The Impact of 2010 Decennial Census Hiring on the Unemployment Rate

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Abstract

The decennial census is the largest peacetime operation of the U.S. federal government. The Census Bureau hires hundreds of thousands of temporary workers to conduct the decennial census. The magnitude of this temporary workforce influences the national employment situation when enumeration efforts ramp up and when they recede. The impact of decennial census hiring on the headline number of payroll jobs added each month is well established, but previous work has not established how decennial census hiring affects the headline unemployment rate. We link the 2010 Decennial Applicant Personnel and Payroll System data to the 2010 American Community Survey to answer this question. We find that the large hiring surge in May 2010 came mostly from people already employed (40 percent) or from people who were unemployed (33 percent). We estimate that the workers hired for Census 2010 lowered the May 2010 unemployment rate by one-tenth of a percentage point relative to the counterfactual. This one-tenth of a percentage point is within the standard error for the official unemployment rate, and BLS press releases would denote a change in the unemployment rate of 0.1% or less as "unchanged." We also estimate that relative to the counterfactual, the more gradual changes in decennial census employment influenced the unemployment rate by less than one-tenth of a percentage point in every other month during 2010.

**Keyword*:*

JEL Classification:

I. Introduction

The Census Bureau hires hundreds of thousands of temporary workers to conduct the decennial census. The magnitude of this temporary workforce influences the national employment situation when enumeration efforts ramp up and when they recede. In the months leading up to and following the decennial census, the Census Bureau shares actual employment numbers with the Bureau of Labor Statistics (BLS). The BLS uses these statistics in their Current Employment Statistics (CES) program, which counts jobs rather than counting persons. For example, the employment situation news release for May 2010 stated "Total nonfarm payroll employment grew by 431,000 in May, reflecting the hiring of 411,000 temporary employees to work on Census 2010."[1]

While we know how decennial census hiring affects the headline number of payroll jobs added,[2] we do not know how decennial census hiring affects the headline unemployment rate. In this research, we provide evidence for how the national unemployment rate is affected by hiring for the decennial census. We have linked the 2010 Decennial Applicant, Personnel and Payroll System (DAPPS) data to the 2010 American Community Survey (ACS). Using ACS definitions of labor force status, we estimate that the 411,000 workers hired for Census 2010 lowered the May 2010 unemployment rate by one-tenth of a percentage point relative to the counterfactual. This one-tenth of a percentage point is within the standard error for the official unemployment rate, and BLS press releases would denote a change in the unemployment rate of 0.1% or less as "unchanged." We also estimate that relative to the counterfactual, decennial census employment

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[1] https://www.bls.gov/news.release/archives/empsit_06042010.htm.
[2] See https://www.bls.gov/opub/btn/volume-9/pdf/the-2020-census-and-ces-employment.pdf for a description of how census workers affect BLS employment estimates.

influenced the unemployment rate by less than one-tenth of a percentage point in every other month during 2010.

The intuition for why hiring for the decennial census has a small effect on the unemployment rate is because many of the persons hired for the census are already employed. Looking at the 411,000 persons hired for temporary census jobs in May 2010, we estimate that 40 percent were employed in April 2010 and 33 percent were unemployed in April 2010 (the remaining 27 percent were not in the labor force).

II. Conceptual Framework

IIA. Hiring for the Decennial Census

We begin by asking how hiring for the decennial census affected the unemployment rate. Conceptually, persons who were unemployed the month before working for the Census Bureau would experience an unemployment-to-employment transition, and this should lower the number of unemployed persons in the economy. The empirical question is how large is the decline in the unemployment rate due to hiring for Census 2010.

We can bound this effect by considering three counterfactual unemployment rates. We ask what would have happened to the May 2010 unemployment rate if hiring for the decennial census did not happen and the 411,000 persons hired in May 2010 remained in their April 2010 labor force status. These three counterfactuals are summarized in the text table below, with further description in the following text.

	Published May 2010	Counterfactual #1: All E	Counterfactual #2: All U	Counterfactual #3: All N
Employed (E)	139,420	139,420	139,009	139,009
Unemployed (U)	14,973	14,973	15,384	14,973
Not in labor force	83,107	83,107	83,107	83,518
Labor Force (E+U)	154,393	154,393	154,393	153,982
U / (E+U)	9.70	9.70	9.96	9.72
Unemployment rate	9.7	9.7	10.0	9.7

Note: Statistics in the first four rows of the table are in thousands.
Statistics in the last two rows of the table are percentages.

