

# REPORT

FINAL REPORT

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## **Redesign of the Income Questions in the Current Population Survey Annual Social and Economic Supplement: Further Analysis of the 2014 Split- Sample Test**

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## EXECUTIVE SUMMARY

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Surveys underestimate income, generally, and they tend to do worse in estimating unearned income than earned income. In an effort to improve the reporting of income in the survey that serves as the official source of household income and poverty statistics in the United States, the Census Bureau developed a new battery of income questions for prospective use in the Current Population Survey Annual Social and Economic Supplement (CPS ASEC). The new questions were designed to improve the capture of retirement income and asset income in particular and unearned income in general. With promising results from a content test conducted with a small sample of households in 2013, the Census Bureau implemented a split-sample test with the 2014 CPS ASEC, administering the redesigned income module to a random subsample of households and the traditional income module to the remaining households. The Census Bureau's preliminary analyses compared estimates of income and poverty from the two samples and found evidence of higher reported reciprocity and income for selected sources in the sample that received the redesigned instrument. More difficult to understand, the Census Bureau study also found evidence that the redesigned instrument was associated with a higher incidence of measured poverty among children. Despite the random assignment to the two samples, differences in composition were observed and may have contributed to the poverty findings.

The analysis presented here takes advantage of the design of the CPS monthly sample to compare the responses of households that were interviewed for the CPS ASEC in consecutive years. Specifically, our analysis uses matched samples of households that were interviewed in both the 2013 and 2014 CPS ASEC. One sample includes households that were administered the traditional income module in both 2013 and 2014 and the other includes households that were administered the traditional module in 2013 and the redesigned income module in 2014. The latter matched sample provides responses to both the traditional and redesigned income modules from the same households. By comparing the change in responses between 2013 and 2014 across the two samples, we obtain estimates of the impact of the redesigned income module. This approach is analogous to the "difference-in-differences" methodology used in evaluation research. Our findings supplement the Census Bureau's comparison of responses to the redesigned and traditional questions between random subsamples of the 2014 CPS ASEC sample.

With our matched sample analysis we found that the receipt of both earned and unearned income declined significantly among households responding to the traditional income questions in both years. The reporting of earned income also declined among households that received the redesigned instrument in 2014, but the reporting of unearned income increased. The difference-in-differences estimates show significantly more reciprocity with the redesigned instrument for three sources of unearned income, led by interest with a 15.74 percentage point net increase. While interest shows a significant decline in reciprocity between 2013 and 2014 with the traditional instrument, it shows a substantial increase between those two years when the traditional instrument was replaced by the redesigned instrument. The other two sources with significantly more reciprocity are disability benefits and financial assistance from others. The receipt of disability benefits grows significantly with the introduction of the redesigned instrument but shows no change with the traditional instrument. Financial assistance from others shows opposing, nonsignificant changes with the different instrument pairings, which yield a significant difference in differences. In contrast to these three sources, farm self-employment

income shows a significant decline in frequency in the redesign sample and in the difference between the two samples.

The Census Bureau analysis also shows significantly higher reciprocity of interest, disability benefits, and dividends with the redesigned instrument. (The Census Bureau analysis did not include financial assistance from others or alimony.) Unlike our analysis, the Census Bureau analysis shows three additional income sources—Social Security, SSI, and public assistance—with significantly higher reciprocity with the redesigned instrument and one source, Worker’s Compensation, with significantly lower reciprocity. For all but Social Security, this discrepancy could be due to differences between the two samples. While not tested for significance, SSI and public assistance were higher in both years, and Worker’s Compensation was lower in both years in the sample that received the redesigned instrument. Social Security reciprocity, however, was very similar between the two samples in both years, showing statistically significant and nearly identical percentage increases between 2013 and 2014. The Census Bureau estimates represent numbers of recipients rather than recipient households, however, and this may account for the difference in our findings.

Except for wage and salary income and Social Security, the reporting of reciprocity in both matched samples shows considerable volatility between 2013 and 2014. Imputation accounts for some of the observed volatility. Even so, our findings are striking. For example, in both samples, 49 percent of the households that reported SSI receipt and 46 to 48 percent of the households that reported receiving dividends in 2013 did not report such income in 2014. With the traditional instrument, new SSI recipients in 2014 were 52.2 percent of the households reporting receipt in 2013. With the redesigned instrument, new SSI recipients in 2014 were 56.8 percent of the number reporting receipt in 2013. For dividends these figures were 39.6 percent and 45.3 percent, respectively. The most volatile source was other income, for which these figures ranged between 80.4 and 88.5 percent. While about 7 percent of households reporting earnings in the 2013 survey did not do so in the 2014 survey, and the new earners in 2014 were 4 to 5 percent of the number of households with earnings in 2013, the corresponding statistics for nearly all other sources ranged between 30 and 80 percent.

Our difference-in-differences analysis of change in the reporting of aggregate income found the redesigned instrument to be associated with significant increases in the reporting of both total income and unearned income overall and in Social Security, disability benefits, retirement income, interest, and financial assistance from others. For a number of other sources, our analysis found differences that, while also not statistically significant, were nonetheless striking. For four of these sources the Census Bureau analysis found significant differences in the reporting of aggregate income. These include higher amounts of SSI, veterans’ benefits, and dividends and a lower amount of farm self-employment income. The matched sample analysis differs from the Census Bureau results in the direction of change for dividends. Our analysis also found evidence of relatively greater increases in survivors’ benefits, for which the Census Bureau found no difference, and other income, which the Census Bureau did not test. The increase in other income undoubtedly reflects the addition of alimony after its elimination as a separate source. One Census Bureau finding that was not replicated in our analysis involved higher aggregate income for public assistance. It is possible that the Bureau’s finding reflects a difference in the underlying samples, but we were not able to explore this directly.

Because the question on disability benefits was moved ahead of the question on veterans' benefits, and respondents to the disability question are no longer asked to exclude veterans' benefits, we speculated that the increased reporting of disability benefits with the redesigned instrument may have been due to respondents reporting their veterans' benefits under the disability question and then either not reporting them as veterans' benefits or reporting them in both places. Instead, we found that most of the growth in the reporting of disability benefits occurred among households reporting no veterans' benefits in either year.

With the matched samples we can ask whether the introduction of the redesigned instrument reduced the estimated household poverty rate and, more generally, where in the distribution of income relative to poverty the redesigned instrument had the greatest impact. Consistent with the Census Bureau's static analysis, we find that the redesigned instrument did not reduce the proportion of households below poverty or with low income generally. However, the redesigned instrument moved households out of the range from 200 to 300 percent of poverty and increased the proportion above 500 percent of poverty.

We also find that while the 2013 distributions of the two samples by relative income were not significantly different, the sample receiving the redesigned instrument in 2014 had somewhat higher fractions below 100 and 200 percent of poverty and lower fractions above 400 and 500 percent of poverty than the sample receiving the traditional instrument in 2014. This provides some support for the Census Bureau's expressed concerns that the sample selected to receive the redesigned instrument tended to have lower income than the sample selected to receive the traditional instrument.

Nevertheless, our matched sample analysis finds a significant reduction in the poverty rate between 2013 and 2014 among children in households receiving the traditional instrument in both years compared to no significant change in households receiving the redesigned instrument in 2014. This is consistent with the Census Bureau's finding that poverty among children in 2014 was higher with the redesigned instrument.

Compared to the traditional instrument, the redesigned instrument shows generally smaller proportions of Social Security-recipient households receiving at least half of their household income from Social Security and more of such households receiving only 10 to 20 percent of their income from this source. Notably, among households receiving the traditional instrument in both years the overall proportion of households receiving half or more of their total income from Social Security rose by 1.31 percentage points between 2013 and 2014 whereas this proportion declined by 2.45 percentage points among households receiving the redesigned instrument in 2014.

Neither the redesigned split-sample file nor the 2015 CPS ASEC, which used the redesigned income module for all households, reflects the full impact of the redesign in that the Census Bureau's imputation procedures did not make use of the income brackets that a fraction of respondents provided in lieu of dollar amounts and did not incorporate the new variables introduced to better capture retirement income, total interest, and total dividends. Essentially, the imputations were run using the old methods. This could account for some of the counter-intuitive findings with respect to farm self-employment income and could have contributed to some of the other findings as well. Because of this possibility, once the Census Bureau has developed and

tested the new imputation procedures, an essential step is that these be run on the 2014 redesign sample file and the Bureau's evaluations repeated. Only then can the Census Bureau be sure that its estimates will reflect the full impact of the redesigned income module. Extending the analysis of the impact of the redesigned instrument to include the 2015 CPS ASEC, which can be done only through a matched sample methodology, would enable the Census Bureau to expand its base of findings on the impact of the redesigned income module.

