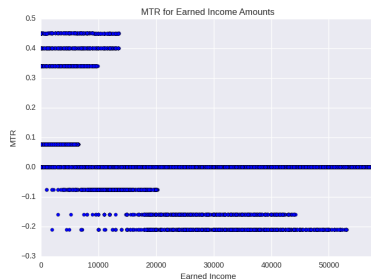# Simple MTR Calculator

Amy Xu

Parker Rogers

June 2016

- If other methods for calculating implicit MTRs for welfare and transfer programs don't work, we may be able to use a simple MTR calculator

- We program income rules to calculate implicit MTRs for EITC from CPS-based dataset as example

- Compare simple calculator results to regression and Tax-Calculator results

- Compare three different levels of program detail when calculating EITC MTRs
    - First we calculate EITC MTRs conditioned upon Earned Income and AGI
    - Later we calculate MTRs conditioned upon Earned Income only
    - Then we calculate MTRs conditioned upon Earned Income, AGI and investment income

Calculating the EITC MTRs from CPS-based dataset

- We calculate EITC MTRs with income rules using a CPS-based dataset so that we can compare the simple calculator MTRs to regression and Tax-Calculator MTRs

Comparing MTRs in Simple Calculator to TC and Regressions

- We performed similar regressions for each income decile with EITC being independent variable and earned income the dependent variable using CPS dataset.

- Computed simple calculator average MTRs for each income decile

- Used simple calculator average MTRs to compare with Tax Calculator MTRs and regression MTRs

Comparing MTRs in Simple Calculator to TC and Regressions

Table 2: One Child

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$44 \leq$ income < 4930	0.32151	0.322453	0.3120
$4930 \leq$ income < 8600	0.327575	0.325668	0.3093
$8600 \leq$ income < 10700	0.106091	0.248494	0.0950
$10700 \leq$ income < 13000	-0.00788191	0.162318	-0.0037
$13000 \leq$ income < 15958	-0.00645202	-0.0328873	-0.0075
$15958 \leq$ income < 19500	-0.0355169	-0.00185882	-0.0753
$19500 \leq$ income < 23372	-0.109368	-0.0909142	-0.1303
$23372 \leq$ income < 27450	-0.152137	-0.152636	-0.1497
$27450 \leq$ income < 32400	-0.154274	-0.146921	-0.1503
$32400 \leq$ income < 43200	-0.109581	-0.114399	-0.1495

EITC and MTR Conditional Upon Different Detail Levels

- Since transfer and wealth programs are often complicated, datasets may not provide all the necessary information to calculate implicit MTRs

- We calculate MTRs using two more levels of detail

EITC and MTR conditional upon only Earned Income

Table 6: One Child

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$44 \leq$ income < 4930	0.3399	0.3399	0.3120
$4930 \leq$ income < 8600	0.3399	0.3399	0.3093
$8600 \leq$ income < 10700	0.111203	0.265119	0.0950
$10700 \leq$ income < 13000	0	0	-0.0037
$13000 \leq$ income < 15958	0	0	-0.0075
$15958 \leq$ income < 19500	-0.027745	-0.0292107	-0.0753
$19500 \leq$ income < 23372	-0.105666	-0.11512	-0.1303
$23372 \leq$ income < 27450	-0.158298	-0.143061	-0.1497
$27450 \leq$ income < 32400	-0.1598	-0.160562	-0.1503
$32400 \leq$ income < 43200	-0.126376	-0.12849	-0.1495

EITC and MTR conditional upon Earned Income, AGI and Investment Income

Table 10: One Child

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$44 \leq$ income < 4930	0.30974	0.318638	0.3120
$4930 \leq$ income < 8600	0.327723	0.32524	0.3093
$8600 \leq$ income < 10700	0.106091	0.248494	0.0950
$10700 \leq$ income < 13000	-0.00624408	0.137998	-0.0037
$13000 \leq$ income < 15958	-0.0047473	-0.0509731	-0.0075
$15958 \leq$ income < 19500	-0.0333948	-0.0100799	-0.0753
$19500 \leq$ income < 23372	-0.108413	-0.0991987	-0.1303
$23372 \leq$ income < 27450	-0.149284	-0.150368	-0.1497
$27450 \leq$ income < 32400	-0.15164	-0.146736	-0.1503
$32400 \leq$ income < 43200	-0.108528	-0.114032	-0.1495

Conclusion/Questions

- Do these results from the relatively simple EITC program mean we can use a simple MTR calculator for other programs?

- Can we use lower amounts of detail when using a simple calculator for other programs?

More Tables, Earned Income and AGI

- Tables for when EITC and MTRs are conditional upon Earned Income and AGI.

