

Comparing Survey and Administrative Measures of Self-Employment Income: New Implications  
from the Health and Retirement Study

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Abstract: Strategic reporting of self-employment income in tax filings results in under-identifying this income in administrative earnings records. Surveys have the potential to better identify this income, but a variety of approaches show that many major surveys do not. In contrast, using the 2004-2016 Health and Retirement Study (HRS) linked to administrative earnings records, this paper finds that the HRS does identify substantially more self-employment income at both the extensive and intensive margins than in administrative earnings records, in line with the Internal Revenue Service's estimated compliance rate of 44% for self-employment income. Comparing sources of discrepancies in reported income in the HRS and administrative earnings records suggests that while 29.4 percent of inconsistent HRS self-employment reports represent likely misreported wage and salary income, more than double, 60.8 percent, represent likely true self-employment not captured in the administrative records. Further results suggest these are disproportionately reported by respondents who consider themselves to be retired, likely reflecting more informal work that is not reported to tax authorities. Results also show the HRS identifies substantially more self-employment employment income, particularly at the tails of the SER/DER earnings distribution, than the administrative records, which has implications for estimates of poverty and inequality. These findings highlight (1) the capacity for survey data to identify self-employment income otherwise missed in analyses using only administrative records; and (2) heterogeneity in reporting self-employment income across survey instruments.

## 1 Measuring Self-Employment and Self-Employment Income

Growing awareness of contract, informal, and insecure work arrangements has prompted major policy and public concerns about how these types of work affect workers' wellbeing and how policy should respond. However, effective policy responses depend on good evidence, and nontraditional work arrangements have proved remarkably difficult to capture accurately in both survey and administrative data sources. To measure work arrangements directly, surveys ask respondents explicitly about the types of work they do. However, an ample literature documents myriad issues with such survey questions as they may not capture the way individuals perceive their work, especially in less traditional work arrangements (Allard and Polivka, 2018; Bureau of Labor Statistics, 2018; Abraham and Amaya, 2019; Bracha and Burke, 2021; Abraham et al., 2023), and can produce divergent estimates based on sampling modes, methods, and timing (Katz and Krueger, 2019).

Given the challenges associated with reporting about work arrangements on surveys, an alternative approach to measuring different types of work arrangements is to use different types of work-related income to infer work arrangements, whether through surveys asking respondents about the different kinds of work-related income they receive or through administrative data, such as tax records. However, another ample literature shows that different survey and administrative data sources on work-related income, especially income from self-employment, also lead to different estimates of magnitudes and trends.

These differences across data sources raise the question of which source on work-related income to use to better understand the types of work that people do. While administrative data likely represent the best data source for measuring outcomes like program participation, when it comes to self-employment income, they provide a less accurate measure. As much of self-

employment income is not subject to third-party reporting and is therefore reported to the IRS only at the discretion of filers, tax filers may choose to under-report self-employment income to tax authorities to reduce their tax burden or to over-report self-employment income to take advantage of tax incentives (Slemrod, 2016). Garin et al. (2022) found that estimates of employment, and in particular, self-employment, in administrative records are influenced by reporting behavior, and rates and changes in reporting behavior can have meaningful effects on estimates of employment trends. Further, less formal work arrangements may be shorter term and less stable, and as a result, may be less likely to be reported as taxable income and identified in administrative records. In addition, to examine effects of these work arrangements on wellbeing, administrative records lack information on many demographic, health, and family characteristics and outcomes of interest.

These considerations point to the possibility for surveys to better identify such income to produce more accurate estimates and provide greater insight into how tax filers systematically misreport such income. However, a puzzle exists as the extant literature has found self-employment income underreported in several surveys using a variety of approaches. Given the potential large benefit of better identified self-employment income, it is valuable to better understand the nature of survey reports of self-employment income, how they relate to survey reports of wage and salary income, and how they compare to administrative records.

This paper adds to the literature by using another survey linked to administrative earnings records, the 2004-2016 Health and Retirement Study (HRS), to examine comparisons using a different source of survey data focusing specifically on older workers. Understanding self-employment income and arrangements is particularly salient for older workers because they comprise a disproportionate share of the self-employed: estimates from the 2020 Current

Population Survey Annual Social and Economic Supplement (CPS ASEC) suggest that while workers age 55 and older comprise 23.1 percent of the workforce, they comprise 38.8 percent of self-employed workers. Moreover, estimates from the 2016 wave of the HRS suggest that the fraction of workers who are self-employed increases with age: from 15.4 percent of workers younger than age 55, to 17.1 percent of workers aged 55-65, and 33.8 percent of workers aged 65 and older.

This paper aims to identify the factors contributing to the mismeasurement of self-employment in survey and administrative data. First, the paper examines discrepancies in HRS and administrative measures of self-employment and wage and salary income. Second, the paper compares the extensive margins of self-employment and wage and salary income in HRS data linked to administrative earnings records to the CPS ASEC linked to administrative earnings records by age group. Third, the paper explores mechanisms for the discrepancies by examining the demographic and work characteristics of respondents with inconsistent reports. Finally, the paper examines the magnitudes of discrepancies across the earnings distribution.

Results show that, in contrast to other major surveys, the HRS identifies more individuals reporting any self-employment income than both the CPS ASEC and the administrative earnings records for same-aged individuals over the same time period. For example, I estimate the self-employment rate of workers aged 53-58 over to be 22.6 percent in the HRS compared to 13.5-13.8 percent in the administrative records and 10.0 percent in the CPS ASEC. Examination of these reports in the HRS suggests that while 29.4 percent of inconsistent HRS self-employment reports represent misreported wage and salary income, more than double, 60.8 percent, represent self-employment not captured in the administrative records or CPS ASEC. Results further suggest that the self-employment captured in the HRS but not in the administrative earnings

records is disproportionately reported by respondents who consider themselves to be retired, which likely reflects more informal work that is not reported to tax authorities. Results also show the HRS identifies substantially more self-employment income, particularly at the tails of the SER/DER earnings distribution, than the administrative records, which has implications for estimates of poverty and inequality. Furthermore, estimates of the compliance rate in the administrative earnings records compared to the survey data are in line with Internal Revenue Service (IRS) estimated compliance rates for self-employment income. These findings highlight (1) the capacity for survey data to identify self-employment otherwise missed in analyses using only administrative records as well as (2) heterogeneity in reporting self-employment income across survey instruments.

## 2 What We Know about Discrepancies in Measuring Self-Employment Income in Surveys

An ample literature finds self-employment income is under-identified in several major household surveys using a number of different approaches. At a high level, one can compare whether weighted survey estimates produce measures in link with those of aggregate administrative benchmarks. For example, Roemer (2000) established a methodology for deriving benchmarks from the National Income and Product Accounts (NIPAs) and compared them to weighted aggregates from the CPS ASEC and Survey of Income and Program Participation over 1990-1996. Estimates showed that both surveys substantially under-identify self-employment income relative to the adjusted NIPA measure, which could reflect missing self-employment income reported in the surveys, incorrect calculations leading to the NIPAs overstating self-employment income, or both.

To identify the extent to which self-employment income in surveys is underreported, Hurst, Li, and Pugsley (2014) used reported expenditures to infer actual income of the self-employed based on the relationship between income and expenditures of wage and salary workers in the Consumer Expenditure Survey and the Panel Study of Income Dynamics. They found that, on average, the self-employed underreport their income by about 25%.

Using linked individual-level survey and administrative data, Abraham et al. (2021) used the CPS ASEC matched to Social Security Administration (SSA) earnings records to compare the fraction with self-employment income. They found that a large and growing fraction of those reporting self-employment income in administrative earnings records reported no such income in the CPS ASEC, but not the reverse. The largest contributor to the increase in the gap is growth in the number of people who have both wage and salary income and self-employment income in the administrative earnings records but only a wage and salary job in the CPS ASEC. Also contributing to the increase in the gap are growth in the number of people who have wage and salary income in the CPS ASEC but self-employment income in the administrative earnings records and the number of people who have self-employment income in the administrative earnings records but no employment income in the CPS ASEC. These findings suggest that the CPS ASEC data are not capturing a substantial share of self-employment activity and that the discrepancy is widening over time, raising the concern that the CPS ASEC in particular and survey data more broadly may not accurately measure either levels or trends in self-employment.

Shedding more light on these inconsistencies, Garin et al. (2022) attributed much of the discrepancy between the CPS ASEC and administrative records identified by Abraham et al. (2021) to a growing share of individuals eligible for the Earned Income Tax Credit reporting self-employment income on their tax forms in order to benefit from negative marginal tax rates.

These findings suggest that a substantial share of the increase in discrepant reports can be attributed to this behavior, easing some concerns that survey and administrative data show different trends and highlighting the potential for changes in reporting incentives to affect estimates of self-employment.

Adding to these findings, recent work by Imboden, Voorheis, and Weber (2023) examined reporting at the intensive margin in the CPS ASEC as compared to administrative records. Among those reporting income in both sources, they found more income reported in the survey as compared to the administrative records for the self-employed as compared to the wage and salary employed and found evidence of bunching of income in the administrative records around EITC thresholds. Taken together with the work of Abraham et al. (2021), these findings suggest that while those who do report self-employment income in both sources report more in the survey, many individuals do not report self-employment income on the survey that they report in tax filings.

This paper adds to this literature by comparing estimates in the HRS linked to administrative earnings records. Given that estimates are sensitive to survey and sample characteristics, using a different source of linked survey data is valuable to understand how the survey questions and methods of the HRS contribute to measuring self-employment.

### 3 Data

To examine mismeasurement in self-employment among older workers, this analysis uses the 2004-2016 waves of the HRS linked to SSA administrative earnings records.

#### 3.1 HRS

The HRS is a longitudinal study of a representative sample of approximately 20,000 Americans over age 50 and their spouses. Since 1992 it has been conducted every two years with

new cohorts added every six years. The HRS asks questions on a breadth of topics including work history, current employment, disability, retirement plans, net worth, income, health insurance and health status. This analysis includes the 2004-2016 waves of the HRS as these are the continuous waves for which applicable Social Security sample weights are available (Health and Retirement Study, 2021).

