional and related occupations	1.8	2.2	na	2.6	4.1	na	8.6	12.1	10.8	7.6	10.5	11.9	7.4	9.6	11.1
Service occupations	4.3	4.7	na	5.8	7.7	na	26.2	35.2	28.3	23.0	29.1	23.6	18.5	21.0	22.5
Sales and related occupations	4.0	4.5	na	3.9	5.2	na	16.1	22.9	23.6	15.3	19.4	20.7	12.9	15.2	17.2
Office and administrative	3.1	3.3	na	3.5	4.3	na	12.4	16.5	14.6	11.3	14.0	15.9	10.3	11.2	10.4
Farming, fishing	13.9	14.5	na	10.5	11.1	na	12.6	16.8	12.9	8.3	10.6	8.6	7.7	8.4	3.0
Construction and extraction	6.7	7.0	na	8.1	10.1	na	19.1	26.9	23.6	15.1	19.4	15.9	11.4	13.4	15.9
Installation, maintenance, other	2.3	2.4	na	2.7	3.7	na	12.5	15.6	22.1	11.0	12.7	16.9	9.5	10.3	12.9
Production occupations	5.0	5.2	na	5.4	5.8	na	18.4	22.5	18.9	15.0	18.1	21.4	10.9	12.0	20.5
Transportation and other	5.3	5.7	na	6.9	8.2	na	17.9	23.6	14.5	18.1	21.6	21.0	14.9	16.3	17.7
Armed Forces	na	na	na	na	na	na	na	na	6.1	na	na	4.4	na	na	1.4
Industry															
Agriculture, forestry, etc.	8.5	8.9	na	6.0	6.7	na	6.9	9.7	10.6	4.2	5.2	14.1	3.6	4.1	8.2
Mining	5.6	6.0	na	5.3	5.6	na	10.0	12.4	8.6	8.0	9.8	11.0	16.5	17.0	16.3
Construction	5.1	5.4	na	6.3	8.1	na	15.5	22.7	22.3	11.8	15.9	12.2	9.1	11.3	12.4
Manufacturing	3.8	4.0	na	4.0	4.4	na	12.9	15.8	11.6	11.3	13.2	17.4	9.0	9.6	10.1
Wholesale and retail trade	3.9	4.2	na	4.5	5.3	na	16.0	21.4	21.5	14.0	17.3	19.0	11.0	12.3	15.3
Transportation and utilities	3.2	3.6	na	4.4	5.8	na	12.2	17.3	13.0	12.8	16.3	18.5	12.2	14.0	13.9
Information	2.5	3.1	na	1.8	3.5	na	10.9	14.2	9.5	11.4	14.3	13.0	11.3	12.9	10.6
Financial activities	1.8	2.1	na	2.2	3.0	na	5.4	8.8	5.9	5.8	7.6	7.5	5.0	6.3	6.3
Professional and business services	4.0	4.6	na	4.7	5.6	na	9.6	13.7	15.3	8.7	11.6	13.3	8.2	10.1	11.1
Educational and health services	1.9	2.1	na	2.8	4.7	na	11.1	15.1	11.1	9.7	12.9	11.9	8.6	10.7	15.0
Leisure and hospitality	5.6	6.1	na	7.6	10.1	na	37.8	47.8	54.2	35.3	42.1	43.6	29.7	32.2	33.3
Other services	2.7	3.3	na	3.8	5.4	na	21.8	34.8	23.4	17.2	26.5	18.9	13.7	18.0	17.9
Public administration	1.3	1.5	na	1.1	1.4	na	4.7	7.5	9.9	3.3	4.7	7.2	3.0	3.5	8.8
Armed Forces	na	na	na	na	na	na	na	na	0.0	na	na	8.3	na	na	1.3

Table 4. Unemployment rates for YLS and CPS, different classifications, February – June CPS

C. Results by period

The YLS covers thirteen survey weeks. Figure 5 shows the results for the employment-population ratio (EPR) by week. The EPR rose from around 54% in the first week (early April) to 56 - 58% in the last month.

Figure 6 shows the results for the unemployment rate (UR) by week. The UR declined gradually over the early-April to June period, and then has stabilized in the last five weeks of the survey.
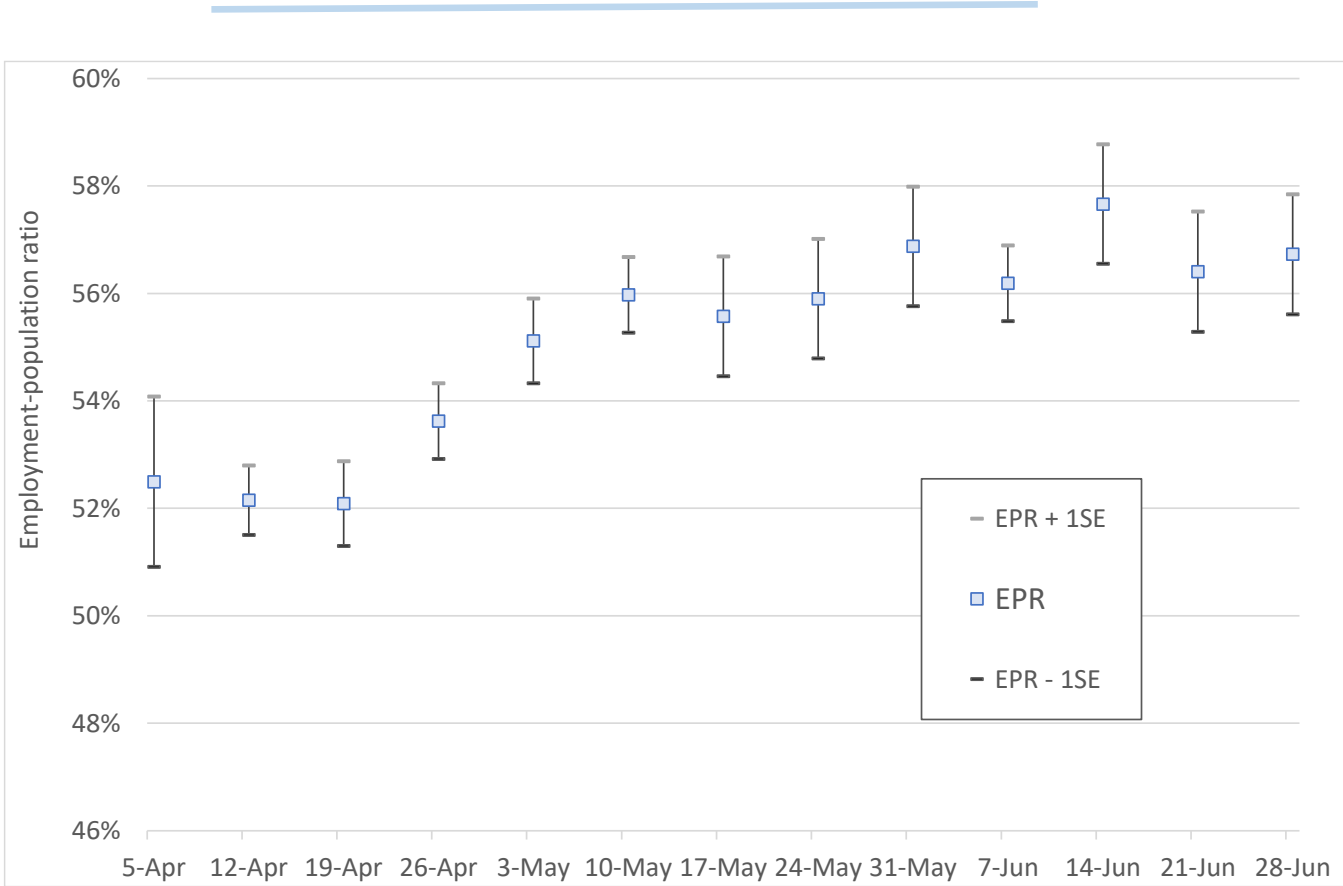
Figure 5. Employment-population ratio by week