## **I. INTRODUCTION**

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Surveys underestimate income, generally, and they tend to do worse in estimating unearned income than earned income. In an effort to improve the reporting of income in the survey that serves as the official source of household income and poverty statistics in the United States, the Census Bureau developed a new battery of income questions for prospective use in the Current Population Survey Annual Social and Economic Supplement (CPS ASEC). The new questions were designed to improve the capture of retirement income and asset income in particular and unearned income in general. For example, they (1) broaden the definition of retirement income by asking respondents to report all withdrawals from all retirement accounts; (2) ask about individual sources of interest income; and (3) include a question on capital gains. Additionally, the new questions attempt to improve the reporting of all forms of unearned income by asking respondents to report their sources of unearned income before providing amounts for any of these sources. With promising results from a content test conducted with a small sample of households in 2013, the Census Bureau implemented a split-sample test with the 2014 CPS ASEC, administering the redesigned income module to a random subsample of households and the traditional income module to the remaining households. The Census Bureau's preliminary analyses compared estimates of income and poverty from the two samples.

In our study, we take a different approach than the Census Bureau's to assess the impact of the redesigned income module on estimates of income and poverty. The analysis presented here takes advantage of the design of the CPS monthly sample to compare the responses of households that were interviewed for the CPS ASEC in consecutive years. Specifically, our analysis uses matched samples of households that were interviewed in both the 2013 and 2014 CPS ASEC. One sample includes households that were administered the traditional income

module in both 2013 and 2014 and the other includes households that were administered the traditional module in 2013 and the redesigned income module in 2014. The latter matched sample provides responses to both the traditional and redesigned income modules from the same households. By comparing the change in responses between 2013 and 2014 across the two samples, we obtain estimates of the impact of the redesigned income module. This approach is analogous to the “difference-in-differences” methodology used in evaluation research. Our findings supplement the Census Bureau’s comparison of responses to the redesigned and traditional questions between random subsamples of the 2014 CPS ASEC sample.

Chapter II reviews the design changes to the income module, describes the split-sample study design and the initial implementation of the redesigned module, and summarizes the Census Bureau’s initial findings. Chapter III outlines Mathematica’s matched sample study design, and Chapter IV presents our findings. Chapter V presents additional analyses, and Chapter VI provides a summary and our conclusions.

## **II. REDESIGN OF THE CPS ASEC INCOME MODULE AND CENSUS BUREAU FINDINGS**

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The revisions to the CPS ASEC income module were substantial and were motivated by a desire to update and generally enhance the collection of income data. To assess their impact prior to full-scale implementation, the Census Bureau conducted a split-sample test using the 2014 CPS ASEC. The Census Bureau’s preliminary analysis of the split-sample data covered a wide range of potential impacts on reported income. A detailed review of the changes to the instrument, a description of the design of the split-sample test, and a summary of the key findings from the Census Bureau analysis provide important background to the present study.

### **A. Changes to the Instrument**

Key changes to the income section of the CPS ASEC include the following:

- Elimination of the use of the family income screener, a crude measure of family income collected at the beginning of the survey, to exclude higher-income families from questions on the receipt of certain means-tested benefits
- Implementation of a “dual-pass approach,” whereby questions on the receipt of all sources of unearned income are asked before income amounts are requested
- Introduction of tailored skip patterns that order the unearned income questions differently for low-income (value of the family income screener is less than \$75,000), senior (the householder or spouse is 62 or older), and all other households
- Addition of follow-up questions to establish ranges of amounts (or brackets) for dollar amounts that respondents were unable or unwilling to provide
- Division of retirement assets into pensions, annuities, and seven distinct types of retirement accounts
- Replacement of questions about regular payments from retirement accounts with questions on withdrawals and distributions—including required withdrawals by persons over 70—from each type of retirement account
- Addition of questions to establish ownership of up to seven types of non-retirement assets that may have paid interest or dividends
- Replacement of questions asking total amounts of interest and dividends with questions about interest or dividends received from each type of retirement and non-retirement account

- Addition of questions to ascertain whether any of the money withdrawn from retirement accounts was rolled over or reinvested and, if so, how much
- Reordering of questions on the receipt of disability and veterans' benefits to put the former ahead of the latter for all respondents
- Addition of a question on capital gains—not previously included in CPS money income—to the section on income-earning accounts
- Elimination of questions on the receipt and amount of alimony
- Revision of the sources listed in the “other” income question to include income received from foster child care, alimony, jury duty, armed forces reserves, severance pay, and hobbies, replacing “hobbies, home businesses, farms, or business interest not already covered”

Table II.1 shows the sequence in which the questions on individual sources of unearned income were asked for low-income, senior, and the remaining, default households and compares these to the sequence using the traditional instrument. Low-income households receive questions on public assistance and the Supplemental Nutrition Assistance Program (SNAP) immediately following unemployment and Worker's Compensation whereas these two programs are covered near the middle of the sequence for default households and even later for senior households. With the traditional instrument, public assistance was sequenced fourth, but questions on SNAP did not appear until after all of the other sources had been covered and were placed in the middle of a separate low-income section that appeared near the end of the instrument. Social Security and SSI were sequenced second and third for default and senior households, as they were with the traditional instrument. For low-income households these sources were included in the 7th and 8th positions.

With the redesigned instrument, questions on pensions and annuities are asked separately from questions on retirement accounts. For senior households, the positioning of these items is about the same as with the traditional instrument and somewhat earlier than for default households and low-income households. Also with the redesigned instrument, accounts that pay



interest and dividends are identified in the sections on retirement accounts, with other income-earning accounts directly following. With the traditional instrument, interest and dividends were treated as general sources, not tied to specific types of accounts. The data on these sources were collected following the questions on retirement account withdrawals and pensions—somewhat earlier than with the redesign.

**Table II.1. Sequence of data collection for income sources under the redesigned and traditional CPS ASEC instruments**

Income Source	Default	Low Income	Seniors	Traditional Instrument
Unemployment/Worker's Compensation	1	1	1	1
Social Security/SS for Children	2	4	2	2
SSI/SSI for Children	3	5	3	3
Disability Benefits	4	6	4	7
Veterans' Benefits	5	7	5	5
Survivor Benefits	6	8	6	6
Public Assistance/TANF	7	2	12	4
SNAP	8	3	13	17 <sup>b</sup>
Pensions	9	9	7	
Annuities	10	10	8	
Retirement Accounts	11	11	9	
Other Income Earning Accounts	12	12	10	
Property Income	13	13	11	11
Education Assistance	14	14	14	12
Child Support	15	15	15	13
Regular Financial Assistance	16	16	16	15
Other Money Income	17	17	17	16
Retirement and Pensions <sup>a</sup>				8
Interest				9
Dividends				10
Alimony				14

Source: U.S. Census Bureau (2014, 2015).

<sup>a</sup> Includes all pensions as well as regular payments from annuities, paid up life insurance, IRA, Keogh, 401(k), 403(b), and 457(b) and (f) accounts.

<sup>b</sup> In the traditional instrument, questions on SNAP appear in the middle of a section on low-income in-kind benefits near the end of the instrument.

The revisions to the income module were designed to improve CPS ASEC income reporting in a number of ways. Bypassing the family income screener will allow moderate income families to report means-tested benefits that they were previously precluded from reporting. The dual-pass approach was adopted to discourage people from falsely reporting that they did not receive individual income sources in order to avoid having to report additional amounts. The tailored

skip patterns were designed to ensure that distinct subsets of the population are asked first about those sources that are likely to be most relevant. The extensive revisions of the questions on retirement income were designed to improve the capture of income from retirement assets that are gradually replacing traditional pensions. The expansion of the questions on non-retirement assets was intended to improve the reporting of interest and dividend income. Finally, a general consideration was to make more effective use of the computer-assisted interviewing technology that was introduced in the mid-1990s; this is best reflected in the tailored skip patterns.

### **B. Design of the split-sample study**

About 30,000 addresses from the 2014 CPS ASEC sample were selected at random to be administered the redesigned income module. The remaining 68,000 addresses were assigned to receive the traditional income module.<sup>1</sup> Both sets of sample addresses included some that were found to be ineligible (primarily demolished or vacant) and some that, while eligible, could not be interviewed within the brief CPS window. From the 30,000 sample addresses selected to receive the redesigned income module, about 22,700 households were interviewed. The sample of 68,000 addresses selected to receive the traditional income module yielded approximately 51,500 interviews.

Around 11 percent of the interviewed households in each sample completed the monthly labor force portion of the questionnaire but did not complete the ASEC supplement. For these households, the Census Bureau imputed responses to the ASEC supplement, using other households from the same sample as donors and the variables collected in the labor force

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<sup>1</sup> Originally, 3/8 of the sample households were to be assigned the redesigned instrument while the remaining 5/8 received the traditional instrument. For this reason the two samples are sometimes identified as the 3/8 and 5/8 samples (see, for example, Semega and Welniak (2015)). While these rates were applied in seven of the CPS sample's eight rotation groups (see Chapter III), one rotation group could not be subsampled, so all of its households received the traditional instrument.

questionnaire as covariates. These “whole imputes” are treated as respondents in the Census Bureau analysis of the impact of the redesigned income module and in our own analysis as well, as the imputations were drawn from responses to the same income module that the nonresponding households were assigned to receive.

