Temporary Assistance for Needy Families (TANF) Imputation

Current Population Survey (CPS) provides Temporary Assistance for Needy Families (TANF) micro-data in the March Supplement, such as the total number of TANF recipients as well as their overall weighted-sum benefits. However, these numbers are underestimated, in most states, compared with the reports from US Department of Health & Human Services (HHS). We augmented total number of recipients and their dollar amount of benefits from CPS 2015 March Supplement to match the 2014 TANF reports provided on HHS website.

In addition to match TANF recipients' number and total benefits, we tried to maintain CPS original micro- data distribution by utilizing HHS current distribution and TANF rules. However, CPS data is insufficient in many ways. In order to augment data reasonably, a number of assumptions are made. This report illustrates details those assumptions and explains imputation procedure.

CPS micro-data and TANF targets

CPS data on TANF

In the TANF section of CPS March Supplement, each respondent reports how much public assistance benefit received during previous calendar year. Meanwhile, CPS also reports the number of months as a recipient.

Targets for imputation

The targets for imputation come from HHS official data. In Fiscal Year 2014, an average of 3.5 million of recipients claims roughly 9.6 billion benefits. The annual average benefits for each recipient is roughly 2700, which varies across states. So, for our imputation, CPS March Supplement data is sub-grouped by state for a better measurement.

Here is the summary of dollar benefit targets for each state:

State	CPS total benefits (Annually)	Admin total benefits (Annually)

Alabama	76,968,063	43,429,852
Alaska	20,572,380	38,707,010
Arizona	27,530,860	33,232,248
Arkansas	10,022,006	11,104,361
California	1,352,378,656	3,491,007,106
Colorado	33,926,319	82,167,037
Connecticut	61,470,109	87,433,806
Delaware	8,131,031	24,319,118
District of Columbia	20,188,110	61,340,387
Florida	125,174,599	175,868,762
Georgia	77,931,427	49,024,258
Hawaii	17,303,141	59,957,143
Idaho	3,969,451	6,815,994
Illinois	61,045,228	81,459,440
Indiana	68,370,595	23,441,807
Iowa	36,636,009	61,234,667
Kansas	18,069,139	49,372,704
Kentucky	31,935,636	159,358,533
Louisiana	27,199,560	21,156,865
Maine	41,924,064	58,970,431
Maryland	66,565,236	116,748,570
Massachusetts	111,919,961	292,700,268
Michigan	142,891,038	167,236,026
Minnesota	89,975,277	86,037,333
Mississippi	16,885,615	19,729,920
Missouri	78,918,108	83,789,053
Montana	4,029,920	19,645,213
Nebraska	29,393,415	23,412,717
Nevada	46,010,905	50,717,562
New Hampshire	16,893,284	24,087,295
New Jersey	169,725,767	271,366,365
New Mexico	18,307,152	55,060,290
New York	349,539,881	2,042,312,206
North Carolina	33,545,056	54,959,910
North Dakota	1,525,774	20,282,702
Ohio	233,510,662	288,374,354
Oklahoma	7,722,839	61,125,969

Oregon	57,496,459	155,800,924
Pennsylvania	172,624,986	263,139,343
Rhode Island	21,114,375	26,150,178
South Carolina	76,284,454	23,928,811
South Dakota	13,703,425	19,684,229
Tennessee	158,761,531	96,135,055
Texas	161,174,041	139,356,497
Utah	18,555,257	24,566,214
Vermont	14,148,181	27,914,158
Virginia	39,697,127	99,363,339
Washington	60,355,714	180,941,247
West Virginia	18,101,350	77,919,498
Wisconsin	44,462,336	150,729,164
Wyoming	1,511,221	3,678,644

Imputation Procedure

We follow a similar two-step procedure like SSI imputation. First, we add up the individual weight in the recipient pool to reach the administrative level for each state. Second, we impute and get the adjust ratio for benefits amount to match the dollar benefit total.