The first column in the table above, titled "Published May 2010," reprints the seasonally adjusted statistics from the archived May 2010 Employment Situation News Release.[3] The BLS reported that the unemployment rate in May 2010 was 9.7%, which is calculated as 14.973 million unemployed persons divided by 154.393 million persons in the labor force.

The second column, titled "Counterfactual #1: All E," shows the counterfactual labor market statistics if all 411,000 persons beginning work for the decennial in May 2010 reported that they were employed in April and in the absence of working for the Census Bureau were still employed at this non-decennial job in May. In this counterfactual, the number of employed in May would not change, nor would the number of unemployed. As such, there would be no effect on the unemployment rate.

The third column, titled "Counterfactual #2: All U," shows the counterfactual labor market statistics if all 411,000 persons beginning work for the decennial in May 2010 reported that they were unemployed in April and in the absence of working for the Census Bureau remained unemployed in May. In this counterfactual, the number of employed in May would fall by 411,000 (from 139.420 million to 139.009 million) and the number of unemployed would

3 https://www.bls.gov/news.release/archives/empsit_06042010.htm.

increase by 411,000 (from 14.973 million to 15.384 million). The counterfactual May unemployment rate would increase by 0.3 percentage points, from 9.7% to 10.0%.

The final column, titled "Counterfactual #3: All N," shows the counterfactual labor market statistics if all 411,000 persons beginning work for the decennial in May 2010 reported that they were not in the labor force (NILF) in April and in the absence of working for the Census Bureau remained NILF in May. In this counterfactual, the number of employed would fall by 411,000 and the number of unemployed would not change. The ratio of the number of unemployed persons to the number of persons in the labor force would increase from 9.70% to 9.72%; this increase occurs as a result of the labor force decreasing even though the number of unemployed does not change. The counterfactual May unemployment rate, after rounding to the nearest tenth of a percent, would be unchanged at 9.7%.

These three counterfactuals imply that the 411,000 persons hired in May 2010 for the decennial census might have lowered the national unemployment rate by anywhere from 0.0 to 0.3 percentage points, with the exact magnitude depending upon how many persons were employed, unemployed, and not in the labor force in the month prior to being hired. Our goal in this paper is to [a] determine how many of the 2010 Decennial hires were employed, unemployed, and not in the labor force the month prior to being hired, and [b] use this information to determine the effect of Decennial hiring on the unemployment rate relative to the counterfactual.

Our calculation and presentation of counterfactual unemployment rates in this paper is similar to what BLS has done when estimating a counterfactual unemployment rate in their Frequently Asked Questions (FAQ) regarding the impact of the coronavirus (COVID-19)

pandemic on the March 2020 employment situation.[4] This BLS document runs the thought

exercise of considering what the unemployment rate would be if Current Population Survey

(CPS) respondents misclassified as employed but not at work for "other reasons" had been

classified properly as "unemployed on temporary layoff." The core of our exercise and the core

of the BLS FAQ exercise are equivalent -- reclassify individuals' labor force status {E, U, NILF}

and calculate the resulting unemployment rate.

IIB. *Separating from the Decennial Census*

We now ask how separating from the decennial census affects the unemployment rate.

Conceptually, persons who finished their temporary work can exit to one of the three labor

market states {employment, unemployment, NILF}, and the employment-to-unemployment

transitions should raise the number of unemployed persons in the economy.

We again bound this effect by considering three counterfactual unemployment rates. We

ask what would have happened to the June 2010 unemployment rate if separations from the

decennial census did not happen and the 225,000 persons separating in June 2010 remained

employed with the Census Bureau. These three counterfactuals are summarized in the text table

below.

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[4] See FAQ #13 at https://www.bls.gov/cps/employment-situation-covid19-faq-march-2020.pdf.

	Published June 2010	Counterfactual #1: All E	Counterfactual #2: All U	Counterfactual #3: All N
Employed (E)	139,119	139,119	139,344	139,344
Unemployed (U)	14,623	14,623	14,398	14,623
Not in labor force	83,949	83,949	83,949	83,724
Labor Force (E+U)	153,742	153,742	153,742	153,967
U / (E+U)	9.51	9.51	9.37	9.50
Unemployment rate	9.5	9.5	9.4	9.5

Note: Statistics in the first four rows of the table are in thousands.
Statistics in the last two rows of the table are percentages.

These three counterfactuals imply that the 225,000 persons separating from temporary census employment in June 2010 might have raised the national unemployment rate by anywhere from 0.0 to 0.1 percentage points, with the exact magnitude depending upon how many persons were employed, unemployed, and not in the labor force in the month after they separated. The maximum effect of decennial census employment on the June 2010 unemployment rate is smaller than the corresponding maximum effect on the May 2010 unemployment rate primarily because decennial census hiring spikes in May (411,000), while decennial census separations beginning in June (225,000) are more gradual. Our goal in this paper is to [a] determine how many of the 2010 Decennial separations were employed, unemployed, and not in the labor force the month they separated, and [b] use this information to determine the effect of temporary decennial separations on the unemployment rate relative to the counterfactual.