### **C. Implementation of the redesigned instrument**

To fully implement the redesigned instrument requires changes to the Census Bureau’s post-survey processing procedures. Editing and imputation routines must be developed for the additional information collected with the redesigned instrument, including but not limited to the data obtained for several retirement and non-retirement accounts. Most notably, the income bracket data collected for all sources of earned and unearned income must be incorporated into the CPS ASEC imputation procedures. In processing the redesigned sample data, the Census Bureau made limited changes to its editing and imputation routines. The income brackets collected from respondents who could not provide full amounts were not used in imputation, and interest, dividends, and withdrawals from separate retirement accounts were imputed collectively. This is likely to have resulted in under-imputation. For example, if a respondent reported interest from one of multiple retirement or non-retirement accounts that provided interest but could not report the amount of interest from any of the other accounts, the reported interest was included in total interest, but nothing was imputed for the other sources.

To provide the new data in a familiar format and to simplify comparison with the traditional income data, the initial release of public use data from the redesigned questionnaire was formatted in the same way as the data from the traditional questionnaire. This meant that the new variables generated by the redesigned instrument—such as capital gains and the account-specific interest, dividends, and withdrawals collected from individual types of accounts—were not included in the release of public use data from the redesigned sample. These limitations were

extended to the recently released 2015 CPS ASEC, which used the redesigned instrument for all households.

An important implication of these processing limitations is that the full impact of the redesigned instrument on estimates of household and family income cannot be known until the CPS ASEC editing and imputation procedures are updated to incorporate all of the new information that the redesigned instrument collects.

#### **D. Census Bureau findings**

To analyze the impact of the redesigned income questions, the Census Bureau weighted both samples to the same national totals at the person level, and compared estimates of income in the prior calendar year from the two samples (Semega and Welniak 2015). Selected results for household income are shown in Table II.2. Median household income based on the redesigned instrument was significantly higher than that based on the traditional instrument for all households (a 3.2 percent increase); family households (2.0 percent) and, among the latter, married-couple households (3.1 percent); and nonfamily households with a male householder (6.8 percent). Median household income was also significantly higher for households with both white (2.7 percent) and non-Hispanic white householders (3.5 percent) and for households with a householder under 65 (3.1 percent) or 65 and older (4.7 percent). With a householder under 65, however, estimates were significantly different only for those with a householder 35 years or older. When the householder was under 35, median household income based on the redesigned instrument was smaller, but not significantly so, than that based on the traditional instrument. There is a strong suggestion here that younger households do not report more income with the redesigned instrument than with the traditional instrument. Lastly, among the four geographic regions, only the south (3.6 percent) and west (6.0 percent) had significantly higher median household income with the redesigned instrument.

**Table II.2. Census bureau findings on median household income and percentage difference between redesigned and traditional income modules**

Household Characteristic	Median Household Income		Percentage Difference (Redesign Less Traditional)
	Traditional Income Module	Redesigned Income Module	
All households	51,939	53,585	3.2*
<b>Type of Household</b>			
Family households	65,587	66,923	2.0*
Married-couple	76,509	78,897	3.1*
Female householder	35,154	35,412	0.7
Male householder	50,625	52,480	3.7
Nonfamily households	31,178	31,480	1.0
Female householder	26,425	26,238	-0.7
Male householder	36,876	39,379	6.8*
<b>Race/Hispanic Origin of Householder</b>			
White	55,257	56,745	2.7*
White, non-Hispanic	58,270	60,329	3.5*
Black	34,598	35,324	2.1
Asian	67,065	72,383	7.9
Hispanic, any race	40,963	39,687	-3.1
<b>Age of Householder</b>			
Under 65 years	58,448	60,265	3.1*
15 to 24 years	34,311	33,791	-1.5
25 to 34 years	52,702	52,416	-0.5
35 to 44 years	64,973	67,594	4.0*
45 to 54 years	67,141	70,598	5.1*
55 to 64 years	57,538	60,481	5.1*
65 years and older	35,611	37,297	4.7*
<b>Region</b>			
Northeast	56,775	56,868	0.2
Midwest	52,082	53,426	2.6
South	48,128	49,854	3.6*
West	56,181	59,525	6.0*

Source: Semega and Welniak (2015) and DeNavas-Walt and Proctor (2015), Appendix D, from the 2014 CPS ASEC.

\* Statistically significant at the .10 level.

Table II.3 shows, by source, the percentage difference between the estimates obtained from the two samples for the number of recipients, aggregate dollars, and mean income among recipients. For all of the listed sources except Worker's Compensation, reported reciprocity is higher or not statistically different with the redesigned instrument versus the traditional instrument. Specifically, the number of recipients 15 and older is higher for any income (a 1.6 percent increase), Social Security (1.7 percent), Supplemental Security Income (10.2 percent), public assistance (23.6 percent), disability benefits (75.3 percent), retirement income (51.7

**Table II.3. Census bureau findings on percentage difference between estimates of recipients, aggregate income, and mean income by source: redesigned versus traditional income module**

Income Source	Number of Recipients	Aggregate Income	Mean Income (Recipients)
Total income	1.6*	4.2*	2.5*
Earnings	0.3	1.6	1.3
Wages and salaries	0.5	2.2	1.7
Nonfarm self-employment	-3.0	-6.9	-4.0
Farm self-employment	-2.2	-47.1	-45.9*
Unemployment Compensation	-5.2	-6.8	-1.7
Worker's Compensation	-17.9*	-7.4	12.8
Social Security	1.7*	2.4*	0.7
Supplemental Security Income	10.2*	10.3*	0.1
Public assistance	23.6*	36.7*	10.6
Veterans' benefits	-7.8	-23.4*	-16.9*
Survivors' benefits	-1.2	8.5	9.8
Disability benefits	75.3*	35.2*	-22.9*
Retirement income	51.7*	22.2*	-19.4*
Company or union pension	11.8*	25.7*	12.4*
State or local government pension	4.1	-20.2*	-23.4*
Federal government retirement	12.7	-10.1	-20.2*
IRA, Keogh, or 401(k)	419.5*	230.1*	-36.5*
Annuities	1,211.0*	973.0*	-18.2
Interest	41.6*	111.7*	49.4*
Dividends	6.5*	-20.3*	-25.1*

Source: Semega and Welniak (2015) from the 2014 CPS ASEC.

\* Statistically significant at the .10 level.

percent), interest (41.6 percent), and dividends (6.5 percent).<sup>2</sup> Within retirement income, reciprocity is higher for company or union pensions (11.8 percent); IRA, Keogh, or 401k plans (419.5 percent); and annuities (1,211.0 percent) but not for state or local government pensions or federal government retirement. Aggregate income is higher for all of these sources except dividends, for which it is 20.3 percent lower. Aggregate income is also significantly lower with the redesigned instrument for farm self-employment, veterans' benefits, and state or local government pensions. With regard to dividends, Semega and Welniak point out that sum of

<sup>2</sup> Estimates from the redesigned income module in Table II.3 do not reflect the Census Bureau's subsequent revision of those data. The Census Bureau has not (yet) updated the tables in Semega and Welniak (2015).

aggregate interest and dividends is 52.8 percent higher with the redesigned instrument, and they suggest that the reduction in aggregate dividends may be the result of improved classification of income between these two sources. We propose an alternative explanation below, where we provide some thoughts on the decline in veterans' benefits as well. The declines in farm self-employment and state or local government pensions have no obvious link to the changes in the instrument, however.

Mean income declined for all of the sources for which aggregate income declined, but mean income also declined for disability benefits and retirement income as a whole—two sources for which recipiency increased. While aggregate income can be expected to rise with increased recipiency, mean income among recipients will decline if those who are added to the recipient total report less income, on average, than those who reported receipt with the traditional instrument. This scenario is not at all unlikely. One can readily imagine that persons who reported the receipt of specific income sources under the redesigned instrument but not the traditional instrument tended to have less of such income than those who reported receipt under both instruments.

Given the types of income that show the greatest improvement under the redesigned instrument, it is not surprising that reported household income increased more among older households than younger households. However, the fact that increases in household income were limited to households in the southern and western regions is difficult to reconcile with the distribution of increased reporting by source. The regional findings warrant further investigation.

With the biggest increases in aggregate income occurring for annuities, withdrawals from retirement accounts, and interest, the distribution of income derived from the redesigned instrument shows a significantly smaller share of total income held by the bottom two quintiles.

Distributional data from the redesigned instrument also show an increase in selected indexes of income inequality (Semega and Welniak 2015). Overall, the poverty rate is not significantly different between the two samples, but selected subpopulations show significantly higher poverty rates with the redesigned instrument compared to the traditional instrument (Mitchell and Renwick 2015 and DeNavas-Walt and Proctor 2015, Appendix D). These include related children under age 18, all persons under 18, and persons identified as white or Asian. Lower poverty rates were observed among persons identified as black and among the subset of workers 18 to 64 who were not working full-time, year-round.

