Using Linked Survey and Administrative Data to Better Measure Income: Implications for Poverty, Program Effectiveness and Holes in the Safety Net

Bruce D. Meyer, University of Chicago and NBER
Nikolas Mittag, CERGE-EI/Charles University

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Abstract

We examine the consequences of underreporting of transfer programs in household survey data for several prototypical analyses of low-income populations. We focus on the Current Population Survey (CPS), the source of official poverty and inequality statistics, but provide evidence that our qualitative conclusions are likely to apply to other surveys. We link administrative data for food stamps, TANF, General Assistance, and subsidized housing from New York State to the CPS at the individual level. Program receipt in the CPS is missed for over one-third of housing assistance recipients, 40 percent of food stamp recipients and 60 percent of TANF and General Assistance recipients. Dollars of benefits are also undercounted for reporting recipients, particularly for TANF, General Assistance and housing assistance. We find that the survey data sharply understate the income of poor households, as conjectured in past work by one of the authors. Underreporting in the survey data also severely understates the effects of anti-poverty programs and changes our understanding of program targeting, often making it seem that welfare programs are less targeted to both the very poorest and middle income households than they are. Using the administrative data rather than survey data alone, the poverty reducing effect of all programs combined is nearly doubled while the effect of housing assistance is tripled. We also re-examine the coverage of the safety net, specifically the share of people without work or program receipt. Using the administrative measures of program receipt rather than the survey ones often reduces the share of single mothers falling through the safety net by one-half or more.

Key words: Poverty, Inequality, Measurement Error, Administrative Data, Survey Misreporting, Linked Data

1. Introduction

Survey data are used for many purposes and have become one of the most important sources of information for policy makers and researchers. A large share of the empirical research in economics and other social sciences relies on survey data as underlined by the hundreds of thousands of citations to surveys such as the Current Population Survey (CPS). Additionally, many of the statistics that are frequently used to design and evaluate policies at both the national and state level, such as the rates of unemployment and health insurance coverage, rely on household survey data. The CPS is the source of these statistics, as well as official income distribution and poverty statistics. The survey is also extensively used to determine the effects of programs on the income distribution, program participation rates, and the extent to which individuals are missed by specific programs or missed by the safety net entirely. However, the usefulness of the information in the CPS and other household surveys depends on its accuracy, which unfortunately, has been declining. In this paper, we examine the implications of survey errors in the CPS, particularly inaccurate income reporting and errors in imputation for missing variables and item non-response, for key income based statistics. We find that inaccurate survey data have badly distorted our understanding of the income distribution, poverty and the effects of government programs.

We focus on the implications of misreporting and imputation errors for three types of questions that the government and researchers try to answer using survey data such as the Current Population Survey. A very large literature examines measures of hardship and the distribution of household income among those with few resources. These statistics supply us with vital information on the prevalence and extent of material deprivation among the worst off in the population. Most well-known is the annual official income and poverty report, the most recent being U.S. Census (2014a). The official poverty rate is also one of the most cited government statistics in the popular press. Many other scholars have used

these data to calculate poverty or income distribution measures at the bottom including Blank and Schoeni (2003), Hoynes et al. (2006), and Burkhauser (2014).

A second prototypical question asks how the addition of the income from specific programs alters the poverty rate or other measures of material deprivation. These calculations provide estimates of the poverty reducing effects of policies and which types of individuals benefit. Such analyses for more than a dozen government programs can be seen in the annual Supplemental Poverty Measure report, most recently U.S. Census (2014b). Many researchers have conducted similar analyses such as the series of papers using the Survey of Income and Program Participation (SIPP) by Scholz, Moffitt and Cowan (2009), and Ben-Shalom, Moffitt and Scholz (2012).

A third important question is who is missed by transfer programs. This information may point to failings of the safety net to reach many of those it is intended to help. Maybe most well known in this line of work are the papers by Blank and Kovak (2007, 2009) and related papers by Bitler and Hoynes (2010), Loprest (2011), and Loprest and Nichols (2011). These papers focus on the share of single mothers who neither work nor receive income from government transfer programs. These papers often conclude that a large share of single mothers is missed by our safety net. In each of these prototypical cases, we find that survey errors, mainly the mis-reporting of government transfer receipt and amounts, but also non-response and inaccurate imputation,[1] lead to a greatly distorted view of the situation of those with the fewest resources and the effects of transfer programs.

While the problems of measurement error and non-response are not new, they are two of several characteristics of household surveys that have been getting worse over time. This decline in household survey quality is documented in Meyer, Mok and Sullivan (2015a, 2015b), who focus on several of the most used surveys including the CPS. Over time, fewer households respond to interviewers (unit nonresponse) and fewer who respond agree to answer income questions (item

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[1] For simplicity, we sometimes refer to both sources of error as misreporting and the problem as program underreporting below, even though the survey data are a mix of reported and assigned values.

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nonresponse). Item non-response rates have been rising over the past 25 years and are on the order of 20-30 percent or higher for both earnings (Bollinger and Hirsch 2006) and government transfers (Meyer, Mok and Sullivan 2015b). For the programs they examine, imputed dollars account for 24 to 36 percent of total dollars received in the CPS in 2012. Several studies find that non-response particularly affects measures of poverty (Hokayem, Bollinger and Ziliak 2015, Turek et al. 2009) and the tails of the income distribution (Bollinger et al. 2014), i.e. our population of interest. Even when households do respond, they are less likely to give accurate answers. In light of these problems, some researchers have questioned the accuracy of income data for the poor and suggested that consumption data would provide a better benchmark. In a series of papers, Meyer and Sullivan (2003, 2012) argue that a major source of the large discrepancy between income and consumption measures of poverty since 2000 is likely to be the under-reporting of transfer income. While an issue for many other variables,[2] the measurement error problem is particularly severe for transfer programs, with receipt missed for one-third of housing assistance recipients, forty percent of SNAP recipients, and sixty percent of TANF and General Assistance recipients. Even among those who correctly report receipt, average amounts received in the CPS fall short of the true amounts by six percent for SNAP, forty percent for TANF and General Assistance and 74 percent for housing assistance. Only a few studies attempt to correct for program underreporting, but most do not. While past evidence on this issue has been based on a mix of aggregate and linked microdata, here we are able to directly calculate the effects of misreporting.

A major difficulty in evaluating the extent of survey errors and their consequences is that one needs an external measure of truth to compare to survey responses. Some previous studies have used re-interviews, information from other surveys or administrative records to validate survey responses. In

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[2] For example, measurement error has been documented for income (e.g. Bound and Krueger 1991; Bollinger 1998; Dahl, DeLeire and Schwabish 2011; Abowd and Stinson 2013), education (Black, Sanders and Taylor 2003), employment status (Poterba and Summers 1986; Chua and Fuller 1987) and health insurance coverage (Davern et al. 2008). Bound, Brown and Mathiowetz (2001) provide an overview of studies of the extent of misreporting for key economic variables and data sources.

this study, we replace survey responses on the receipt and amount of government transfers with administrative records for four income transfer programs linked to the survey. The administrative records are extremely accurate (they contain actual payments made, they are validated by the agency and definitions are comparable to survey definitions). The administrative data are linked to survey data at the individual level with a high match rate because validated social security numbers are required to receive three of the programs.

Overall, correcting for misreporting sharply changes key results from survey data. Using the administrative variables, poverty and inequality are better than officially reported, program effects are larger and fewer individuals have fallen through the safety net. Incomes below the poverty line, particularly below half the poverty line, are substantially understated in the CPS. While the substantive importance of underreporting becomes smaller as income rises, correcting for underreporting makes a larger difference to household resources than including reported non-cash benefits throughout the income distribution for the programs we examine. Underreporting of transfer receipt also makes government anti-poverty policies appear sharply less effective: the poverty reducing effect of all programs combined is nearly doubled while the effect of housing assistance is tripled. Both the understatement of household income and the poverty reducing effect in the survey are even more pronounced for subpopulations that are at particular risk of deprivation such as the elderly, disabled or single mothers. They are particularly extreme for single mothers, for whom correcting for survey errors increases the overall poverty reduction due to the four programs by 11 percentage points, amplifying the poverty reducing effect of public assistance more than 6-fold and that of housing assistance more than 10-fold. In addition, we find that the fraction of non-working single mothers missed by government transfers is much lower than previously reported. This underlines that the coverage of the safety net is better than the survey suggests. The extent of misreporting of transfer programs is higher in the CPS than in other surveys, but none of the major surveys is without substantial measurement error in

program receipt (Meyer, Mok, Sullivan 2015a, 2015b, Meyer, Goerge, Mittag 2015). Thus, our results suggest substantial biases to similar analyses in alternative datasets.

In Section 2, we describe our linked survey and administrative data and report on the extent of misreporting of binary measures of receipt as well as continuous measures of amounts reported by true recipients. In the following sections we then use our linked administrative data to re-examine the prototypical analyses of low-income populations. We perform each analysis twice, once using the survey answers and once using the administrative measures of program receipt and amounts received. In Section 3, we examine the distribution of government transfers across the income distribution. In Section 4, we examine the poverty reducing effects of the different transfer programs, while Section 5 examines the frequency with which families are missed by the programs. Section 6 discusses the external validity of our results, while Section 7 offers conclusions.