Estimates are weighted by week. The upper and lower bars are the estimates plus or minus one standard error of the estimate. Weeks are beginning April 5 through June 28, 2020.
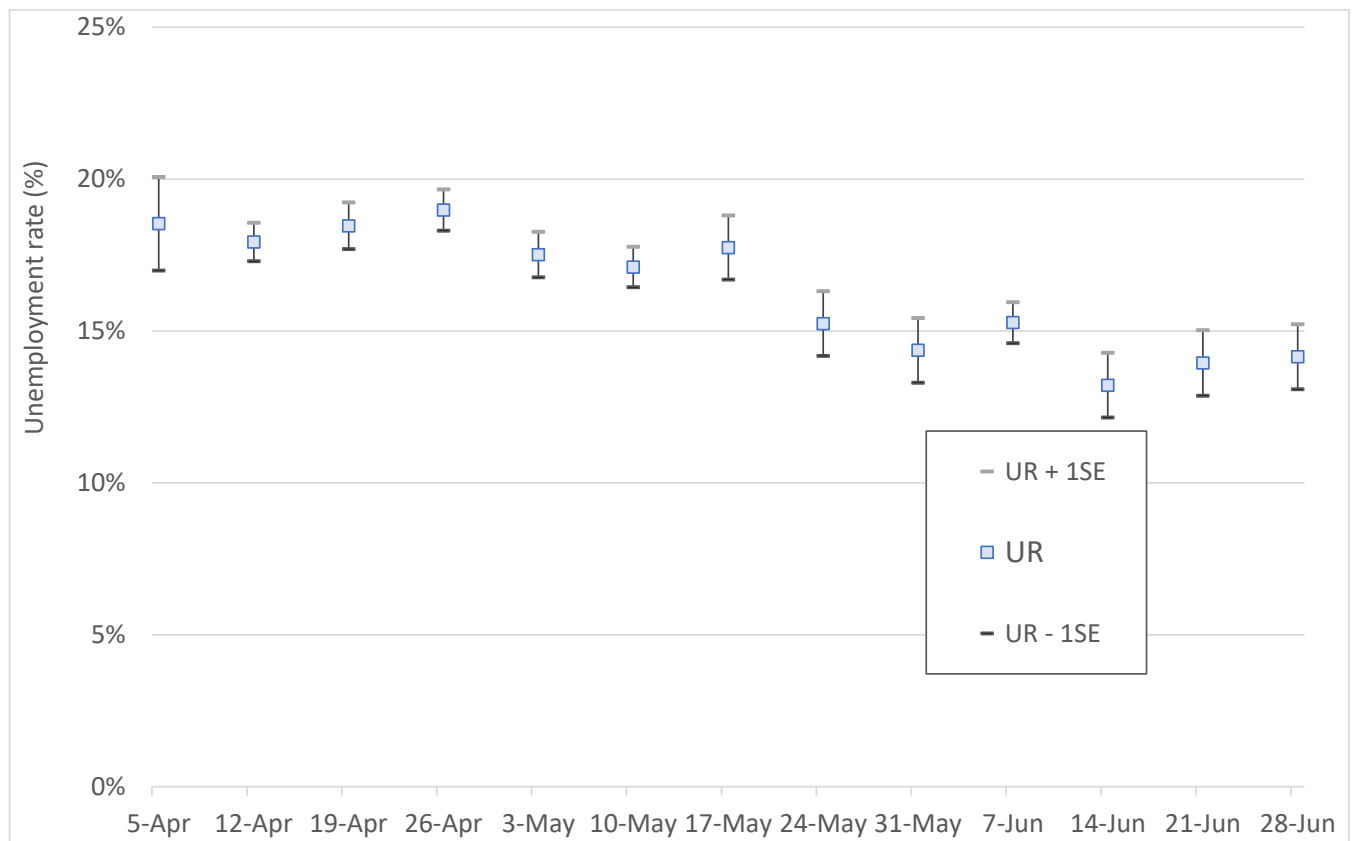
Figure 6. Unemployment rate by week

Estimates are weighted by week. The upper and lower bars are the estimates plus or minus one standard error of the estimate. Weeks are beginning April 5 through June 28, 2020.

VI. Further Results

The YLS has many interesting findings for the pandemic period. Section A samples a few of the nuggets from the surveys. Subsequent sections discuss the gig economy and the overlap between employment and the collection of unemployment insurance.

A. Some nuggets from the YLS

Appendix D shows the results of the YLS for a representative wave of the survey. Many of the questions illuminate aspects of the labor market during the pandemic.

Work at home or the office? Many workers who normally worked outside the home started to work remotely as the effects of the pandemic spread. How large were the numbers? We looked at the respondents who worked at home in February as well as in the survey week. For the months of April through June, 43% responded that they worked solely at home, and another 10% responded they work both home and outside.