Step I: impute recipient

A basic logistic regression model is built up for analyzing the likelihood of being a recipient. Following TANF rules, other welfare programs indicators and CPS available information, the independent variables contain age, gender, number of children under 6, number of children from 6 to 18, earned income, unearned income, whether having TANF recipients in family, whether currently in labor force, whether receiving SSI, whether receiving SNAP and whether getting married.

Because TANF aims to increase economic security and stability at a family level, we include a dummy variable of whether having other TANF recipient within family.

TANF rules vary across states, so the variables we pick up are not exactly consistent with each state's official description. But current independent variable basket is good proxy.

TANF indicator = α + β₁ *age + β₂ * gender + β₃ *child₁ + β₄ * child₂ + β₅

$$TANF\ indicator = \alpha + \beta_1 * age + \beta_2 * gender + \beta_3 * child_1 + \beta_4 * child_2 + \beta_5 * earned\ income + \beta_6 * unearned\ income + \beta_7 * other\ family\ member\ indicator + \beta_8 * unemployed\ indicator + \beta_9 * SSI\ indicator + \beta_{10} * SNAP\ indicator + \beta_{11} * marriage + \varepsilon$$

Then we rank all recipients by their fitted probability. For each state's sub-group, we sum-up their weights until the weights reach administrative level. For the state whose pre-imputation weights are bigger than administrative data, we skip this step and do a direct shrink in following step.

Step II:

For each imputed recipient, we assign the average benefit amount for correspondent state. Then we calculate the total dollar benefits again for each state, and compare the new dollar benefits with TANF administrative data. Conditions vary among states, and we can get the adjustment ratios by dividing administrative benefits to imputed benefits. Most adjustment ratios nearly equal to 0.9. We use the adjustment ratios to augment or shrink each household's benefits.

However, currently we have some extreme cases, which may need further attention: South Carolina, Indiana, Alabama, Tennessee, Georgia, Nebraska and Wyoming. These states have either big or small adjustment ratio.

Appendix
Table 1: TANF recipients' numbers by state

State	CPS Population	TANF Population
Alabama	13,061	40,903
Alaska	3,204	9,466
Arizona	7,500	29,409
Arkansas	4,056	13,493
California	258,460	1,298,103
Colorado	7,045	45,018
Connecticut	12,443	28,806
Delaware	2,696	13,209
District of Columbia	5,179	16,687
Florida	35,129	86,765
Georgia	19,502	29,948
Hawaii	2,627	24,399
Idaho	1,108	2,803
Illinois	17,261	44,546
Indiana	15,073	20,330
Iowa	8,777	32,786
Kansas	4,448	16,990
Kentucky	6,012	57,766
Louisiana	8,969	12,889
Maine	6,821	12,211
Maryland	19,526	50,134
Massachusetts	19,947	79,813
Michigan	20,286	61,280
Minnesota	22,925	43,578
Mississippi	7,765	18,036
Missouri	27,167	66,090
Montana	1,660	7,418
Nebraska	4,766	11,318
Nevada	10,341	31,866
New Hampshire	2,500	6,567
New Jersey	38,961	66,125
New Mexico	5,806	36,143
New York	75,395	263,275
North Carolina	10,888	31,223
North Dakota	266	3,274
Ohio	34,514	122,033

Oklahoma	2,921	15,707
Oregon	13,367	56,785
Pennsylvania	51,395	171,544
Rhode Island	5,124	13,423
South Carolina	16,234	25,356
South Dakota	2,366	6,237
Tennessee	47,518	111,544
Texas	46,527	80,118
Utah	3,381	9,927
Vermont	2,620	6,519
Virginia	10,606	56,546
Washington	10,184	94,337
West Virginia	5,286	18,649
Wisconsin	9,939	64,591
Wyoming	763	743

