

Supplemental Security Income (SSI) Imputation

Current Population Survey (CPS) provided micro-data for Supplemental Security Income in the March Supplement, but often the total number of recipients and weighted sum of benefits reported in CPS fall short to Social Security Administration (SSA) statistics. We augmented total number of recipients and dollar benefit amount from CPS 2014 March Supplement to match the 2014 SSI annual report published by SSA.

In addition to match recipients and benefit totals, we tried to maintain CPS original micro-data distribution by utilizing SSA distribution information as much as we can to present more sensible results. However, CPS data on SSI is not always on the same scale as SSA statistics, which makes the comparison difficult in many ways. Thus to augment the micro data, we made a series of assumptions based on given information. This report details the imputation procedure and assumptions involved.

CPS micro-data and SSA Targets

CPS data on SSI

In the SSI section of CPS March Supplement, the respondents of each household reported how much benefit he or she receives during the previous calendar year, and on behalf of their children reported how much they received benefits from SSI. In other words, for each person record in CPS, if marked as SSI recipient, has an SSI benefit amount. Some exceptions are from children (under 15) records, whose SSI assumedly lump summed to their parents' benefit amount.

Targets for imputation

The targets for the imputation are mainly from SSA annual report. In 2014, there were in total 8.3 million people claimed roughly 55 million benefit from the federally administered SSI programs. In addition to the aggregates, we also target each state number of recipients subtotals by age group, and dollar benefit subtotals. There are several adjustments to make before the imputation.

First, SSI has both federal and state-administered components. We assume an average SSI recipient covered by CPS would't distinguish the origin of their SSI checks, so we want to include the state counterpart. However, statistics are not available for most state administered program after 2011. We take the last year available from SSA website (link!!), and extrapolate each states total benefit universally by the growth rate of federate payments for individual recipients.

Second, CPS covered non-institutional population in the U.S., but SSI pays a portion of room and board for people living in nursing homes and other type of assisted living facilities, which most likely are not included in CPS sample. As state subtotals by living arrangements are not available, we take a look at the split ratio based on federal benefit. The table down below shows that the three category of living arrangements that covers non-institutionalized population constitutes about 99.79% of total benefit distributed. Thus, we decided to ignore the institutionalized portion of benefit in the federal and state benefit total.

Living arrangement	Number of Recipients	Average Benefit
Own household	6.76	527.69
Another's household	0.35	454.33
Parent's household	1.09	638.88
Medicaid institution	0.12	33.47
Unknown	0.01	526.25

* Average benefit is per recipient per month

Third, subtotals provided by SSA, in terms of recipients and dollar benefit amounts, are only available for December 2014, which may not represent full year number of recipients and absolutely do not match total benefits. For recipients number of each age group at state level, we amplify it by the ratio of full year recipients to December statistics all over the U.S. Similarly, we ignored state variance and augmented the December state aggregate by overall full-year to December payments ratio in the U.S. The ratio for 2014 is slight above twelve at 12.096.

Recipients (2014, in millions)	CPS	SSA Dec 2014	SSA annual
Under 18	0.406	1.299	1.401
18-64	4.626	4.913	5.523
65+	1.267	2.122	2.344
Total	6.299	8.334	9.271

After making all assumptions above, we obtained targets for number of recipients and dollar benefit amount. Please refer to Appendix for summaries of recipients targets by age group and state.

Here's the summary dollar benefit targets. Federal Total is December 2014 statistics, and adjusted to annual amount by multiplying 12.096. State targets are from 2011 reports on SSA website, extrapolated to 2014 using single recipient federal benefit amount (721/674). The administrative total benefit targets are the sum of federal and state benefit after adjustments.

State	CPS total	Federal Total	Federal Total after Adj	State Total	State Total After adj	Admin Total
Alabama	552	93	1129	0	0	1129
Alaska	27	6	77	55	59	136
Arizona	748	66	803	0	0	803
Arkansas	627	60	732	0	0	732
California	5955	817	9885	2565	2744	12629
Colorado	309	39	483	28	30	513
Connecticut	400	35	432	42	45	477
Delaware	91	9	113	1	1	114
District of Columbia	119	16	198	4	4	202