The HRS asks respondents about different types of income they received in the calendar year prior to the interview. Respondents are asked if they had any income of a particular type and are then asked for the amount of income. Respondents are first asked about income from self-employment (income and profits), then wage and salary income, then income from a professional practice or trade, then income from tips, bonuses, or commissions, and finally, any other income from work, all before taxes and other deductions. If a respondent indicated that they received income of a particular type but did not know the specific amount, they were asked to provide a range using unfolding brackets of standardized cutoff amounts.

For this paper's analysis, I examine HRS respondents' reports of self-employment and wage and salary income.<sup>1</sup> I classify respondents as having any self-employment income in the HRS if they reported self-employment income of \$400 or more in the calendar year prior to the interview. I use the \$400 cutoff because individuals are required to file an income tax return if their net earnings from self-employment are \$400 or more (Internal Revenue Service, 2022).<sup>2</sup> I

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<sup>1</sup> In addition to asking about income sources, the HRS asks respondents whether they are currently working for pay, and if so, whether they work for themselves or someone else on their current main job. The survey does not ask respondents whether they work for themselves or someone else on any additional jobs held currently or over the course of the calendar year. Given that the administrative records are also reported in terms of earnings and cover the full calendar year rather than a point in time, I use the income reports rather than the employment reports as they are more appropriately comparable.

<sup>2</sup> Results are robust to classifying respondents as self-employed if they report any positive self-employment income.



classify respondents as having any wage and salary income in the HRS if they report positive wage and salary income in the calendar year prior to the interview.

For extensive margin estimates, in cases where the respondent indicates that they received income of a particular type but does not provide an amount, I use imputed values from the RAND HRS Detailed Imputations File 2018 (Bugliari et al., 2022). I examine the sensitivity of the extensive margin results to the inclusion of other types of work-related income as well as different approaches to imputing missing income amounts in Appendix 1 and Appendix 2, and do not find substantial differences related to the choice of approach. For intensive margin estimates, I drop respondents who do not provide either self-employment or wage and salary income amounts.

In addition to the core HRS data, to examine characteristics of self-employment that might account for discrepancies, I identify those who report owning, running, or managing a business separately from those who do not, classified as engaged in independent self-employment. As described by Abramowitz (2021), this measure was derived for respondents reporting being self-employed on their current main job from internal HRS data on their narrative descriptions of the industry and occupation associated with their current main job. The narratives include answers to the following open-ended questions: “What industry do you work in? That is, what does your company do or make?” and “What sort of work do you do?” and tend to be 4-5 sentences long. Using the narrative responses to these questions and hand classifying a subset of observations to train a machine learning model to classify the remainder, each self-employed respondent’s current main job was classified as one of three self-employment roles (own; manage; independent). Jobs were classified as “own” when a respondent explicitly claimed to own the business by using such terms as own, co-own, owner, proprietor, president,

or chief executive officer (CEO) or to run the business by using such terms as director, officer, or “I run the business”. Jobs were classified as “manage” when a respondent explicitly claimed a managerial or executive role by using such terms as boss, manager, supervisor, executive, chief financial officer (CFO), or vice president or expressed engaging in managerial or supervisory activity. Jobs were classified as “independent” when a respondent did not express owning or managing a business or managing or supervising people (all other cases). For this analysis, the “own” and “manage” categories are examined jointly. Because these measures are derived from the survey’s employment questions, these represent point-in-time measures at the time of the survey, and accordingly, are only available for respondents reporting self-employment on their current main job at the time of the survey.

### 3.2 SSA Earnings Records

The analysis links the HRS to SSA administrative earnings records. These records are compiled from information provided to SSA by employers and the Internal Revenue Service (IRS) through IRS Form W-2, quarterly earnings records, and annual income tax forms. SSA uses this information to calculate benefit amounts for all types of beneficiaries (Olsen and Hudson, 2009). This analysis links HRS respondents to their earnings information in SSA’s Summary Earnings File (SER) and Detail Earnings File (DER). While the DER generally provides more detailed information, I use both files because some respondents including HRS AHEAD cohort respondents are only linked to their earnings in the SER and not linked to their earnings in the DER (Health and Retirement Study, 2022). The self-employment earnings information examined in this analysis come from IRS Form 1040 Schedule SE (self-employment tax).

For this paper's analysis, I classify respondents as having any self-employment income in the administrative earnings records if they have positive self-employment earnings in the DER or have self-employment quarters of coverage in the SER.<sup>3</sup> I classify respondents having wage and salary income in the administrative earnings records if they have positive Medicare wages and tips (W2 Box 5) in the DER or have all wages classified as either wages or agriculture earnings in the SER. Respondents may be classified as having only self-employment income, only wage and salary income, both, or neither. Income amounts come from the DER, but are supplemented by the SER if DER amounts are missing and the SER amounts can be attributed to either self-employment or wage and salary income only.

#### 4 Methods

The analysis makes use of the linked data to first examine discrepancies between survey and administrative measures of self-employment income. I then compare my extensive margin results to the findings of Abraham et al. (2018) using the CPS ASEC. To better understand the nature of extensive margin discrepancies and the mechanisms driving them, the analysis then examines worker and job characteristics for discrepant cases. Finally, I examine discrepancies between survey and administrative measures of the intensive margins of self-employment and wage and salary income including the magnitudes of discrepancies across the earnings distribution.

HRS respondents report income for the calendar year prior to the interview and these reports are linked to the SER/DER for the contemporaneous year (e.g., in 2016, a respondent reports income in 2015, which is linked to their records covering the 2015 tax year). To account

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<sup>3</sup> No positive SER/DER self-employment earnings amounts in the linked HRS-SER/DER data are less than \$400.

for selection in the sample of individuals who consent and are matched to the SER/DER, the analysis uses the 2004-2018 Social Security Weights constructed by the HRS for respondents who have ever had a Social Security linkage.<sup>4</sup> All income amounts are deflated to 2016 dollars using the annual Bureau of Labor Statistics' Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W).

## 5 Results

### 5.1 Comparing the HRS and Administrative Earnings Records

#### 5.1.1 Magnitudes

I first examine the consistency of HRS income reports linked to the SER/DER in Table 1. Panel A shows weighted estimates, and Panel B shows unweighted estimates. For discussion, I will focus on weighted estimates, which tend to be larger in magnitude but show similar patterns to the unweighted estimates. Focusing first on income at the extensive margin, the first column of Table 1 shows the share of respondents in the full HRS reporting any self-employment or wage and salary income. The second column shows the same estimates limited to the analysis sample, which includes records that have been linked to the administrative earnings records and have positive Social Security weights. We see estimates of the share of respondents in the linked HRS reporting any self-employment or wage and salary income that are slightly larger in magnitude, but are generally consistent with the full sample. The third column shows the same estimates in the linked SER/DER, which are starkly different. While we see a weighted estimate of 13.5 percent of respondents reporting any self-employment income in the HRS, the corresponding estimate is only 8.0 percent in the SER/DER. In contrast, we see more

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<sup>4</sup> I use the 2004-2018 weights file because it provides more comprehensive weights than the 2004-2016 file.

respondents reporting wage and salary income in the SER/DER: a weighted estimate of 44.6 percent of respondents reporting wage and salary income in the HRS, corresponding to 48.4 percent in the SER/DER. As a result, we see a higher self-employment rate (defined as the number of workers reporting any self-employment income divided by the number of workers reporting any self-employment or wage and salary income): 25.4 percent in the HRS compared to 15.1 percent in the SER/DER. These results are robust to different definitions and imputations of self-employment income and wage and salary income, discussed in more depth in Appendix 1. These findings suggest that the HRS identifies additional extensive margin self-employment income not captured in the SER/DER, while the SER/DER identify additional extensive margin wage and salary income not captured in the HRS.

Focusing next on income at the extensive margin, the first column of Table 1 shows average self-employment income conditional on reporting any in the full HRS, the second column shows the same estimates limited to the analysis sample, and the third column shows the same estimates in the linked SER/DER.<sup>5</sup> We see somewhat smaller estimates of the average self-employment income in the linked HRS, \$52,200 as compared to \$61,600 in the full HRS, but starkly lower in the SER/DER at \$25,700. Average wage and salary income in the linked HRS is similar to that in the full HRS, \$53,600 as compared to \$54,000 in the full HRS, and somewhat lower in the SER/DER at \$50,500. Combined, average self-employment and wage and salary income in the linked HRS is also similar to that in the full HRS, \$58,200 as compared to \$60,400 in the full HRS, and again lower in the SER/DER at \$49,900. These findings suggest that the

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<sup>5</sup> These estimates are limited to respondents reporting valid amounts for self-employment and wage and salary income, and reported amounts in the HRS of less than \$400 have been set equal to \$0 to be consistent with the administrative records, though not imposing these constraints produces similar results.

HRS identifies additional intensive margin self-employment income and wage and salary income not captured in the SER/DER.

### 5.1.2 Trends

Figure 1 shows trends in different types of work arrangements in the HRS and in the SER/DER in survey waves when new cohorts were added, 2004, 2010, and 2016. I disaggregate workers into three categories: (1) those with only self-employment income (no wage and salary income) and (2) those with both wage and salary and self-employment income, presented in Panel A of Figure 1, and (3) those with only wage and salary income (no self-employment income), presented in Panel B of Figure 1. In Panel A of Figure 1, we see substantially more individuals with any self-employment income in the HRS as compared to the SER/DER across all waves, for both individuals with only self-employment income as well as individuals with both self-employment and wage and salary income. Over the 2004-2016 period, we see modest increases in the number of individuals with only self-employment income in both the HRS and SER/DER, which are more pronounced in the HRS (15.8 percent) than the SER/DER (6.6 percent). We see larger increases in the numbers of individuals with both self-employment and wage and salary income in both the HRS (26.2 percent) and SER/DER (27.1 percent). These estimates contrast with the findings of Abraham et al. (2021) who found increasing numbers of individuals with any self-employment income in the administrative earnings records, but not in the CPS ASEC. In Panel B of Figure 1, we see substantially more individuals with wage and salary income in the SER/DER as compared to the HRS across all waves with similar increases over the 2004-2016 period.