Differences in the composition of the two samples could account for some of the unexpected differences. In particular, the higher child poverty rate could be due to a higher fraction of female-headed households in the sample that received the redesigned instrument (Mitchell and Renwick 2015). More generally, the random assignment of sample households to the two samples could have placed disproportionately more households with low-income children in the sample that received the redesigned instrument.



### **III. DESIGN OF THE MATCHED SAMPLE STUDY**

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Addresses selected into the monthly CPS sample are retained in the sample for four consecutive months, after which they leave the sample for eight months and then return for another four months. The two four-month periods in-sample span the same calendar months one year apart. Sample addresses are rotated so that in any given month, one-eighth of the sample is in its first month, one-eighth is in its second month, and so on. With this design, three-fourths of the 72,000 addresses that make up the monthly CPS sample are the same in consecutive months, and one-half of the addresses are the same in months separated by one year.

The CPS ASEC sample includes an additional 26,000 households drawn from other months. Details are provided in U.S. Census Bureau (2006). The manner in which the supplemental sample is drawn implies that about half of the households selected in one year will also be selected in the next year, but unlike the overlap in the monthly sample, the year-to-year overlap in the supplemental sample is partially dependent on the stability of migration and household composition patterns.<sup>3</sup>

The occupants of a sample address may change over the period that the address is retained in the sample, and not all addresses are successfully interviewed in every month that they appear in the sample. About 15 percent of the U.S. population moves in the course of a year, and nonresponse to the March CPS is around 10 percent among eligible addresses. As a result, considerably less than 50 percent of the members of responding households in consecutive CPS ASECs are the same in the two years.

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<sup>3</sup> Households selected into the supplemental sample have certain characteristics (for example, there is an Hispanic supplement) and cannot have moved between the interview month and the month in which they were selected (and their characteristics identified).

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Sample addresses can be matched between consecutive CPS ASEC samples using the H\_IDNUM1 and H\_IDNUM2 fields on the annual files. The combination of H\_IDNUM1 and the first three (of five) digits of H\_IDNUM2 uniquely identifies an address. The fourth digit of H\_IDNUM2 distinguishes two or more groups of residents discovered to be living in physically separate spaces within the same sampled housing unit. The fifth digit will change over time if the original occupants are replaced by new occupants.<sup>4</sup>

Matching on H\_IDNUM1 and all five digits of H\_IDNUM2 will ensure that there is at least some continuity between the people living at a given address in two consecutive CPS ASECs, but changes in household composition are not precluded, and such changes can have a marked impact on household income between the two years. It is desirable, therefore, to refine the match. The Census Bureau assigns “line numbers” to the members of each newly interviewed household. Line numbers are unique within an address. In theory, and for the most part in practice as well, household members retain their line numbers through subsequent interviews. People moving into a sample address after the first interview are assigned new line numbers that do not duplicate those of household members interviewed previously at that address. Household members with the same address ID and line number in consecutive CPS ASEC samples should represent the same person.<sup>5</sup> We restricted our matches to ones in which the householder did not change. That is, after matching on H\_IDNUM1 and H\_IDNUM2, we retained only those matches

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<sup>4</sup> Correspondence from Tim J. Marshall, U.S. Census Bureau, August 12, 2015.

<sup>5</sup> We are not certain about the assignment of line numbers in the event of a complete turnover of occupants—one producing a change in the final digit of H\_IDNUM2. For matching purposes, however, the continuity of line numbers within a sample address does not matter if H\_IDNUM2 changes.

in which the individual identified as the householder in both years had the same line number, and we required additional agreement on age and sex.<sup>6</sup>

Table III.1 displays the results of our matching of the two samples to the 2013 CPS ASEC.<sup>7</sup> Of the 51,475 interviewed households that received the traditional income questionnaire in 2014, 19,152 or 37.2 percent were matched to a 2013 household with the same address. Of these, 17,736 represented the same household (largely the same persons), and 16,686 (or 32.4 percent of the total) had the same householder in both years, based on their common line number, age, and sex. For households administered the redesigned instrument in 2014, the match rate to 2013 was higher because the Census Bureau was not able to assign the redesigned instrument to addresses appearing in the CPS sample for the first time in March 2014 (or, we believe, in the month from which they were selected into the supplemental sample). Of the 22,662 households that were given the redesigned instrument in 2014, 10,443 or 46.1 percent matched to a 2013 household with the same address. Of these, 9,611 represented the same household, and 9,031 or 39.9 percent had the same householder in both years.

Because two households with the same householder may have had other changes between the two years that affected household income, we explored two additional restrictions on the matches. One was to restrict the matched households to those with limited composition change, which we defined as having added no more than one person to the household (which in most cases would be a newborn) or zero persons if the household had only one member in 2013. The

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<sup>6</sup> In most cases the householder should have been one year older at the 2014 interview than the 2013 interview, but if the householder's birthday fell near the interview date, he or she could have been the same age in years at the two interviews or two years older at the 2014 interview. We allowed for all three possibilities.

<sup>7</sup> The 2014 redesigned CPS ASEC sample file was revised and re-released in September 2015. All of the tabulations and analyses presented in this and later chapters use the September 2015 version of the file. Some of the Census Bureau findings presented in Chapter II (specifically, those in Table II.3) are based on an earlier, internal version of the file.

second was to restrict the matched households to those with the same respondent in both years. For the traditional sample, restricting the composition change reduced the percentage of matching households to 29.4 percent; requiring the same respondent reduced the matching percentage to 26.2 percent; and imposing both restrictions reduced the match rate to 24.0 percent. For the sample with the redesigned instrument, the restrictions reduced the match rate to 36.1 percent, 32.6 percent, and 29.8 percent, respectively. The analyses reported below use matched samples with the sample respondent in both years but with no restriction on composition change.

**Table III.1. Overview of 2013 matches to 2014 traditional and redesigned sample households**

Population	Traditional CPS ASEC	Redesigned CPS ASEC	Traditional CPS ASEC	Redesigned CPS ASEC
	<b>Unweighted Counts</b>		<b>Percentage of Total</b>	
Total interviewed households in 2014	51,475	22,662	100.0	100.0
With match to 2013 on address ID	19,152	10,443	37.2	46.1
With match to 2013 on household ID	17,736	9,611	34.5	42.4
and on line number of head	17,378	9,402	33.8	41.5
and on sex and age of head	16,686	9,031	32.4	39.9
With limited composition change	15,150	8,202	29.4	36.2
With same respondent	13,476	7,376	26.2	32.6
With both	12,369	6,750	24.0	29.8
	<b>Weighted Counts (1,000s)</b>		<b>Percentage of Total</b>	
Total household universe in 2014	122,977	123,976	100.0	100.0
With match to 2013 on address ID	45,774	55,027	37.2	44.4
With match to 2013 on household ID, line #, age and sex of head	42,704	51,341	34.7	41.4
With limited composition change	38,854	46,907	31.6	37.8
With same respondent	34,793	42,106	28.3	34.0
With both	31,980	38,734	26.0	31.2

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

Note: Weights used in this and all subsequent tables are from the 2014 sample file unless indicated otherwise.

Weighted match rates were about two percentage points higher than these unweighted match rates for the sample administered the traditional income module and about 1.5 percentage points higher for the sample administered the redesigned income module. For the sample administered the traditional income module, 34.7 percent matched to a household with the same householder,

and 28.3 percent matched to a household with the same respondent in both years. For the sample administered the redesigned income module, 41.4 percent matched to a household with the same householder, and 34.0 percent matched to a household that also had the same respondent.

A limitation of the CPS matched samples is that they exclude movers. That is, people who moved between the two years could not have been interviewed in more than one year. Because moving can be associated with a change in income—positive or negative—the matched samples are likely to underrepresent households with changes in income. That could be a plus for this analysis, however, making the differences between the 2013 and 2014 responses for the sample receiving the redesigned instrument in 2014 more likely to be due to the instrument change than to other factors.

With the release of the 2015 CPS ASEC, which is based entirely on the redesigned instrument, it would be possible to conduct a second round of matched sample analysis. Of the households that were interviewed in both 2014 and 2015, more than two-thirds received the traditional instrument in 2014. Their changes in responses between 2014 and 2015 could be compared to those of the smaller subsample that responded to the redesigned instrument in both years. The mid-September release of the 2015 data did not provide adequate time for us to conduct such an analysis under this project, but the data provide an inviting subject for future research using the methods employed here.

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## **IV. MATCHED SAMPLE FINDINGS**

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For this preliminary analysis, we focus on reporting at the household level, as one respondent reported on the income received by all household members. All of our estimates are derived from household-level variables. Household-level reciprocity is based on a single question for each source, in most cases, whereas household-level income is aggregated from responses provided for individual household members. Our findings cover reciprocity, aggregate income, joint receipt of disability and veterans' benefits, relative income, and reliance on Social Security.