III. Data and Methodology

IIIA. Data

We use three data sources in our analysis -- the 2010 Decennial Applicant, Personnel and Payroll System (DAPPS) data, the 2010 American Community Survey (ACS) data, and the BLS published counts of decennial census temporary and intermittent workers in 2010. We use an

internal identifier called a Protected Identification Key (PIK) to link DAPPS and ACS

information on labor force status for the decennial employees who were sampled in the ACS

shortly before or shortly after their DAPPS employment spell.[5]

The 2010 Decennial Applicant, Personnel and Payroll System (DAPPS) data contains

information on the employment and earnings of persons who were hired for temporary jobs

during 2010 Decennial Census operations. DAPPS is the source of the monthly estimates of

temporary and intermittent payroll employment that Census sends to BLS for determining the

growth of payroll employment.[6] The DAPPS variable that we use in our analysis is the full list

of weeks with census employment.

The ACS samples about 3.5 million households per year, and collects information about

labor force status in the week prior to the interview date. The large sample size of the ACS

enables the calculation of valid statistics for relatively small subgroups; decennial census

employees are one such subgroup. We use ACS definitions of employment status in the

reference week to determine an individual's labor force status: Employed (E), Unemployed (U),

or Not in the labor force (NILF). The ACS is collected on a rolling basis throughout the calendar

year, and we have the exact date of the ACS interview.

IIIB. Approximating the counterfactual labor force status

We use the ACS interview date to determine an individual's labor force status in the four

weeks preceding census hire and the four weeks following census separation. We use this to

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[5] See https://www.census.gov/about/adrm/linkage/technical-documentation/processing-de-identification.html for more information about the PIK.

[6] DAPPS data contain employment information for all temporary decennial census jobs, including those located in Puerto Rico. BLS excludes employment in Puerto Rico from the monthly count of payroll jobs and the published count of temporary and intermittent census workers. To maximize comparability with BLS statistics, we also drop DAPPS observations corresponding to decennial census jobs in Puerto Rico.

infer what their labor force status would have been in absence of their census hire or separation.

To put this in more detail, let's use the month of May 2010 as an example. The CPS reference week for May 2010 was May 9th through 15th, and the CPS reference week for the preceding month was April 11th through 17th. We consider new hires to be anyone who started working for the decennial census between April 18th and May 15th, and was still working as of the May CPS reference week. The DAPPS data gives us this information on start dates.

The next step is to determine what the person's labor force status would have been in absence of the decennial hire. Because the true counterfactual is unobservable, for our linked ACS-DAPPS sample we approximate their labor force status in absence of the decennial hire with their labor force status in the ACS reference week, right before they started working for the decennial census. In order to obtain a sufficient sample size, we take the set of people whose ACS reference weeks fell within 4 weeks prior to their DAPPS start date. So for example, let's consider people who started working for decennial the week of May 2nd through 8th, 2010. For this start week, we only keep ACS respondents whose ACS reference week (the week before their ACS interview) was during the time period April 4th through May 1st. We then observe their employment status from this ACS reference week, and we assume this would have also been their employment status in the May 2010 CPS reference week if they hadn't been hired. The data construction for the other key start weeks that contribute to the May 2010 statistic (April 18 through 24, April 25 through May 1, May 9 through 15) are constructed analogously. Assuming that our sample of linked ACS-DAPPS individuals hired between the April and May CPS reference weeks is representative of all decennial census workers hired in the same period, the results from the linked ACS-DAPPS sample give us the *proportion* of the new census hires in May who come from employment, unemployment, and not in the labor force. We use the linked

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ACS-DAPPS sample to calculate these proportions separately by month of the first CPS

reference week after hire. To get the total counts of people who come from each labor force

category, we multiply these proportions by the total number of gross hires that we calculate from

the DAPPS universe file.

The paragraph above describes how we construct the number of gross hires to decennial

work each month that come from employment, unemployment, or not in the labor force.

However, even when the Census Bureau is hiring a large number of people, there are some

persons who are ending their work for the 2010 Decennial Census. To get the net hires and

separation numbers we are interested in, we also look at the number of people who leave Census

each month to get gross separation numbers as well.

These separation numbers are constructed in a very similar way to the hiring numbers.