Why absent from job? The YLS asked respondents about the reasons they were absent from work, adding pandemic-related questions to the normal ones in the CPS. It was interesting that only a small fraction of respondents listed child-care problems as a reason for absence. However, close to half listed, "I was temporarily absent from a job due to the coronavirus." Additionally, 8% said they were absent because of illness in their family, and 11% said they were absent because of their own illness.

When last worked? Several questions queried people about when they lost their last jobs. About 1% of respondents replied that they last worked in each month from May 2019 to February 2020. There was a huge jump in job losses in March 2020, when about 12% of jobless people last worked. Since that time, the rate of job loss has been about 4% per month. Of nearly 7000 respondents who said they lost their job in the last year, 44% lost them in March.

Why lost job? The YLS asked people why they lost their jobs. Of those who responded, 63% of workers said they lost their job because their firm reduced workers or hours because of COVID-19.

Answering internet surveys as a job. One of the issues with the YLS is that people might think that answering surveys represents "work for pay or profit." While this is a reasonable answer, we know that respondents are definitely biased toward

people who respond to internet surveys (since they all do!). To test the extent to which this might bias the responses, we directed respondents that they should not consider internet surveys as a job. Starting in wave 21, we queried respondents on this issue. In the final waves, with targeted questions, we determined that the fraction of the population which responded "yes" to the work-for-pay answer increased from 44.7% to 46.2 from respondents whose only job was answering internet surveys. We were unable reliably to classify these individuals as unemployed or not-in-the-labor force, but we note that the number of employed is slightly overestimated in the survey.

B. Self-employment and "Gig-Economy" Work

We also investigated the number of self-employed workers in the YLS sample. The CPS includes a "class of worker" characterization that includes wage and salary workers, self-employed workers, and unpaid family workers. Counting both the incorporated and unincorporated self-employed in the self-employment category, slightly more than 10% of employed persons have been self-employed over the last several years in the CPS.

This figure is close to the rates of self-employment in the YLS data, which we measured by asking people who worked for pay about their type of employer. We asked respondents whether they were "self-employed," and 12.0% of weighted respondents selected this answer, a figure that close to the CPS self-employment rate.[20]

A separate YLS question asked workers to classify themselves using different categories than the class-of-worker question in the CPS. Respondents could note that they were working "for myself in my own firm," that they were a "contract or gig economy worker," or that they were "working for a wage or salary at a firm or other employer." For all waves that included this question, 16% of working respondents said they were working for themselves in their own firm, while another 11% said they were gig-economy workers.

As other researchers attempting to measure the "gig economy" have found, it can be difficult to match up workers conceptions of their jobs with CPS concepts; many might consider themselves gig-economy or self-employed with presented with one set of potential answers, but call themselves wage-and-salary workers when presented with a different set of answers.

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[20] For more on the effects of high self-employment and multiple-jobholding rates in online surveys of the labor market, see Katz and Krueger (2019).

C. Unemployment Insurance

One of the key advantages of an internet labor market survey is the ability to add questions that are not found in the basic CPS questionnaire. In this section, we discuss questions related to the receipt of unemployment insurance (UI), which has been a central pillar of support to the economy during the pandemic.

The large increase in UI applications is often directly linked to "lost jobs." The YLS included questions on both employment status and unemployment insurance. It turns out that many of the people applying for and receiving UI are also working for pay in the YLS. (As in the rest of this study, all estimates are weighted.)

As an example, across all survey waves, 7.7% of persons at least 20 years old report that they are receiving UI. According to the BLS, there are about 243.3 million persons 20 and above in the civilian noninstitutional population, so the survey implies total UI receipt of about 0.078 x 243.3 million = 18.9 million. This is very close to the average number of continuing claims over the April – June period of 19.6 million reported by the Department of Labor.

An interesting feature of the YLS is that the receipt of UI among employed people is surprisingly high. Across all survey waves, 6.1% of persons working for pay report that they are receiving UI. There is no substantial change in this percentage across the waves. By comparison, 9.4% of persons not working for pay report receiving UI. The large number of employed receiving UI is likely due to the low thresholds necessary for UI receipt under the CARES Act.

VII. Comparison with other studies

Many studies are forecasting U.S. labor market characteristics, but few are tracking labor market responses in real time. As of the date of the report, other than the CPS and the present study, we are aware of six other surveys that examine labor-market dynamics in the COVID period.

The three main other studies published to date are by Olivier Coibion, Yuriy Gorodnichenko, and Michael Weber (2020, CG&W), which relies on the Nielsen Homescan panel; a survey by Alexander Bick and Adam Blandin (2020, B&B), which relies on a Qualtrics panel; and a Census Bureau panel, the Household Pulse Survey (2020, HPS), which began April 23.

1. The CG&W study relies on a panel that was fielded earlier in 2020 with employment questions and then was administered over the period April 2 - 6, 2020. The employment-population ratio in the CG&W study in April 2020 was 52%, similar to the 52.1% in the YLS (20+) and close to the April CPS estimate of 53% (ages 18+, not seasonally adjusted). The CG&W-estimated LFPR dropped by 7.5 percentage points between January and April, and the unemployment rate in the

CG&W study in early April 2020 was 6.3%, far below both the YLS and the CPS. The discrepancy may result from CG&W's definition of unemployment (those on layoff not looking for work are all classified as NILF).

2. *The Rapid Population Survey (RPS)* by Bick and Blandin, in collaboration with the Federal Reserve Bank of Dallas, covers virtually the same period as the YLS. RPS reports results among those aged 18-64. In April 2020, RPS found a 57% employment-population ratio (18-64) compared to 62% (20-64) in YLS and 63% (59% using the U3-alt definition) among those aged 18-64 in CPS. The RPS found an unemployment rate of 17% compared to 17.3% in YLS and 14% (19% alt) in CPS.

In May 2020, RPS estimates that 52% of working-age adults were employed, compared to 65% in both YLS and CPS (62% alt); and that 24.7% of the labor force was unemployed, compared to 16.8% in YLS and 12.7% (15.9% alt) in CPS.

In June 2020, RPS finds a 60% employment rate, compared to 67% in YLS and 67% (66% alt) in CPS; RPS estimates an unemployment rate of 19.4% compared to 14.8% in YLS and 11% in CPS (12.7% U3-alt).