2. Data, Methods and the Extent of Measurement Error

We begin with household survey data from the New York State sample of the 2008-2013 Current Population Survey Annual Social and Economic Supplement (CPS-ASEC). Early in the survey year, usually March, the CPS asks about income in the previous year (the reference year). Income is collected on many sources including earnings and a large set of government transfer programs. Imputed values for many in-kind benefits are also available in the survey files including housing assistance.

We link administrative records from two sources to the CPS. The first set of administrative records is from the New York State Office of Temporary and Disability Assistance (OTDA). The records are monthly payments from SNAP (food stamps), TANF and General Assistance for all individuals in New York State from 2007 through 2012. In the years since the 1996 welfare reform act, General Assistance has grown relative to federal cash assistance; in recent years total benefit payments have exceed those for TANF. Besides payment amounts and dates, the files include addresses and payment types. The

records are from actual payments, and appear to be accurate. For SNAP, for example, the overall total from our administrative records differs from official aggregate outlays by less than a percent in all years. The individual identifiers have been previously checked by NY OTDA against social security records.

The second source of administrative data is records on housing assistance from the Department of Housing and Urban Development (HUD). These data are from the 2009-2012 PIC and TRACS data files and include the programs under HUD jurisdiction. The data contain information on all recipients of these programs including addresses, number and ages of family members, and rent paid by the tenant from April 2008 to March 2012. While the data include the market rent for most units since they are part of voucher programs, the data do not include rent amounts for publicly owned housing units. We impute market rent for these units using conditional mean imputation within cells formed by five-digit ZIP code and household size. Further detail on the imputation as well as the data and the definitions discussed in the remainder of this section is provided in the data appendix.

We match the administrative data to the CPS survey data at the individual level using individual identifiers created by the Person Identification Validation System (PVS) of the U.S. Census Bureau.[3] In short, the PVS uses the person data (such as address, name, gender, and date of birth) from the administrative records and survey data to search for a matching record in a reference file derived from the Social Security Administration Numerical Identification file. The reference file contains all transactions recorded against a social security number. If a matching record is found, the social security number of the record from the reference file is transformed into a protected identification key (PIK)[4] and attached to the corresponding records in our data. A PIK is obtained for over 99 percent of the administrative records from each source and 86 percent of the individuals in the CPS. Our unit of analysis is a household, so we aggregate the data to the household level. We consider a household to

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[3] NORC (2011) and Wagner and Layne (2012) discuss the PVS in detail.
[4] There is a one-to-one correspondence between PIKs and social security numbers; PIKs are used to protect the anonymity of individuals in the data.

have a PIK if a PIK was obtained for anyone in the household, which is the case for 91 percent of the households in the CPS. In order to account for the incomplete matching, we multiply the household weights by the inverse of the predicted probability of any household member having a PIK (see e.g. Wooldridge 2007). The coefficients of the Probit model we use to predict these probabilities are reported in Appendix Table A1. As the high rate of PIK-linking suggests, our results do not appreciably change when using the adjusted household weights.

Our main approach is to consider two measures of income or program receipt: first, a measure that relies only on survey data, and, second, a measure that substitutes some or all of our administrative data for the survey data on transfer program receipt. We use the household as the unit of analysis which is logical given the sharing of resources among members, but this decision also insures a high rate of data linkage. Since the administrative data have records for each recipient person, we are able to link the information from a program case to the household if anyone in the household who is recorded as receiving the benefits of the program has a PIK. The CPS questions regarding SNAP, TANF and General Assistance refer to receipt during the previous calendar year and we define the administrative variables accordingly. In our analyses below, we aggregate TANF and General Assistance to public assistance (PA) because the two programs have the same benefits in New York and cases are allocated to the programs in significant part to satisfy federal rules rather than based on other distinctions.

The housing data do not include state and city funded programs as well as those funded by non-HUD federal agencies, so they do not cover all types of public housing. Thus, individuals who report housing assistance in the survey data, but cannot be found in the HUD data may very likely be receiving benefits through a non-HUD housing program. Therefore, we consider a household to be a recipient of housing assistance if it is a recipient according to either the survey or the administrative data. In contrast to the other transfer programs, the CPS questions on housing assistance refer to the current month rather than any time over the previous year. Thus, we define receipt of housing assistance in the

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linked data based on the current month as well. The amount of the housing subsidy in the CPS is not reported, but imputed by the U.S. Census Bureau using an adjusted conditional mean imputation based on the American Housing Survey (AHS). Rather than using recent data, the imputation uses predicted amounts derived from a model estimated in the 1985 AHS (adjusted for inflation). Most of the predictor and cell variables in the model are imputed themselves (e.g. market rent in the AHS is imputed from unsubsidized units and unit size in the CPS is imputed based on family size). The cells for the imputation of the subsidy are based on very sparse criteria (3 income ranges, 3 apartment sizes and 4 geographic regions). Thus, the CPS contains at most 9 unique values of the subsidy for each of the four regions, and the same value is assigned to a family of similar composition and income in New York City and Slippery Rock, PA.[5]

We use these imputed CPS market values for those who report receipt of housing assistance in the survey, but do not receive assistance from any of the programs in the administrative HUD data and the administrative amount for households that are recipients according to the administrative data or both data sources. In both cases, we calculate annual amounts by multiplying the amount for the current month by 12.[6] The validation information for housing is only available for 2008 to 2011. Consequently, we limit most analyses to this time period, but are able to include 2007 and 2012 when analyzing SNAP and public assistance. The safety net in New York is more extensive than in other states, with receipt rates and amounts received above the national average, particularly for housing assistance. Consequently, we report several results without housing assistance to focus on the more nationally comparable parts of the safety net.

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[5] See Johnson, Renwick and Short (2011) for further discussion of the imputation procedure.
[6] This convention overstates the amount for households that only received assistance for part of the previous year. For households in the administrative data, we could obtain the exact amount from the administrative data, but this is not possible for recipients of state-level programs. However, we are mainly interested in aggregate amounts and doing so would understate them because we would not include housing assistance received by households that received assistance, but did not do so in the interview month. As long as there are no seasonal trends in housing assistance, multiplying the monthly amount by 12 assigns some of the benefits to the wrong households, but yields correct aggregate amounts.

Due to the high match rates and the quality of the administrative data, we believe that the administrative information on program receipt is accurate. We do not mean to claim that linked administrative data are free of errors or contain fewer errors than survey data in general. Both administrative data and data linkage vary substantially in quality. Our records are based on actual payments, which are monitored well and consequently line up very closely with administrative aggregates. Other linked data, such as many components of tax records, are based on individual reports, so they may contain errors just as in surveys. In such cases, it may be better to combine administrative and survey measures as in Abowd and Stinson (2013), Kapteyn and Ypma (2007) or Meijer, Rohwedder and Wansbeek (2012). While our administrative variables are not perfect due to rare errors in the administrative data or false matches, such errors should be infrequent enough to be negligible compared to the extent of misreporting. Therefore, we argue that the results based on the linked administrative data are close to true values.

We first summarize the extent of errors in survey data on program receipt and amounts to document the need for corrected income distribution estimates. The first three columns of Table 1 report error rates for the full New York sample, while the last three columns show similar rates for those with income below twice the poverty line, our main population of interest. The errors arise from a combination of misreporting and imputation due to item non-response or, for housing assistance amounts, missing survey questions. The first row of Table 1 reports for the three programs, the false negative rate, the share of true recipients who do not report receipt in the survey. In the full sample, the false negative rate is 43, 63, and 36 percent for SNAP, public assistance, and housing assistance, in order. The error rates are still high, but somewhat lower in the sub-sample of those with incomes below twice the poverty line. The full sample false negative rates for SNAP and public assistance are higher than found thirty years ago by Marquis and Moore (1990) in the Survey and Income and Program

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Participation, but lower for SNAP than found recently in Meyer, Goerge and Mittag (2015) in the CPS for Illinois and Maryland.