Taking May 2010 as an example again, our statistic for this month comes from people whose last

week working for decennial was during the time period April 11th and May 8th. To approximate

what their labor force status would have been in the CPS reference week of May 9th through 15th,

we look at linked ACS-DAPPS individuals whose ACS reference weeks fell within 4 weeks of

their separation. So for example, for people whose last DAPPS week was May 2nd through 8th,

we only keep respondents with an ACS reference week during the time period May 9th through

June 5th. We then use the labor force status from this ACS reference week, and assume their

labor force status in the May 2010 CPS reference week would have been the same. Assuming

that our sample of linked ACS-DAPPS individuals separating between the April and May CPS

reference weeks is representative of all decennial census workers separating in the same period,

the results from the linked ACS-DAPPS sample give us the *proportion* of the census separations

in May who exit to employment, unemployment, and not in the labor force. We use the linked

ACS-DAPPS sample to calculate these proportions separately by month of the first CPS reference week after separation. To get the total counts of people who exit to each labor force category, we multiply these proportions by the total number of gross separations that we calculate from the DAPPS universe file. To get the number of net hires from employment, we take the gross hires from employment described above and subtract the gross separations to employment described above. We conduct corresponding calculations to obtain the net hires from unemployment and not in the labor force.

To summarize, we apply the distribution of labor force status in the four weeks preceding census hire among ACS-DAPPS linked individuals to the set of all DAPPS hires, deriving total flows into decennial Census employment from E, U, and NILF. Similarly, we apply the distribution of labor force status in the four weeks following census separation among ACS-DAPPS linked individuals to the set of all DAPPS separations, deriving total flows out of decennial census employment into E, U, and NILF. Table 1 gives the sample sizes by month for our ACS-DAPPS analysis sample using the methodology described above.[7]

IIIC. Representativeness of ACS-DAPPS Linked Sample

As mentioned previously, we link the DAPPS and the ACS data via the PIK. In the DAPPS data, basically all observations have a PIK because decennial workers have to provide their names and social security numbers when applying to work for Census, and this information was verified during the hiring process. However, only 92.57 percent of 2010 ACS respondents have a PIK (Bond et al. 2013). A respondent in the ACS may be missing a PIK if their personally identifiable information in the ACS is incomplete (such as their last name being

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[7] Due to insufficient sample, our analysis sample excludes individuals with hire or separation events in or before the January 2010 CPS reference week and after the September 2010 CPS reference week.

missing), or if they are not present in any of the administrative records used by the U.S. Census Bureau. Bond et al. (2013) find that in the ACS, white non-Hispanic, native born, higher income, and employed individuals are more likely to receive a PIK. Thus, analyzing only data for persons with a PIK in both the DAPPS and the ACS might bias inferences. In addition, while the 2010 ACS did have a high response rate of 97.6%, there is still the possibility that nonresponse bias may affect our estimates as well. While the ACS weights are intended to mitigate nonresponse bias, they do not explicitly account for differences in employment status across responding and nonresponding households.

To analyze potential bias in our ACS-DAPPS sample, Table 2 presents means of select employment and demographic variables. Employment variables come from the DAPPS. Demographic variables come from the Census Numident, which provides data on age and sex for all individuals in the United States with a social security number. The first column shows the results for the entire universe of DAPPS workers, and the second column shows corresponding statistics for the sample of all DAPPS workers matched to the 2010 ACS. The last column of estimates shows means for our analysis sample: PIKs assigned uniquely to ACS and DAPPS individuals, where age in the ACS is at least 18 and the ACS reference week falls within a four week window before Census hire or after Census separation. The main difference in Table 2 is that the analysis sample has fewer males and is slightly older. Among the employment variables, the only statistically significant difference is that individuals in our analysis sample earn about $7 less per week on average than the full universe of DAPPS individuals.[8]

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[8] In future work, we plan to investigate whether our key results are robust to reweighting the analysis sample to better resemble the demographic and employment characteristics of the full DAPPS universe.

IIID. Key assumptions and possible sources of error

The key assumptions in our methodology are that A) for hires, a person's ACS labor force status in the period close to their start date would have been the same in the upcoming CPS reference week if they were not hired for the decennial census (with the assumption for separations defined similarly), B) all people working for the 2010 Census would report themselves as employed in the ACS, and C) ACS labor force status proxies for CPS labor force status.