3. The Census-administered *Household Pulse Survey (HPS)* of the population age 18+ has been published for nine weeks since April 23 - May 5. The HPS tracks several variables and is particularly useful in rapid estimation of employment. It uses a "work for pay" question similar to the CPS and the YLS. The estimates of the employment-population ratio in the HPS are close to those of the CPS for the CPS survey weeks. HPS estimates the proportion of the total population employed in the past seven days was 52% in May and 55% in June (using survey dates closest to the CPS reference week), compared to 56% in May and 56% in June in YLS, and 55% and 57% in CPS, respectively (53 and 56% alt).

However, the HPS does not attempt to calculate unemployment. So there is no comparison between the HPS and other surveys on the labor force or the unemployment rate.

In addition, three other surveys offer useful points of comparison: the COVID Impact Survey, sponsored by the Federal Reserve Bank of Minneapolis and the Data Foundation (Abigail Wozniak, Joe Willey, Jennifer Benz, and Nick Hart, 2020); a survey by Abi Adams-Prassl, Teodora Boneva, Marta Golin, and Christopher Rauh (2020); and one by the Pew Research Center (2020).

4. The COVID Impact Survey, sponsored by the Federal Reserve Bank of Minneapolis and the Data Foundation, found for April 2020 that 47% of people worked for pay, close to the YLS result of 46% from the same week. At the beginning of May 2020 and June 2020, COVID Impact finds work-for-pay rates of 49% and 51%, respectively; YLS results are similar, with 49.7% in May and 51.7% in June 2020. In addition, COVID Impact estimates that 21% of those who did not work for

pay were temporarily laid off/furloughed and 44% are retired, compared to 19% and 37% in YLS, respectively.

     5. Adams-Prassl et al. conducted the second wave of their US survey on April 9-11, 2020, in which 18% of respondents (unweighted) report having lost their jobs within the last four weeks due to the coronavirus. In YLS for the same reference period, 17% (weighted) of respondents stopped working in March or April 2020.

     6. The 2020 Pew Research Center's American Trends Panel's 65th wave was recorded on April 7-12, 2020. In that survey, 54% of respondents described themselves as employed full-time or part-time, compared to the 52.5% employment-population ratio of YLS.

     Reviewing the four main studies finds the following summary. The CG&W uses a simpler definition of unemployment (must be looking for work) and thus likely classifies as NILF many people which CPS and YLS would count as unemployed. We believe that the major differences among YLS, RPS, and HPS arise from the weighting of the different panels. The RPS uses a Qualtrics panel, while the HPS uses a rotating panel with person-level weights. The weights in the HPS were adjusted for non-response and housing unit occupancy and then raked to match population controls from the American Community Survey and Census data.

     Moreover, the sample size varies among the studies. The sample size of the RPS is roughly 2,000 per wave for seven waves; the sample size of CG&W was 13,895; the HPS has a total sample size of over 700,000, having reached over 563,000 different persons; and the YLS has a total of 43,000 respondents. COVID Impact has 2,100 nation-level observations per wave, while the Pew Research Center April 7-12 survey has a sample size of 4,917.

VIII. Reliability of the estimates

A. Total survey error

As with other surveys, there are several reasons why unemployment and participation estimates generated by YLS could differ from underlying population values. Often called "total survey error," they come from several sources: sampling error, non-response error, errors from differences in questionnaires and question wording, errors from interviewer vs. self-administered survey, and respondent error. (Lohr, 2010) The first type, sampling error, is easily calculated. The standard error of the estimate of the unemployment rate for weeks ranges from 0.7% for the CPS survey weeks to 1.0% for non-survey weeks.[21]

However, as in most surveys, non-sampling error is likely to be a more important concern. A particular issue for online surveys is potential unreliability

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[21] The present document uses standard statistical language. Often survey researchers use the term "margin of error," which is two times the standard error of estimate, or in the present case 2.0%.

arising from the biased nature of the panel. One useful indicator is the difference between the *unweighted and weighted* responses. For all waves, the unemployment rate averaged 18.6% for the unweighted sample and 16.8% for the weighted sample. Similarly, the employment-population ratio is 5 ppts higher in the weighted than the unweighted sample.

This difference reflects the fact that the respondents in the YouGov online panel tend to have relatively more people unemployed and relatively fewer people employed than the weighted panel. The weighting procedure described in section III is designed to correct for such biases.

A third source of error in comparing the YLS to the CPS is survey-design error, or the extent to which the survey questions and procedures accurately reflect those in the CPS. The source of the difference will be examined in future reports.[22]

B. Internal consistency on retest

A useful and easily calculated measure of the reliability of surveys is the consistency of answers on retest, sometimes called stability. (See Lohr 2020, Chapter 13.) The YLS has 12009 duplicate responders of the 43,000 responses through wave 39. We tested the consistency of the responses for these. We expect some to be relatively accurate (age and gender), while others are more taxing (such as February employment status). Table 6 provides a tabulation of major variables for the duplicates. Most of the elementary answers are consistent. However, occupation is highly inconsistent.

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[22] For example, those who are under 18 are excluded from the sample because protection of human subjects requires parental consent to participate in a survey.

Question	Inconsistent answers
Gender	0.0%
Race	2.2%
Education	7.3%
Age	4.1%
Device	7.8%
Region	1.4%
Religion	4.7%
February employment	14.5%
Occupation	36.7%

Table 6. Consistency of take-retake

The table shows the fraction of the time that the same question was answered differently by the same respondent.

IX. Next steps

The present study reports on the survey design and the results of the Yale Labor Survey, which is an online survey designed to measure the state of the US labor market in rapid-fire methods. The authors recognize that the YLS has significant drawbacks relative to the CPS. It is a much smaller survey, it lacks respondents experienced with CPS questions, it may be biased from imperfect representativeness of the sample, and it does not have a long history of trial, error, and correction.

Despite these shortcomings, we believe that internet surveys will be a valuable addition to the toolbox available for gathering information. In light of the increasing penetration of the internet into the US society – a trend that is bound to accelerate during the COVID crisis and be a durable feature of societies– it seems likely that internet panels will be increasingly important in the future. At least for the moment – in July 2020 – in-person surveys have become virtually impossible, mail surveys face high hurdles during the pandemic, and the true response rate for many phone surveys is under 10%.

The goal of this research is to help design and evaluate internet surveys.

We stated at the outset that this study has three principal purposes. The first is to determine *whether it is feasible* to provide rapid-turnaround estimates of the state of the national labor market. We believe that the YLS passes this test. The second goal is to *provide more timely estimates* of the state of the labor market. Here again, the YLS can provide timely and flexible information and has passed this test. The third goal is to *test the reliability of online panels.* The goal of reliability has not yet been achieved and will await further testing in the months ahead.