Reported in the second row of the table, the false positive rate, the share of true nonrecipients who are recorded as recipients, is much lower for these programs.   The rates are 1.9, 0.7, and 2.8 percent for SNAP, public assistance, and housing assistance, in order. While the rates of false positives are low, they apply to the much larger pool of non-recipients, so they constitute a substantial share of households. As a consequence, the reporting rate, the share of dollars paid out that are reported in the survey, is substantial higher than the share among true recipients. The false positive rates are high in this table for two additional reasons. First, a substantial share of households does not answer the receipt questions and have imputed responses. A large share of the false positives, is due to the educated guesses by the Census Bureau. This is particularly severe for SNAP and public assistance where imputed responses make up 36 and 43 percent of the false positives. Second, as discussed above, in the case of housing assistance, we cannot be certain that households who report receipt, but are not recorded in the HUD data do not receive housing assistance from non-HUD federal, state or local programs. Given that there are several such programs in New York, it is likely that the majority of the 3 percent false positive rate for housing assistance is due to recipients of other programs.[8]

There is even less previous evidence on misreporting of amounts than on misreporting of receipt. However, our results show that it is a substantial problem as well. The third row of Table 1 shows that more than half of those who correctly report receipt of SNAP commit large errors (more than $500 in absolute value) in reporting amounts. This misreporting of amounts is even worse for public assistance, where only 12 percent of reporting recipients report an amount that lies within $500 of their true receipt. As discussed above, the value of housing assistance in the CPS is imputed rather than

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[8] Thus, in the analyses below, we treat the reports of housing assistance that are not recorded in the HUD administrative data as correct reports, but do not include them here in order to illustrate the difference between the administrative and the survey data.

reported. Our results show that the differences between the imputations and the true values are huge both in aggregates, understating the true average subsidy by a factor of almost 4, and at the individual level with 97.5% of reporting recipients being off by $500 or more and 75% being off by $4000 or more. This discrepancy is not surprising given the shortcomings of the imputation procedure discussed above. It is also in line with the differences Johnson, Renwick and Short (2011) find when comparing aggregate numbers from HUD and the CPS for the entire U.S.[9]

The differences in reported amounts of reporting recipients are not as extreme for SNAP and public assistance. However,the correlations between true and reported amounts are low and the standard deviations of the errors are on the order of 75 percent of mean amounts received. This further underlines that even among those who correctly report receipt, few report correct amounts. On the positive side, the results show that amounts are understated less on average than receipt. While the results confirm the finding in Meyer, Mok and Sullivan (2015b) that there is only slight net underreporting of amounts by true SNAP recipients, our results show that there is substantial underreporting of amounts of public assistance and housing assistance. Taken together, the findings of substantial errors in both receipt and amounts received suggest that misreporting has the potential to sharply alter the analyses described above.

While microdata based false negative rates are not available for the rest of the country, one can compare the net reporting rate, the share of dollars paid out for a program that is recorded in the survey, in New York to that of the rest of the U.S. The state level reporting rates as well as national rates by year can be found in Meyer, Mok and Sullivan (2015a, 2015b). These rates suggest that New York has worse reporting of public assistance that the rest of the U.S., but better reporting of SNAP than other states. We discuss the differences between New York and the rest of the U.S. and in how far the analyses below apply nationally further in section 6.

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[9] The differences they find are smaller, but the actual subsidies are higher in New York than in the U.S. (yet imputations are not) and we calculate amounts per household rather than family.

In the analyses below, we rely on reported pre-tax money income (in 2012 dollars) as our main measure of income, since it is the official and most commonly used measure of household resources in the CPS. However, we repeat all analyses using a supplemental poverty measure (SPM) type income definition, which includes in-kind transfers (reported food stamps and imputed market values of housing assistance, school lunch, Medicaid, Medicare and employer health insurance contributions) and subtracts taxes (state and federal income and payroll taxes after credits). Our measures of poverty use the official federal poverty thresholds, which we do not adjust for the SPM income measure. We also use the poverty thresholds as an equivalence scale to adjust for household size and composition by reporting results in terms of income relative to the poverty line. The federal poverty thresholds arguably have several shortcomings and are often considered arbitrary, but in lieu of a universally preferred measure, they provide a well-known and easily interpretable metric to analyze economic hardship. Contrary to un-linked administrative records, our linked data provides us with the demographic detail necessary to analyze demographic groups that are known to be particularly affected by poverty. So besides analyzing the overall population, we focus on three disadvantaged groups: single mother headed households (unmarried females with at least one child under 18 present), households with an elderly member (age 65 or older), and households with a disabled member.[10]

3. Program Effects Across the Income Distribution

We first examine how misreporting affects our understanding of the economic well-being of households throughout the income distribution, particularly low income households. We find that underreporting of government transfers severely understates income of those in deep poverty and thereby makes poverty look more severe and inequality look worse than it truly is. In addition, while

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[10] The survey questions we use to identify disabled individuals were added to the CPS in survey year 2009, so our analyses of households with a disabled member are restricted to 2008 to 2012.

missing dollars as a share of income fade out quickly as income rises, dollars missing in the survey remain sizeable higher up in the income distribution. Throughout the income distribution, accounting for unreported dollars from our four programs makes a larger difference than adding reported amounts of our two non-cash programs to cash income.

Table 2 compares dollars received and reported from SNAP, public assistance and housing assistance as well as all programs combined in New York State in 2008-2011 by bins of annual reported pre-tax household money income relative to the poverty line.[11] The definition of the income bins uses survey data only, since we are primarily interested in how accounting for misreporting changes our views of the economic conditions of individuals at different points in the income distribution, where those points are defined by official numbers from the CPS. Throughout the income distribution, dollars reported are much lower than the administrative numbers. Thus, there is net underreporting in the CPS and the differences are large enough to severely skew analyses of the safety net and the well-being of program recipients.

The first row of each panel (for all programs first and then the three programs separately) contains estimates of program dollars received from the CPS survey data. The second row replaces the survey reports of program dollars received by the numbers recorded in the administrative data. Focusing on those with reported incomes below half the poverty line in column 1 first, the first two rows of Table 2 show that while $1,553 in program dollars are reported, actual receipt is $2,991. Thus, measures of income that use the CPS reports of government transfers make individuals in deep poverty look substantially worse off. As shown in the third row, more than $1400 in transfer payments are missing in the survey data per person. This makes an important difference for a poor family as, shown in

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[11] Results using our SPM-type income measure to define the income bins are in Appendix Table A2 and we discuss the main differences at the end of this section.

the fourth row, it adds up to 110 percent of their reported cash income.[12] Reported cash income can be found in the second line from the bottom of the table. In other words, the dollars from the three programs we examine that is *not* reported in the survey exceeds the amount of cash income that *is* reported by this group. The fifth row for all programs as well as the individual programs contains the dollar reporting rate, i.e. the percentage of dollars received that are reported in the survey which is just over half at 52 percent for all programs combined for those in deep poverty. To put the magnitude of missing transfer dollars into context, the last row for all programs combined contains the amount received from the two non-cash programs (food stamps and housing assistance) according to the survey as a proportion of reported cash income. This ratio is 104 percent for those reported to be in deep poverty, smaller than unreported benefits as a percent of reported cash income.

Consequently, accounting for misreporting would substantially improve measures of well-being of individuals in deep poverty, so individuals at the bottom of the income distribution are less severely deprived than the survey data suggest. In addition, missing a large share of income of the very poor makes measures of inequality look worse, particularly since many common measures of inequality are most sensitive to values in the tails of the income distribution. The importance of this difference is further emphasized by the fact that the increase in available resources from adding unreported benefits from the four programs we examine is larger than the reported amount received from the two non-cash programs in our data. This suggests that the change in our measures of well-being of the poor when correcting for misreporting is of comparable to or larger in magnitude than the change when moving from a pre-tax money income measure of resources to an SPM-type definition. In fact, for all income ranges, unreported program dollars exceed reported non-cash benefits.

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[12] Note that the base for this percentage includes reported public assistance, but neither food stamps nor housing assistance. We use this denominator for consistency as the numerator changes, but reported cash income also is the most commonly used measure of resources in the CPS and is used to compute the official poverty rate. It therefore provides a good illustration of the magnitude of survey errors relative to the resources we believe a household to have.

Repeating the analyses for the disadvantaged subpopulations further underlines that program under-reporting in the CPS makes poverty look more severe. Missing dollars per person for households with an elderly member in deep poverty are slightly lower, by $100, than in the overall population, while resources of households with a disabled member and single mother headed households are even more severely understated by the CPS. Missing dollars per person in deep poverty are higher than average by about 30% or $500 for both groups. Single mother headed households in deep poverty have more than $2000 per person in additional income than the CPS suggests from our four programs alone. Adding these benefits to pre-tax money income increases their resources by more than 150 percent. In comparison, adding the survey measures of food stamps and housing assistance only represents an increase of 135 percent ($1734).

Misreporting not only understates the importance of transfers overall, but also makes programs with high reporting rates such as the Food Stamp Program appear relatively more important for low income individuals. For our four programs, relying on only survey data understates the support families in deep poverty receive from the government overall, because only 52 percent of dollars truly received are reported in the survey. Almost two-thirds of this effect is due to missing housing assistance and about a quarter is caused by underreporting of public assistance. Housing assistance makes up a larger share of missing dollars since individuals in deep poverty receive almost three times as much in housing subsidies ($1509) as public assistance ($567). With annual transfers of $914 per individual in deep poverty, food stamps are a more important resource than public assistance, but substantially smaller than housing assistance. However, 85 percent of food stamp dollars received by individuals in deep poverty are reported in the CPS, while housing and public assistance have low dollar reporting rates in this income category (38 percent for housing assistance and 34 percent for public assistance). The higher reporting rate makes the Food Stamp Program appear to be the most important transfer program for those in deep poverty: In the survey data it accounts for slightly more than half of transfer income

received from any of the programs we analyze. However, the administrative data reveal that it makes up less than a third of total dollars received and that housing assistance is a more important resource for individuals in deep poverty.

