i

## Appendix

Our time series and panel data analyses rely on a measure of simulated UI exhaustions. This appendix describes the simulation.

We begin with data at the state-week level on initial claims for UI payments, as reported by the Employment and Training Administration (ETA). We denote these as $IC_{sw}$.

Initial claims substantially overstate the number of actual recipients, in part because some claimants are ruled ineligible for benefits. On average, a bit less than half as many initial payments are made as there are initial claims filed. Unfortunately, ETA does not publish weekly state-level data on initial payments. They do publish monthly data, however. We compute the ratio of initial payments to initial claims at the state-by-month level, and denote it $F_{sm}$. We estimate the number of initial payments in week w of month m(w) as $IC_{sw}*F_{s,m(w)}$.

Next, we calculate the date at which an individual who makes an initial claim in state s in week w will exhaust his benefits, e(s,w). We use our database of UI rules for this, assuming that all recipients are eligible for the full duration of benefits and that they draw benefits continuously from w until exhaustion.

As noted in the text, we consider two definitions of exhaustion: The first week in which benefits are not received at the usual time, and the first week in which they are not received either initially or retroactively. The distinction arises from the temporary expirations of the EUC program in 2010: Many recipients are counted as exhausting during these expirations by the first definition but afterward by the second. Most of our analysis uses the second definition.

There are cases where recipients exhaust their benefits, experience periods of non-payments, then become eligible for additional benefits later. This can happen when new EUC tiers are added for which past exhaustees are eligible. It can also arise for EB recipients during and after the 2010 temporary EUC expirations: Many states ended EB payments during these expirations, then rejoined when the program was reauthorized (and the 100% federal EB share simultaneously reinstated). Recipients whose EB payments were interrupted were not repaid retroactively. Both of our definitions count these recipients as having exhausted their benefits on the first week for which benefits were not paid.

Of course, most claimants do not remain in unemployment until exhaustion, either because they get jobs beforehand or because they exit the labor force. We estimate the probability that an individual who drew his initial payment in week w survives to exhaust his benefits $d = e(s,w)-w$ weeks later as

(A1)    $S(d; s,w) = \prod_{t=0}^{d-1}\big(1 - \lambda(s,d,w+d)\big),$

where $\lambda(s,d,v)$ represents the probability that an individual in state s with unemployment duration d in week v exits unemployment (by finding a new job or by exiting the labor force) by week v+1.

To estimate the hazard function, we begin with monthly data on initial and final payments in the regular UI program, which offers 26 weeks of benefits. Let $p_m$ represent the ratio of final payments in month m+5 to initial payments in month m, computed for the nation as a whole. This can be seen as an estimate of the 26-week survival probability. We smooth it by estimating a time series regression of $p_m$ on a 5th order polynomial in calendar time, with month-of-year (seasonality) effects

removed. Let the fitted value (net of the seasonality effects) be $\hat{p}_m$. Our initial

estimate of the hazard is based on the 26$^{th}$ root of this:

(A2) $\quad \lambda^0(s, d, v) = 1 - \left(\hat{p}_{m(v)+3}\right)^{1/26}.$

Here, m(v) is the month containing week v; we shift this by 3 to capture the month

in the midpoint of the period covered by the six-month survival data.

Note that this initial hazard estimate does not vary with duration of

unemployment, where the evidence indicates that unemployment exit hazards are

higher for the short-term unemployed than for the long-term unemployed. We draw

estimates of the duration profile from Rothstein's (2011) analysis of exit hazards in

CPS data, as summarized by his Figure 5. We use the CPS data to compute exit

hazards for three duration groups (d<13, 13≤d<26, and d≥26) relative to the

average exit hazard over the first 26 weeks, treating the periods before and after

January 1, 2008 separately. By comparing the exit hazard in each duration group to

the average exit hazard for those with d<26, we obtain multiplicative factors for use

in adjusting $\lambda^0$. These lead us to our adjusted hazards:

(A3) $\quad \lambda(s, d, v) = \begin{cases} 1.049 * \lambda^0(s, d, v) & \text{if } d < 13 \text{ and } v < 1/1/2008 \\ 1.081 * \lambda^0(s, d, v) & \text{if } d < 13 \text{ and } v \geq 1/1/2008 \\ 0.723 * \lambda^0(s, d, v) & \text{if } 13 \leq d < 26 \text{ and } v < 1/1/2008 \\ 0.691 * \lambda^0(s, d, v) & \text{if } 13 \leq d < 26 \text{ and } v \geq 1/1/2008 \\ 0.760 * \lambda^0(s, d, v) & \text{if } 26 \leq d \text{ and } v < 1/1/2008 \\ 0.610 * \lambda^0(s, d, v) & \text{if } 26 \leq d \text{ and } v \geq 1/1/2008. \end{cases}$