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Appendix A. Details on Methods for Calculating Unemployment

This appendix describes the approach used by the YLS to assign respondents to E (employed), U (unemployed), and NILF (not in the labor force). Like the CPS, our survey divides the US population into three groups, employed, unemployed, and not-in-the-labor-force, through a series of sequential rules. The questions and responses for the latest July survey week are contained in Appendix D.

- **Employed** persons either worked for pay in the reference week (WORKFORPAY=YES) or answered that they still received pay even though they did not work during the reference week (WORKSITUATION_WORKING = 3 or 4). The "work-for-pay" question is common with the CPS and represents the bulk of employed workers.

- **Unemployed** persons are those that did not work for pay during the reference week but still met two alternative conditions for the CPS's definition of unemployment. To be unemployed, someone who did not work for pay must satisfy one of the following requirements:

    - *Active search:* These respondents actively searched in the last four weeks (FINDWORK=1) and were available for work within 7 days (AVAILABLE=1),

    - *On layoff or furlough and expecting to return to job:* Respondents could signal this expectation in two ways: (1) One question (WORKSITUATION) asked non-working respondents to characterize their work situation. Respondents could signal recall expectation by selecting option 1: "Laid off or furloughed from a job to which you expect to return." Additionally, (2) respondents would need to respond "yes" to a separate question, RECALL, which asked, "If you recently lost your job, have you been given any indication that you will be recalled to work within the next 6 months?"[23]

- Persons who are **not in the labor force (NILF)** were neither employed nor unemployed.

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[23] For a respondent selecting this option, we used another question to verify that the respondent did in fact lose a job within the past 12 months. This restriction had no material impact on the results.

Appendix B. Difference between BLS headline unemployment rate and 20+ rate

The YLS reports results for respondents 20 years and over, whereas the CPS covers those 16 and over. Because people aged 16 to 19 tend to have high unemployment rates, the headline rate is always higher than the 20+ rate. This difference peaked in the 1970s and 1980s, and since that time has declined to 0.3 to 0.5 percentage points. During the pandemic, the difference has averaged 0.5 percentage points. Therefore, a reasonable correction would be to add ½ percentage point to the numbers for 20+ years in the report to obtain the headline unemployment rate for 16+ years.

Appendix C. Construction of U3-alt

A significant difference between our method of determining labor market status and the method in the CPS concerns workers *who are employed but absent from work*. Traditionally, absent workers have jobs, but they do not work during the reference week because they are on vacation, sick at home, prevented from getting to work by bad weather, etc. Such absences can be either paid or unpaid.

Unfortunately, during the pandemic, many people consider themselves with jobs but "absent from work" because their employer has temporarily shut down. These people should not be considered employed, but the structure of the CPS questionnaire has caused millions of such workers to be included in the official employment category.

Specifically, beginning in March 2020, large numbers of workers were classified as employed and absent from work, but these absences were not due to the usual reasons such as vacation or illness. Rather, these absences were grouped into an "other reasons" category.

To be specific, the CPS first asks whether the respondent worked for pay during the survey week. The CPS then asks respondents who answer "no" to the initial work-for-pay question whether they "had a job" during the survey week, including a job from which they were temporarily absent. Many persons displaced by the pandemic who did not work during the survey week answered "yes" to the second question, which resulted in them being classified as employed but absent from their jobs.

Because the YLS employment classification has a different structure, it is less susceptible to this classification error. The YLS first asks a work-for-pay question like the one in the CPS. It then follows up by asking all respondents to characterize their work situation. The "work-situation" question asks respondents if they worked in their usual place, if they worked at a different location, if they did not work but still got paid, or if none of these situations applied. Persons are classified as employed in the YLS if they answer yes to the initial work-for-pay question or if they indicate in the work-situation question that they either worked for pay or received pay. The YLS definition therefore avoids the ambiguity of whether someone who did not work and did not get paid should be counted as employed because they had a job from which they were temporarily absent.

In FAQs published with employment reports for March through June 2020, the BLS suggested that one way to assess the degree of CPS classification error is to reclassify as unemployed those persons who are recorded as employed but absent from their jobs for "other reasons." These are reasons besides the usual ones (which include sickness, vacation, maternity/paternity leave, etc.). This is from the FAQ on the April 2020 CPS:

Of the 11.5 million employed people not at work during the survey reference week in April 2020, 8.1 million people were included in the "other reasons" category, much higher than the average of 620,000 for April 2016–2019 (not seasonally adjusted). BLS analysis of the underlying data suggests that this group included workers affected by the pandemic response who should have been classified as unemployed on temporary layoff. Such a misclassification is an example of non-sampling error and can occur when respondents misunderstand questions or interviewers record answers incorrectly.[24]

We follow this suggestion (with some minor differences) to create the CPS U3-alt rate. Because the constructed CPS U3-alt rate corrects for the CPS classification error, it provides an apples-to-apples comparison with the unemployment rate in the YLS, where the CPS classification error is much less likely to occur.

More precisely, because of confusion over the meaning of employment absences during the pandemic, we did not use an absence question in our employment definition. Instead, we augmented our WORKFORPAY question (which is essentially identical to the work-for-pay question in the CPS) with a WORKSITUATION_WORKING question. This question asked workers if they worked at their usual place of work, worked at home, or did not work *but were still being paid,* either with vacation or personal-leave pay or some other form of pay. Employed workers in the YLS have worked for pay (according to either the WORKFORPAY or WORKSITUATION_WORKING questions) or were on paid absences (according to the WORKSITUATION_WORKING question). Consequently, our method would not classify workers displaced by the pandemic into unpaid absences as employed. Rather, the YLS will classify them as either unemployed or not in the labor force using the two-fold categorization of unemployment described in Appendix A.

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[24] The FAQ for the April Employment Situation Release can be accessed here: http://www.bls.gov/cps/employment-situation-covid19-faq-april-2020.pdf.

Appendix D. Survey results for wave 38.

Yale Labor Tracker
Wave 38
(LAST WEEK was June 21 - June 27)

YouGov®

Sample	1,000 Adults
Conducted	July 1 - 3, 2020
Margin of Error	±3.3%

---

workforpay. LAST WEEK, did you do any work for pay or profit?