Florida	2894	305	3691	7	8	3699
Georgia	1076	142	1718	0	0	1718
Hawaii	165	14	177	16	17	194
Idaho	229	16	198	8	9	207
Illinois	1408	156	1887	30	32	1919
Indiana	1024	72	877	8	9	886
Iowa	316	27	328	5	5	333
Kansas	373	26	322	0	0	322
Kentucky	1057	100	1221	17	18	1239
Louisiana	662	98	1191	0	0	1191
Maine	346	19	238	5	5	243
Maryland	649	69	837	6	7	844
Massachusetts	1046	102	1239	185	198	1437
Michigan	1257	160	1936	22	24	1960
Minnesota	521	53	643	71	76	719
Mississippi	794	66	807	0	0	807
Missouri	1217	78	947	0	0	947
Montana	141	9	116	0	0	116
Nebraska	212	14	179	6	6	185
Nevada	188	28	349	6	6	355
New Hampshire	183	10	125	0	0	125
New Jersey	1438	100	1219	92	98	1317
New Mexico	221	33	409	0	0	409

New York	4271	360	4359	621	665	5024
North Carolina	1770	127	1537	79	84	1621
North Dakota	54	4	49	0	0	49
Ohio	2563	179	2174	8	9	2183
Oklahoma	847	53	642	38	41	683
Oregon	444	48	585	2	2	587
Pennsylvania	2707	214	2593	117	126	2719
Rhode Island	247	17	217	18	19	236
South Carolina	790	64	778	16	17	795
South Dakota	41	7	93	1	1	94
Tennessee	878	100	1216	0	0	1216
Texas	3110	345	4184	0	0	4184
Utah	216	17	209	0	0	209
Vermont	79	8	103	9	10	113
Virginia	683	85	1033	27	29	1062
Washington	862	87	1057	28	30	1087
West Virginia	409	42	517	0	0	517
Wisconsin	832	64	784	141	151	935
Wyoming	55	3	42	0	1	43

Imputation Procedure

We imputed recipients and benefits using a two-step procedure, adding individual to the recipient pool to match the administrative total first

(Step I), and then impute and adjust benefit amount for recipients to match the dollar benefit total (Step II).

Step I: impute recipients

In general, we use a logistic regression model to estimate how likely one person is a recipient. Independent variables of this model are the determinants of the program. In this particular imputation process, we used countable income, age, and disability in the model as independent variables, mainly based on the [SSI program rules](#). Countable income is a proxy that includes earned income, unearned income, and excludes 1) first \$20 of most income received and 2) \$65 of earnings over one-half earning above \$65. Even though this proxy cannot capture every single items for countable income, it should do a fine job distinguish recipients from non-recipients, which is sufficient in our logit model. Age is a indicator whether this person is above 65 or not. Disability is a combined disability indicator which covers both physical disability provided in CPS March supplement and [work disability](#) definition by Census. Again this disability indicator is no way a perfect one for SSI since it does not match the [SSI-defined disability](#), but this is the best we could achieve given all the data we have.

$$SSI\ Indicator = Countable\ Income + Age + Disability$$

We ran the model on a subset of March CPS sample, and the subset is defined by countable income amount. As most people with very high income are ineligible to receive SSI, we use 95 percentile of countable income as a bar to screen out potential recipients. In addition, young people with no disability most likely have more job opportunities than aged individual (over 65) with a disability. Thus we set four different 95-percentile income standard for each group defined by age and disability. Here is the 95 percentile for each group.

95 Percentile Countable Income	Under 65	65 or older
Disabled	429	0
Not Disabled	15607	0

We ranked potential recipients by their fitted probability, and for each state added individual as recipients until the total weights of recipients sum to the closest point of that state's target.

Step I: impute and adjust dollar benefit amount

For each imputed recipient, we assign the average benefit amount of his or her state and age information. After this step, most likely the aggregate of all benefits on file is still lower than administrative total. What we do is to augment each record's benefit proportionally by the ratio of administrative total over current aggregates. In some cases where we might have more benefits on file, we would shrink each person's benefit in the same way.

APPENDIX

Table 1. Recipients 18 or older and under 65

State	CPS total	SSA Total (Dec 2014)	SSA Total after Adj
Alabama	58398	118618	141619
Alaska	2752	8040	9599
Arizona	83482	69564	83053
Arkansas	70706	67733	80867
California	449504	619855	740047
Colorado	41462	46688	55741
Connecticut	40249	39679	47373
Delaware	8898	10428	12450
District of Columbia	12541	18040	21538
Florida	279754	268648	320740
Georgia	130750	158291	188984
Hawaii	16702	14797	17666
Idaho	26429	20834	24874
Illinois	119010	171403	204639
Indiana	116891	89423	106762
Iowa	40120	35824	42770
Kansas	41231	32481	38779
Kentucky	102945	128445	153351