Our final simulated UI exhaustion measure for state s, week t is combines

initial claims, payment rates, and survival to exhaustion. Formally, it is:

(A4) $\quad E_{st} = \sum_{e(s,w)=t} IC_{sw} * F_{s,m(w)} * \prod_{i=0}^{e(s,w)-w-1}\left(1 - \lambda(s, i, w + i)\right).$

**Figure A1. SSDI recipients, SSA data vs. CPS ASEC**
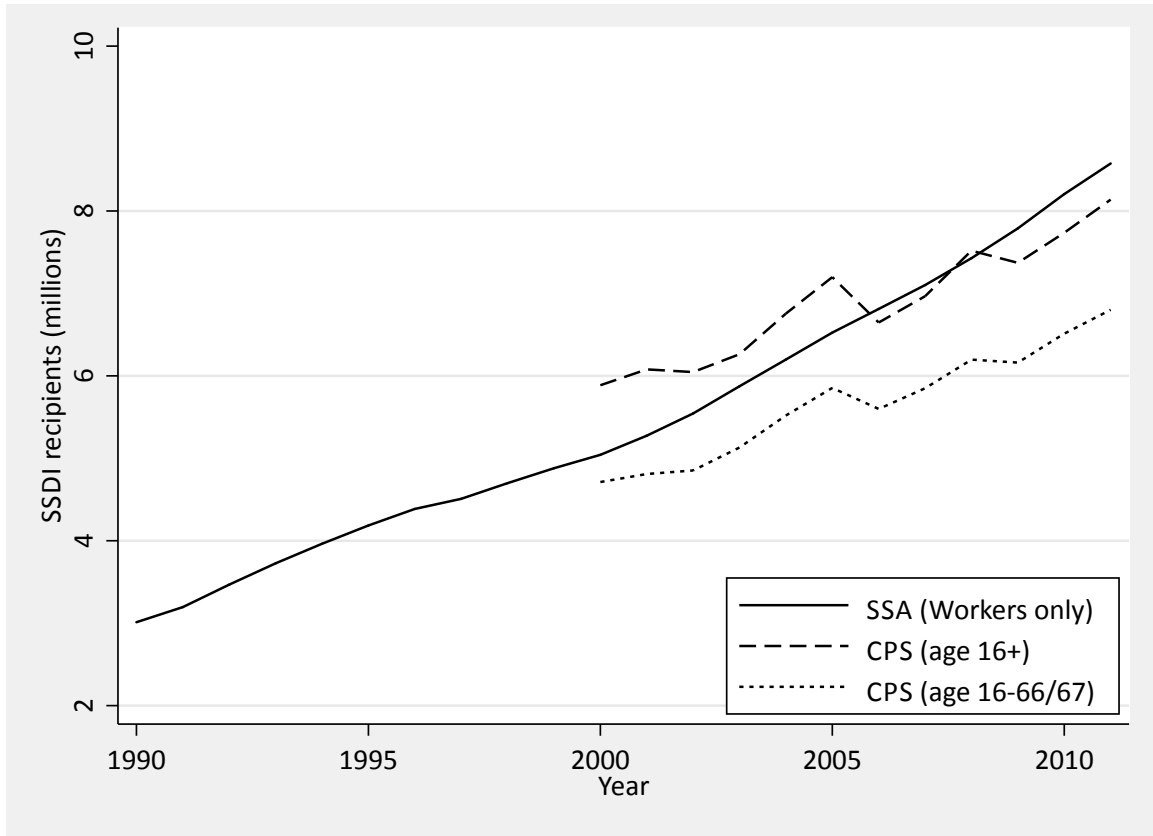


Notes: SSA series includes only disabled worker cases. In the CPS, recipiency is measured by reported income from Social Security with (own) disability listed as a reason.