Yes 49.23%
No 50.77%

---

workforpay_init. Initial Work for Pay Response

Yes 50.44%
No 49.56%

---

workonline. When you said you worked for pay or profit, were you referring to a job answering online surveys?
Asked of those who said they worked for pay last week

Yes 16.95%
No 83.05%

---

workonlineagain. Aside from answering online surveys, did you have another job where you worked for pay or profit?
Asked of those who included survey takig as work for pay

Yes 85.84%
No 14.16%

---

absent. LAST WEEK, did you have a job, either full-or part-time? Include any job from which you were temporarily absent.
Asked of those who did not work for pay during the last week

Yes 12.69%
No 87.31%

---

absent_reason. What was the main reason you were absent from work LAST WEEK?
Asked of those temporarily absent from work last week

On layoff (Temporary or indefinite) 28.34%
Slack work/business conditions 7.78%
Waiting for new job to begin 3.23%
Vacation/personal days 9.97%
Own illness/injury/medical problems 7.73%
Child care problems 5.62%
Other family/personal obligations 5.47%
Maternity/paternity leave 1.92%
Labor dispute 0.00%
Weather affected job 0.00%
School/training 4.57%
Civic/military duty 0.00%
Other reason 25.36%

absent_reason_mult. Which of the following statements describe why you were absent from your job LAST WEEK. Check all that apply.
Asked of those temporarily absent from work last week

I was temporarily absent from a job due to my own illness 10.64%
I was temporarily absent from a job due to an illness in my family 2.97%
I was temporarily absent from a job due to a vacation (paid or unpaid) 12.47%
I was temporarily absent from a job due to bad weather 1.82%
I was temporarily absent from a job due to a labor dispute (for example, a strike) 0.96%
I was temporarily absent from a job due to the coronavirus 45.68%
None of the above 28.70%

worksituation_working. What best describes your employment situation LAST WEEK?

I worked for pay or profit at my usual place of work 39.00%
I worked for pay or profit, not at my usual place of work but at home or at another workplace
....12.79%
I did not work, but still earned pay (for example, personal or sick leave) 2.35%
I did not work, but my employer is still paying me (but not for the usual reasons for time off such as personal time or sick leave) 1.02%
I did not work and was not paid 44.84%

multiplejobs. Did you work more than one job LAST WEEK?
Asked of those who worked for pay last week

Yes 20.93%
No 79.07%

surveys_workforpay. Earlier in this survey, you said that you worked for pay or profit. Did you include answering online surveys as one of your jobs?
Asked of those who worked for pay last week

Yes 14.77%
No 85.23%

mainjob_online. Last week, was your MAIN JOB answering online surveys?
Asked of those that included surveys in working for pay

Yes 60.96%
No 39.04%

secondjob_online. When you said that answering online surveys is one of your jobs, were you thinking of your second job (or possibly third job)?
Asked of those that included surveys in working for pay and those who worked multiple jobs

Yes 77.66%
No 16.04%
Actually, when I said answering online surveys was a job, I was thinking about my first or main job. 6.30%

---

numberjobs. How many jobs did you work at LAST WEEK?
Asked of those that worked more than one job last week

Two jobs 84.91%
More than two jobs 15.09%

---

wherejobnow. In your [job/main job], where did you work LAST WEEK?
Asked of those who worked for pay last week

Outside the home at a place of business, office, or other location 57.78%
At home 32.04%
Both home and outside 10.18%

---

fracwherebothnow. Did you work mostly at home or outside your home?
Asked of those who work both at home and in the office

Mostly at home 37.45%
About equally at home and outside my home 32.81%
Mostly outside my home 29.74%

---

fracwhereboth. When you worked at home LAST WEEK, how did you work?
Asked of those who worked from home in last week

Primarily on the telephone 4.83%
Primarily on email 24.94%
Primarily by video or voice on the Internet 22.68%
Primarily with someone in my home 4.21%
Primarily by myself 43.33%

---

typeemployer. In your [job/main job], what type of employer did you work for last week?
Asked of those who worked for pay last week

Federal, state, or local government 16.03%
Private-for-profit company 62.55%
Non-profit organization (including tax-exempt or charitable organizations) 11.76%
Self-employed 9.66%

---

gigwork. In your [job/main job], do you work for yourself (including working as a contractor, freelancer, or "gig economy" worker) or do you work for a firm or other employer?
Asked of those who worked for pay last week

I work for myself or my own firm 14.33%
I am a contractor, freelancer, or "gig-economy" worker 8.97%
I am paid a wage or salary 76.70%

sizeemployer. How many people usually work for your current employer? (If the employer has more than one location, include people at all locations.)
Asked of those who worked for pay last week and are not self employed

1 to 10	14.21%
11 to 100	24.54%
101 to 1000	25.10%
More than 1000	36.14%

selfemployees. Do you have any employees who work for you (not including yourself)?
Asked of those who worked for pay last week and are self employed

Yes	23.00%
No	77.00%

yearsemployed. [How long have you held your current job (or a different job with the same employer)?/How long have you been self-employed?]
Asked of those who worked for pay last week

Less than a year	22.75%
More than a year	77.25%

monthemployed. [In which month did you start working for your current employer?/Which month did you start working for yourself?]
Asked of those who have had their job less than a year

May 2020	4.28%
April 2020	2.35%
March 2020	2.09%
February 2020	1.12%
January 2020	2.26%
December 2019	1.46%
November 2019	2.77%
October 2019	1.02%
September 2019	1.99%
August 2019	0.86%
July 2019	0.59%
June 2019	0.65%
May 2019	1.33%
More than one year	77.25%

hoursyesterday. How many hours did you work yesterday for pay or profit?
Asked of those who worked for pay last week

Miniumum	0.00
1st Quartile	6.00
Median	8.00
Mean	7.46
3rd Quartile	8.00
Maximum	24.00
Standard Deviation	4.01
Weighted N	446

fulltimereg. Do you usually work a full-time workweek of 35 hours or more per week?
Asked of those who worked for pay last week

Yes	80.97%
No	19.03%

typework. You answered that you worked for pay or profit last week. [Which/Considering all your jobs, which] of the following apply to your answer?
Asked of those who worked for pay last week

I worked for pay as an employee	83.93%
I worked for profit in a firm which I own	13.00%
I worked for profit in a firm which I do not own	5.35%
I worked without pay in a family farm or firm	1.59%
Other	2.65%

parttimelast. Did you work less than 35 hours LAST WEEK?
Asked of those who worked for pay last week

Yes	37.48%
No	62.52%

whypart. What is the main reason you worked less than 35 hours LAST WEEK?
Asked of those who worked part time last week