## 5.2 Examining the Extensive Margin

### 5.2.1 Comparing the HRS, the CPS ASEC, and Administrative Earnings Records

To understand how these estimates of extensive margin self-employment rates using the HRS linked to the SER/DER compare to estimates using the CPS ASEC linked to the DER covering the same ages, Figure 2 shows survey and administrative measures of self-employment rates by age in the 2004-2012 HRS covering the 2003-2011 calendar years to equivalent estimates in Abraham et al. (2018) covering the 1998-2011 calendar years. The self-employment rate is again calculated as the weighted number of respondents identified as reporting any self-employment income divided by the number of respondents identified as having any self-employment or wage and salary income. Figure 2 shows that the SER/DER linked to the HRS and the DER linked to the CPS ASEC produce remarkably similar results: as an example, I estimate the self-employment rate of workers aged 53-58 to be 13.5 percent in the SER/DER linked to the HRS, which compares to 13.8 percent for same-aged workers in the DER linked to the CPS ASEC. In contrast, as discussed in Abraham (2021), Figure 2 shows substantially less self-employment identified in the linked CPS ASEC, 10.0 percent, as compared to the administrative records. However, I do not see the same pattern in the HRS. Instead, more self-employment is identified in the HRS as compared to the administrative records: I estimate the self-employment rate of workers aged 53-58 to be 22.6 percent in the linked HRS. These findings suggest (1) different patterns among the two surveys and (2) different implications for interpreting discrepancies between the survey and administrative data.

While Abraham et al.'s (2018) estimates cover the 1998-2011 calendar years, the HRS estimates cover the 2003-2011 calendar years due to the availability of Social Security Weights for those years. Nonetheless, estimating unweighted results covering the 1998-2011 calendar

years shows similar patterns. For example, I estimate the unweighted self-employment rate of workers aged 53-58 to be 12.6 percent in the SER/DER linked to the HRS and 20.7 percent in the linked HRS (compared to 13.5 percent and 22.6 percent, respectively, as presented previously) suggesting that the differences in estimates between this analysis and that of Abraham et al. (2018) are not be driven by differences in time periods. Given that these estimates reflect the same sample ages, we can conclude that differences in reporting are not driven by sample differences in age, but rather by differences in reporting between the two surveys and administrative records.

The differences in estimates across the surveys could be driven by a number of factors including survey question language, question order, survey mode, survey timing, sample composition, proxy responses, or administrative record linkage rates. Each survey collects information on self-employment income using different lines of questioning; questions on self-employment income for both surveys are included in Appendix 3. The HRS asks respondents directly about their amount of income from self-employment in the prior calendar year, and asks about self-employment first before asking about other types of work-related income. In contrast, the CPS ASEC asks respondents about their income from their longest held job in the prior calendar year and then subsequently about income from any other businesses and income from a farm in the prior calendar year, but never explicitly asks about self-employment income. In addition, in the HRS, if a respondent indicated that they received income of a particular type but did not know the specific amount, they were asked to provide a range using unfolding brackets of standardized cutoff amounts, but there is no such line of questioning in the CPS ASEC. As shown in Appendix 2, the additional responses account for a small share of the difference in the self-employment rate between the HRS and CPS ASEC and thus contribute to the difference, but



do not explain it. While both surveys are fielded either in person or by phone, HRS respondents are interviewed over the calendar year while the CPS ASEC is fielded only February through April. In addition, the HRS only covers sampled individuals and their spouses, whereas the CPS ASEC covers all members of the household ages 15 and older. This sample composition leads to much higher rates of proxy reporting in the CPS ASEC than the HRS, which has been found to contribute to estimating lower estimates of alternative work arrangements (Katz and Krueger, 2019). Furthermore, as the HRS is longitudinal and interviews respondents every two years after entering the survey, HRS respondents may become more familiar with the survey content over time, whereas CPS ASEC respondents are interviewed only twice at most. Another factor that might contribute to differences in estimates is the linkage rates of the survey data to the administrative earnings records. Abraham et al. (2018) are able to link between 70 and 80 percent of CPS ASEC records, depending on the year, and use propensity score methods to reweight the sample to be population representative. For this analysis, 55.9 percent of HRS records are linked to the SER/DER, and provided Social Security weights methods are used to reweight the sample to be population representative. While any of these survey or linkage characteristics could drive differences between estimates from the HRS and CPS ASEC, this paper focuses on understanding differences between the HRS and the administrative earnings records that would drive greater reporting of self-employment in the HRS.<sup>6</sup>

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<sup>6</sup> While Abraham et al. (2018, 2021) show substantially more respondents with self-employment income in the DER as compared to the CPS ASEC, among those who report any income, Imboden, Voorheis, and Weber (2023) do find greater amounts of self-employment income reported in the CPS ASEC as compared to the DER. Future work could examine reporting at the extensive and intensive margins in the CPS ASEC, HRS, and SER/DER using comparable samples to evaluate differences in estimates across the respective data sources.

## 5.2.2 Identifying the Sources of Inconsistent Reports in the HRS

Identifying these differences in the HRS and administrative records raises the question of who is reporting consistently across these sources and who is not, to identify reasons for inconsistent reports. The higher estimates of reporting any wage and salary income in the SER/DER and higher estimates of reporting any self-employment income in the HRS suggest one potential source of the inconsistent estimates of self-employment – some respondents misreporting their wage and salary income as self-employment income in the HRS.

Alternatively, it may be that these inconsistencies exist independently of each other and are not related and these reports could reflect true self-employment income captured on the survey but not reported to tax authorities or simply erroneous reports of self-employment income. I proceed by examining these inconsistent reports in more depth to identify the mechanisms driving these discrepancies and focus on the linked HRS-SER/DER data.<sup>7</sup>

To explore what drives these inconsistencies, in Table 2 I compare patterns of consistent (matching in the HRS and SER/DER) and inconsistent (not matching in the HRS and SER/DER) reports of having any self-employment income and any wage and salary income in the HRS and the SER/DER.

I start by examining reporting in the SER/DER for HRS respondents reporting only self-employment income, shown in the first row of Table 2. 8.5 percent of respondents report only self-employment income in the HRS, much higher than the 4.6 percent of respondents reporting only self-employment income in the SER/DER. Only 3.3 percentage points of respondents report

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<sup>7</sup> While Garin et al. (2022) found changes in underreporting associated with the EITC, such findings are not likely to affect a substantial share of the HRS respondents in this analysis as EITC claimants must be under age 65 and have narrow earnings eligibility for households without qualifying children (National Conference of State Legislatures, 2022).

only self-employment income in both the HRS and the SER/DER, representing only 38.8 percent (3.3 percent/8.5 percent) of respondents reporting self-employment income in the HRS, but 71.1 percent (3.3 percent/4.6 percent) of respondents reporting only self-employment income in the SER/DER. These estimates suggest that, while we do see inconsistencies in both sources, they do not show symmetric patterns, with a greater share of respondents reporting any self-employment income captured in the HRS rather than the SER/DER.

The remainder of respondents reporting only self-employment income in the HRS, 5.1 percentage points (60.0 percent), represent inconsistent reports. The largest share of these inconsistent HRS self-employment income reports, 3.1 percentage points (60.8 percent = 3.1 percent/5.1 percent) of respondents, report no self-employment nor wage and salary income in the SER/DER, and potentially represent true self-employment income captured on the survey but missing in the administrative earnings records. This compares to only 0.6 percent of the reverse - respondents reporting only self-employment income in the SER/DER, but no income from either self-employment or wage and salary employment in the HRS. A smaller share of inconsistent HRS self-employment income reports, 1.5 percentage points (29.4 percent = 1.5 percent/5.1 percent) of these respondents report only wage and salary income in the SER/DER and can be presumed to include individuals who misreported the nature of their income in the HRS. While these comprise a non-trivial share of inconsistent HRS self-employment income reports, they do not account for even near the majority of inconsistent cases. An even smaller share of inconsistent HRS self-employment income reports, 0.5 percentage points (9.6 percent = 0.5 percent/5.1 percent) of these respondents report both self-employment and wage and salary income in the SER/DER and can be presumed to include individuals who forgot to report their wage and salary income in the HRS.

Overall, these findings suggest that we do not see misreporting of SER/DER wage and salary income as self-employment income in the HRS driving differences in estimates. Rather, we see a considerable share of HRS respondents not reporting their wage and salary income on the survey and a substantial share of HRS respondents not reporting their self-employment income in the SER/DER.<sup>8</sup> I proceed by examining what contributes to different self-employment income reporting patterns.

### 5.2.3 Examining Individual and Work Characteristics Associated with Different Self-Employment Income Reporting Patterns in the HRS

To better understand who is reporting in different ways and the nature of their work, Table 3 presents characteristics associated with different consistent and inconsistent self-employment income reports for respondents reporting self-employment income in either the HRS or the SER/DER, or both.

I examine reporting patterns by a number of individual-level characteristics. These include age, sex, race/ethnicity, foreign born status, education, marital status, what the respondent has resident children, weekly hours worked at the main job and at all jobs, whether the respondent considers themselves partly or fully retired, and years since entering the survey which all reflect point-in-time estimates at the time of the survey. In addition, to consider how survey characteristics affect estimates, I examine rates of proxy reporting. While only a small share of HRS interviews are completed by true proxy respondents (3.7% of the analysis sample), each household has a designated financial respondent to answer questions related to income, and

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<sup>8</sup> To put these results in context, comparing these estimates to those of Abraham et al. (2021), I find that 57.6 percent of HRS respondents reporting any HRS self-employment income had no self-employment income for the same year on their tax returns compared to 51.5 percent of CPS ASEC respondents, and more starkly, that 28.8 percent of HRS respondents with any self-employment income on their tax returns did not report it in the survey, compared to 66.7 percent of CPS ASEC respondents.

while this person should be selected based on their knowledge of household finances, it is possible that they might be less knowledgeable about their spouse's income than if the spouse had reported on their own behalf. Combining these reports with true proxy reports still only represent 30.7 percent of this analysis sample, which is much lower than in the CPS, in which proxy reporting rates are closer to 50 percent (U.S. Census Bureau, 2006).