Missing program dollars, as a share of income, falls quickly as income rises. For those between half the poverty line and the poverty line, the unreported dollars add up to 28 percent of reported income. The decline continues above the poverty line as reported cash income is almost 10 times higher than missing transfers for those in near poverty (100-150 percent of the poverty line) and more than 20 times higher for individuals between 150 and 200 percent of the poverty line. As a share of income, missing dollars become almost negligible after that. This fade out is mainly driven by the rapid increase in income and reinforced by declining total amounts received from government programs. However, adding unreported dollars continues to increase available resources by a larger amount than including reported non-cash benefits in the income definition throughout the income distribution.

For the subpopulations, comparing survey and administrative measures of transfer receipt in higher income bins provides further evidence that underreporting makes the disadvantaged look more economically deprived than they are. Accounting for misreporting still makes a larger difference for measures of economic resources of all three disadvantaged subpopulations in higher income bins, because the decline of missing transfer dollars is slower. The difference is particularly pronounced for single mothers for whom missing dollars still add up to 10 percent of reported cash income between 150 and 200 percent of the poverty line.

While unreported dollars make up only a small share of total income, the survey data conceal that dollars received from government programs per person are still substantial in absolute terms at higher income levels. For example, individuals in the income category that includes the median household (300 to 350 percent of the poverty line) receive an average of $299 in transfer payments per year, only $58 of which are reported in the CPS. Amounts of this magnitude are unlikely to make an

important difference for estimates of the distribution of annual income. However, they are likely to affect studies of income volatility and transitory poverty if the missing dollars are from underreporting of short spells of program receipt.[13]

For the subpopulations, amounts received are higher and reporting rates comparable, so substantial absolute dollar amounts are missing in the survey at higher income levels as well. For the disabled and elderly, more than $2000 per person are missing between 50 and 100 percent of the poverty line and more than $1600 are missing between 100 and 150 percent. For single mother headed households below 150 percent of the poverty line, missing dollars are slightly lower, but both received and missing dollars remain sizeable higher in the income distribution. Even for individuals who live in single mother headed households that belong to the upper half of the income distribution because their income exceeds four times the poverty rate, the survey numbers fall short of true benefit receipt by $414 per person.

The main reason why missing dollars remain sizeable in higher income ranges is that reporting rates decline with income. While slightly more than half of transfer dollars received in deep poverty and almost half (46 percent) of dollars received between 50 and 100 percent of the poverty line are reported, only 38% of dollars received between 100 and 200 percent of the poverty line and an even smaller 20% of dollars received higher up is captured by the CPS. Reporting rates that decline with income not only make simple corrections for misreporting inaccurate, but also imply that transfer payments become less and less visible in the survey data as income increases. This problem makes survey data particularly problematic when analyzing the role of transfer programs higher up in the distribution of annual income. Consequently, studies of those that have annual incomes well above the poverty line but still receive transfers, such as those with volatile incomes or those who mix work with welfare receipt, are likely to be particularly affected by the problem of underreporting.

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[13] Besides research on income volatility, this finding is also likely to affect studies of people who supplement earned income with transfer receipt.

In summary, we find that underreporting in the CPS causes us to severely underestimate resources available to the poor and thereby makes poverty look more severe and inequality worse. As a share of income, the understatement of resources in the survey data fades out at higher income levels, but does so slower for the elderly, disabled and single mothers. Using the SPM-type income measure instead of reported cash income to form the income bins changes our results slightly, but does not affect the main conclusions. Results are reported in Appendix Table A2. Most notably, both dollars received and missing dollars are lower up to 150 percent of the poverty line and higher above this threshold. This result holds both in absolute terms and as a share of cash income. The main reason for this pattern is that including reported government transfers in the income definition moves a lot of individuals, and particularly transfer recipients, to higher income bins.

4. Poverty Reduction and Program Effects

Transfer misreporting not only makes the economic situation of low income households look worse, but also causes the poverty reducing effect of government transfer programs to be severely understated. The CPS is the source of the official poverty rate and thereby an important source of information that guides anti-poverty policies. The poverty reduction due to government transfers is one of the most important indicators used to evaluate the effectiveness of individual transfer programs as well as overall government policies to reduce economic deprivation. Most of these analyses, regardless of the indicator of effectiveness they employ, are based on survey data, since other data sources rarely provide the required family characteristics. Underreporting of transfer receipt therefore makes government efforts to reduce poverty appear sharply less effective. Even worse, since measures of the cost of government programs are usually based on administrative data, under-reporting in surveys has an uneven effect on cost-benefit analyses.

In the calculations below, we consider anyone to be moved out of poverty by a program if their non-program income is below the poverty threshold, but exceeds it when adding benefits received from the program. These statistics have two well-known caveats. First, they abstract from behavioral responses. Second, more than one program may receive credit for moving a given household out of poverty if they individually raise the household above the poverty threshold. Of course, when we look at the effect of combinations of programs this double counting is removed. We focus on 2008 to 2011, because we have administrative data on all programs for these four years. The average poverty rate excluding the four programs we examine (i.e. according to reported cash income without public assistance) was 13.7 percent over this time period.

Table 3 shows that the four programs moved a much larger fraction of people out of poverty than the CPS suggests. Including reported benefits from the four programs in the income definition reduces the average poverty rate by 2.8 percentage points, while including benefits according to the administrative data reduces it by 5.3 percentage points. Thus, when taking underreporting into account all programs combined move another 2.5 percent of the population out of poverty. Consequently, the overall poverty reducing effect of the four government transfer programs is almost twice as large as the CPS indicates. Housing assistance appears particularly more effective when using the administrative numbers, moving an additional 2.5 percent of individuals out of poverty. It thereby has the largest poverty reducing effect of the programs we examine. However, this reduction is severely understated in the survey data, where it is only half as large. Excluding housing assistance, the poverty reduction of food stamps and public assistance combined was 1.8 percentage points in the CPS and almost 50 percent higher in the linked data (2.6 percentage points). Most of the reduction is due to food stamps (2.1 percentage points), only 0.5 percentage points are due to public assistance.

The understatement of poverty reduction is even greater for two of the three disadvantaged groups, single mother headed households and those with a disabled member, due to their higher

poverty rates. Results are reported in the bottom panel of Table 3 for single mothers and in Appendix Table A3 for households with an elderly or disabled member. While average poverty rates according to the base income measure are lower for households with elderly members (10 percent), they are higher for those with a disabled member (19.8 percent) and those headed by single mothers (37.5 percent). For households with disabled members and those headed by single mothers, both the poverty reducing effects and the differences between the administrative and the survey measures are striking. All programs combined account for a 10 percentage point reduction in the poverty rate for disabled households and 18 percentage points for single mother headed households. For the latter, the survey only captures a reduction of 7 percentage points. Consequently, a reduction in the poverty rate of 11 percentage points, over 1.5 times that in the reported data, is missed when only using the survey data.

As Table 3 shows, the difference for single mother headed households is primarily due to the large impact of housing assistance, which is poorly reported. The poverty reduction due to housing assistance in the CPS is only 0.7 percent, while the administrative numbers show that the decrease exceeds 7 percentage points, i.e. its poverty reducing effect for single mothers is 10 times higher than the CPS suggests. Public assistance also has a much larger effect on the poverty rate for all three subgroups than the effect recorded in the CPS: it is 5 times larger than recorded for households with a disabled member and 6.5 times larger using the administrative data for households headed by a single mother. As the poverty rate is lower for the elderly, the effect of our four government programs is lower for them in absolute terms. Yet, they still reduce poverty by 38 percent, while the survey data only suggest a reduction of 24 percent.

The comparisons above show that the CPS poorly measures the number of people moved across the federal poverty threshold, but other income cutoffs are also frequently considered and are informative. The previous section shows that overall reporting rates decline with income, so the fraction

of program effects missed by the CPS is likely to be larger for higher cutoffs and smaller for lower cutoffs.

For example, the reduction in deep poverty due to government programs appears lower than it actually is in the CPS by a similar, but slightly smaller amount than the reduction in poverty. On average, 6 percent of individuals lived in households with base income below 50 percent of the poverty line, i.e. in deep poverty, between 2008 and 2012. According to administrative measures of transfer receipt, government transfers account for a smaller reduction of the rate of deep poverty than the poverty rate, as they reduced it by 3.3 percentage points. In the survey data, the reductions of both rates are similar at about 2.5 percentage points.