My regular work hours are less than 35 per week	33.51%
I worked for pay at home because of the coronavirus	24.31%
I was absent from work without pay because of the coronavirus	8.01%
I was sick with the coronavirus	2.09%
I was caring for a person who was sick with the coronavirus	2.39%
My firm notified me that the coronavirus pandemic required the reduction of hours or shutdown of the firm	7.70%
Other reasons	21.99%

hoursworknow. How many hours did you ACTUALLY work for pay on [your job/all your paid jobs] LAST WEEK?
Asked of those who worked for pay last week

Miniumum	1.00
1st Quartile	25.00
Median	40.00
Mean	34.61
3rd Quartile	41.00
Maximum	98.00
Standard Deviation	15.32
Weighted N	446

wherejobnow2. For your SECOND job, where did you work LAST WEEK?
Asked of those who worked multiple jobs

Outside the home at a place of business, office, or other location	51.03%
At home	36.31%
Both home and outside	12.66%

fracwherebothnow2. For your SECOND job, did you work mostly at home or outside your home?
Asked of those who work both at home and in the office in their second job

Mostly at home	11.19%
About equally at home and outside my home	38.65%
Mostly outside my home	50.16%

typeemployer2. In your SECOND job, what type of employer did you work for last week?
Asked of those who worked multiple jobs

Federal, state, or local government	17.59%
Private-for-profit company	47.88%
Non-profit organization (including tax-exempt or charitable organizations)	12.30%
Self-employed	22.24%

gigwork2. In your SECOND job, do you work for yourself (including working as a contractor, freelancer, or "gig economy" worker) or do you work for a firm or other employer?
Asked of those who worked multiple jobs

I work for myself or my own firm	44.35%
I am a contractor, freelancer, or "gig-economy" worker	30.09%
I am paid a wage or salary	25.57%

sizeemployer2. How many people usually work for your employer in your SECOND job? (If the employer has more than one location, include people at all locations.)
Asked of those who worked multiple jobs last week and are not self employed

1 to 10	26.24%
11 to 100	43.23%
101 to 1000	14.37%
More than 1000	16.15%

selfemployees2. In your SECOND job, do you have any employees who work for you (not including yourself)?
Asked of those who worked multiple jobs last week and are self employed

Yes 22.72%
No 77.28%

healthemp. Do any of your employers provide you with health insurance?
Asked of those who worked for pay last week

Yes 63.44%
No 36.56%

months_workforpay. In which of the following months did you do any work for pay or profit?

	Worked	Did not work
April 2020	50.87%	49.13%
March 2020	58.13%	41.87%
February 2020	61.73%	38.27%
January 2020	62.49%	37.51%

worksituation. You said that you did NOT work last week for pay or profit. What best describes your situation at this time?
Asked of those who did not work for pay during the last week

Laid off or furloughed from a job to which you expect to return 11.25%
Looking for work 8.99%
Disabled 14.33%
Ill 1.68%
In school 5.58%
Taking care of house or family 13.76%
Retired 36.12%
Something else 8.30%

dur_nilf. How long have you been [worksituation]?
Asked of those not it the labor force

Less than one year 12.22%
More than one year 87.78%

paynowork. Regardless of the reason you did not work LAST WEEK, did you earn any pay (or profit) for your time away from work?
Asked of those who did not work for pay during the last week

Yes 11.29%
No 88.71%

YouGov®

healthemp_past. Do any of your past employers still provide you with health insurance?
Asked of those who have been NILF for less than a year

Yes 15.90%
No 84.10%

monthunemployed. When did you last work at a job or business?
Asked of those who did not work for pay during the last week

May 2020 .... 9.89%
April 2020 .... 3.40%
March 2020 .... 12.23%
February 2020 .... 2.59%
January 2020 .... 0.60%
December 2019 .... 1.32%
November 2019 .... 0.67%
October 2019 .... 0.46%
September 2019 .... 0.69%
August 2019 .... 0.66%
July 2019 .... 0.52%
June 2019 .... 0.48%
May 2019 .... 1.28%
Before May 2019 .... 3.22%
Never worked 4.17%
Not in labor force 57.83%

recall. Have you been given any indication that you will be recalled to work within the next 6 months?
Asked of those who did not work for pay during the last week and are students or in the labor force

Yes 34.48%
No 65.52%

findwork. Have you been doing anything to find work during the last 4 weeks?
Asked of those who did not work for pay during the last week

Yes, I have actively searched for work by doing things like submitting resumes to potential employers, answering employment advertisements, or asking friends and relatives about jobs 17.16%
No, I have not been actively searching, but I have occasionally checked job listings ...12.45%
No, I have not been doing anything to find work within the last four weeks 70.39%

available. If someone offered you a job today, could you begin work within the next 7 days?
Asked of those actively searching for employment

Yes 80.29%
No 19.71%

wantwork. Do you currently want a job, either full or part time?
Asked of those who did not work for pay during the last week and are not looking for work

Yes 13.90%
Maybe/it depends 17.32%
No, I am retired 30.77%
No, I am disabled or unable to work 16.03%
No, I do not want a job for other reasons 21.98%

whynolook. You indicated that you were not actively looking for work over the last 4 weeks. What is the MAIN REASON that you did not look for work?
Asked of those who would want a job if offered

No work is available in my line of work or area because of the current Covid-19 pandemic
....25.01%
No work is available in my line of work or area because of other reasons 7.35%
I tried to find work, but could not find any 8.74%
Lack of child care, or other family or personal responsibilities 14.37%
Ill health or physical disability 15.42%
Some other reason 29.12%

joblostcovid. Did you lose your job because your firm reduced workers or hours because of COVID-19?
Asked of those who lost their job in 2020 Feb or later

Yes 56.82%
No 43.18%

multiplejobs_feb. Did you work more than one job during the first two weeks of February 2020?
Asked of those who worked for pay last week

Yes 20.93%
No 79.07%

sizeemployer2_feb. For your SECOND job, how many people worked for your current employer in the first two weeks of February 2020? (If the employer has more than one location, include people at all locations.)
Asked of those who worked for pay in the first two weeks of February and are not self employed

1 to 10 ....36.32%
11 to 100 ....33.52%
101 to 1000 ....10.69%
More than 1000 ....19.46%

wherejobjanfeb. In your main job, where did you typically work in the first two weeks of February 2020?
Asked of those who worked for pay last week

Outside the home at a place of business, office, or other location 79.50%
At home 13.22%
Both home and outside 7.28%

fracwherebothjanfeb. What fraction of your time did you typically work at home in the first two weeks of February 2020?