Table 3 shows that compared to those with only self-employment income in one of the data sources, those with consistent reports tend to be younger, are more likely to be Non-Hispanic White, completed more years of education, work more hours, and are less likely to be partly or fully retired. Respondents with mismatched SER/DER and HRS income types tend to be more similar to those with consistent reports than to those with income in only one source. Among inconsistent reports from only one source, those reporting self-employment income only in the SER/DER tend to be older, completed fewer years of education, work fewer hours, and are more likely to be retired than those reporting self-employment income only in the HRS.

To further identify individual-level characteristics associated with different reporting patterns of those reporting self-employment income in the HRS, Table 4 presents weighted regression estimates for effects of person and work characteristics on the probability of having different reporting patterns for those reporting self-employment income in the HRS. The regression model controls for all characteristics examined in Table 3 except weekly hours worked at the main job and at all jobs and includes categorical controls for age and education groups instead of continuous measures. The regression model also controls for dummy variables for quartile of the HRS self-employment earnings distribution based on the pooled sample and a full set of year dummies, which are omitted from the table.

As in Table 3, Table 4 shows distinct characteristics by reporting pattern. The first column of Table 4 shows coefficient estimates of the likelihood of reporting self-employment income in the HRS, but not in the SER/DER among those reporting self-employment income in the HRS. As these estimates mask variation across different reporting patterns, the remaining columns show coefficient estimates for each of the three ways such income could be reported in the SER/DER. Results in column 2 show that respondents with self-employment income in the HRS and no earnings reported in the SER/DER are less likely to be married, more likely to be partly or fully retired, have less education, are less likely to be Non-Hispanic White, and are less likely to be foreign born. Results in column 3 show that respondents with self-employment income in the HRS but who report wage and salary earnings in the SER/DER are more likely to be married, less likely to be proxy respondents, and report more HRS self-employment income. Results in column 4 show that respondents with missing secondary self-employment income in the SER/DER tend to be younger, less likely to be partly or fully retired, are more likely to be financial respondents, and report less HRS self-employment income.

Taken together, these results suggest salient differences in characteristics among reporting patterns. Reporting only self-employment income in only one source is associated with a smaller number of hours worked and is more likely to be held by respondents who consider themselves to be retired, which might suggest these work arrangements comprise more informal employment. In addition, the nature of reporting self-employment income in only one source seems to be distinct from those who misclassify their income. Misclassifying income does not appear to be associated with retirement, but rather is concentrated among younger HRS respondents who on average work full-time jobs.

#### 5.2.4 How Does Heterogeneity of Self Employment Contribute to Inconsistencies?

To better understand what contributes to discrepancies between HRS and SER/DER measures of self-employment, the analysis next compares the shares of individuals who report owning, running, or managing a business separately from those who do not, classified as engaged in independent self-employment across consistent and inconsistent patterns of interest for those classified as self-employed in the HRS. It is important to note that these reports correspond to the time of survey and the classification of self-employment using income-based measures reflects the calendar year prior to the survey, so a minimal amount of discordance due to job changes over the two periods is expected. In Table 5, we see that among those reporting any self-employment income in the HRS, the majority worked in independent self-employment roles: 73.0 percent of consistent reports, 64.7 percent of HRS-only reports, and 52.9 percent of those reporting only wage and salary income in the SER/DER. Those reporting only self-employment income in the HRS only were more likely to report not being in the labor force in the HRS interview year, 21.5 percent compared to 7.0 percent for consistent reports and 9.2 percent for those reporting self-employment income in the HRS and wage and salary income in the SER/DER. One explanation for some respondents reporting self-employment income in the HRS only is that their work is sufficiently informal that they would consider themselves to not be in the labor force and for them not to report their self-employment income on their tax forms. Alternatively, it may be that their work is less stable such that they are less likely to be in the labor force in the subsequent interview year. Those reporting self-employment income in the HRS and wage and salary income in the SER/DER were more likely to own or manage businesses: 26.1 percent as compared to 14.4 percent for concordant reports 8.4 percent for those reporting only self-employment income in the HRS only. This suggests one explanation for this

type of misreporting: business owners who identify as self-employed but are actually compensated as employees. This finding is consistent with the results in Table 3 and Table 4 showing that respondents with misclassified income are more similar to those with consistent reports, which likely reflect more formal employment, while those with reports in only one source reflect more informal work.

### 5.3 Examining the Intensive Margin

#### 5.3.1 Kernel Densities

In addition to seeing respondents report any self-employment income on the HRS but not to tax authorities, to the extent that individuals underreport their income for tax purposes, we would expect to see larger income amounts reported in the HRS as compared to the SER/DER, in particular, for self-employment, which we saw was the case on average in Table 1. To examine the full distributions of reported income, Figure 3 presents kernel density plots for each source and reporting pattern for self-employment income in Panel A and wage and salary income in Panel B. Panel A shows that for both data sources, consistent records reflect self-employment income distributions shifted more to the right than inconsistent records, with larger amounts reported in the HRS than the SER/DER. Records of self-employment income appearing only in the SER/DER are skewed most to the left, while consistent SER/DER reports and records of self-employment income appearing only in the HRS have similar distributions, and consistent HRS records of self-employment income are skewed most to the right. These patterns suggest underreporting of income in the administrative records across the income distribution, but concentrated at small amounts.

Panel B of Figure 3 shows different patterns for the distributions of wage and salary income. While again, for both data sources, consistent records reflect distributions shifted more



to the right than inconsistent records, distributions for consistent HRS records and consistent SER/DER records are remarkably similar. For inconsistent records, we again see larger income amounts being reported in the HRS than the SER/DER. This difference between self-employment and wage and salary income distributions could reflect greater consistency and knowledge of wage and salary income as compared to self-employment income and less ability to strategically report wage and salary income.

### 5.3.2 Discrepancies across the Earnings Distribution

To understand how magnitudes of differences in reported income vary across the earnings distribution, Figure 4 shows the difference in reported income in the HRS as compared to the SER/DER by SER/DER earnings distribution percentiles for the full sample in Panel A and for different reporting patterns of interest in Panels B-D. For the full sample, Panel A of Figure 4 shows fairly stable differences in reported income between the 5<sup>th</sup> and 75<sup>th</sup> percentiles, with near zero differences in wage and salary income and larger differences in self-employment income of \$4,000 on average reported in the HRS as compared to the SER/DER. However, we see very different patterns at the tails of the distribution. Below the 5<sup>th</sup> percentile, consisting mostly of respondents reporting no SER/DER earnings, we see much larger amounts of both unreported wage and salary income of \$12,000 on average and self-employment income of \$21,000 on average. In contrast, above the 75<sup>th</sup> percentile of the distribution, we see wage and salary income under-reported in the survey and self-employment income under-reported in the SER/DER resulting in a net under-reporting of self-employment income averaging \$27,000 and wage and salary income averaging \$19,000 at the 95<sup>th</sup> percentile of the distribution.

Panel B of Figure 4 presents estimates for consistent reports, showing generally small amounts of discrepancies among consistent reports. On average, among consistent reports,

\$2,000 of additional self-employment income is reported in the HRS as compared to the SER/DER, most pronounced at lower percentiles of the distribution. Likewise, small amounts of additional wage and salary income, also averaging \$2,000, are reported in the HRS as compared to the SER/DER at the 75<sup>th</sup> percentile of the distribution and below, though we see additional wage and salary income of \$4,000 on average reported in the SER/DER as compared to the HRS at the 80<sup>th</sup> percentile and above.

Panel C of Figure 4 presents estimates for reports for respondents having only self-employment income in the HRS and only wage and salary income in the SER/DER. By design, we see increasing amounts of self-employment income reported in the HRS and not the SER/DER and wage and salary income reported in the SER/DER and not the HRS, which constitute very large amounts in the right tail of the distribution. The combined amounts, averaging \$29,000, reflect that the reported self-employment amounts reported in the HRS are larger than the respective wage and salary income amounts reported in the SER/DER.

Panel D of Figure 4 presents estimates for reports of missing secondary self-employment. We see larger but stable amounts of self-employment income reported in the HRS as compared to the SER/DER, averaging \$12,000, for the 90<sup>th</sup> percentile of the earnings distribution and below, but see much larger amounts, averaging \$96,000, at the 95<sup>th</sup> percentile of the earnings distribution.

Jointly, these results suggest that self-employment is consistently underreported in administrative as compared to survey data. We see the largest amounts of underreporting self-employment income among those with no income in the administrative data and among those reporting secondary self-employment.

### 5.3.3 Comparing Income Measures to Consumption Measures

This analysis has shown evidence of self-employment income identified in the HRS that is not identified in the SER/DER and that the majority of those reporting such income report being self-employed for their current main job at the time of interview in the following calendar year in the HRS. Nonetheless, we might be concerned that such income is spuriously reported. To examine whether the amounts of these income reports are reasonable, I follow the approach of Hurst, Li, and Pugsley (2014) using reported expenditures to infer actual income of the self-employed based on the relationship between income and expenditures of wage and salary workers. Hurst, Li, and Pugsley (2014) found a substantial self-employment gap in the Consumer Expenditure Survey and PSID. In the event that self-employment income is spuriously reported, we would expect to see the opposite here.

For this analysis, I use the 2005-2017 HRS Consumption and Activities Mail Survey (CAMS) linked to the income measures collected in the prior HRS wave. I include only records with non-missing consumption measures. As consumption measures are collected at the household level, I aggregate income to the household level and include only households reporting either only self-employment income or only wage and salary income in the HRS. I estimate regressions comparing the relationship between log household income and (1) log household non-durable spending and (2) log household total spending. I include a control for whether the household has only self-employment income in the HRS as well as a control for household size. I estimate the regressions using both the HRS income measures as well as the SER/DER income measures.