Louisiana	70245	113096	135026
Maine	33464	27937	33354
Maryland	68889	73404	87637
Massachusetts	101740	116812	139462
Michigan	143576	191686	228855
Minnesota	62462	59844	71448
Mississippi	99086	78828	94113
Missouri	95577	99671	118998
Montana	13998	12762	15237
Nebraska	15317	19190	22911
Nevada	15923	28093	33540
New Hampshire	16895	15034	17949
New Jersey	132604	98369	117443
New Mexico	21902	37578	44865
New York	348718	340372	406371
North Carolina	187678	148316	177075
North Dakota	6725	5599	6685
Ohio	273154	219044	261518
Oklahoma	105828	65073	77691
Oregon	31573	57067	68133
Pennsylvania	290115	236902	282838
Rhode Island	27979	21539	25715
South Carolina	91340	76209	90986
South Dakota	7605	9252	11046
Tennessee	104723	126835	151429
Texas	315832	345640	412661
Utah	28991	20661	24667
Vermont	11171	11602	13852
Virginia	67678	97541	116455
Washington	57764	98797	117954
West Virginia	53551	57771	68973
Wisconsin	75600	78180	93339
Wyoming	6907	4908	5860

Table 2. Recipients 65 or older

State	CPS Total	SSA Total (Dec 2014)	SSA Total after Adjustment
Alabama	24054	28282	31241
Alaska	1095	3101	3425

Arizona	14489	28968	31999
Arkansas	4089	14886	16443
California	308626	565676	624856
Colorado	9592	16193	17887
Connecticut	7857	14642	16174
Delaware	2386	2658	2936
District of Columbia	3284	4663	5151
Florida	88647	185190	204564
Georgia	18640	51705	57114
Hawaii	6031	8778	9696
Idaho	3805	4083	4510
Illinois	22498	63195	69806
Indiana	3383	13941	15399
Iowa	3745	7103	7846
Kansas	5504	6923	7647
Kentucky	20306	32015	35364
Louisiana	15068	32040	35392
Maine	2901	5392	5956
Maryland	14917	26039	28763
Massachusetts	38165	47934	52949
Michigan	21856	43740	48316
Minnesota	9501	20649	22809
Mississippi	10736	23395	25843
Missouri	16452	19487	21526
Montana	2789	3059	3379
Nebraska	6674	4424	4887
Nevada	3485	13019	14381
New Hampshire	2359	2121	2343
New Jersey	26482	57343	63342
New Mexico	7186	17219	19020
New York	154099	224787	248304
North Carolina	33019	43574	48133
North Dakota	886	1600	1767
Ohio	48911	43746	48323
Oklahoma	16973	14580	16105
Oregon	16602	17334	19147
Pennsylvania	23695	65106	71917
Rhode Island	2664	7095	7837
South Carolina	16826	21686	23955

South Dakota	1078	3039	3357
Tennessee	23893	32096	35454
Texas	100932	174513	192770
Utah	4329	5166	5706
Vermont	505	2554	2821
Virginia	29101	34055	37618
Washington	46888	34155	37728
West Virginia	5472	11878	13121
Wisconsin	14055	16872	18637
Wyoming	507	876	968

Table 3. Recipients under 18

State	CPS Total	SSA Total (Dec 2014)	SSA Total after Adj
Alabama	5486	27624	29793
Alaska	0	1258	1357
Arizona	4367	20978	22625
Arkansas	18492	28863	31129
California	27295	118869	128203
Colorado	3114	9991	10776
Connecticut	5871	8938	9640
Delaware	152	3601	3884
District of Columbia	1279	4079	4399
Florida	30906	107287	115711
Georgia	11178	46318	49955
Hawaii	0	1660	1790
Idaho	1194	5576	6014
Illinois	2830	41073	44298
Indiana	12119	24593	26524
Iowa	3775	8300	8952
Kansas	716	9516	10263
Kentucky	13184	27941	30135
Louisiana	2911	36143	38981
Maine	2513	4262	4597
Maryland	2311	18741	20213
Massachusetts	13925	23980	25863
Michigan	9176	41883	45172
Minnesota	8902	13714	14791

Mississippi	6799	23372	25207
Missouri	24380	23610	25464
Montana	1943	2427	2618
Nebraska	3361	4105	4427
Nevada	699	9807	10577
New Hampshire	1304	2516	2714
New Jersey	9645	25894	27927
New Mexico	6958	9262	9989
New York	14085	88442	95387
North Carolina	18613	43410	46819
North Dakota	646	1025	1105
Ohio	21442	50469	54432
Oklahoma	8668	17322	18682
Oregon	2480	10735	11578
Pennsylvania	26453	72103	77765
Rhode Island	0	4646	5011
South Carolina	9657	20459	22065
South Dakota	553	2614	2819
Tennessee	10718	24959	26919
Texas	23601	146148	157624
Utah	2823	5385	5808
Vermont	290	1627	1755
Virginia	6328	23905	25782
Washington	5622	18310	19748
West Virginia	918	8066	8699
Wisconsin	15084	22627	24404
Wyoming	868	1002	1081