**Table A.1 Panel data regressions for SSDI applications at the state-month level, comparing results with different data sources and time periods**

| | Published data Full sample | | | | Published data 2008-2010 | | | | Administrative files 2008-2010 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Final UI exhaustions | -0.003 | -0.003 | -0.003 | -0.004 | -0.009 | -0.008 | -0.009 | -0.007 | -0.000 | 0.000 | 0.000 | 0.000 |
| | (0.003) | (0.003) | (0.003) | (0.002) | (0.005) | (0.005) | (0.005) | (0.004) | (0.002) | (0.002) | (0.002) | (0.001) |
| Exhaustions index (avg., prev. 3 months) | | | | -0.002 | | | | -0.015 | | | | -0.006 |
| | | | | (0.007) | | | | (0.010) | | | | (0.004) |
| Exhaustions index (avg., next 3 months) | | | | 0.002 | | | | 0.002 | | | | 0.003 |
| | | | | (0.007) | | | | (0.008) | | | | (0.004) |
| Unemployment rate (SA) | 0.011 | | 0.010 | 0.010 | 0.015 | | 0.015 | 0.013 | 0.007 | | 0.007 | 0.006 |
| | (0.005) | | (0.006) | (0.005) | (0.006) | | (0.006) | (0.006) | (0.004) | | (0.004) | (0.004) |
| ln(initial UI claims) | | | 0.021 | | | | 0.016 | | | | 0.023 | |
| | | | (0.032) | | | | (0.019) | | | | (0.013) | |
| State FE | y | y | y | y | y | y | y | y | y | y | y | y |
| Month FE | y | y | y | y | y | y | y | y | y | y | y | y |
| Cubic UE rate control | | y | | | | y | | | | y | | |
| N | 5151 | 5151 | 5151 | 4845 | 1836 | 1836 | 1836 | 1836 | 1836 | 1836 | 1836 | 1836 |
| R2 | 0.987 | 0.987 | 0.987 | 0.987 | 0.990 | 0.990 | 0.990 | 0.990 | 0.997 | 0.997 | 0.997 | 0.997 |

Notes: Dependent variable in Columns 1-8 is ln(applications for SSDI) from publicly available tabulations by state and month; dependent variable in Columns 9-12 is ln(applications for SSDI) compiled from administrative micro data files. Panel ranges from August 2004 - December 2012 for Columns 1-4 and from January 2008 - December 2010 for the remaining columns. SA indicates the unemployment rate has been seasonally adjusted (see text). Standard errors, clustered at the state level, in parentheses.

**Table A.2 Event study regressions for SSDI applications at the state-month level**

| | All Extensions | | | | Extensions of 13 Weeks of More | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | All | | Non-Overlapping | | All | | Non-Overlapping | |
| | (1) | | (2) | | (3) | | (4) | |
| | b/se | p-value | b/se | p-value | b/se | p-value | b/se | p-value |
| Week of Extension | -0.004 | [0.095] | -0.014 | [0.360] | -0.014 | [0.035] | -0.027 | [0.111] |
| | (0.010) | | (0.015) | | (0.015) | | (0.016) | |
| 1 Week Post Extension | 0.004 | [0.319] | 0.004 | [0.680] | 0.017 | [0.973] | 0.007 | [0.399] |
| | (0.010) | | (0.009) | | (0.013) | | (0.010) | |
| 2 Weeks Post Extension | -0.016 | [0.015] | 0.002 | [0.911] | -0.013 | [0.053] | 0.007 | [0.675] |
| | (0.012) | | (0.017) | | (0.016) | | (0.020) | |
| 3 Weeks Post Extension | -0.019 | [0.002] | -0.009 | [0.435] | -0.012 | [0.033] | -0.001 | [0.909] |
| | (0.010) | | (0.012) | | (0.015) | | (0.014) | |
| 4 Weeks Post Extension | -0.015 | [0.052] | -0.001 | [0.939] | -0.011 | [0.123] | -0.017 | [0.374] |
| | (0.012) | | (0.012) | | (0.017) | | (0.017) | |
| 1 Week Pre Extension | 0.009 | | -0.005 | | 0.005 | | -0.010 | |
| | (0.013) | | (0.012) | | (0.014) | | (0.012) | |
| 2 Weeks Pre Extension | 0.019 | | -0.007 | | 0.038 | | 0.004 | |
| | (0.012) | | (0.014) | | (0.012) | | (0.010) | |
| 3 Weeks Pre Extension | 0.031 | | 0.010 | | 0.023 | | 0.005 | |
| | (0.014) | | (0.017) | | (0.016) | | (0.016) | |
| 4 Weeks Pre Extension | 0.001 | | 0.001 | | 0.004 | | -0.007 | |
| | (0.010) | | (0.016) | | (0.011) | | (0.016) | |
| Difference in Average (0 to 4 vs -1 to -4) | -0.025 | | -0.004 | | -0.024 | | -0.004 | |
| P-Value | [0.026] | | [0.911] | | [0.064] | | [0.498] | |
| Average (0 to 4 weeks) | -0.010 | | -0.004 | | -0.007 | | -0.006 | |
| P-Value | [0.414] | | [0.91] | | [0.211] | | [0.468] | |
| Non-Overlapping Extensions Only | No | | Yes | | No | | Yes | |
| 13+ Week Extensions Only | No | | No | | Yes | | Yes | |
| State FE | x | | x | | x | | x | |
| Time FE | x | | x | | x | | x | |
| Cubic in Insured Unemp. Rate | x | | x | | x | | x | |
| Cubic in Unemployment Rate (SA) | x | | x | | x | | x | |
| N | 8007 | | 8007 | | 8007 | | 8007 | |
| R2 | 0.989 | | 0.989 | | 0.989 | | 0.989 | |