Asked of those who worked both at home and in the office in January/February

Mostly at home 8.11%

About equally at home and outside my home 61.64%

Mostly outside my home 30.26%

hourscomparison. How do the number of hours you are working now compare with the number of hours you were working during early February?

Asked of those who worked pay during the first two weeks of February, are currently working and had a different employement in February situation than they do currently

Working more hours now 19.12%

Working the same hours 56.98%

Working fewer hours now 21.55%

Am temporarily absent or furloughed from my job and expect to return 2.35%

samejobfeb. Same Employer Now and February (Imputed)

Yes 93.44%

No 6.56%

nosamejobfeb. You told us that you started your current job in [month year]. Was the job you held in early February in the same industry as your current job?

Asked of people who do not have the same employer as they did in February

Same industry and same employer in February and now 33.38%

Same industry, but different employer in February 33.52%

Different industries 33.10%

firmstillalive. Is the employer you worked for in February still in business?

Asked of people who do not have the same employer as they did in February

Yes 64.88%

No 24.59%

I don't know 10.53%

workforpay_feb. Thinking back to the first two weeks of February 2020, did you do any work for pay or profit?

Asked of those who had a different employement in February situation than they do currently

Yes 60.54%

No 38.94%

Not sure 0.52%

typeemployer_feb. Who was your employer during the first two weeks of February 2020?
Asked of those who worked pay during the first two weeks of February and had a different employement in February situation than they do currently

Federal, state, or local government	15.28%
Private-for-profit company	62.44%
Non-profit organization (including tax-exempt or charitable organizations)	11.43%
Self-employed	10.86%

gigwork_feb. How would you describe your relationship with your employer in February?
Asked of those who worked pay during the first two weeks of February and had a different employement in February situation than they do currently

I worked for myself	14.81%
I was a contractor, freelancer, or "gig-economy" worker	9.36%
I worked for a wage or salary	75.82%

sizeemployer_feb. How many people worked for your employer in early February? (If the employer has more than one location, include people at all locations.)
Asked of those who worked for pay in the first two weeks of February and are not self employed

1 to 10	14.79%
11 to 100	24.96%
101 to 1000	24.78%
More than 1000	35.47%

yale_covid_employ_month. In what month before March 2020 did you answer the employment question?

October 2019	6.86%
November 2019	39.56%
December 2019	12.67%
January 2020	14.96%
February 2020	25.95%

yale_covid_employ. Which of the following best describes your employment status (asked pre-March 2020)?

Full-time	45.96%
Part-time	13.19%
Temporarily laid off	0.22%
Unemployed	2.12%
Retired	21.75%
Permanently disabled	5.73%
Homemaker	5.18%
Student	3.81%
Other	2.05%

earnings. Counting all of your sources of EARNED INCOME (wages, salaries, tips, and commissions, but before taxes and excluding government benefits), how much did YOU earn in 2019?

Less than $10,000	26.28%
$10,000-$19,999	11.71%
$20,000-$29,999	9.21%
$30,000-$39,999	9.55%
$40,000-$49,999	10.20%
$50,000-$59,999	7.25%
$60,000-$69,999	5.56%
$70,000-$79,999	4.68%
$80,000-$89,999	4.13%
$90,000-$99,999	2.43%
$100,000-$109,999	1.88%
$110,000-$119,999	1.26%
$120,000-$129,999	1.42%
$130,000-$139,999	0.46%
$140,000-$149,999	0.95%
$150,000 or more	3.03%

changeearnings. This question concerns your EARNED INCOME (wages, salaries, tips, and commissions, but excluding government benefits). Considering all jobs, for last week, how much did your earned income change since February?

Up by (%)	7.14%
No major change	76.13%
Down by (%)	16.73%

changeearnings_up. Percent Increase in Income

Miniumum	0.00
1st Quartile	5.00
Median	20.00
Mean	30.77
3rd Quartile	40.00
Maximum	100.00
Standard Deviation	33.99
Weighted N	70

changeearnings_down. Percent Decrease in Income

Miniumum	0.00
1st Quartile	20.00
Median	50.00
Mean	52.21
3rd Quartile	100.00
Maximum	100.00
Standard Deviation	37.08
Weighted N	161

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ifbenefits_mult. What government benefits do you normally collect?

Social security 31.91%
Medicaid 13.69%
Food stamps 11.84%
Other 6.40%
No government benefits 53.54%

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uiapply. Have you tried to apply for unemployment insurance within the last four weeks?

Yes, I believe my application is on file with my state employment agency. 13.85%
Yes, but I had trouble filing my application, so I am not sure my application is on file. ...3.36%
Yes, but my application is not on file because I did not complete my application. 1.71%
No, I have not tried to apply for unemployment insurance. 81.08%

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ifcovidbenefits_mult. Last week, did you collect any special government benefits?

Unemployment insurance 8.69%
Small business assistance 4.05%
Other 4.27%
No special benefits 84.20%

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occup. What is your occupation?
Asked of those who have worked for pay before

Management, business, and financial occupations 12.15%
Professional and related occupations 26.59%
Service occupations 16.74%
Sales and related occupations 12.85%
Office and administrative support occupations 11.81%
Farming, fishing, and forestry occupations 2.71%
Construction and extraction occupations 3.76%
Installation, maintenance, and repair occupations 3.15%
Production occupations 4.22%
Transportation and material moving occupations 4.76%
Armed Forces 1.26%

YouGov

industrynaics. Please tell us the industry of the organization that you work for.
Asked of those who have worked for pay before

Agriculture, forestry, fishing, and hunting	1.72%
Mining	0.51%
Construction	3.95%
Manufacturing	7.78%
Wholesale and retail trade	10.65%
Transportation and utilities	5.74%
Information	4.51%
Financial activities	5.18%
Professional and business services	8.50%
Educational and health services	18.75%
Leisure and hospitality	4.65%
Other services	24.28%
Public administration	2.73%
Armed Forces	1.04%

other_panels. Aside from YouGov, do you take surveys from any other companies?

Yes	38.51%
No	61.49%

num_panels. How many other companies regularly send you surveys which you take?
Asked of those who take surveys with other companies

One other company	37.49%
2 - 4 other companies	46.07%
More than 5 companies	16.44%

survey_earnings. About how much per year do you earn by taking surveys?

Less than $10	31.20%
$10 - $50	26.18%
$50 - $100	25.13%
Over $100	17.49%