Results in Table 6 show the estimated coefficients for self-employed households using HRS income measures to be small and positive, suggesting a self-employment income gap of 4.8

percent to 11.8 percent, and not suggesting over-reporting of self-employment income relative to wage and salary income. In contrast, the estimated coefficients for self-employed households using SER/DER income measures are substantially larger and positive, suggesting a self-employment income gap in the SER/DER of 31.0 percent to 38.5 percent. The SER/DER estimates are broadly consistent with estimates by Hurst, Li, and Pugsley (2014) using the Consumer Expenditure Survey and Panel Study of Income Dynamics ranging from 24.5 percent to 31.7 percent. Taken together, these results suggest the self-employment income reported in the HRS does not reflect spurious income and may suggest that the HRS still under-identifies the full extent of self-employment income, but identifies substantially more than the administrative earnings records.

#### 5.3.4 Implications for the Tax Gap and Compliance Rates

Table 7 shows estimates of the tax gap, calculated here as the difference between the weighted income identified in the HRS and the weighted income identified in the SER/DER, and compliance rates, calculated here as the share of the weighted income identified in the HRS that is identified in the SER/DER. Table 7 shows \$2 billion in self-employment income identified in the HRS that is not identified in the SER/DER, corresponding to an estimated compliance rate of 30.2%. Given that income reported only as self-employment in the HRS but only wage and salary income in the SER/DER was likely misreported in the HRS, deducting the amount of reported self-employment income from the self-employment income total in the HRS reduces the difference to \$1.3 billion, corresponding to an estimated compliance rate of 39.7%. This estimate is in line with the Internal Revenue Service's estimated compliance rate of 44% for self-employment income (Slemrod, 2016).

## 6 Discussion

This paper (1) examined discrepancies in HRS and administrative measures of self-employment income, (2) compared the extensive margins of self-employment income in HRS data linked to administrative earnings records to the findings of Abraham et al. (2018) linking the CPS ASEC to administrative earnings records by age group, (3) explored mechanisms for the discrepancies by examining the demographic and work characteristics of respondents with inconsistent reports, and (4) examined the magnitudes of discrepancies across the earnings distribution. The results show the HRS identifies substantially more individuals reporting any self-employment income than the CPS ASEC or administrative records for same-aged individuals. Examination of these reports suggests that while 29.4 percent of inconsistent HRS self-employment reports represent misreported wage and salary income, more than double, 60.8 percent, represent self-employment not captured in the administrative records or CPS ASEC. Results further suggest that these reports captured in the HRS but not in the administrative earnings records are disproportionately reported by respondents who consider themselves to be retired, which likely reflects more informal work that is not reported to tax authorities. However, we see misclassified income predominantly among those who are not retired. Results also show the HRS identifies substantially more self-employment employment income, particularly at the tails of the SER/DER earnings distribution, than the administrative records, which has implications for estimates of poverty and inequality. Estimates of the compliance rate in the administrative earnings records compared to the survey data are in line with Internal Revenue Service (IRS) estimated compliance rates for self-employment income.

The results show that worker and work characteristics for income reported in only one source are fundamentally different than for either consistent reports or misclassified reports. This

suggests a potential limitation of the administrative earnings records to identify more informal work arrangements, which is particularly relevant for certain populations, including retirees. This limitation is important, for example, to understand income in retirement, as well as how more informal work arrangements are used to supplement more income more broadly. Accordingly, survey data that better captures this income has the potential to complement administrative earnings records.

The paper's findings also suggest that not all surveys are created equal. Questions and formats vary across surveys, and accordingly, one cannot assume that estimates from one survey generalize to other surveys. The findings suggest several reasons why the HRS might capture self-employment income for more respondents than the CPS ASEC. The HRS questions specifically ask about self-employment income and are structured to ask about income independently of work, which might elicit more accurate responses than framing questions in the context of a specific work role and not mentioning self-employment explicitly, as in the CPS ASEC. In addition, in asking about work-related income, the HRS asks about self-employment first, which likely elicits more responses than if it had been asked later in the question order.

A limitation of this study is that the administrative earnings records of self-employment earnings examined in this analysis come from IRS Form 1040 Schedule SE (self-employment tax). These data is that they do not include income from owners of C or S corporations (or limited liability companies that elect to be taxed as C or S corporations), which could account for some of the underreporting and misclassification of self-employment in the administrative data.

The findings suggest opportunities to improve survey collection of information on income in general and self-employment income in particular. Future work comparing surveys to each other and to administrative records to identify survey characteristics that could be used to

improve data collection efforts would be valuable. In particular, while the paper's findings are limited to the HRS population of individuals aged 50 and older, they suggest the value of future work examining who at younger ages is not being identified in different surveys or administrative earnings records and how their absence impacts the view of the labor market and prevents developing and implementing policies related to informal work. Refining survey questions to better capture how respondents think about work and income from work is essential for improving understanding of these types of work arrangements, who works in them, and their effects on wellbeing.

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Tables

Table 1: Self-Employment and Wage and Salary Income in the Analysis Sample

	HRS Respondents with a Positive HRS Weight		
	HRS Weight	Linked HRS Respondents with a Positive SS Weight	
		HRS	HRS
<i>Extensive Margin</i>			
Panel A: Weighted			
% with any Self-Employment Income (>\$400)	12.1%	13.5%	8.0%
% with any Wage and Salary Income	39.4%	44.6%	48.4%
% with any Self-Employment (>\$400) or Wage and Salary Income	47.3%	53.0%	53.1%
Self-Employment Rate (SE/SE+WS)	25.7%	25.4%	15.1%
Extensive Margin Observations	128,490	71,767	71,767
<i>Intensive Margin</i>			
Average Self-Employment Income - Unconditional (000's)	5.7	5.1	1.5
Average Wage and Salary Income - Unconditional (000's)	18.7	21.2	21.7
Average Self-Employment and Wage and Salary Income - Unconditional (000's)	24.5	26.3	23.1
Average Self-Employment Income - Conditional (000's)	54.9	42.1	19.8
Average Wage and Salary Income - Conditional (000's)	51.7	50.2	46.7
Average Self-Employment and Wage and Salary Income - Conditional (000's)	56.8	52.7	45.6
Intensive Margin Observations	119,540	67,743	67,743
<i>Extensive Margin</i>			
Panel B: Unweighted			
% with any Self-Employment Income (>\$400)	9.8%	10.3%	6.4%
% with any Wage and Salary Income	32.1%	33.8%	37.6%
% with any Self-Employment (>\$400) or Wage and Salary Income	38.8%	40.8%	41.6%
Self-Employment Rate (SE/SE+WS)	25.2%	25.3%	15.4%
Extensive Margin Observations	128,490	71,767	71,767
<i>Intensive Margin</i>			
Average Self-Employment Income - Unconditional (000's)	3.9	3.3	1.0
Average Wage and Salary Income - Unconditional (000's)	13.1	13.6	14.0
Average Self-Employment and Wage and Salary Income - Unconditional (000's)	16.9	16.9	14.9
Average Self-Employment Income - Conditional (000's)	47.2	36.5	16.8
Average Wage and Salary Income - Conditional (000's)	45.6	43.7	39.5
Average Self-Employment and Wage and Salary Income - Conditional (000's)	49.5	45.4	38.2
Intensive Margin Observations	119,540	67,743	67,743

Notes: The sample includes all respondents in the 2004–2016 HRS. The first column is further limited to respondents with a positive HRS survey weight, and weighted estimates are calculated using these weights. The second and third columns are further limited to respondents who were linked to the SER or

DER in the calendar year prior to the survey and have a positive Social Security weight for respondents who have ever had a Social Security linkage. Intensive margin estimates include only respondents with reported values for both self-employment income and wage and salary income. Panel A represents weighted estimates, while Panel B presents unweighted estimates. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

Table 2: Consistency of Survey Reports and Administrative Records of Income

HRS	SER/DER				Total
	Self-Employment Income Only	Wage and Salary Income Only	Self-Employment and Wage and Salary Income	No Self-Employment or Wage and Salary Income	
Self-Employment Income Only	3.3%	1.5%	0.5%	3.1%	8.5%
Wage and Salary Income Only	0.4%	36.6%	1.2%	1.4%	39.6%
Self-Employment and Wage and Salary Income	0.4%	2.7%	1.5%	0.4%	5.0%
No Self-Employment or Wage and Salary Income	0.6%	4.2%	0.1%	42.0%	47.0%
Total	4.6%	45.0%	3.4%	47.0%	100%

Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey and have a positive Social Security weight for respondents who have ever had a Social Security linkage. HRS income categories are presented vertically while SER/DER categories are presented horizontally. Each cell shows the share of respondents with the corresponding combination of income reported in the HRS and SER/DER. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

Table 3: Individual Characteristics for Consistent and Inconsistent Income Reports across All Income Types

	Consistent		Inconsistent					
			SER/DER Only		HRS Only		Mismatched SER/DER and HRS Types	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Age	60.8	0.3	65.9***	0.6	62.4***	0.3	59.6***	0.2
Percent Male	63.0	2.1	58.1	3.1	61.6	2.4	63.0	1.1
Percent White, Non-Hispanic	86.9	1.5	69.1***	4.4	77.1***	2.3	83.0*	1.4
Percent Black, Non-Hispanic	4.1	0.6	11.1***	1.8	10.7***	1.1	6.7***	0.7
Percent Hispanic	6.0	1.1	15.8*	4.9	7.6	1.5	6.3	1.1
Percent Foreign Born	9.6	1.3	15.9*	3.0	7.8	1.0	9.5	0.9
Years of Education	14.5	0.1	12.8***	0.3	13.5***	0.1	14.5	0.1
Percent Married	75.5	1.9	76.3	2.7	64.0***	2.2	72.9	1.4
Percent Has Resident Children	29.9	1.7	26.5	3.7	26.8	1.9	31.5	1.7
Weekly Hours Worked at Main Job	34.3	0.7	13.6***	1.2	23.4***	0.9	35.3	0.5
Weekly Hours Worked at All Jobs	37.7	0.9	14.2***	1.3	24.4***	0.9	39.1	0.5
Percent Says They're Partly Retired	23.8	1.5	18.7	2.8	37.1***	1.7	19.8**	1.2
Percent Says They're Fully Retired	5.4	0.5	49.0***	3.1	15.1***	1.2	5.0	0.4
Percent Proxy Report	1.5	0.4	2.8	1.0	2.2	0.5	2.6*	0.3
Percent Non-Financial Respondent	28.8	1.5	35.3**	2.3	30.2	2.2	28.3	1.0
Years in Survey	8.1	0.2	10.8***	0.5	9.2***	0.3	7.1***	0.2
Observations	2,541		654		2,248		3,525	

Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey, have a positive Social Security weight for respondents who have ever had a Social Security linkage, and who reported self-employment income in either the HRS, the SER/DER, or both. Consistent reports include those reporting only self-employment income in both the HRS and SER/DER and inconsistent reports include those that do not match in the HRS and SER/DER. Inconsistent reports are further separated by those with income of a given type: only self-employment income reported only in the SER/DER, only self-employment income reported only in the HRS, or income reported in both surveys but as different types. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 for t-test of difference in means compared to consistent reports. Source: 2004–2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

Table 4: Effects of Person Characteristics on the Probability That a Person with HRS Self-Employment Earnings Does Not Have SER/DER Self-Employment Earnings

	SE in HRS Only	No SER/DER Earnings	SER/DER WS Earnings	SE and WS in HRS; WS in SER/DER
Age 55-59	-0.02 (0.03)	-0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)
Age 60-64	-0.08** (0.04)	-0.01 (0.03)	-0.01 (0.02)	-0.06** (0.03)
Age 65-69	-0.07 (0.05)	-0.00 (0.04)	0.02 (0.03)	-0.09** (0.03)
Age 70-74	-0.09 (0.06)	0.04 (0.05)	0.01 (0.04)	-0.14*** (0.04)
Age 75-79	-0.15** (0.07)	0.02 (0.05)	-0.01 (0.04)	-0.17*** (0.04)
Male	0.05 (0.03)	0.03 (0.02)	-0.02 (0.01)	0.04 (0.02)
Black, Non-Hispanic	0.12*** (0.04)	0.15*** (0.03)	-0.01 (0.02)	-0.02 (0.03)
Hispanic	0.05 (0.05)	0.11** (0.04)	-0.02 (0.03)	-0.04 (0.04)
Other Race	0.12* (0.06)	0.14* (0.07)	-0.01 (0.03)	-0.01 (0.05)
Foreign-born	-0.09** (0.04)	-0.08** (0.03)	0.03 (0.02)	-0.03 (0.03)
More than HS Education	-0.08*** (0.02)	-0.09*** (0.02)	-0.02 (0.02)	0.03* (0.02)
Married	-0.02 (0.04)	-0.07*** (0.02)	0.04*** (0.01)	0.02 (0.02)
Has Resident Children	-0.01 (0.03)	0.00 (0.02)	0.01 (0.02)	-0.01 (0.02)
Partly Retired	0.03 (0.03)	0.16*** (0.03)	-0.01 (0.01)	-0.12*** (0.02)
Fully Retired	0.08** (0.04)	0.30*** (0.03)	0.02 (0.02)	-0.24*** (0.03)
Proxy Respondent	0.17 (0.21)	0.31 (0.20)	-0.11*** (0.02)	-0.04 (0.03)
Not Financial Respondent	-0.01 (0.03)	0.04* (0.02)	0.01 (0.02)	-0.07*** (0.02)
Years in Survey	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
HRS Self-Employment \$ Second Quartile	-0.14*** (0.02)	-0.02 (0.02)	0.03*** (0.01)	-0.15*** (0.03)
HRS Self-Employment \$ Third Quartile	-0.23*** (0.03)	-0.03 (0.02)	0.07*** (0.02)	-0.28*** (0.03)

HRS Self-Employment \$ Fourth Quartile	-0.22*** (0.04)	-0.06** (0.03)	0.15*** (0.02)	-0.32*** (0.04)
Observations	5,862	5,862	5,862	5,862

Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey, have a positive Social Security weight for respondents who have ever had a Social Security linkage, and reported self-employment income in the last calendar year in the HRS. The columns present regression estimates of the likelihood of different reporting patterns. Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.



Table 5: Work Roles for Select Income Reporting Patterns

	Self-Employment Income Only in HRS and SER/DER		Self-Employment Income Only in SER/DER Only		Self-Employment Income Only in HRS Only		Self-Employment Income Only in HRS, Wage and Salary Income Only in SER/DER	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
	Percent Employee	5.0	0.6	8.9	2.6	4.8	0.6	10.8
Percent Self-Employed - Independent Role	73.0	1.5	24.3	2.7	64.7	1.6	52.9	2.7
Percent Self-Employed - Owner/Manager Role	14.4	1.3	4.5	1.5	8.4	1.0	26.1	2.6
Percent Not Working	7.0	0.7	62.3	3.1	21.5	1.3	9.2	1.1
Observations	1,879		544		2,008		829	

	WS Income Only in HRS and SER/DER		WS Income Only in SER/DER Only		WS Income Only in HRS Only		Self-Employment Income Only in SER/DER, Wage and Salary Income Only in HRS	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
	Percent Employee	87.3	0.3	24.2	1.6	61.7	2.3	79.1
Percent Self-Employed - Independent Role	0.8	0.1	3.0	0.4	3.8	0.7	10.2	2.3
Percent Self-Employed - Owner/Manager Role	0.3	0.0	0.7	0.3	0.3	0.2	0.4	0.3
Percent Not Working	11.5	0.3	71.9	1.7	34.1	2.2	10.3	2.2
Observations	19,939		3,196		1,004		247	

	Self-Employment Income and WS Income in HRS, Wage and Salary Income Only in SER/DER		Self-Employment Income and WS Income in SER/DER, Wage and Salary Income Only in HRS		Self-Employment Income and WS Income in HRS and SER/DER		No Self-Employment Income or WS Income in SER/DER or HRS	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
	Percent Employee	62.3	2.1	86.8	1.7	70.0	2.3	1.2
Percent Self-Employed - Independent Role	20.7	1.5	4.0	1.2	20.7	2.1	2.1	0.1
Percent Self-Employed - Owner/Manager Role	10.3	1.3	0.8	0.6	5.0	1.2	0.2	0.0
Percent Not Working	6.0	0.7	8.4	0.9	3.6	0.7	96.5	0.2
Observations	1,297		662		662		38,660	

Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey, have a positive Social Security weight for respondents who have ever had a Social Security linkage. The columns present different combinations of income in the HRS and SER/DER. The estimates show the share of respondents within a given income category in different work roles for their current main job at the time of the survey. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security

Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

Table 6: Using Spending to Estimate the Self-Employment Income Gap

	HRS Income		SER/DER Income	
	Log Non-Durable Spending	Log Total Spending	Log Non-Durable Spending	Log Total Spending
Log Total Income (Beta)	0.40*** (0.01)	0.41*** (0.01)	0.35*** (0.01)	0.35*** (0.01)
Self-Employed HH (Gamma)	0.05** (0.02)	0.02 (0.02)	0.17*** (0.02)	0.13*** (0.02)
Observations	4,425	4,426	4,368	4,369
Self-Employment Income Gap ( $1 - e^{(-\text{Gamma}/\text{Beta})}$ )	11.8%	4.8%	38.5%	31.0%

Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey, have a positive Social Security weight for respondents who have ever had a Social Security linkage, reported values for both self-employment income and wage and salary income in the HRS, and had valid measures for non-durable spending and total spending in the CAMS. The table shows estimates of the self-employment income gap by comparing coefficients from regressions estimating the relationship between income and spending for household reporting either only self-employment income or only wage and salary income in the HRS. Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, 2004-2018 HRS Cross-Wave Social Security Weights, and 2005-2017 HRS Consumption and Activities Mail Survey.