Table 4 December 2014 SSI mean Benefit by Age and State (SSA Annual Report)

State	Under 18	18-64	65 or older
Alabama	632.00	521.3	307.61
Alaska	568.21	533.68	365.25
Arizona	634.01	546.92	394.15
Arkansas	638.21	509.57	276.38
California	696.19	653.12	531.08
Colorado	609.04	530.81	394.7
Connecticut	625.14	537.63	415.29
Delaware	611.41	532.11	376.69

District of Columbia	645.95	598.73	413.56
Florida	626.43	535.34	426.26
Georgia	632.48	535.29	332.43
Hawaii	603.37	592.49	460.15
Idaho	606.09	517.57	329.76
Illinois	638.46	553.18	433.41
Indiana	628.33	527.17	344.32
Iowa	605.66	505.89	327.77
Kansas	614.96	513.42	351.39
Kentucky	637.76	532.84	328.28
Louisiana	641.28	534.55	321.49
Maine	601.86	502.86	310.52
Maryland	620.8	561.79	418.07
Massachusetts	609.91	532.19	433.05
Michigan	635.48	551.48	417.15
Minnesota	609.38	527.72	475.07
Mississippi	632.44	519.12	291.48
Missouri	623.1	513.8	337.53
Montana	625.06	508.43	316.93
Nebraska	601.84	504.29	344.23
Nevada	632.67	553.62	403.11
New Hampshire	581.05	497.94	359.42
New Jersey	630.08	546.09	423.79
New Mexico	633.72	527.35	342.28
New York	634.37	552.77	442.75
North Carolina	620.78	519.59	309.96
North Dakota	551.33	482.67	343.96
Ohio	635.17	544.27	392.13
Oklahoma	620.31	525.6	314.7
Oregon	618.15	544.04	385.42
Pennsylvania	630.78	555.4	419.85
Rhode Island	630.33	537.57	391.4
South Carolina	621.36	522.79	313.99
South Dakota	592.08	495.62	346.19
Tennessee	626.51	529.4	325.23
Texas	622.12	526.52	337.36
Utah	575.07	519.34	404.53
Vermont	652.07	523.92	342.93
Virginia	614.63	526.14	381.6
Washington	614.3	555.52	461.98

West Virginia	624.73	539.98	341.89
Wisconsin	622.3	524.28	369.89
Wyoming	589.48	499.69	289.06

Table 5 Adjustment ratios for each state

State	Imputed	SSA Total	Adjust Ratio
Alabama	1280	1129	0.8821
Alaska	91	136	1.4931
Arizona	959	803	0.8370
Arkansas	814	732	0.8994
California	11082	12629	1.1396
Colorado	488	513	1.0521
Connecticut	518	477	0.9200
Delaware	142	114	0.8050
District of Columbia	219	202	0.9224
Florida	4408	3699	0.8391
Georgia	1917	1718	0.8963
Hawaii	204	194	0.9514
Idaho	261	207	0.7913
Illinois	2513	1919	0.7637
Indiana	1189	886	0.7449
Iowa	380	333	0.8777
Kansas	453	322	0.7108
Kentucky	1560	1239	0.7944
Louisiana	1462	1191	0.8142
Maine	374	243	0.6507
Maryland	974	844	0.8661
Massachusetts	1458	1437	0.9856
Michigan	2202	1960	0.8902
Minnesota	694	719	1.0353
Mississippi	982	807	0.8215
Missouri	1401	947	0.6756
Montana	161	116	0.7187
Nebraska	268	185	0.6912
Nevada	436	355	0.8139
New Hampshire	197	125	0.6338
New Jersey	1776	1317	0.7418
New Mexico	434	409	0.9423
New York	5796	5024	0.8667

North Carolina	2030	1621	0.7984
North Dakota	60	49	0.8088
Ohio	2804	2183	0.7786
Oklahoma	918	683	0.7441
Oregon	770	587	0.7624
Pennsylvania	3338	2719	0.8144
Rhode Island	312	236	0.7564
South Carolina	917	795	0.8660
South Dakota	86	94	1.0935
Tennessee	1345	1216	0.9045
Texas	5095	4184	0.8213
Utah	252	209	0.8296
Vermont	117	113	0.9662
Virginia	1181	1062	0.8990
Washington	1371	1087	0.7922
West Virginia	602	517	0.8573
Wisconsin	1008	935	0.9275
Wyoming	58	43	0.7537