Notes: Dependent variable is ln(SSDI applications), measured at the state-by-week level. Panel ranges from January 2008 - December 2010. SA indicates the unemployment rate has been seasonally adjusted (see text). Standard errors, clustered at the state level, in parentheses. P-values of tests of post-extension dummies against the average of pre-extension dummies are in squared brackets.

**Table A.3 Event study regressions for the award rate among SSDI applicants**

| | All Extensions | | | | Extensions of 13 Weeks of More | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | All | | Non-Overlapping | | All | | Non-Overlapping | |
| | (1) | | (2) | | (3) | | (4) | |
| | b/se | p-value | b/se | p-value | b/se | p-value | b/se | p-value |
| Week of Extension | -0.003 | [0.970] | -0.005 | [0.787] | 0.003 | [0.424] | 0.004 | [0.794] |
| | (0.004) | | (0.008) | | (0.005) | | (0.010) | |
| 1 Week Post Extension | 0.001 | [0.368] | 0.000 | [0.604] | -0.004 | [0.669] | -0.002 | [0.520] |
| | (0.006) | | (0.005) | | (0.006) | | (0.006) | |
| 2 Weeks Post Extension | 0.006 | [0.157] | 0.014 | [0.023] | 0.006 | [0.240] | 0.013 | [0.117] |
| | (0.008) | | (0.007) | | (0.007) | | (0.006) | |
| 3 Weeks Post Extension | -0.002 | [0.881] | -0.007 | [0.630] | 0.004 | [0.350] | 0.003 | [0.899] |
| | (0.006) | | (0.009) | | (0.006) | | (0.008) | |
| 4 Weeks Post Extension | -0.004 | [0.854] | 0.000 | [0.519] | -0.002 | [0.998] | 0.001 | [0.983] |
| | (0.006) | | (0.005) | | (0.006) | | (0.008) | |
| 1 Week Pre Extension | -0.013 | | -0.008 | | -0.013 | | -0.005 | |
| | (0.005) | | (0.005) | | (0.006) | | (0.006) | |
| 2 Weeks Pre Extension | 0.006 | | 0.008 | | 0.002 | | 0.010 | |
| | (0.005) | | (0.006) | | (0.006) | | (0.008) | |
| 3 Weeks Pre Extension | -0.006 | | -0.007 | | 0.003 | | 0.004 | |
| | (0.004) | | (0.004) | | (0.005) | | (0.006) | |
| 4 Weeks Pre Extension | 0.002 | | -0.006 | | 0.001 | | -0.003 | |
| | (0.007) | | (0.005) | | (0.006) | | (0.005) | |
| Difference in Average (0 to 4 vs -1 to -4) | 0.003 | | 0.003 | | 0.003 | | 0.002 | |
| P-Value | [0.706] | | [0.218] | | [0.283] | | [0.47] | |
| Average (0 to 4 weeks) | 0.000 | | 0.000 | | 0.001 | | 0.004 | |
| P-Value | [0.636] | | [0.352] | | [0.398] | | [0.289] | |
| Non-Overlapping Extensions Only | No | | Yes | | No | | Yes | |
| 13+ Week Extensions Only | No | | No | | Yes | | Yes | |
| State FE | x | | x | | x | | x | |
| Time FE | x | | x | | x | | x | |
| Cubic in Insured Unemp. Rate | x | | x | | x | | x | |
| Cubic in Unemployment Rate (SA) | x | | x | | x | | x | |
| N | 8007 | | 8007 | | 8007 | | 8007 | |
| R2 | 0.72 | | 0.73 | | 0.72 | | 0.73 | |

Notes: Dependent variable is the acceptance rate, measured at the state-by-week level. Panel ranges from January 2008 - December 2010. SA indicates the unemployment rate has been seasonally adjusted (see text). Standard errors, clustered at the state level, in parentheses. P-values of tests of post-extension dummies against the average of pre-extension dummies are in squared brackets.