Reporting rates decline with income, so while government programs become less important at higher income thresholds, the fraction of their effect that is missed in the CPS also becomes larger. For example, 22.3 percent of individuals live in near poverty, i.e. in households with base income below 150 percent of the federal poverty line. The four government transfer programs reduce this rate by 4.3 percentage points. Thus, their effect is indeed smaller in absolute numbers than their effect on poverty. However, only a 1.2 percent decrease in near poverty is captured by the survey reports. Consequently, the programs move more than 3.5 times as many people out of near poverty than the CPS suggests, making them look substantially more effective when correcting for misreporting. Since the reporting rate declines faster than the receipt rate, the CPS makes programs look less and less effective when considering thresholds further up in the income distribution. For instance, the CPS indicates that government transfers only move 0.6 percent of the population across twice the poverty line, while the linked data reveal that they still move 2.8 percent across this threshold.

For the disadvantaged subpopulations, the differences between the survey and administrative effects are often larger, and are most pronounced for single mother headed households. For this group,

of the 11 point reduction in near poverty, only 2 percentage points can be found in the CPS. Similar

results are found at twice the poverty line.

In addition to the fraction of households below multiples of the poverty line, we also examine

the poverty gap and how much of it is filled by government transfers. The poverty gap, the total dollars

needed to raise all households to the poverty line, has been emphasized by many researchers as better

capturing deprivation (see e.g. Deaton 1997, Ravallion 1996). Correcting the survey data for

underreporting increases the share of the poverty gap filled by the four programs by 44 percent; they

now fill about half of the poverty gap rather than one-third of the gap. As with the poverty rate, housing

assistance is the most important program as it fills more than a quarter of the poverty gap. Food stamps

are almost as important, filling 23 percent of the poverty gap and public assistance accounts for an 11

percentage point reduction.[14] Both housing and public assistance are poorly reported and thereby, with

about half of their effect missing in the survey data, appear much less effective at narrowing the poverty

gap. Food stamps are reported more accurately, but almost a quarter of their effect is missing

nonetheless. Consequently, survey data understate the effect of food stamps, but they overstate the

relative importance of food stamps.

The survey data also miss a large share of the poverty gap that is filled for the disadvantaged

subgroups. Even though the poverty gap is of similar magnitude for them, government programs fill a

larger share of it for households with disabled members (62 percent) and single mother headed

households (67 percent). Again, the differences between survey and administrative data are striking. For

example, the survey misses a 10 percentage point reduction in the gap due to public assistance and a 22

percentage point reduction due to housing assistance for single mother headed households.

As well as the level of poverty, policy makers and researchers focus on changes over time. Due

to measurement error, the survey data may not only misrepresent the level of poverty and program

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[14] Note that the contributions of the individual programs add up to more than their joint contribution, since
pooling them leads to a larger amount being spent above the poverty line.

effects, but also how they change over time as trends in misreporting magnify or hide trends in poverty. We focus on how accurately the CPS reflects the effect of the government program expansion during the great recession. According to our base income measure, the poverty rate grew steadily between 2008 and 2011, from 12.67 percent to 14.42 percent, i.e. a 1.74 percentage point (13.8 percent) increase. However, when including transfers, the poverty rate only grew by 0.76 percentage points (7 percent) according to survey reports and 0.32 percentage points (4 percent) according to the administrative measures. Neither of the measures that include transfers suggests an economically large increase in poverty over the recessionary period,[15] but the increase is more than twice as large when relying on survey data only. Substantively, these numbers show that the expansion of government benefits successfully dampened the increase of the poverty rate, because the poverty reducing effect of the programs kept up with its increase: according to the administrative data, the poverty reduction due to all programs combined increased from 4.5 to 5.9 percentage points between 2008 and 2011.

The results are overall similar, but less pronounced when looking at our SPM-type income measure. This difference is mainly due to the fact that fewer people are poor according to the SPM-type income. While the differences between CPS reports and the administrative measures are still large, both program effects and their understatement in the CPS are smaller overall for the measures we examine. To summarize, we find that regardless of the measure of poverty used, underreporting makes poverty look higher in survey data and severely understates the effectiveness of government policies in reducing economic hardship. Particularly for the disadvantaged subpopulations, government programs have a strikingly larger effect on measures of poverty than indicated in the data source of official poverty statistics.

5. Holes in the Safety Net

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[15] This is in line with Sherman (2011), who relies on a simple imputation of missing program benefits and finds that programs fill in nearly the entire drop in income in the recession.

Another important criterion to evaluate government transfer programs and the overall safety net is how well they reach people in need. We find that the safety net reaches far more people in need than the survey data suggest. Focusing on single mothers, we show that the share that neither work nor receive any program benefits is often overstated in the CPS by 50 percent or more due to misreporting, depending on which programs are included. Our results suggest that underreporting of government programs is likely to make any similar measure of the extreme left tail of the income distribution look severely worse.

We focus on single mothers who have little or no income from both work and welfare programs. This group has been called disconnected single mothers, and has received particular attention in the literature (Blank and Kovak 2009, Bitler and Hoynes 2010, Loprest 2011, Loprest and Nichols, 2011, Turner, Danziger and Seefeldt 2006). For example, Blank and Kovak (2009) find high and rising rates of disconnectedness. A second reason to focus on single mothers is that the government programs for which we link data are particularly relevant for them. However, we expect misreporting to make the safety net look substantially worse for other disadvantaged groups as well, since the consequences of misreporting loom particularly large in such studies for several reasons. First, the measures of interest are very sensitive to the common failure to report program receipt in surveys as we discuss further below. Second, unlinked administrative data usually do not contain the covariates required to isolate particularly poor populations so these kinds of analyses usually have to rely on survey data. Finally, reporting rates are known to differ by demographic group (Meyer, George, Mittag 2015), so using survey data alone to analyze which demographic groups the safety net fails to reach is particularly problematic. Linking survey data to administrative records at the individual level can overcome these problems and greatly improve estimates of how many people the safety net fails to reach.

Table 4 reports the percentage of single mother headed households who are missed by the safety net according to survey reports and administrative program receipt for 2008 to 2011. The first

row uses the definition from Blank and Kovak (2009), which considers anyone disconnected who does not work and does not receive TANF, but we also include General Assistance, since much of what used to be TANF is now General Assistance. In line with their definition, we only consider single female household heads under age 55 and exclude full-time students and households with income higher than twice the poverty line. Following their approach, we initially require no earnings and no benefits in the left panel of table 4, but then allow up to $2000 in annual earnings and $1000 in benefits from all programs combined in the right panel.[16] Even for the definition of Blank and Kovak in the first row, which is only affected by failure to report public assistance, the CPS overstates the number of single mother headed households without earnings and access to the safety net by 34 percent. While allowing for some earnings and program receipt increases the numbers of households left behind, it does not decrease the degree to which the survey understates the coverage of the safety net. The survey continues to overstate the number of households by 33 percent, so that according to the CPS, slightly more than 5 percent of all single mother headed households seem to fall through the cracks of the safety net even though they are in fact program recipients, as we see in the administrative data.

The problem that survey data understate the coverage of the safety net is not due to the particular definition used by Blank and Kovak, but arises regardless of how we use the survey data to measure the coverage of the safety net and extreme deprivation. Taking more transfer programs into account makes the safety net look much more effective at reaching disadvantaged populations, but does not alleviate the problems caused by underreporting of government transfers. In the remaining rows of table 4, we consider several definitions of being missed by the safety net, varying what programs we include. Going down the rows of Table 4 underlines two points:

First, we see that a large share of those who neither work nor receive public assistance do not fall through the cracks of the safety net, because they receive other cash or non-cash transfers.

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[16] For comparability with their definition, all dollars are in 2005 dollars.

Including non-cash benefits particularly affects the number of households the safety net fails to reach: adding food stamp receipt reduces the fraction by 75 percent (70 percent for the low income and benefits definition). This reduction is larger than the effect of including reported receipt of all other cash programs combined. Accounting for housing assistance as well, reduces the number by another 40 percent.

Second, regardless of which programs are included in the definition, the third and sixth column of Table 4 show that the extent to which the safety net fails to reach those in need substantively depends on how we measure program receipt. Depending on which additional programs we include, the extent to which the CPS overstates the fraction of single mothers that neither work nor participate in any of the programs rises to 50 to 113 percent in the survey data. The range of overstatement is slightly lower (40 to 82 percent) when including households with low earnings and low benefit receipt, but the survey data still make the coverage of the safety net and its ability to reach particularly disadvantaged individuals look worse. In fact, including additional programs aggravates the problem of underreporting. The fraction of single mothers who appear to fall through the cracks who actually receive one or more of the government benefits according to the administrative data, increases as the definition of the safety net becomes more inclusive. While a quarter of those who appear to be left behind when only considering public assistance do in fact receive the program, this share rises to more than two-fifth when including food stamps and housing assistance. Finally, more than three-quarters of those who appear to be left behind in the survey when including all cash and non-cash transfers are actually covered by one or more of the programs. On the positive side, the CPS correctly reflects the pattern of the time trend. The administrative and the survey data agree on the fact that both the number and the share of single mothers the safety net fails to reach increased initially during our time period and declined as the economy improved.