Table 2: TANF average benefits by state

State	Average Annual Benefits
Alabama	1,061.78
Alaska	4,089.09
Arizona	1,129.99
Arkansas	822.99
California	2,689.31
Colorado	1,825.19
Connecticut	3,035.25
Delaware	1,841.16
District of Columbia	3,675.85
Florida	2,026.95
Georgia	1,636.99
Hawaii	2,457.34
Idaho	2,432.11
Illinois	1,828.65
Indiana	1,153.08
Iowa	1,867.70
Kansas	2,905.94
Kentucky	2,758.67
Louisiana	1,641.51
Maine	4,829.29
Maryland	2,328.72
Massachusetts	3,667.33
Michigan	2,729.04
Minnesota	1,974.35
Mississippi	1,093.89
Missouri	1,267.81
Montana	2,648.26
Nebraska	2,068.57
Nevada	1,591.58
New Hampshire	3,667.93
New Jersey	4,103.85
New Mexico	1,523.38
New York	7,757.34
North Carolina	1,760.22
North Dakota	6,194.45
Ohio	2,363.08

Oklahoma	3,891.72
Oregon	2,743.68
Pennsylvania	1,533.94
Rhode Island	1,948.21
South Carolina	943.70
South Dakota	3,155.87
Tennessee	861.86
Texas	1,739.39
Utah	2,474.77
Vermont	4,282.24
Virginia	1,757.20
Washington	1,918.04
West Virginia	4,178.16
Wisconsin	2,333.59
Wyoming	4,953.85

Table 3: Adjustment ratios by state

State	Imputed	Admin	Adjust ratio
Alabama	107,144,275	43,429,852	0.4053
Alaska	45,765,893	38,707,010	0.8458
Arizona	51,953,860	33,232,248	0.6396
Arkansas	17,872,588	11,104,361	0.6213
California	4,149,675,916	3,491,007,106	0.8413
Colorado	104,558,876	82,167,037	0.7858
Connecticut	110,511,066	87,433,806	0.7912
Delaware	27,613,507	24,319,118	0.8807
District of Columbia	62,497,952	61,340,387	0.9815
Florida	229,519,414	175,868,762	0.7662
Georgia	94,645,636	49,024,258	0.5180
Hawaii	70,549,777	59,957,143	0.8499
Idaho	8,136,170	6,815,994	0.8377
Illinois	110,483,550	81,459,440	0.7373
Indiana	75,303,257	23,441,807	0.3113
Iowa	81,375,826	61,234,667	0.7525
Kansas	52,078,876	49,372,704	0.9480
Kentucky	177,782,953	159,358,533	0.8964
Louisiana	34,679,457	21,156,865	0.6101
Maine	67,400,729	58,970,431	0.8749
Maryland	135,570,413	116,748,570	0.8612
Massachusetts	329,631,963	292,700,268	0.8880
Michigan	259,251,060	167,236,026	0.6451
Minnesota	132,367,223	86,037,333	0.6500
Mississippi	28,418,349	19,729,920	0.6943
Missouri	129,209,822	83,789,053	0.6485
Montana	18,787,360	19,645,213	1.0457
Nebraska	42,358,317	23,412,717	0.5527
Nevada	80,374,953	50,717,562	0.6310
New Hampshire	32,362,961	24,087,295	0.7443
New Jersey	281,855,142	271,366,365	0.9628
New Mexico	64,077,594	55,060,290	0.8593
New York	1,804,225,849	2,042,312,206	1.1320
North Carolina	69,329,861	54,959,910	0.7927
North Dakota	19,869,654	20,282,702	1.0208
Ohio	441,619,879	288,374,354	0.6530

Oklahoma	59,310,913	61,125,969	1.0306
Oregon	177,131,167	155,800,924	0.8796
Pennsylvania	355,845,445	263,139,343	0.7395
Rhode Island	37,952,484	26,150,178	0.6890
South Carolina	85,341,809	23,928,811	0.2804
South Dakota	26,279,767	19,684,229	0.7490
Tennessee	214,452,280	96,135,055	0.4483
Texas	216,900,934	139,356,497	0.6425
Utah	35,632,405	24,566,214	0.6894
Vermont	30,668,346	27,914,158	0.9102
Virginia	122,626,843	99,363,339	0.8103
Washington	221,058,286	180,941,247	0.8185
West Virginia	64,950,066	77,919,498	1.1997
Wisconsin	171,352,671	150,729,164	0.8796
Wyoming	1,511,221	3,678,644	2.4342