**Table A.4 Event study regressions for ln(number of SSDI applications) and acceptance rate by age group, Including only extensions of 13 weeks or more that are not overlapping**

| | Age 20-29 | | Age 30-49 | | Age 50-65 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Week of Extension | -0.024 | 0.045 | -0.031 | 0.001 | -0.036 | -0.003 |
| | (0.055) | (0.026) | (0.027) | (0.015) | (0.023) | (0.011) |
| 1 Week Post Extension | 0.024 | -0.006 | 0.028 | 0.004 | -0.001 | -0.005 |
| | (0.062) | (0.034) | (0.027) | (0.013) | (0.014) | (0.008) |
| 2 Weeks Post Extension | -0.037 | -0.027 | 0.022 | -0.024 | 0.006 | 0.026 |
| | (0.063) | (0.040) | (0.034) | (0.016) | (0.021) | (0.009) |
| 3 Weeks Post Extension | -0.025 | -0.045 | 0.010 | 0.000 | 0.002 | 0.001 |
| | (0.056) | (0.028) | (0.025) | (0.013) | (0.016) | (0.010) |
| 4 Weeks Post Extension | -0.079 | -0.023 | 0.035 | -0.002 | -0.029 | 0.008 |
| | (0.053) | (0.029) | (0.027) | (0.017) | (0.026) | (0.007) |
| 1 Week Pre Extension | -0.014 | -0.025 | 0.007 | 0.008 | -0.024 | -0.007 |
| | (0.048) | (0.024) | (0.022) | (0.013) | (0.017) | (0.007) |
| 2 Weeks Pre Extension | 0.020 | 0.028 | 0.035 | 0.038 | -0.013 | 0.006 |
| | (0.047) | (0.026) | (0.021) | (0.012) | (0.015) | (0.010) |
| 3 Weeks Pre Extension | -0.040 | -0.022 | -0.038 | -0.002 | 0.027 | 0.005 |
| | (0.051) | (0.032) | (0.036) | (0.022) | (0.016) | (0.006) |
| 4 Weeks Pre Extension | -0.022 | -0.038 | -0.004 | -0.021 | -0.003 | -0.005 |
| | (0.058) | (0.029) | (0.032) | (0.014) | (0.018) | (0.006) |
| Difference in Average (0 to 4 vs -1 to -4) | -0.014 | 0.003 | 0.013 | -0.01 | -0.008 | 0.006 |
| P-Value of Joint Significance test | [ 0.862 ] | [ 0.245 ] | [ 0.490 ] | [ 0.583 ] | [ 0.737 ] | [ 0.037 ] |
| Difference in Average (0 to 4 vs 0) | -0.028 | -0.011 | 0.013 | -0.004 | -0.012 | 0.005 |
| P-Value of Joint Significance test | [ 0.747 ] | [ 0.430 ] | [ 0.463 ] | [ 0.590 ] | [ 0.672 ] | [ 0.016 ] |
| Non-Overlapping Extensions Only | Yes | Yes | Yes | Yes | Yes | Yes |
| 13+ Week Extensions Only | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | x | x | x | x | x | x |
| Time FE | x | x | x | x | x | x |
| Cubic in Insured Unemp. Rate | x | x | x | x | x | x |
| Cubic in Unemployment Rate (SA) | x | x | x | x | x | x |
| N | 7620 | 7620 | 8003 | 8003 | 8007 | 8007 |
| R2 | 0.86 | 0.18 | 0.97 | 0.54 | 0.98 | 0.53 |

Notes: Dependent variable is ln(number of SSDI applications) for columns 1, 3 and 5 and the acceptance rate for columns 2, 4 and 6. Panel ranges from January 2008 - December 2010. SA indicates the unemployment rate has been seasonally adjusted (see text). Standard errors, clustered at the state level, in parentheses. P-values of tests of post-extension dummies against the average of pre-extension dummies are in squared brackets.