The exaggeration of the extreme left tail of the income distribution seems to be a common effect of program misreporting. Other measures that heavily weight these outliers are likely subject to substantial error. Measures of being in contact with government anti-poverty agencies necessarily rely on binary measures of program receipt or agency contact that are likely heavily underreported as well and therefore prone to be affected in similar ways. However, the problem also applies to other measures of extreme deprivation that are based on resources rather than program receipt. For example, the share of individuals with income below $2 per day (e.g. Ravallion, Chen and Sangraula 2008, Shaefer and Edin, 2013) is likely to be overstated in surveys due to program misreoprting. In most cases, receipt of a single government program is sufficient to move a household out of this category. Thus, the pervasive failure to report program receipt at all makes any entirely survey based measure of extreme poverty likely to exaggerate true material deprivation.

6. Discussion

While our specific results pertain to New York, a large and important state, over a six year period, it is very likely that our results are more general. As Table 5 shows, New York is similar demographically to the rest of the U.S. in terms of age, education, race and the share Hispanic. The poverty rate in New York and the generosity of its welfare system are higher than in the nation as a whole. The most striking difference between New York and the rest of the U.S. is the frequency of public housing receipt. Our results on the importance of under-reporting of housing assistance receipt and the understatement of the value of the assistance almost certainly overstate these problems for the rest of the U.S.

On the other hand, several other studies have found reporting of SNAP to be worse in other states than what we find for New York. While evidence from validation studies for other states is scarce, it indicates that reporting is better in New York. Meyer, Goerge and Mittag (2015) find higher rates of

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misreporting in the CPS for Illinois and Maryland. Harris (2015) uses validated American Community Survey data to show that the rates of false negatives are substantially higher in Texas than in New York. In terms of aggregate comparisons, Meyer, Mok and Sullivan (2015a, 2015b) provide a detailed picture of dollar reporting rates both nationally and by state. As mentioned above, their results underline that New York is not an outlier in terms of reporting rates and survey errors appear better, rather than worse than the national average.

More importantly, we are only able to correct for mis-reporting in four programs, SNAP, TANF, General Assistance, and housing assistance. Meyer, Mok and Sullivan (2015a) document that the CPS substantially understates receipt of other benefits including the Earned Income Tax Credit, unemployment insurance, Supplemental Security Income, Workers' Compensation, and Social Security (OASDI). While reporting of OASDI receipt is better, dollars received are still substantially understated in the CPS. Given the size of OASDI and the existing evidence on the extent of underreporting of OASDI and SSI (e.g. Nicholas and Wiseman 2010), the dollars missed greatly exceed those for any of the programs analyzed here. We expect that our study would indicate much larger overall effects of unreported transfers if we were able to include all of these programs. We expect that our results especially understate the problem of under-reported transfers to those 65 and older given that we do not have administrative data on the major programs for this demographic group such as Social Security and Supplemental Security Income.

7. Conclusions

Previous work has documented the under-reporting of transfers in surveys, but has not directly showed that it mattered for widely used analyses of important outcomes. The results in this paper show that using administrative data combined with survey data sharply alters our view of well-being at the bottom of the income distribution and the effects of transfer programs. The incomes of those far down

in the distribution, specifically those below half the poverty line, are considerably understated. The under-reporting of transfers is less important as income rises, but for some programs such as SNAP and housing assistance, substantial dollars are under-reported well above the poverty line. Throughout the income distribution, correcting for underreporting of our four programs has a larger impact on household resources than including reported non-cash benefits from these programs. We also find that poverty rates are markedly lower and the effects of government programs in reducing poverty are sharply understated. All of these differences are much larger for disadvantaged groups, in particular single mother headed households. In addition, we find that the fraction of non-working single mothers missed by government transfers is much lower than previously reported.

Our findings also have implications for the broader issues of social science data quality as well as measurement error and non-response in surveys. We provide an example of how the declining quality of data from household surveys documented in Meyer, Mok and Sullivan (2015b) has important implications for what we learn from a key survey. The issue goes beyond poverty and inequality in the Current Population Survey. Other variables besides program receipt are mis-measured such as educational attainment and health insurance coverage, and the under-reporting of transfers is pronounced in all major U.S. household surveys.

Knowing more about misreporting also allows us to improve surveys. One way to do so is to improve survey design and interview procedures to reduce the severity of misreporting. A second approach is to do a better job of imputing missing or mis-measured variables and missing values due to item non-response. The evidence in the case of transfer programs suggests that simple imputation methods are unlikely to work. The assumptions these methods rely on are unlikely to hold, because program mismeasurement is non-classical and related to covariates (Mittag 2013, Meyer and Mittag 2014, Meyer, Goerge and Mittag 2015). A third approach is to link administrative records to improve data quality or even replace survey responses, which can address both the problem of misreporting and

item non-response. Besides the substantive contributions of the paper, it demonstrates the value of linking administrative data to an important and widely used survey dataset. This type of linkage is likely to be increasingly used to augment and remedy weaknesses of survey data.

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Data Appendix

Adjusting for Missing PIKs

Less than 10 percent of the households in the CPS data do not have a PIK and therefore cannot be linked to the administrative data. We adjust the household weights for missing PIKs using inverse probability weighting (see e.g. Wooldridge 2007). In particular, we define a dummy variable that equals 1 if anyone in the survey household has a valid PIK. We then estimate the probability of a household having a PIK by estimating yearly probit models using this variable as the dependent variable and demographic and economic characteristics of the household and its head as independent variables. The estimated coefficients are reported in Table A1. Using these coefficients, we calculate the probability that each household is PIKed and multiply the household weights by the inverse of this probability.

Definitions of Income and Program Variables

Our main income definition is pre-tax money income, which includes reported earnings and all reported cash transfers. The SPM-type measure adds in-kind transfers (food stamps and imputed market values of housing assistance, school lunch, Medicaid, Medicare and employer health insurance contribution) and subtracts FICA, the federal retirement payroll deduction and federal and state taxes (including all credits). We use market values and not fungible values of non-cash transfers and do not subtract SECA taxes (unless they are included in the FICA variable). For each definition, we use two types of income measures: raw dollar amounts inflation adjusted to 2012 dollars (referred to as dollar income) and dollar amounts divided by the poverty line (referred to as poverty index income). We use the federal poverty thresholds both for the poverty rate and for the normalization of income. We define them based on the total number of adults and children in the household and the age of the householder.

For all programs, we define receipt at the household level, i.e. a household and all its members are considered recipients if anyone in the household receives a program. The CPS questions for food

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stamps and public assistance refer to any receipt in the previous calendar year and we match that definition in the administrative data. We consider anyone to report housing assistance receipt who reports either subsidized rent or living in public housing. Both CPS question for housing assistance refer to current recipiency status and we match this definition in the administrative data. Our housing data do not cover all types of public housing, so we consider a household to be a recipient of housing subsidies if they receive housing subsidies according to the survey OR the administrative data. If they are recipients in both sources, we use the administrative subsidy amount.

We define the monthly housing subsidy as the difference between the rent of the unit and total tenant payments as recorded in the administrative data. The rent of the unit is missing for government owned units (public housing). Since the administrative records contain very detailed information, we impute it using the average rental payment of housing assistant cases with the same number of individuals in the same 5-digit zip code. We calculate annual amounts by multiplying current receipt by 12 both in the survey and in the administrative data. For households in the administrative data, we could obtain the exact amount from the administrative data, but this is not possible for recipients of state-level programs. We thereby overstate the amount for households that only received assistance for part of the previous year. However, we are mainly interested in aggregate amounts and computing exact amounts for current recipients would understate aggregate amounts, because we would not include housing assistance received by households that received assistance, but did not do so in the interview month. As long as there are no seasonal trends in housing assistance, multiplying the monthly amount by 12 assigns some of the benefits to the wrong households, but yields correct aggregate amounts.

Definitions of Subpopulations

When we restrict the analysis to single mothers, we use households headed by an unmarried female (divorced, widowed, never married) with at least one child under 18 in the household (including

foster, grand and step children). We use the same definition for single mother headed households in the analyses of who is left behind by the safety net. However, following Blank and Kovak (2009), we exclude full-time students, those with incomes above twice the poverty line and households headed by a female younger than 18 or 55 and older there. Households with an elderly member are households in which anyone is 65 or older. A household is included in the analysis for the disabled if anyone in the household gave a positive answer to any of the 6 disability questions. Since these questions are first included in the 2009 CPS, this analysis starts in reference year 2008.