For assumption A), this assumption is imperfect as people could lose their existing jobs or individuals unemployed in the ACS reference week could find non-census work before the next CPS reference week. In addition, the time span of interview dates we used to calculate counterfactual employment status is somewhat large in order to obtain a sufficient sample size. For example, for the May 2010 statistics, we include in our analysis sample people who started working for the decennial census the week of April 18 through 24 and whose ACS reference week was March 21st through March 27th. The inclusion of this lagged data may bias our results slightly. Ideally we would use ACS labor force status only in the CPS reference weeks surrounding census employment, but we have insufficient sample for that exercise.

For assumption B), it's possible that despite the ACS having the question "LAST WEEK, did this person do ANY work for pay, even for as little as one hour?" some people might consider their decennial job to be more of a hobby or community service activity rather than a job. These people may report themselves as unemployed or not the labor force, or may be imputed as unemployed or NILF. In addition, if someone else from the household is responding to the ACS on their behalf, the respondent might be unaware the person is working for the U.S.

Census Bureau, and thus report their labor force status incorrectly. Examining the prevalence of these possible errors for decennial workers is left for future research.

For assumption C), we approximate CPS labor force status using ACS labor force status because we have a much larger sample of linked ACS-DAPPS individuals than we would if we linked the DAPPS to the CPS. Three factors might lead to differences in labor force status measures according to the ACS and the CPS, and we reiterate that the CPS is the source of the official unemployment rate published by the BLS. First, the ACS uses fewer questions to assign employment status, and some of those questions are worded differently to their analogs in the CPS, as Kromer and Howard (2011) detail. Second, the ACS and the CPS collect data via different modes, with the main difference in 2010 being the option to respond to the ACS by submitting the paper questionnaire without interviewer assistance. Third, the CPS is an address-based panel study, with estimated unemployment rates that decline with individuals' months in sample (Krueger, Mas, and Niu, 2017). By contrast, the ACS is a cross-sectional study. For 2010, the annual unemployment rate for the civilian, noninstitutionalized population aged 16 and over was 10.8% (margin of error +/-0.1) according to the ACS 1-year data and 9.6% according to the CPS.[9] Consequently, our ACS measures of employment status likely overstate the stock of unemployed surrounding census employment, relative to the unobserved CPS measures of employment status. However, sensitivity analysis suggests that these CPS-ACS differences affect our calculations of the counterfactual unemployment rates in the next section by less than one-tenth of a percentage point.

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[9] See
https://data.census.gov/cedsci/table?q=s2301%202010&hidePreview=false&tid=ACSST1Y2010.S2301&y=2010&vintage=2010 for the ACS estimate and https://www.bls.gov/cps/cpsaat01.htm for the CPS estimate.

IV. Results

The BLS publishes the number of decennial census temporary and intermittent workers in each month. We repeat this information in Table 3. The first column in Table 3 shows the stock of temporary census workers by month, and the second column shows the net flows from one month to the next. Table 3 shows a large hiring spike of 411,000 workers in May 2010, followed by employment levels that decline by 225,000 in June 2010, 143,000 in July, and 114,000 in August. As seen in Figure 1 (and shown explicitly in the appendix), our DAPPS data closely replicates the BLS published numbers.

Figure 2a shows the number of DAPPS persons who were employed, unemployed, or not in the labor force in the month prior to becoming a temporary census employee. Figure 2b shows the labor force status {E,U,NILF} of the DAPPS persons in the month after they leave temporary census employment. The data that underlies all the figures is given in the appendix to this paper.

Our main finding comes from Figure 2a. Looking at May 2010, 164,700 DAPPS persons were employed the month before beginning their temporary census employment, 135,800 DAPPS persons were unemployed the month before beginning their temporary census employment, and 111,000 were not in the labor force the month before beginning their temporary census employment. Based on the methodology described in the conceptual framework earlier, these flows imply that, relative to the counterfactual, the 411,000 DAPPS persons hired in May 2010 decreased the May 2010 unemployment rate by 0.1%.[10] This one-

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[10] If we assume that the 135,800 persons remained unemployed in May and the 111,000 persons remained NILF in May, then the counterfactual number of unemployed increases from the published 14.973 million to 15.109 million and the counterfactual labor force falls from the published 154.393 million to 154.282 million. The counterfactual unemployment rate of 9.8% is calculated as (15.109 / 154.282 = 9.79%), which is 0.1% higher than the published unemployment rate of 9.7% (14.973 / 154.393 = 9.70%).

tenth of a percentage point is within the standard error for the official BLS unemployment rate, and BLS press releases would denote a change in the unemployment rate of 0.1% or less as "unchanged."