**Table A.5 Additional details on characteristics of new recipients of Social Security Disability Insurance (SSDI) and Unemployment Insurance (UI) recipients in linked CPS samples**

| Demographic characteristics | No UI or DI in either year | | DI in y, not y-1 | | UI in y, not y-1 | |
|---|---|---|---|---|---|---|
| | **Mean** | **N** | **Mean** | **N** | **Mean** | **N** |
| **Female** | 52% | 243,016 | 50% | 3,873 | 42% | 7,136 |
| **Age** | | | | | | |
| Age 16-39 | 42% | | 19% | | 43% | |
| Age 40-49 | 27% | | 21% | | 29% | |
| Age 50-54 | 12% | | 15% | | 13% | |
| Age 55-59 | 10% | | 22% | | 9% | |
| Age 60-64 | 8% | | 22% | | 6% | |
| **Education** | | | | | | |
| LTHS | 9% | | 24% | | 11% | |
| HS | 29% | | 42% | | 39% | |
| Some college | 28% | | 24% | | 29% | |
| BA+ | 33% | | 10% | | 21% | |
| **Race/Ethnicity** | | | | | | |
| White | 80% | | 71% | | 77% | |
| Black | 12% | | 24% | | 16% | |
| Asian | 6% | | 2% | | 5% | |
| Hispanic | 14% | | 12% | | 14% | |
| **Labor force in year y-1 (from year-y March supplement)** | | | | | | |
| **Indicators** | | | | | | |
| Work any weeks | 82% | | 26% | | 91% | |
| Work or look any weeks | 83% | | 28% | | 92% | |
| Idle any weeks | 28% | | 83% | | 20% | |
| Idle weeks because disabled | 14% | 63,760 | 67% | 3,195 | 25% | 1,288 |
| Idle weeks because discouraged | 5% | 61,365 | 2% | 3,098 | 13% | 1,178 |
| **Income in y-1 (from year-y March supplement)** | | | | | | |
| Earnings>0 | 82% | 243,016 | 26% | 3,873 | 91% | 7,136 |
| UI Income > 0 | 0% | | 3% | | 0% | |
| SSDI income > 0 | 0% | | 0% | | 1% | |
| Worker's Compensation > 0 | 1% | | 3% | | 2% | |
| Welfare > 0 | 1% | | 2% | | 1% | |
| Work-limiting disability? | 5% | | 61% | | 5% | |
| **Subsample who worked > 0 weeks in y-1** | | | | | | |
| Weeks worked | 48.5 | 203,321 | 39.5 | 1,059 | 47.9 | 6,544 |
| Weeks unemployed | 0.8 | | 2.2 | | 1.9 | |
| Hours / week | 40.2 | | 35.0 | | 40.5 | |
| Average weekly earnings | $938 | | $641 | | $817 | |
| UI income > 0 | 1% | | 4% | | 1% | |
| SSDI income > 0 | 0% | | 0% | | 0% | |
| Work-limiting disability? | 2% | | 39% | | 3% | |

Source: CPS March supplements 2005-2013.

**Table A.6 Additional details on income and earnings of new recipients of Social Security Disability Insurance (SSDI) and new Unemployment Insurnace (UI) recipients and their families in linked CPS samples**

|  | No UI or SSDI in either year | SSDI in y, not y-1 | UI in y, not y-1 |
|---|---|---|---|
| **Year y-1** | Mean | Mean | Mean |
| # of persons in family | 3.07 | 2.47 | 2.89 |
| Total family income | $84,436 | $41,244 | $69,585 |
| Individual's income | $42,624 | $15,929 | $38,564 |
| Rest of family's income | $41,812 | $25,315 | $31,021 |
| Total family earnings | $76,411 | $26,191 | $63,766 |
| Individual's earnings | $39,264 | $6,786 | $36,386 |
| Rest of family's earnings | $37,147 | $19,405 | $27,379 |
| **Year y** |  |  |  |
| # of persons in family | 3.07 | 2.44 | 2.90 |
| Total family income | $86,489 | $41,649 | $64,793 |
| Individual's income | $43,942 | $17,868 | $33,727 |
| Rest of family's income | $42,547 | $23,781 | $31,065 |
| Total family earnings | $78,149 | $19,314 | $52,656 |
| Individual's earnings | $40,425 | $1,903 | $25,606 |
| Rest of family's earnings | $37,724 | $17,411 | $27,050 |

Source: CPS March supplements 2005-2013.