### **A. Reciprocity**

The results of our difference-in-differences analysis of the reported receipt of income by source are presented in Table IV.1. The first two columns compare the reporting of each income source in 2013 and 2014 among matched households that received the traditional income module in both years, and the third column shows the change between the two years (2014 less 2013). The next three columns compare the reporting in 2013 and 2014 among matched households that received the traditional income module in 2013 but the redesigned income module in 2014 and show the change between the two years. The final column shows the results of the difference-in-differences calculation, or the difference between the 2013 to 2014 change among households receiving the redesigned module in 2014 and the 2013 to 2014 change among households receiving the traditional module in both years. We note that the receipt of both earned and unearned income declined significantly among households responding to the traditional income questions in both years. The reporting of earned income also declined among households that received the redesigned instrument in 2014, but the reporting of unearned income increased. The difference-in-differences column shows a significant increase in the reporting of unearned income with the redesigned income module.

**Table IV.1. Change in the percentage of households with income by source, 2013 to 2014, among matched households with the same respondent receiving redesigned versus traditional income module**

Income Source	Description	Traditional Module: % of Households with Income Source		Difference: 2014 Less 2013	Redesigned Module: % of Households with Income Source		Difference: 2014 Less 2013	Difference: Redesigned Less Traditional
		2013	2014		2013	2014		
HTOTVAL	Total income	98.68	98.71	0.03	98.81	98.48	-0.33	-0.36
HEARNVAL	Earned income	73.84	71.82	-2.02*	73.49	72.10	-1.39*	0.63
HOTHVAL	Unearned income	79.06	77.87	-1.19*	78.85	84.56	5.71*	6.90*
HWSVAL	Wages and salaries	71.17	69.11	-2.06*	70.62	69.37	-1.25*	0.81
HSEVAL	Self-employment	8.67	8.04	-0.63*	7.97	7.04	-0.93*	-0.30
HFRVAL	Farm income	1.20	1.30	0.10	1.42	1.01	-0.41*	-0.51*
HUCVAL	Unemployment Compensation	6.20	4.53	-1.67*	6.97	4.68	-2.29*	-0.62
HWCVAL	Worker's Compensation	0.98	0.94	-0.04	0.73	0.73	0.00	0.04
HSSVAL	Social Security	33.50	34.71	1.21*	33.47	34.79	1.32*	0.11
HSSIVAL	Supplemental Security Income	3.89	4.02	0.13	4.29	4.61	0.32	0.19
HPAWVAL	Public assistance/ welfare	1.19	0.86	-0.33*	1.26	1.06	-0.20	0.13
HVETVAL	Veterans' benefits	2.95	2.94	-0.01	2.72	2.78	0.06	0.07
HSURVAL	Survivors' benefits	2.62	2.90	0.28	2.96	2.86	-0.10	-0.38
HDISVAL	Disability benefits	1.35	1.40	0.05	1.23	2.35	1.12*	1.07*
HRETVAL	Retirement income	15.36	16.60	1.24*	15.15	16.99	1.84*	0.60
HINTVAL	Interest	50.03	48.96	-1.07*	49.33	64.00	14.67*	15.74*
HDIVVAL	Dividends	20.09	18.73	-1.36*	19.34	18.90	-0.44	0.92
HRNTVAL	Rent/estate/trust income	7.69	6.99	-0.70*	7.14	7.22	0.08	0.78
HEDVAL	Educational assistance	5.33	4.69	-0.64*	5.33	4.59	-0.74*	-0.10
HCSPVAL	Child support	3.40	2.97	-0.43*	3.46	3.09	-0.37*	0.06
HALMVAL	Alimony	0.30	0.24	-0.06	0.35	0.00	-0.35*	-0.29*
HFINVAL	Financial assistance from others	1.60	1.40	-0.20	1.41	1.60	0.19	0.39**
HOIVAL	Other income	1.28	1.20	-0.08	1.25	1.24	-0.01	0.07
HFDVAL	SNAP benefits	9.32	9.36	0.04	10.30	10.60	0.30	0.26

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

\* Statistically significant at the .05 level or higher.

\*\* Statistically significant at the .10 level but not the .05 level.



Below the rows reporting total, earned, and unearned income, 21 specific sources are presented, including the in-kind SNAP benefits that are not counted in total income. These 21 sources include some that were not reported in Table II.3, but they do not include the Table II.3 breakdown of retirement income into component sources, as these are based on person-level variables, which we did not use for this analysis.

The difference-in-differences estimates show significantly more reciprocity with the redesigned instrument for three sources of unearned income, led by interest with a 15.74 percentage point net increase. Interest shows a significant decline in reciprocity between 2013 and 2014 with the traditional instrument but a substantial increase between those two years when the traditional instrument is replaced by the redesigned instrument. The other two sources are disability benefits and financial assistance from others. The receipt of disability benefits grows significantly with the introduction of the redesigned instrument but shows no change with the traditional instrument. Financial assistance from others shows opposing, nonsignificant changes with the different instrument pairings, which yield a significant difference in differences. In contrast to these three sources, farm self-employment income shows a significant decline in frequency in the redesign sample and in the difference between the two samples.

The rare income source alimony was reported by only 0.24 percent of all households receiving the traditional instrument in 2014. Because the redesigned instrument eliminates separate questions on alimony, there are no reported alimony recipients with that instrument. Respondents can still report alimony as one of several sources of other income. We note, however, that there is no significant change in the reporting of other income with the redesigned instrument. We cannot tell from these results if people reporting alimony in 2013 tended not to

include it as other income in 2014 or if they may have had additional sources of other income, such that the inclusion of alimony had little impact on the receipt of other income overall.

As noted earlier, the Census Bureau analysis also shows significantly higher receipt of interest and disability benefits with the redesigned instrument. (The Census Bureau analysis did not include financial assistance from others or alimony.) Contrary to our analysis, the Census Bureau analysis shows four additional income sources—Social Security, SSI, public assistance, and dividends—with significantly higher recipiency with the redesigned instrument and one source, Worker’s Compensation, with significantly lower recipiency. For all but Social Security and dividends, this discrepancy could be due to differences between the two samples. While not tested for significance, SSI and public assistance are higher in both years, and Worker’s Compensation is lower in both years in the sample that received the redesigned instrument. Social Security recipiency, however, is very similar between the two samples in both years, showing statistically significant and nearly identical percentage increases between 2013 and 2014. Dividends exhibit a statistically significant decline with the traditional questionnaire and a smaller, nonsignificant decline in the sample that received the redesigned instrument in 2014.

Except for wage and salary income and Social Security, the reporting of recipiency in both matched samples shows considerable volatility between 2013 and 2014 (Table IV.2). We measured volatility with respect to both dropping and adding reported sources. For the former we calculated for each individual source of income the percentage of 2013 recipient households that did not report receiving the same source in 2014. For the addition of sources we expressed the number of households that were new recipients in 2014 as a percentage of the number of households that reported recipiency in 2013. A figure of 50 percent for dropping sources would indicate that half of the 2013 recipient households did not report that source in 2014. For adding

sources a figure of 50 percent would indicate that the new reporters in 2014 were half as numerous as the total reporters in 2013.

**Table IV.2. Difference in the gross change in reported reciprocity between 2013 and 2014 among matched sample households with the same respondent receiving redesigned versus traditional income module**

Variable	Percentage of 2013 Recipients Who Dropped Source in 2014			New Recipients in 2014 as % of 2013 Recipients		
	Trad. Module	Red. Module	Difference	Trad. Module	Red. Module	Difference
HWSVAL	7.2	6.7	-0.5	4.3	5.0	0.7
HSEVAL	50.7	53.7	3.0	43.4	42.1	-1.3
HFRVAL	72.0	76.5	4.5	80.4	47.5	-32.9
HUCVAL	67.0	71.3	4.3	40.0	38.4	-1.6
HWCVAL	74.2	69.1	-5.1	70.4	69.1	-1.3
HSSVAL	11.0	10.7	-0.3	14.6	14.7	0.1
HSSIVAL	49.0	49.3	0.3	52.2	56.8	4.6
HPAWVAL	76.0	73.3	-2.7	48.3	57.2	8.9
HVETVAL	43.7	44.0	0.3	43.6	46.3	2.7
HSURVAL	66.1	68.6	2.5	76.9	65.3	-11.6
HDISVAL	74.3	77.8	3.5	78.3	169.7	91.4
HRETVAL	32.7	34.0	1.3	40.8	46.2	5.4
HINTVAL	29.9	17.3	-12.6	27.8	47.1	19.3
HDIVVAL	46.4	47.6	1.2	39.6	45.3	5.7
HRNTVAL	59.1	56.3	-2.8	50.0	57.5	7.5
HEDVAL	61.0	61.9	0.9	49.0	48.1	-0.9
HCSPVAL	49.4	45.0	-4.4	36.9	34.3	-2.6
HALMVAL	61.8	100.0	38.2	40.7	0.0	-40.7
HFINVAL	76.9	68.4	-8.5	64.5	82.3	17.8
HOIVAL	86.6	88.5	1.9	80.4	87.9	7.5
HFDVAL	37.6	35.4	-2.2	38.0	38.4	0.4

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

Note: A negative difference in the percentage of each sample that *dropped* a source between 2013 and 2014 indicates that the sample receiving the redesigned income module was less likely to drop the source. A positive difference in the percentage of each sample that *added* a source indicates that the sample receiving the redesigned income module was more likely to add the source.