Table 4a shows the calculation of the originally published unemployment rates for all months between February 2010 and September 2010. [11] The third column of Table 4a shows the ratio of the number of unemployed persons to the number of persons in the labor force calculated to two decimal places, and the fourth column of Table 4a shows this ratio rounded to one decimal place. This fourth column is the published unemployment rate. Table 4b shows the calculation of the counterfactual unemployment rates for all months between February 2010 and September 2010. The third column of Table 4b shows the ratio of unemployment to the labor force for the counterfactuals, and the fourth column of Table 4b shows the difference between the counterfactual unemployment - labor force ratio and the published unemployment - labor force ratio to two decimal places.

As seen in the fourth column of Table 4b, the difference between the counterfactual and the published unemployment - labor force ratios are less than 0.05 in absolute value in all months of 2010 except May. The difference for May 2010 is 0.09, which is the calculation underlying our key conclusion that the 411,000 DAPPS persons hired in May 2010 decreased the May 2010 unemployment rate by 0.1% relative to the counterfactual. Relative to the counterfactual, the corresponding flows in all other months of 2010 influenced the unemployment rate by less than

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[11] In Table 4a, we use the employment and unemployment statistics as originally published by the BLS. Our conclusions do not change if we use the employment and unemployment statistics currently published on the BLS website.

0.05% (although cumulatively, the 165,630 exits into unemployment between June and September 2010 are large enough to raise the unemployment rate by 0.1%).[12]

Two other findings from Figure 2a are worth mentioning. First, the large hiring surge in May 2010 came from persons already in the labor force: 40 percent (164,700 / 411,500) of DAPPS persons beginning work in May were employed in the prior month, and 33 percent (135,800 / 411,500) were unemployed in the prior month. Second, the persons hired for temporary census employment are not representative of the population in terms of labor force status. Of the 411,000 persons hired into temporary census employment in May 2010, their unemployment rate the month before was 45.2% (135,800 / 300,500), which is substantially higher than the 9.9% April 2010 seasonally adjusted unemployment rate of all persons.

V. Summary

Our goal in this paper has been to quantify how the large spike in temporary hiring for the decennial census affects the national unemployment rate. By linking DAPPS and ACS data, we show that the more than 400,000 temporary workers hired in May 2010 lowered the May 2010 unemployment rate by one-tenth of a percentage point relative to the counterfactual. We also show that relative to the counterfactual, hires into temporary census employment or exits from temporary census employment in any other month of 2010 are not large enough to affect the unemployment rate. These estimates are within the standard error for the official

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[12] The calculations in Table 4b illustrate why we focus on the difference in the unemployment - labor force ratio, which has two decimals, rather than the unemployment rate, which has one decimal. For example, in March 2010, the 48,000 persons hired into Census employment decreased the March 2010 unemployment rate from the counterfactual 9.763% to the published 9.749%, which is a change of 0.014%, However, when rounded to one decimal, this would be a decrease in the unemployment rate of 0.1% (from 9.8% to 9.7%).

unemployment rate, and BLS press releases would denote a change in the unemployment rate of one-tenth of a percentage point or less as "unchanged."

We conclude with two final thoughts. First, it is tempting to speculate how the large decennial census hiring event about to occur in 2020 will affect the unemployment rate. We do not attempt to do so here because the economic environments in 2010 and 2020 differ in ways we do not at this time fully understand. In future research we plan to replicate this study with 2020 DAPPS and 2020 ACS once the data become available. Second, we see the data on decennial hiring as useful in developing a better understanding of temporary work more generally, and we plan to analyze how temporary census employment affects family income and whether it serves as a stepping stone onto higher rungs of the job ladder.

References

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Table 1: ACS-DAPPS analysis sample size, by month

2010	Sample Size
February	40
March	100
April	250
May	650
June	200
July	200
August	150
September	70
Total	1,660

Note: Sample sizes rounded according to disclosure avoidance practices for unweighted counts.
Source: Authors' calculations.