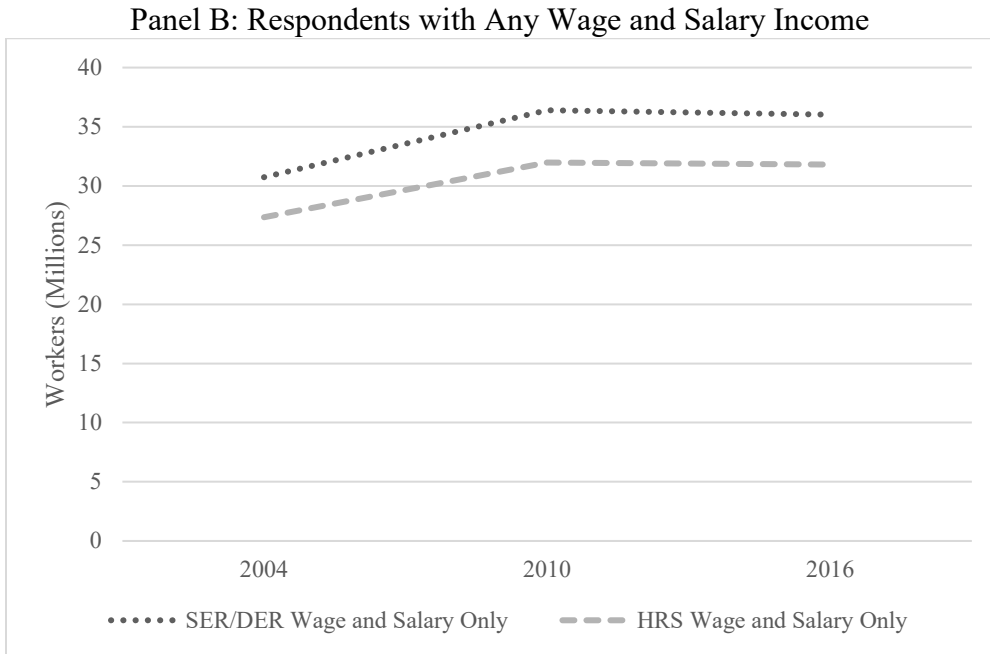
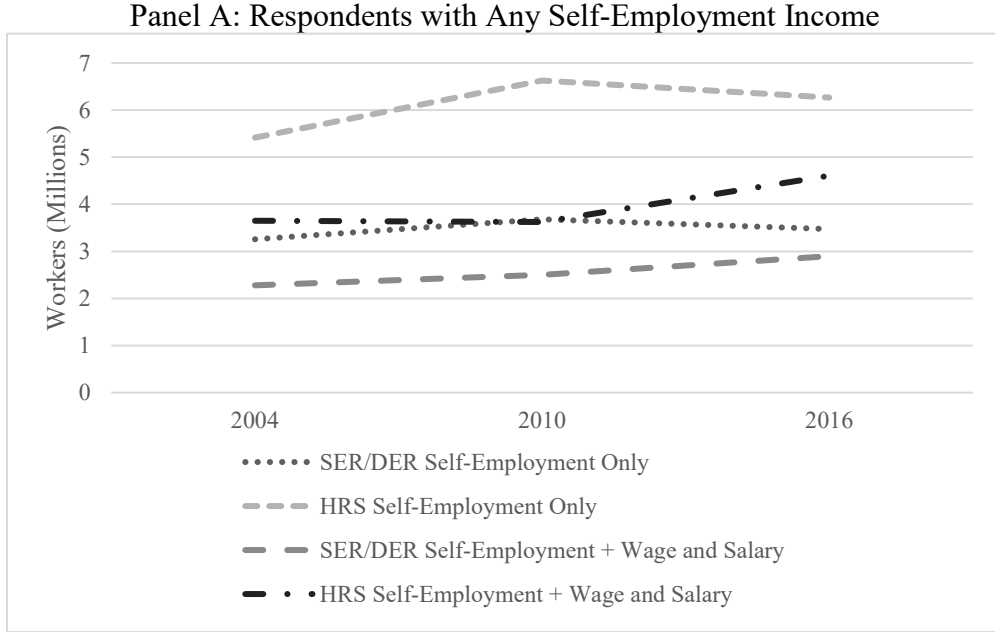
Table 7: Using the HRS to Estimate the Tax Gap and Compliance Rate

<i>Billions</i>	HRS	SER/DER	Difference	Estimated Compliance Rate
Total Self-Employment Income	2.24	0.65	1.60	28.7%
Total Wage and Salary Income	9.39	9.55	(0.16)	
Total Self-Employment and Wage and Salary Income	11.63	10.19	1.44	
Tot. Inc. for Respondents with Only HRS SE and SER/DER WS	0.45	0.25	0.20	
Adjusted Total Self-Employment Income	1.79	0.65	1.15	36.0%
Adjusted Total Wage and Salary Income	9.64	9.55	0.09	
Adjusted Total Self-Employment and Wage and Salary Income	11.43	10.19	1.24	

Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey, have a positive Social Security weight for respondents who have ever had a Social Security linkage, and reported values for both self-employment income and wage and salary income in the HRS. The table shows estimates of the tax gap and compliance before and after accounting for likely misreported income by respondents reporting only self-employment income in the HRS and only wage and salary income in the SER/DER. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

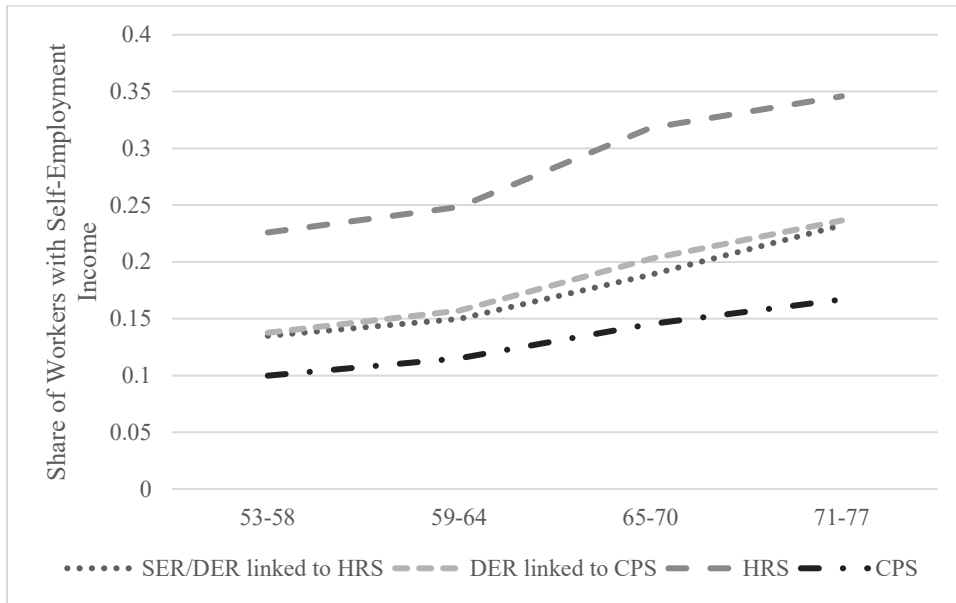
## Figures

Figure 1: Survey Reports and Administrative Records of Self-Employment and Wage and Salary Income by Survey Wave



Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey and have a positive Social Security weight for respondents who have ever had a Social Security linkage. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

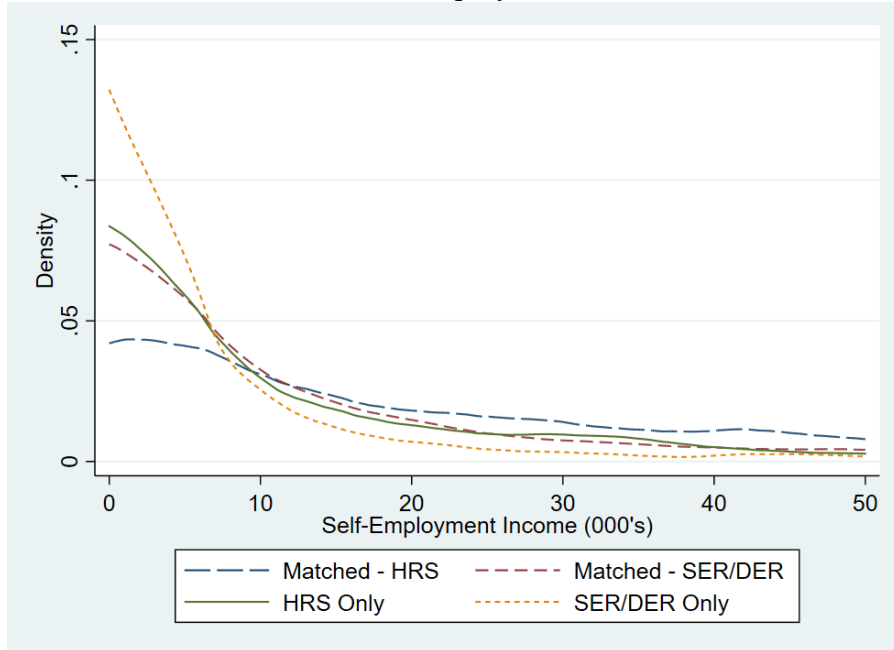
Figure 2: Survey Reports and Administrative Records of Self-Employment Rates by Age



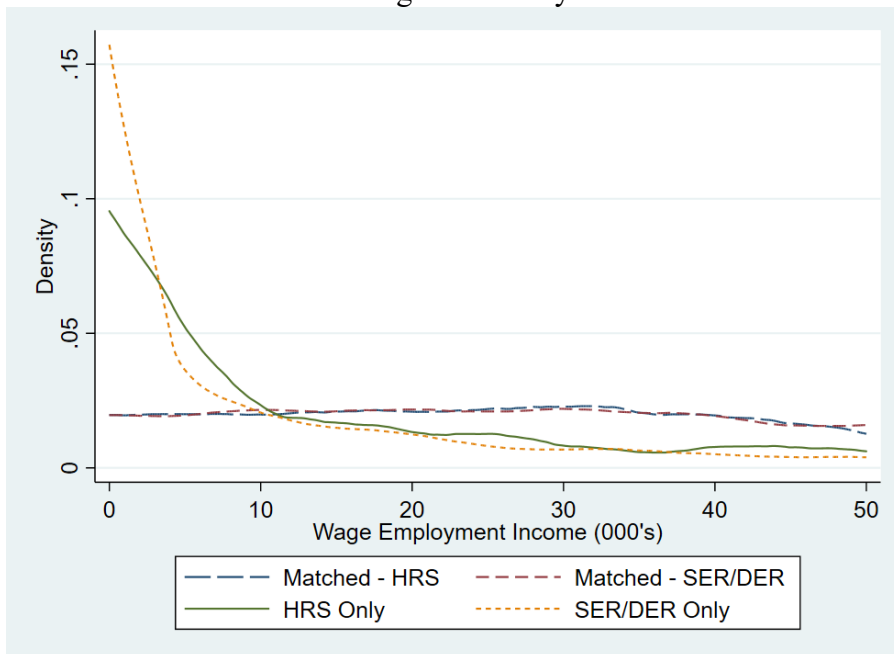
Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey and have a positive Social Security weight for respondents who have ever had a Social Security linkage. Estimates for the CPS ASEC and DER linked to CPS ASEC come from Abraham et al. (2018). Source: 2004–2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, 2004–2018 HRS Cross-Wave Social Security Weights, and Abraham et al. (2018).