Table 1
Survey Errors in Transfer Receipt Reporting, CPS New York , 2008-2011

Error Type	Sample	Full Sample			Income < 2X Poverty Line		
		SNAP	Public Assistance	Housing Assistance	SNAP	Public Assistance	Housing Assistance
False negatives	True recipients	42.8%	63.3%	35.6%	33.0%	56.8%	29.6%
False positives	True non-recipients	1.9%	0.7%	2.8%	7.6%	2.0%	8.0%
Absolute error in amount >$500	Recipients who report	53.22%	87.89%	97.50%	52.66%	88.27%	97.57%
Mean of true amount	Recipients who report	$3,389	$5,213	$12,000	$3,499	$5,317	$12,014
Mean of reported amount	Recipients who report	$3,170	$3,152	$3,081	$3,262	$3,004	$3,230
SD of error in amount	Recipients who report	$2,392	$4,619	$8,776	$2,341	$4,384	$8,657
Correlation true and reported amount	Recipients who report	0.55	0.22	0.07	0.57	0.26	0.08

Note: Estimation uses households with at least one PIKed member only, weights are adjusted for PIK rates. SNAP and public assistance amounts are average annual receipt per household, housing assistance amounts are annualized from monthly amounts per household. False positives for housing assistance may be recipients of non-HUD housing programs and therefore should not necessarily be interpreted as survey errors.

Table 2

Survey and Administrative Amounts Received by Program, by Annual Reported Pre-Tax Money Income Divided by Poverty Line,

CPS NY Sample, 2008-2011

	< 50%	50-100%	100-150%	150-200%	200-250%	250-300%	300-350%	350-400%	>400%
				Categories of Annual Reported Income Relative to Poverty Line					
				All Programs Combined					
Dollars Received per Person Survey	$1,553	$1,302	$612	$369	$194	$80	$58	$41	$14
Dollars Received per Person Admin	$2,991	$2,850	$1,630	$970	$632	$429	$299	$189	$98
Dollars Missing per Person in Survey	$1,438	$1,548	$1,018	$600	$439	$348	$241	$148	$84
... as Share of Reported Cash Income	110.2%	28.3%	11.6%	4.9%	2.8%	1.9%	1.1%	0.6%	0.2%
Net Dollar Reporting Rate	52%	46%	38%	38%	31%	19%	19%	22%	14%
Reported Non-cash Benefits (% of Cash Income)	104.0%	21.5%	6.3%	2.4%	1.2%	0.4%	0.2%	0.1%	0.0%
				Food Stamps					
Dollars Received per Person Survey	$780	$669	$337	$174	$92	$30	$28	$16	$6
Dollars Received per Person Admin	$914	$884	$464	$306	$209	$101	$100	$63	$31
Dollars Missing per Person in Survey	$135	$214	$127	$131	$117	$71	$72	$47	$25
... as Share of Reported Cash Income	10.3%	3.9%	1.4%	1.1%	0.8%	0.4%	0.3%	0.2%	0.0%
Net Dollar Reporting Rate	85%	76%	73%	57%	44%	30%	28%	25%	18%
				Public Assistance					
Dollars Received per Person Survey	$193	$119	$48	$78	$13	$8	$3	$7	$2
Dollars Received per Person Admin	$567	$306	$91	$90	$30	$33	$21	$17	$11
Dollars Missing per Person in Survey	$373	$187	$43	$12	$16	$25	$18	$10	$9
... as Share of Reported Cash Income	28.6%	3.4%	0.5%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%
Net Dollar Reporting Rate	34%	39%	53%	87%	45%	24%	16%	42%	19%
				Housing Assistance					
Dollars Received per Person Survey	$578	$510	$218	$117	$88	$39	$27	$18	$6
Dollars Received per Person Admin	$1,509	$1,660	$1,076	$574	$394	$294	$179	$109	$57
Dollars Missing per Person in Survey	$932	$1,150	$858	$457	$306	$255	$152	$91	$50
... as Share of Reported Cash Income	71.4%	21.0%	9.8%	3.7%	2.0%	1.4%	0.7%	0.3%	0.1%
Net Dollar Reporting Rate	38%	31%	20%	20%	22%	13%	15%	16%	11%
Share of Individuals	5.5%	7.9%	8.7%	8.0%	8.4%	8.2%	7.3%	6.2%	39.8%
Income per Individual ($)	1305	5474	8782	12240	15505	18661	21959	25964	55973
Number of Household Observations	689	1045	1143	1000	1001	972	864	750	4682

Note: Estimation uses households with at least one PIKed member only, weights are adjusted for PIK rates. Income categories are defined based on pre-tax money income, poverty thresholds are the official poverty thresholds. Dollars received are 2012 dollars, but not adjusted for family size.

Table 3
Reduction in Poverty, Deep Poverty and Near Poverty due to Transfer Programs According to Survey and Administrative Data,
CPS NY Sample, 2008-2011

Entire Population

	Deep Poverty (baseline: 6.0%)				Poverty (baseline: 13.65%)				Near Poverty (baseline: 22.3%)			
	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey
All Programs Combined	2.48%	3.33%	0.85%	34.28%	2.79%	5.29%	2.50%	89.7%	1.18%	4.33%	3.14%	265.48%
SNAP	1.38%	1.57%	0.19%	13.68%	1.59%	2.09%	0.50%	31.2%	0.57%	1.06%	0.48%	84.10%
Public Assistance	0.42%	0.89%	0.47%	112.75%	0.19%	0.47%	0.28%	149.7%	0.15%	0.24%	0.09%	59.53%
Housing Assistance	0.76%	1.84%	1.08%	142.23%	0.86%	2.56%	1.71%	199.1%	0.31%	2.43%	2.12%	674.00%
Public Assistance and SNAP	1.85%	2.39%	0.54%	29.35%	1.89%	2.75%	0.86%	45.2%	0.74%	1.42%	0.67%	90.45%

Single Mother Headed Households

	Deep Poverty (baseline: 21.4%)				Poverty (baseline: 37.5%)				Near Poverty (baseline: 51.5%)			
	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey
All Programs Combined	11.52%	15.93%	4.40%	38.23%	7.30%	18.34%	11.04%	151.20%	2.31%	11.43%	9.12%	394.07%
SNAP	6.59%	6.77%	0.17%	2.65%	3.47%	5.00%	1.52%	43.85%	1.42%	3.39%	1.97%	139.20%
Public Assistance	2.25%	4.71%	2.46%	109.46%	0.28%	1.81%	1.53%	548.28%	0.19%	1.04%	0.85%	436.21%
Housing Assistance	3.53%	9.72%	6.19%	175.09%	0.71%	7.68%	6.98%	986.70%	0.54%	4.89%	4.35%	811.13%
Public Assistance and SNAP	8.79%	10.98%	2.19%	24.92%	4.90%	8.32%	3.41%	69.62%	1.61%	4.59%	2.98%	184.73%

Note: N=12,146 households for the entire population, 1072 for single mothers. Poverty rate is share of individuals in households with income below thresholds. The baseline poverty rates use pre-tax cash income excluding public assistance as the income definition. Poverty thresholds are the official poverty thresholds, individuals in households below 50% of the threshold are in deep poverty, those below 150% in near poverty.

Table 4

Single Mother Headed Households without Program Receipt or Earnings According to Survey and Administrative Data, CPS NY Sample, 2008-2011

Included Programs	No earnings and program receipt				Low earnings and program receipt		
	Survey	Admin	% Over-statement		Survey	Admin	% Over-statement
Public Assistance only	17.1%	12.8%	34%		22.8%	17.1%	33%
Public Assistance and Food Stamps	5.3%	3.2%	68%		7.4%	5.1%	46%
Public Assistance, Food Stamps and Housing	3.6%	1.7%	113%		5.1%	3.0%	71%
All Cash Transfers	5.4%	3.6%	50%		9.8%	7.0%	40%
All Cash Transfers and Food Stamps	not disclosed				3.5%	1.9%	82%

Note: N=578. All definitions restrict the sample to households headed by an unmarried female with at least one own, grand, related or foster child present in the household. In column 2-4, we consider households that have no earnings and receive none of the programs in the first 3 columns as left behind, columns 5-7 also include those with yearly earnings less than $2000 and combined program receipt of less than $1000 (2005 dollars). "All Cash Transfers" includes unemployment compensation, Social Security, SSI, PA, Education Assistance, Worker's compensation, Veteran's payments, Survivor income, disability income, retirement income, child benefits, alimony and financial assistance. Estimation uses individuals in household with at least one PIKed member only, weights are adjusted for PIK rates.

Table 5
Reported Transfer Program Receipt and Demographics,
U.S. v. NY, 2007-2012 CPS

Transfer Receipt	U.S.	NY
Any Program Receipt Rate	13.06%	16.04%
Average Received ($)	$432	$687
SNAP Receipt Rate	11.17%	12.43%
Average Received ($)	$264	$344
Public Assistance Receipt Rate	2.12%	2.78%
Average Received ($)	$49	$73
Housing Assistance Receipt Rate	3.67%	7.50%
Average Received ($)	$118	$270

Demographics	U.S.	NY
Age under 18	24.42%	22.72%
Age 18-39	29.56%	30.28%
Age 40-64	33.06%	33.56%
Education Less than High School	34.52%	33.16%
Education High School	23.08%	23.19%
Education Some College	21.46%	19.55%
Black	12.75%	17.22%
Other Non-white	8.05%	9.79%
Hispanic	16.27%	17.37%
Poverty Rate	12.26%	13.85%

Note: Average received is unconditional annual dollars. Housing assistance is CPS imputed market values of reduced rent and public housing. For the demographics, the omitted category is "65 and older" for age, "college degree or more" for education and "white" for ethnicity.