Table 2: Representativeness of ACS-DAPPS linked sample

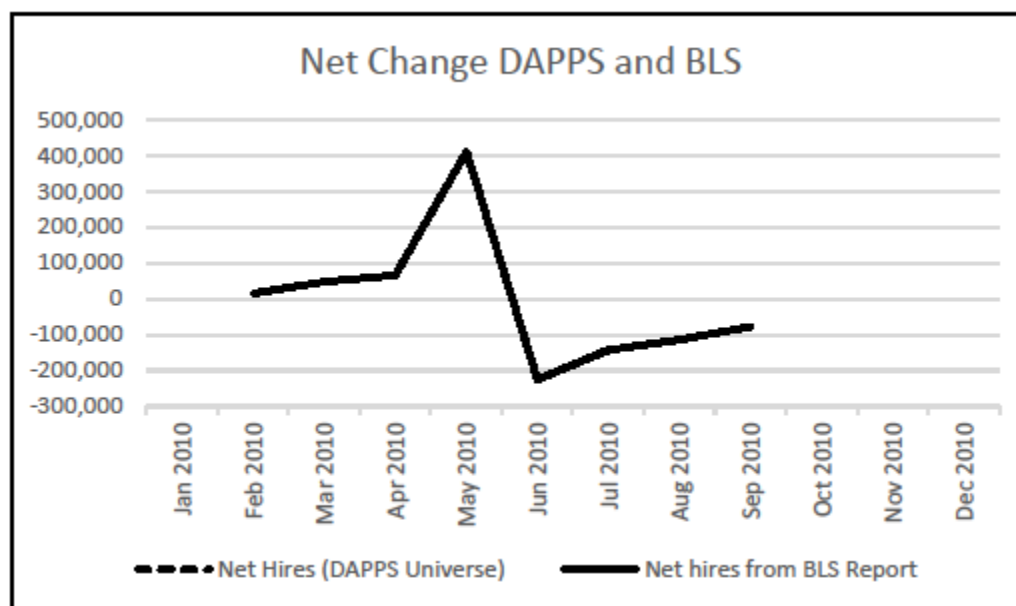|	2010 DAPPS Universe		All 2010 ACS-DAPPS linked individuals		2010 ACS-DAPPS analysis sample	
	Mean	SE	Mean	SE	Mean	SE
Weeks Between Start and End Date	9.732	0.008	9.867	0.082	9.426	0.189
Percent Weeks Worked Between Start and End Date	89.96	0.017	89.87	0.175	89.84	0.418
Average Earnings Per Week (2010 $)	318.7	0.159	320.4	1.635	311.5	3.941
Hourly Wage (2010 $)	14.50	0.003	14.51	0.035	14.44	0.088
Average Hours Per Week	7.113	0.002	7.131	0.020	7.177	0.049
Male (%)	43.50	0.057	43.57	0.579	40.62	1.451
Age (as of December 31st, 2010)	44.92	0.019	45.54	0.196	46.24	0.499
Observations	761,000		11,000		1,660	

Note: Sample sizes rounded according to disclosure avoidance practices for unweighted counts.
Source: Authors' calculations.

Table 3: BLS publication of the number of decennial census temporary and intermittent workers in each month of 2010
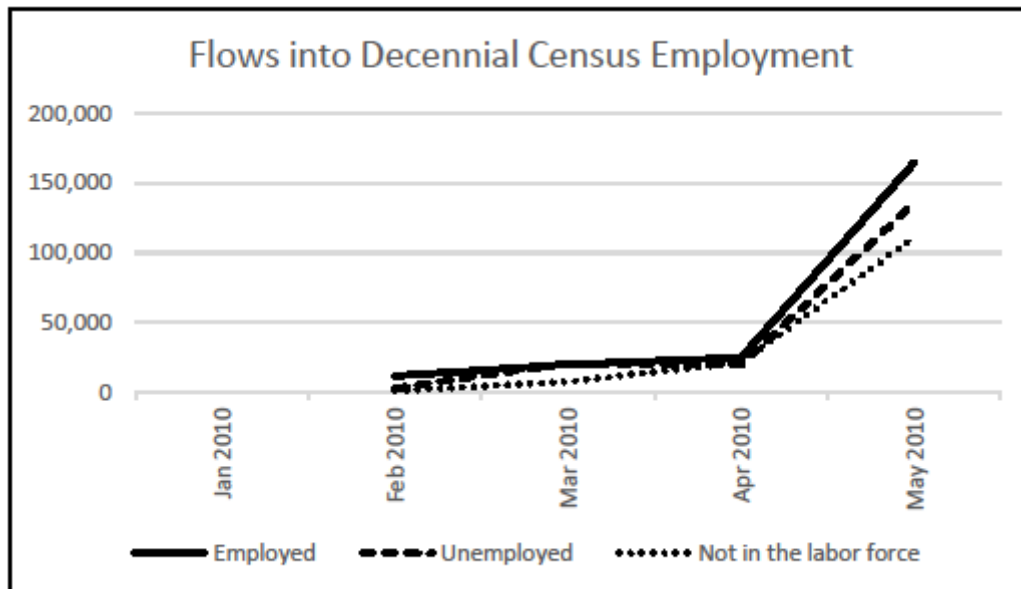
2010	Number (thousands)	Change (thousands)
January	24	9
February	39	15
March	87	48
April	154	66
May	564	411
June	339	-225
July	196	-143
August	82	-114
September	6	-77
October	1	-5
November	0	-1
December	0	0