Imputation accounts for some of the observed volatility. Recall that about 11 percent of the CPS ASEC sample in a given year has half of the ASEC supplement wholly imputed. In addition, some sources of income are subject to high item nonresponse. Even so, our findings are striking. For example, in both samples, 49 percent of the households that reported SSI receipt and 46 to 48 percent of the households that reported receiving dividends in 2013 did not report such income in 2014. With the traditional instrument, new SSI recipients in 2014 were 52.2

percent of the households reporting receipt in 2013. With the redesigned instrument, new SSI recipients in 2014 were 56.8 percent of the number reporting receipt in 2013. For dividends these figures were 39.6 percent and 45.3 percent, respectively. The most volatile source was other income, for which these figures ranged between 80.4 and 88.5 percent. While about 7 percent of households reporting earnings in the 2013 survey did not do so in the 2014 survey, and the new earners in 2014 were 4 to 5 percent of the number of households with earnings in 2013, the corresponding statistics for nearly all other sources ranged between 30 and 80 percent.

We would expect to see more evidence of volatility in the sample that received the redesigned instrument in 2014, owing to the change in questionnaires. We do not see this in the fraction of households dropping sources between 2013 and 2014, except for alimony, where that source was eliminated from the redesigned instrument. Over the 21 sources, 12 or barely more than half have a higher percentage of 2013 recipients dropping their reported receipt in 2014 among those responding to the redesigned income module. We do see larger and marginally more positive differences (13 out of 21) with respect to the addition of sources, and most are consistent with our findings with respect to reciprocity.<sup>8</sup> Since a goal of the redesign was to increase the reporting of reciprocity, it is not surprising that we should see bigger differences with respect to the addition of sources than the dropping of sources. In fact, for some sources, a greater fraction of households adding receipt with the redesigned income module is accompanied by a lower fraction dropping receipt. This is most pronounced for interest income and financial assistance from others. For the former, for example, there is a 19.3 percentage point increase in

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<sup>8</sup> Differences between the two samples are not as important as the measures of volatility, so we did not test for significance of the differences between the results with the redesigned versus traditional income module.

the proportion of households adding this source and a 12.6 percentage point decrease in the proportion of households dropping this source between 2013 and 2014.

## **B. Aggregate Income**

Our difference-in-differences analysis of change in aggregate income finds the redesigned instrument associated with significant increases in the reporting of both total income and unearned income overall and in Social Security, disability benefits, retirement income, interest, and financial assistance from others (Table IV.3). Comparing the magnitudes of the percentage changes in the two samples, there are a number of additional differences that, while not statistically significant, are nonetheless striking. Some of these correspond to sources where the Census Bureau analysis found significant differences in the reporting of aggregate income. These include farm income, SSI, veterans' benefits, and dividends although the two analyses differ in the direction of the effect on dividends. Our analysis also finds evidence of relatively greater increases in survivors' benefits, for which the Census Bureau found no difference, and other income, which the Census Bureau did not test. The increase in other income undoubtedly reflects the addition of alimony after its elimination as a separate source.

One Census Bureau finding not repeated in the matched sample analysis involves public assistance income. In the matched sample analysis the sample with the redesigned instrument in 2014 shows a smaller decline than the other sample, but this difference is not statistically significant. The Census Bureau found significantly higher public assistance income in the sample with the redesigned instrument than the sample with the traditional instrument. The Census Bureau result could reflect a difference in the underlying samples, but we cannot directly compare the weighted aggregates calculated from the matched samples. Because of its higher

match rate, as shown in Table III.1, the matched sample that received the redesigned instrument has a higher weighted population total, and this affects comparisons of aggregate income.<sup>9</sup>

**Table IV.3. Difference in the percentage change in aggregate income between 2013 and 2014, by source: matched households with the same respondent**

Variable	Description	Percentage Change in Aggregate Income		Difference: Redesigned Less Traditional
		Trad. Module	Red. Module	
HTOTVAL	Total income	1.26	5.48*	4.22**
HEARNVAL	Earned income	0.40	-0.35	-0.75
HOTHVAL	Unearned income	4.29*	27.13*	22.84*
HWSVAL	Wages and salaries	0.86	0.09	-0.77
HSEVAL	Self-employment	-8.47	-4.16	4.31
HFRVAL	Farm income	12.46	-34.01*	-46.47
HUCVAL	Unemployment Compensation	-31.77*	-39.02*	-7.25
HWCVAL	Worker's Compensation	6.08	3.77	-2.31
HSSVAL	Social Security	4.44*	9.39*	4.95*
HSSIVAL	Supplemental Security Income	7.04	15.39**	8.35
HPAWVAL	Public assistance/welfare	-15.50	-3.02	12.48
HVETVAL	Veterans' benefits	10.56	-6.12	-16.68
HSURVAL	Survivors' benefits	-0.42	23.84	24.26
HDISVAL	Disability benefits	4.00	67.35*	63.35**
HRETVL	Retirement income	12.08*	46.42*	34.34*
HINTVAL	Interest	15.48**	176.52*	161.04*
HDIVVAL	Dividends	12.71	1.26	-11.45
HRNTVAL	Rent/estate/trust income	-25.74*	-25.48*	0.26
HEDVAL	Educational assistance	3.86	-15.63	-19.49
HCSPVAL	Child support	-17.87*	-13.17	4.70
HALMVAL	Alimony	33.24	-100.00*	-133.24*
HFINVAL	Financial assistance from others	-34.30*	64.47	98.77*
HOIVAL	Other income	6.71	75.51	68.80
HFDVAL	SNAP benefits	-6.20**	-5.90	0.30

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

\* Statistically significant at the .05 level or higher.

\*\* Statistically significant at the .10 level but not the .05 level.

As noted earlier, the redesigned instrument does not ask the respondent to report the total interest and total dividends received during the prior year. Instead, interest and dividends are collected for each of potentially several retirement and non-retirement accounts that were

<sup>9</sup> We did not reweight the two matched samples to national totals because they are not representative of the entire CPS universe, given their exclusion of movers.

identified earlier in the questionnaire. To collect interest and dividends from non-retirement accounts, the questionnaire fills in either “interest” or “dividends” depending on the type of account. For checking or savings accounts, money market funds, CDs, or savings bonds, the respondent is asked how much was received in interest. For mutual funds or shares of stock in corporations, the respondent is asked how much was received in dividends.<sup>10</sup> For each of the several types of retirement accounts, however, the respondent is asked how much “interest or dividends” was earned during the year. The respondent is not asked for separate reports. Absent that information, the Census Bureau classifies all of the reported interest or dividends from retirement accounts as interest.<sup>11</sup> It is possible that the reduction in aggregate dividends associated with the redesigned instrument can be attributed to this allocation of income from retirement accounts.

### **C. Disability and Veterans’ Benefits**

Because the question on disability benefits was moved ahead of the question on veterans’ benefits, and respondents to the disability question are no longer asked to exclude veterans’ benefits, we speculated that the increased reporting of disability benefits with the redesigned instrument may have been due to respondents reporting their veterans’ benefits under the disability question and then either not reporting them as veterans’ benefits or reporting them in both places. To explore this possibility, we tabulated for both samples the reporting of disability benefits in combination with veterans’ benefits. If our speculation is correct, we should find that households in the redesign sample reporting disability benefits in 2014 but not 2013 tended to have one of two patterns in their reporting of veterans’ benefits: (1) they reported such benefits

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<sup>10</sup> Personal communication from Jessica Semega, U.S. Census Bureau, December 29, 2014.

<sup>11</sup> Personal communication from Jessica Semega, U.S. Census Bureau, September 2, 2015.

in 2013 but not 2014, or (2) they reported such benefits in both years. We found that the first pattern was equally rare in the two samples (0.03 percent of all households) while the second pattern was somewhat more common in the redesign sample than the traditional sample (0.19 versus 0.04 percent), but not nearly enough to explain the growth reporting of disability benefits in the redesign sample (Table IV.4). Instead, most of the growth in the reporting of disability benefits occurred among households reporting no veterans' benefits in either year. Here the fraction of households increased from 0.98 percent to 1.81 percent. The explanation for the sharp increase in the reporting of disability benefits lies elsewhere, then.