Figure 3: Kernel Densities of Income by Type and Source

Panel A: Self-Employment Income

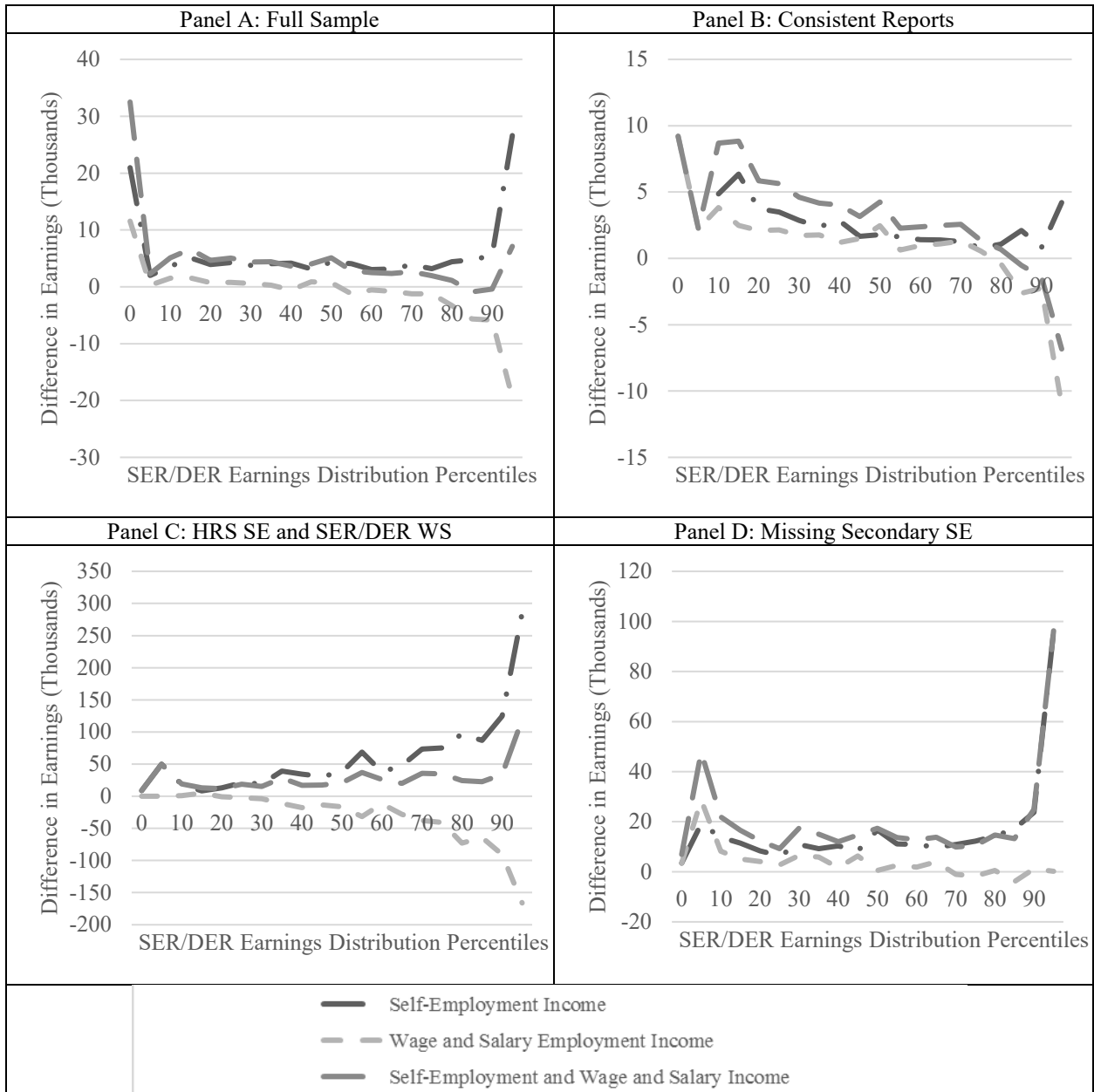


Panel B: Wage and Salary Income



Notes: The sample includes all respondents in the 2004–2016 HRS who were linked to the SER or DER in the calendar year prior to the survey and have a positive Social Security weight for respondents who have ever had a Social Security linkage. Source: 2004–2016 RAND HRS Detailed Imputations File, 2016 SSA Respondent Cross-Year Summary and Detail Earnings Files, and 2004–2018 HRS Cross-Wave Social Security Weights.

Figure 4: Difference in Reported Income HRS-SER/DER by SER/DER Earnings Distribution



Notes: The sample includes all respondents in the 2004–2016 HRS reporting positive self-employment or wage and salary income in either the HRS or SER/DER who were linked to the SER or DER in the calendar year prior to the survey, have a positive social security weight for respondents who have ever had a Social Security linkage, and reported values for both self-employment income and wage and salary income in the HRS. Source: 2004-2016 RAND HRS Detailed Imputations File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.



## Appendix 1: Extensive Margin Alternative Imputation Approach

For the paper's extensive margin analysis, in cases where the respondent indicated that they received income of a particular type but did not provide an amount, I use imputed values from the RAND HRS Detailed Imputations File 2018. There are three scenarios in which a respondent might have an imputed value: (1) the respondent provided a complete bracket, (2) the respondent provided an incomplete bracket, the complete bracket was imputed, and the value was imputed from the imputed bracket, and (3) the respondent did not provide a bracket, the complete bracket was imputed, and the value was imputed from the imputed bracket. Of the 7,405 self-employment income reports of \$400 or more, 6,633 were reported and 772 were imputed including 226 whose minimum amount was either \$0 or missing. While all of these respondents reported that they had self-employment income, it is possible that they had less than \$400 of self-employment income and so their self-employment income would not appear in the SER/DER.

With respect to determining which categories of work-related income should be classified as self-employment income or wage and salary income, for this paper's analysis, I focus only on reports of self-employment and wage and salary income. Respondents also report other types of work-related income they received in the calendar year prior to the interview including (1) income from a professional practice or trade, (2) income from tips, bonuses, commissions, and finally, (3) any other income from work. 4,764 respondents report having income in one of these categories, though only 885 of these respondents did not also report wage and salary income. Review of these reports suggests that such income could reflect self-employment or wage and salary income, and in some cases may be doubly reported across some categories. Due to these ambiguities, the main analysis focused only on self-employment and wage and salary income.

Given this paper's findings of greater reporting of any self-employment income in the HRS compared to the SER/DER and less reporting of any wage and salary income in the SER/DER compared to the HRS, I examine how the paper's estimates would change if I were to adopt an imputation approach and include additional work-related income to minimize the number of respondents reporting any self-employment income and maximize the number of respondents reporting any wage and salary income in the HRS. To do this, I impute self-employment income to be \$0 for respondents either reporting a range with a minimum amount of less than \$400 or not reporting a minimum amount (226 respondents). I also include all other work-related income categories as wage and salary income to see whether accounting for these additional sources of income meaningfully changes the paper's findings (885 respondents).

Appendix 2 shows estimates using these alternative approaches and shows estimates that are not meaningfully different from those in Table 1. In particular, Table 1 shows estimates of 40.8 percent of respondents having any self-employment or wage and salary income and 10.3 percent having any self-employment income, producing a self-employment rate of 25.2 percent, while Appendix 2 shows comparable estimates of 40.8 percent of respondents having self-employment or wage and salary income and 9.5 percent having any self-employment income, producing a self-employment rate of 23.3 percent. These findings suggest that neither the classification of additional types of work-related income nor the imputation approach are driving this paper's findings of a greater number of respondents having any self-employment income and fewer respondents having any wage and salary income in the HRS compared to the SER/DER.

Appendix 2: Extensive Margin Estimates by Alternative Imputation Approach

	All		Preferred		Imputing to	
	Estimates		Imputation		Minimize Self-Employment and Maximize Wage and Salary Employment	
	Number	Number	Percent	Number	Percent	
Linked to SER/DER for LCY with a Positive SSA Weight	71,767	71,767		71,767		
Has any HRS SE Income (>\$400) or Wage and Salary Income	29,257	29,257	40.8%	29,280	40.8%	
Has any HRS SE Income (>\$400)	7,405	7,405	10.3%	6,833	9.5%	
Reported Amount	6,287	6,287		6,287		
Imputed from Range >\$400	546	546		546		
Imputed from Range with Min=0 or Missing	572	572				
Has any HRS SE Income (<\$400)	324					
Reported Amount	298					
Imputed from Range with Min=0	26					
Has any HRS Wage and Salary Income	24,266	24,266	33.8%	25,151	35.0%	
Reported Amount	21,504	21,504		21,504		
Imputed	2,762	2,762		2,762		
Has Other HRS Work-Related Income	4,764					
Has No HRS Wage and Salary Income after Imputation	885			885		

Source: 2004-2016 RAND HRS Detailed Imputation File, 2016 Social Security Administration Summary Earnings File and Detail Earnings File, and 2004-2018 HRS Cross-Wave Social Security Weights.

### Appendix 3: Survey Questions on Self-Employment Income in the HRS and CPS ASEC

#### **2014 HRS**

PQ012: We are interested in how people are getting along financially these days. The next questions are about income you [or your] [husband/wife/partner] receive. Let's start with income from work. Did you do any work for pay last year, in [Last Calendar Year]?

PQ014: Did any of your earnings from work in [Last Calendar Year] come from self-employment?

PQ015: What was your income from self-employment, before taxes and other deductions, in [Last Calendar Year]? Please include income you actually received from the business and any profits that may have been left in the business.

PQ016: Did it amount to less than \$\_\_\_\_, more than \$\_\_\_\_, or what? BREAKPOINTS: \$5,000, \$10,000, \$25,000, \$100,000

#### **2013 CPS ASEC**

Q29a: Did (name/you) work at a job or business at any time during 2012?

Q46: What was (name's/your) longest job during 2012?

Q47E1: Ask Only If Necessary. (Were/Was) (you/he/she) employed by government, by a PRIVATE company, a nonprofit organization, or (was/were) (you/he/she) self-employed or working in a family business?

Q48aa/ Q48b: How much did (name/you) earn from this employer before taxes and other deductions during 2012? / What were (name's/your) net earnings from this business/farm after expenses during 2012?

Q49b1d: How much did (name/you) earn from all other employers before taxes and other deductions during 2012?

Q49b2: How much did (name/you) earn from (blank/any other businesses of) (your/his/her) (own/own business) after expenses?

Q49b4: How much did (name/you) earn from (your/his/her) farm after expenses?