Source: https://www.bls.gov/ces/tables/census-temporary-intermittent-workers-government-employment.htm.
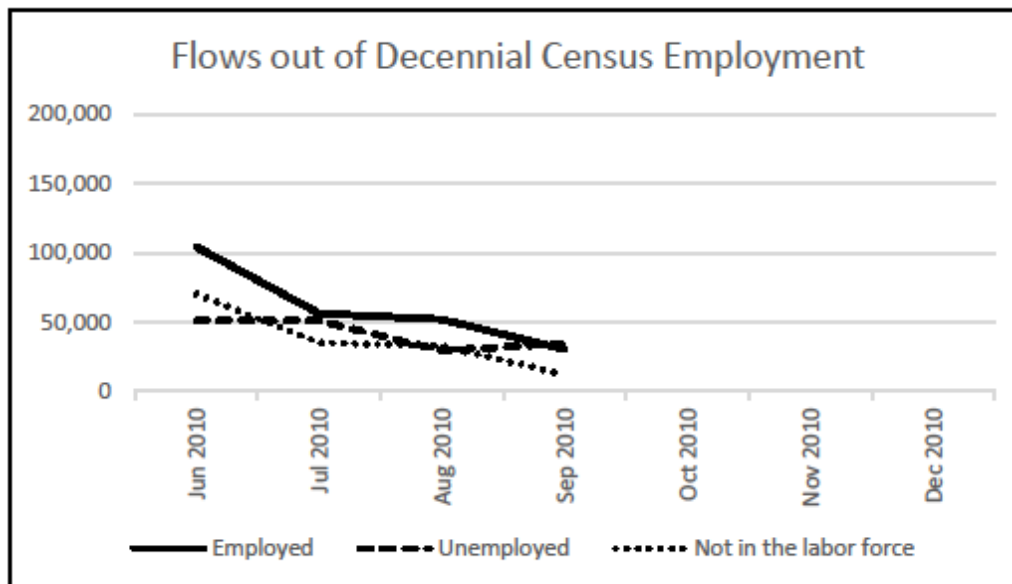
Figure 1: Net change in the number of decennial census temporary and intermittent workers in each month of 2010, BLS published numbers and DAPPS data

Figure 2a: Labor force status of DAPPS persons the month before becoming a temporary census employee

Figure 2b: Labor force status of DAPPS persons the month after leaving temporary census employment

Table 4a: Unemployment rate as originally published by BLS, by month

2010	Employment (E)	Unemployment (U)	U / (E+U)	Published Unemployment Rate
February	138,641	14,871	9.69	9.7
March	138,905	15,005	9.75	9.7
April	139,455	15,260	9.86	9.9
May	139,420	14,973	9.70	9.7
June	139,119	14,623	9.51	9.5
July	138,960	14,599	9.51	9.5
August	139,250	14,860	9.64	9.6
September	139,391	14,767	9.58	9.6

Note: Employment and unemployment are in thousands.
U/(E+U) and Published Unemployment Rate are percentages.
Source: https://www.bls.gov/bls/news-release/empsit.htm#2010.

Table 4b: Counterfactual unemployment rate, by month

2010	Counterfactual Employment (E)	Counterfactual Unemployment (U)	Counterfactual U / (E+U)	Difference U / (E + U)
February	138,637	14,874	9.69	0.00
March	138,877	15,026	9.76	0.01
April	139,414	15,280	9.88	0.02
May	139,173	15,109	9.79	0.09
June	139,240	14,572	9.47	-0.04
July	139,046	14,548	9.47	-0.04
August	139,312	14,831	9.62	-0.02
September	139,437	14,732	9.56	-0.02

Note: Employment and unemployment are in thousands.
Counterfactual U/(E+U) and Difference U/(E+U) are percentages.
"Difference U / (E+U)" is the difference between Table 4a and Table 4b.
Source: Authors' calculations.

Appendix

Month	Net hires from BLS Report	Net Hires (DAPPS Universe)	Employed	Unemployed	Not in the labor force
February 2010	15,000	15,500	11,610	2,768	1,122
March 2010	48,000	47,900	19,840	20,640	7,420
April 2010	66,000	66,000	24,780	19,800	21,420
May 2010	411,000	411,500	164,700	135,800	111,000
June 2010	-225,000	-225,500	-104,300	-50,960	-70,240
July 2010	-143,000	-142,000	-56,070	-50,860	-35,070
August 2010	-114,000	-114,000	-51,970	-29,260	-32,770
September 2010	-77,000	-76,550	-30,150	-34,550	-11,850