**Table IV.4. Weighted percentage of matched households by receipt of household income from disability and veterans' benefits, 2013 and 2014**

Disability	Veterans' Benefits	Traditional Income Module	Redesigned Income Module	Difference: Redesigned Less Traditional
Neither Year	Neither Year	93.59	93.06	-0.53
Neither Year	2013 but not 2014	1.22	1.16	-0.06
Neither Year	2014 but not 2013	1.22	1.18	-0.04
Neither Year	Both Years	1.56	1.30	-0.26
2013 but not 2014	Neither Year	0.87	0.90	0.03
2013 but not 2014	2013 but not 2014	0.04	0.01	-0.03
2013 but not 2014	2014 but not 2013	0.05	0.02	-0.03
2013 but not 2014	Both Years	0.04	0.03	-0.01
2014 but not 2013	Neither Year	0.98	1.81	0.83
2014 but not 2013	2013 but not 2014	0.03	0.03	0.00
2014 but not 2013	2014 but not 2013	0.01	0.06	0.05
2014 but not 2013	Both Years	0.04	0.19	0.15
Both Years	Neither Year	0.33	0.26	-0.07
Both Years	2013 but not 2014	0.00	0.00	0.00
Both Years	2014 but not 2013	0.00	0.00	0.00
Both Years	Both Years	0.02	0.01	-0.01

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

Note: Estimates are based on matched sample households with the same respondent in 2013 and 2014 and weighted by the 2014 weight.

#### **D. Relative income**

With the matched samples we can ask whether the introduction of the redesigned instrument reduced the estimated household poverty rate and, more generally, where in the distribution of income relative to poverty the redesigned instrument had the greatest impact. Consistent with the Census Bureau's static analysis, we find that the redesigned instrument did not reduce the



proportion of households below poverty or with low income generally.<sup>12</sup> Compared to the traditional questionnaire, the redesigned income module increased the proportion of households below 200 percent and below 100 percent of poverty, although neither change was statistically significant (Table IV.5). Responses to the redesigned instrument moved households out of the range from 200 to 300 percent of poverty and increased the proportion above 500 percent of poverty—both by significant margins.

**Table IV.5. Distribution of households by relative income in 2013 and change between 2013 and 2014: matched households with the same respondent receiving redesigned versus traditional income module**

Household Income Relative to Poverty	Percentage				Difference: Redesigned Less Traditional
	Distribution by 2013 Relative Income		Change from 2013 to 2014		
	Trad. Module	Red. Module	Trad. Module	Red. Module	
Less than 1.00	11.37	11.80	-0.02	0.24	0.26
1.00 to < 2.00	18.81	19.15	-0.17	0.14	0.31
2.00 to < 3.00	16.70	16.71	-0.03	-1.77*	-1.74*
3.00 to < 4.00	13.42	13.81	-0.09	-0.85	-0.76
4.00 to < 5.00	10.75	10.33	-0.08	-0.03	0.05
5.00 or greater	28.95	28.19	0.39	2.27*	1.88*

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

\* Statistically significant at the .05 level or higher.

\*\* Statistically significant at the .10 level but not the .05 level.

We also find that while the 2013 distributions of the two samples by relative income were not significantly different, the sample receiving the redesigned instrument in 2014 had somewhat higher fractions below 100 and 200 percent of poverty and lower fractions above 400 and 500 percent of poverty than the sample receiving the traditional instrument in 2014. This provides some support for the Census Bureau's expressed concerns that the sample selected to receive the

<sup>12</sup> Household-level poverty was calculated by comparing household income to poverty thresholds corresponding to household size.

redesigned instrument tended to have lower income than the sample selected to receive the traditional instrument.

Breaking down the population by age, the Census Bureau found that the redesign sample had a significantly higher poverty rate than the traditional sample among children under 18. We used the matched samples to compare the changes in poverty rates among households classified by their demographic composition and among individuals categorized by age.

The patterns observed in the household and individual poverty rates by age are similar for persons 18 to 64 and persons 65 and older, although none of the changes is significant. For persons 18 to 64, the change in poverty rates between 2013 and 2014 is near zero with the traditional instrument and positive with the redesigned instrument (Table IV.6). For persons 65 and older, the change is positive with the traditional instrument and negative with the redesigned instrument, yielding a larger negative difference in differences. For both populations the absence of a significant change is consistent with the Census Bureau's updated findings.

**Table IV.6. Poverty rates in 2013 and change between 2013 and 2014 among households and persons classified by age: matched households with the same respondent receiving the redesigned versus traditional income module in 2014**

Description	Poverty Rate in 2013		Change from 2013 to 2014		Difference: Redesigned Less Traditional
	Trad. Module	Red. Module	Trad. Module	Red. Module	
Household poverty rates					
With persons under 18	15.26	14.73	-1.44*	-0.31	1.13
With persons 18-64	11.49	11.78	-0.13	0.65	0.78
With persons 65 and older	9.46	10.73	0.45	-0.35	-0.80
Individual poverty rates					
Persons under 18	19.10	19.87	-1.61*	0.17	1.78
Persons 18 to 64	11.36	11.65	0.02	0.39	0.37
Persons 65 and older	8.54	9.77	0.55	-0.43	-0.98

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

\* Statistically significant at the .05 level or higher.

\*\* Statistically significant at the .10 level but not the .05 level.

Poverty rates for households with children and for children as a group show different patterns by traditional versus redesign sample in 2013. For households with children, poverty in 2013 is lower in the redesign sample than the traditional sample, but for children themselves the reverse is true. However, both rates decline significantly between 2013 and 2014 within the traditional sample but show little change within the redesign sample. Neither difference in differences is significant, but they lend perspective to the Census Bureau finding. The Census Bureau observes a lower child poverty rate with the traditional sample than the redesign sample in 2014 because poverty declines between 2013 and 2014 with the traditional instrument whereas it remains unchanged when the redesigned instrument replaces the traditional instrument. Yet the fact that child poverty should decline in the traditional sample but not the redesign sample is not explained by (or in any obvious way consistent with) the observed changes in income generally, as income increases more in the redesign sample than the traditional sample.

#### **E. Reliance upon Social Security**

Finally, with the largest impacts of the redesigned instrument being seen on retirement income and on interest income, which are received disproportionately by households with older members, an important policy question is whether the increased income attributed to these sources has any impact on estimates of households' reliance on Social Security. Compared to the traditional instrument, the redesigned instrument shows generally smaller proportions of Social Security-recipient households receiving at least half of their household income from Social Security and more of such households receiving only 10 to 20 percent of their income from this source (Table IV.7). Notably, among households receiving the traditional instrument in both years the overall proportion of households receiving half or more of their total income from Social Security rose by 1.31 percentage points between 2013 and 2014 whereas this proportion declined by 2.45 percentage points among households receiving the redesigned instrument in

2014. From a policy perspective, though, neither of these changes alters the importance of Social Security as a source of income for a substantial portion of the population (about one-third of all households in each year).

**Table IV.7. Percentage of household income received from social security among households receiving social security, 2013 and 2014: matched households with the same respondent, redesigned versus traditional income module**

Percent of Total Household Income	Traditional Module: % of Income from Social Security		Difference: 2014 Less 2013	Redesigned Module: % of Income from Social Security		Difference: 2014 less 2013	Difference: Redesigned Less Traditional
	2013	2014		2013	2014		
Less than 10 percent	5.82	5.82	0.00	6.41	5.90	-0.51	-0.51
10 to < 20 percent	11.47	9.83	-1.64	9.37	11.75	2.38	4.02
20 to < 30 percent	11.18	10.36	-0.82	11.55	11.03	-0.52	0.30
30 to < 40 percent	9.68	10.59	0.91	9.75	10.40	0.65	-0.26
40 to < 50 percent	8.11	8.35	0.24	7.83	8.29	0.46	0.22
50 to < 60 percent	8.09	8.62	0.53	8.54	7.82	-0.72	-1.25
60 to < 70 percent	6.06	7.63	1.57	6.08	5.86	-0.22	-1.79
70 to < 80 percent	5.92	5.61	-0.31	6.11	5.17	-0.94	-0.63
80 to < 90 percent	5.44	5.38	-0.06	5.93	5.00	-0.93	-0.87
90 to < 100 percent	10.34	10.44	0.10	11.31	13.73	2.42	2.32
100 percent	17.90	17.38	-0.52	17.12	15.06	-2.06	-1.54
50 percent or more	53.75	55.06	1.31	55.09	52.64	-2.45	-3.76

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples, matched to the 2013 CPS ASEC public use sample.

## **V. ADDITIONAL ANALYSIS**

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We suspect that the reduction in aggregate dividends associated with the redesigned instrument (statistically significant in the Census Bureau and similar but not significant in our matched sample study) is due to the classification of all interest and dividends obtained from retirement accounts as interest. As we noted in our discussion of the changes to the instrument, the questions used to elicit these amounts of income do not differentiate between the two sources, and retirements accounts can include both interest-producing and dividend-paying assets.