Table A1 – The Determinants of a Household having a PIK, CPS New York , 2008-

	Coefficients	Marginal Effects
Single, no children	-0.4309***	-0.0672***
	(0.0709)	(0.0112)
Single, with children	-0.0020	-0.0003
	(0.0727)	(0.0113)
Multiple adults, no children	-0.2032***	-0.0317***
	(0.0608)	(0.0095)
Number of members under 18	0.0483*	0.0075*
	(0.0268)	(0.0042)
Number of members 18 or older	0.0614**	0.0096**
	(0.0247)	(0.0038)
Age 16-29	-0.0678	-0.0106
	(0.0494)	(0.0077)
Age 30-39	-0.1113***	-0.0174***
	(0.0423)	(0.0066)
Age 50-59	0.1672***	0.0261***
	(0.0451)	(0.0070)
Age 60-69	0.3932***	0.0613***
	(0.0553)	(0.0086)
Age 70 or more	0.3180***	0.0496***
	(0.0587)	(0.0092)
Less than high school	-0.1144**	-0.0178**
	(0.0481)	(0.0075)
High School graduate	-0.1637***	-0.0255***
	(0.0379)	(0.0059)
Complete graduate and beyond	0.0010	0.0002
	(0.0410)	(0.0064)
Hispanic	-0.2106***	-0.0328***
	(0.0380)	(0.0059)
Black non-hispanic	-0.1328***	-0.0207***
	(0.0392)	(0.0061)
Other non-hispanic	-0.4917***	-0.0767***
	(0.0454)	(0.0070)
Unemployed	0.2085***	0.0325***
	(0.0761)	(0.0119)
Not in Labor Force	-0.1034***	-0.0161***
	(0.0389)	(0.0061)
Household income/poverty line	0.0214***	0.0033***
	(0.0062)	(0.0010)
Anyone in household Disabled	0.1726	0.0269
	(0.1281)	(0.0200)
Rural	0.1042*	0.0163*
	(0.0560)	(0.0087)
Recipient of Housing assistance (CPS)	0.3103***	0.0484***
	(0.0553)	(0.0086)
Linear trend in CPS survey year	0.0121	0.0019
	(0.0081)	(0.0013)
Constant	1.3505***	
	(0.0974)	
Observations	19,852	19,852

Note: Dependent variable is a dummy whether anyone in the household was assigned a PIK. All models use household weights. Robust standard errors in parentheses (using the delta method in column 2). All analyses conducted using household weights. The unreported omitted family type is multiple adults with children, the age category is 40-49, the education category is some college, the race group is non-Hispanic white, the employment category is employed. *** p<0.01, ** p<0.05, * p<0.1

Table A2

Survey and Administrative Amounts Received by Program, by Annual Reported SPM-type Income Divided by Poverty Line,

CPS NY Sample, 2008-2011

	Categories of Annual Reported Income Relative to Poverty Line								
	< 50%	50-100%	100-150%	150-200%	200-250%	250-300%	300-350%	350-400%	>400%
All Programs Combined									
Dollars Received per Person Survey	$275	$721	$809	$546	$477	$407	$387	$256	$84
Dollars Received per Person Admin	$954	$2,031	$1,674	$1,358	$1,230	$996	$899	$671	$251
Dollars Missing per Person in Survey	$679	$1,310	$865	$812	$752	$589	$512	$415	$167
... as Share of Reported Cash Income	67.4%	23.2%	10.0%	6.8%	4.9%	3.1%	2.2%	1.6%	0.4%
Net Dollar Reporting Rate	29%	35%	48%	40%	39%	41%	43%	38%	33%
Reported Non-cash Benefits (% of Cash Income)	27.0%	11.3%	7.6%	4.1%	2.7%	1.8%	1.6%	0.9%	0.2%
Food Stamps									
Dollars Received per Person Survey	$167	$383	$412	$299	$261	$179	$186	$108	$43
Dollars Received per Person Admin	$335	$576	$542	$478	$389	$286	$238	$175	$75
Dollars Missing per Person in Survey	$168	$193	$131	$179	$128	$107	$52	$67	$32
... as Share of Reported Cash Income	16.7%	3.4%	1.5%	1.5%	0.8%	0.6%	0.2%	0.3%	0.1%
Net Dollar Reporting Rate	50%	66%	76%	63%	67%	63%	78%	62%	58%
Public Assistance									
Dollars Received per Person Survey	$3	$82	$146	$65	$56	$68	$16	$16	$5
Dollars Received per Person Admin	$146	$293	$276	$172	$134	$110	$69	$39	$17
Dollars Missing per Person in Survey	$143	$211	$129	$107	$78	$43	$53	$22	$13
... as Share of Reported Cash Income	14.2%	3.7%	1.5%	0.9%	0.5%	0.2%	0.2%	0.1%	0.0%
Net Dollar Reporting Rate	2%	28%	53%	38%	42%	61%	23%	42%	27%
Housing Assistance									
Dollars Received per Person Survey	$105	$256	$245	$182	$157	$154	$184	$132	$36
Dollars Received per Person Admin	$473	$1,163	$856	$708	$706	$600	$592	$457	$159
Dollars Missing per Person in Survey	$368	$906	$612	$526	$549	$446	$408	$325	$123
... as Share of Reported Cash Income	36.5%	16.0%	7.1%	4.4%	3.6%	2.4%	1.8%	1.2%	0.3%
Net Dollar Reporting Rate	22%	22%	29%	26%	22%	26%	31%	29%	23%
Share of Individuals	1.5%	2.1%	5.2%	8.4%	12.0%	10.8%	10.8%	9.3%	40.0%
Income per Individual ($)	1008	5654	8615	11885	15416	18810	23069	26429	45804
Number of Household Observations	217	270	600	972	1462	1309	1378	1182	4756

Note: Estimation uses households with at least one PIKed member only, weights are adjusted for PIK rates. Income categories are defined based on SPM-type income (after taxes, including in-kind transfers), poverty thresholds are the official poverty thresholds. Dollars received are 2012 dollars, but not adjusted for family size.

Table A3
Reduction in Poverty, Deep Poverty and Near Poverty due to Transfer Programs According to Survey and Administrative Data,
CPS NY Sample, 2008-2011, Households With an Elderly or Disabled Member

Households With an Elderly Member

	Deep Poverty (baseline: 3.1%)				Poverty (baseline: 10.0%)				Near Poverty (baseline: 21.0%)			
	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey
All programs Combined	1.06%	1.28%	0.22%	20.71%	2.35%	3.84%	1.48%	62.89%	1.59%	5.69%	4.10%	257.55%
SNAP	0.50%	0.58%	0.08%	15.93%	1.50%	1.72%	0.22%	14.94%	0.86%	1.45%	0.59%	68.66%
Public Assistance	0.06%	0.29%	0.24%	429.45%	0.00%	0.16%	0.16%	1)	0.05%	0.00%	-0.05%	-100.00%
Housing Assistance	0.60%	0.96%	0.36%	59.61%	1.27%	2.61%	1.34%	105.09%	0.40%	4.19%	3.79%	952.78%
Public Assistance and SNAP	0.58%	0.78%	0.20%	34.28%	1.53%	1.98%	0.44%	28.87%	0.90%	1.49%	0.58%	64.51%

Households With a Disabled Member

	Deep Poverty (baseline: 7.3%)				Poverty (baseline: 19.8%)				Near Poverty (baseline: 32.0%)			
	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey	Survey	Admin	Difference	% of Survey
All programs Combined	3.93%	5.09%	1.16%	29.40%	5.86%	10.22%	4.37%	74.53%	2.44%	8.83%	6.39%	262.37%
SNAP	2.02%	2.39%	0.37%	18.17%	2.77%	3.84%	1.08%	38.89%	1.20%	1.71%	0.51%	42.82%
Public Assistance	0.63%	1.34%	0.71%	112.58%	0.24%	1.22%	0.98%	408.55%	0.09%	0.52%	0.43%	480.25%
Housing Assistance	1.13%	2.75%	1.63%	144.63%	3.02%	5.69%	2.67%	88.65%	0.73%	5.37%	4.64%	631.64%
Public Assistance and SNAP	2.69%	3.53%	0.83%	30.99%	3.26%	5.16%	1.91%	58.58%	1.29%	2.35%	1.06%	82.33%

Note: N=2,919 households for the elderly, 2,168 for the disabled. Poverty rate is share of individuals in households with income below thresholds. The baseline poverty rates use pre-tax cash income excluding public assistance as the income definition. Poverty thresholds are the official poverty thresholds, individuals in households below 50% of the threshold are in deep poverty, those below 150% in near poverty.

[1] The poverty reduction according to the survey is 0%, so the true reduction as a percentage of the survey reduction is not defined due to the required division by 0.