We investigated whether there are any data sources that provide aggregate annual estimates of interest and dividends earned in retirement accounts, given that retirement account owners receive such information following the end of each calendar year. We contacted staff at the Investment Company Institute (ICI), which is the trade association for the mutual fund industry; the Statistics of Income (SOI) Division of the Internal Revenue Service (IRS); and the Bureau of Economic Analysis (BEA). From the ICI we learned that because the Securities and Exchange Commission treats investment income from mutual funds as ordinary dividends, the ICI does not attempt to separate interest from dividends when they collect data from their members.<sup>13</sup> The information that the IRS receives from retirement accounts, on Form 5498, includes contributions and the fair market value of the accounts but nothing on the composition of earnings during the year.<sup>14</sup> The earnings on tax deferred retirement accounts have no tax implications until funds are withdrawn, and at that point all earnings (including capital gains, for the most part) are taxed the same. BEA publishes annual estimates of interest and dividends from

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<sup>13</sup> Personal communication from Peter Brady, ICI, September 4, 2015.

<sup>14</sup> Personal communication from Victoria Bryant, IRS/SOI, September 4, 2015.

defined benefit and defined contribution pension plans, which does not equate with retirement accounts but is related. These estimates include an additional component of income that BEA describes as “imputed interest on plans’ claims on employers,” but this component is reported separately, so it can be excluded. The remaining interest and dividends in 2013 were fairly comparable in magnitude (\$161.8 billion of interest and \$145.0 billion of dividends), although the two have converged since earlier years, when interest was half again as large as dividends.<sup>15</sup> This suggests that allocating nearly half of the combined interest and dividends to dividends would provide a better approximation of the actual distribution.

We had hoped to be able to apply this information to divide the combined interest and dividends earned in retirement accounts into separate interest and dividend amounts. By doing so we could determine whether the reduction in aggregate dividends attributed to the redesigned income module could be explained by the Bureau’s classifying all dividends from retirement accounts as interest. While the public use version of the 2014 redesign sample (and the full 2015 CPS ASEC) does not break down interest and dividends by source, the internal Census Bureau version of these data does so. However, the amounts reported for each such source are prior to imputation, and until the Census Bureau revises its editing and imputation procedures to accommodate the new income module, the imputation of interest and dividends is done only in the aggregate—that is, as interest and dividends rather than individual sources. Given that over half of total interest and dividends is imputed, and that there was evidence from the internal data that this fraction might be even greater for interest than dividends, we were reluctant to base an estimate of the potential increase in total dividends on the reported earnings from retirement accounts.

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<sup>15</sup> Table 7.20, Transactions of Defined Benefit and Defined Contribution Pension Plans, BEA, August 6, 2015.

This prompted us to look more closely at the relative magnitudes of reported and imputed interest and dividends in the two 2014 samples. These results are presented in Table V.1, which shows the high rate of imputation of both income sources in both samples. For interest, 46.6 percent of reciprocity and 59.2 percent of total dollars are imputed with the traditional income module. Both percentages are even higher with the redesigned module—51.4 and 65.9 percent, respectively. For dividends, the redesigned module also shows more imputation of reciprocity than the traditional module (57.0 versus 53.2 percent), but their rates of imputation of total amounts are virtually identical at 53.5 and 53.6 percent. Moreover, the imputation rates for total dollars of dividends are not very different from the imputation rates for reciprocity; for interest the imputation rates for total dollars were 13 to 14 percentage points higher than the imputation rates for reciprocity. This is a striking difference for two income sources collected together. It would bear further review by the Census Bureau to determine if some element of the imputation procedure for the redesigned module is working incorrectly or at least differently between the two sources.

**Table V.1. Estimates of interest and dividends by imputation status, traditional and redesigned income questions, 2014 CPS ASEC**

Income Source and Description of Estimate	Estimates		Percent of Total	
	Trad. Module	Red. Module	Trad. Module	Red. Module
<b>Persons with interest income (1,000s)</b>	86,142	123,773	100.0	100.0
Reported	45,981	60,147	53.4	48.6
Imputed	40,161	63,626	46.6	51.4
<b>Total amount of interest income (\$Mil.)</b>	182,834	388,990	100.0	100.0
Reported	74,542	132,453	40.8	34.1
Imputed	108,292	256,537	59.2	65.9
<b>Persons with dividends (1,000s)</b>	29,921	31,804	100.0	100.0
Reported	14,003	13,687	46.8	43.0
Imputed	15,918	18,117	53.2	57.0
<b>Total amount of dividends (\$Mil.)</b>	146,745	117,522	100.0	100.0
Reported	68,018	54,647	46.4	46.5
Imputed	78,727	62,875	53.6	53.5

Source: Mathematica Policy Research, from the 2014 Traditional CPS ASEC and Redesigned CPS ASEC public use samples.

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## **VI. SUMMARY AND CONCLUSIONS**

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A chief goal of the redesign of the CPS ASEC income module was to increase the reported receipt of individual sources of unearned income and, through that mechanism, increase the reported dollars of unearned income as well. The difference-in-differences analysis shows a significant increase in the reported receipt of unearned income with the redesigned income module. Contributing to this result, the difference-in-differences analysis shows significantly higher receipt of three sources of unearned income: interest, disability benefits, and financial assistance from others. The Census Bureau analysis did not include financial assistance from others but did find significantly higher reported reciprocity for the other two sources. Unlike our analysis, however, the Census Bureau also found significantly higher reported reciprocity for four additional income sources—Social Security, SSI, public assistance, and dividends—and significantly lower reciprocity for Worker’s Compensation. For all but Social Security and dividends, these discrepancies could be due to differences between the two samples, based on the patterns observed in both 2013 and 2014.

Our difference-in-differences analysis of change in the reporting of aggregate income found the redesigned instrument to be associated with significant increases in the reporting of both total income and unearned income overall and in Social Security, disability benefits, retirement income, interest, and financial assistance from others. For a number of other sources, our analysis found differences that, while also not statistically significant, were nonetheless striking. For four of these sources the Census Bureau analysis found significant differences in the reporting of aggregate income. These include higher amounts of SSI, veterans’ benefits, and dividends and a lower amount of farm self-employment income. The matched sample analysis differs in the direction of change for dividends. Our analysis also found evidence of relatively

greater increases in survivors' benefits, for which the Census Bureau found no difference, and other income, which the Census Bureau did not test. The increase in other income undoubtedly reflects the addition of alimony after its elimination as a separate source. One Census Bureau finding that was not replicated in our analysis involved higher aggregate income for public assistance. It is possible that the Bureau's finding reflects a difference in the underlying samples, but because of how we weighted the matched samples we cannot directly compare aggregates across the two samples.

One expectation from an improved reporting of sources and amounts of income was that estimates of the proportion of the population below the poverty line would be reduced. However, consistent with the Census Bureau's static analysis, we found that the redesigned instrument did not reduce the proportion of households below poverty or with low income generally. Compared to the traditional questionnaire, the redesigned income module increased the proportion of households below 200 percent and below 100 percent of poverty, although neither change was statistically significant. However, significant changes were recorded elsewhere in the distribution, as the redesigned instrument reduced the proportion of households between 200 and 300 percent of poverty and increased the proportion above 500 percent of poverty.

While the absence of a reduction in poverty may be understandable given that the biggest effects of the new instrument are to increase reported retirement and interest income, the most surprising effect of the new instrument in the Census Bureau's analysis was a higher poverty rate among children under 18. Our matched sample analysis can explore the potential impact of differences between the two samples because it includes prior year data based on the traditional instrument for the recipients of both 2014 instruments. While we did find higher 2013 poverty rates for children under 18, adults 18 to 64, and adults 65 and older among households that were

administered the redesigned instrument in 2014, there was a significant reduction in the poverty rate between 2013 and 2014 among children in households receiving the traditional instrument in both years compared to no significant change in households receiving the redesigned instrument in 2014. Neither of the other age groups showed this pattern. This finding is consistent with the Census Bureau's finding that poverty among children in 2014—but not adults—was higher with the redesigned instrument.

Our analysis of imputation frequency for interest and dividends in the full redesign and traditional samples in 2014 finds evidence of excessive imputation of interest amounts compared to dividends. While both have high imputation rates for recipiency and amounts, the proportion of interest dollars imputed in the sample receiving the redesigned instrument is well beyond what we see for dividends in the same sample and for both items in the sample administered the traditional questionnaire. A careful review of interest and dividends imputation in the redesigned sample would appear to be warranted.

Finally, neither the redesigned split-sample file nor the 2015 CPS ASEC, which used the redesigned income module for all households, reflects the full impact of the redesign in that the Census Bureau's imputation procedures did not make use of the income brackets that a fraction of respondents provided in lieu of dollar amounts and did not incorporate the new variables introduced to better capture retirement income, total interest, and total dividends. Essentially, the imputations were run using the old methods. This could account for some of the counter-intuitive findings with respect to farm self-employment income and could have contributed to some of the other findings as well. Because of this possibility, once the Census Bureau has developed and tested the new imputation procedures, an essential step is that these be run on the 2014 redesign sample file and the Bureau's evaluations repeated. Only then can the Census Bureau be sure that

its estimates will reflect the full impact of the redesigned income module. Extending the analysis of the impact of the redesigned instrument to include the 2015 CPS ASEC, which can be done only through a matched sample methodology, would enable the Census Bureau to expand its base of findings on the impact of the redesigned income module.

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