Table 1: Childless

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$10 \leq$ income < 1100	0.0717891	0.0749477	0.0706
$1100 \leq$ income < 2500	0.0715924	0.0709922	0.0682
$2500 \leq$ income < 3900	0.0714506	0.0616463	0.0663
$3900 \leq$ income < 5300	0.066889	0.0735019	0.0619
$5300 \leq$ income < 6700	0.0616205	0.0654906	0.0404
$6700 \leq$ income < 8100	-0.00421558	0.0075194	-0.0171
$8100 \leq$ income < 9800	-0.0612944	-0.050404	-0.0658
$9800 \leq$ income < 11600	-0.0605452	-0.0689626	-0.0627
$11600 \leq$ income < 13200	-0.0599481	-0.0754736	-0.0644
$13200 \leq$ income < 19600	-0.0184475	-0.0137392	-0.0705

Table 2: One Child

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$44 \leq$ income < 4930	0.32151	0.322453	0.3120
$4930 \leq$ income < 8600	0.327575	0.325668	0.3093
$8600 \leq$ income < 10700	0.106091	0.248494	0.0950
$10700 \leq$ income < 13000	-0.00788191	0.162318	-0.0037
$13000 \leq$ income < 15958	-0.00645202	-0.0328873	-0.0075
$15958 \leq$ income < 19500	-0.0355169	-0.00185882	-0.0753
$19500 \leq$ income < 23372	-0.109368	-0.0909142	-0.1303
$23372 \leq$ income < 27450	-0.152137	-0.152636	-0.1497
$27450 \leq$ income < 32400	-0.154274	-0.146921	-0.1503
$32400 \leq$ income < 43200	-0.109581	-0.114399	-0.1495

Earned Income and AGI (continued)

- Tables for when EITC and MTRs are conditional upon Earned Income and AGI.

Table 3: Two Children

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$10 \leq$ income < 7233	0.377706	0.37123	0.3680
$7233 \leq$ income < 11900	0.378353	0.346876	0.3591
$11900 \leq$ income < 14150	0.287995	0.392858	0.1968
$14150 \leq$ income < 15830	-0.00965042	-0.0317303	-0.0100
$15830 \leq$ income < 18720	-0.0293278	-0.0738909	-0.0803
$18720 \leq$ income < 22700	-0.127653	-0.122884	-0.1574
$22700 \leq$ income < 26700	-0.191236	-0.2345	-0.1966
$26700 \leq$ income < 31800	-0.20504	-0.163385	-0.1978
$31800 \leq$ income < 37100	-0.206332	-0.203142	-0.1969
$37100 \leq$ income < 48300	-0.171021	-0.176585	-0.1966

Table 4: Three or more Children

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$1 \leq$ income < 7620	0.438811	0.444678	0.4291
$7620 \leq$ income < 12160	0.440659	0.436026	0.3884
$12160 \leq$ income < 14470	0.236224	0.447933	0.1653
$14470 \leq$ income < 17060	-0.00849115	-0.0966498	-0.0201
$17060 \leq$ income < 21270	-0.0954322	-0.0814759	-0.1331
$21270 \leq$ income < 25030	-0.164597	-0.166058	-0.1692
$25030 \leq$ income < 29900	-0.207045	-0.201289	-0.1956
$29900 \leq$ income < 34670	-0.204224	-0.207295	-0.1975
$34670 \leq$ income < 41430	-0.202187	-0.173123	-0.1979
$41430 \leq$ income < 51500	-0.177526	-0.18178	-0.1956

Earned Income Only

- Tables for when EITC and MTRs are conditional upon Earned Income only.

Table 5: Childless

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$10 \leq$ income < 1100	0.0765	0.0765	0.0706
$1100 \leq$ income < 2500	0.0765	0.0765	0.0682
$2500 \leq$ income < 3900	0.0765	0.0765	0.0663
$3900 \leq$ income < 5300	0.0765	0.0765	0.0619
$5300 \leq$ income < 6700	0.0752072	0.0760031	0.0404
$6700 \leq$ income < 8100	0	0	-0.0171
$8100 \leq$ income < 9800	-0.0624266	-0.0593288	-0.0658
$9800 \leq$ income < 11600	-0.0631547	-0.0599945	-0.0627
$11600 \leq$ income < 13200	-0.0627697	-0.0709021	-0.0644
$13200 \leq$ income < 19600	-0.0240875	-0.0177241	-0.0705

Table 6: One Child

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$44 \leq$ income < 4930	0.3399	0.3399	0.3120
$4930 \leq$ income < 8600	0.3399	0.3399	0.3093
$8600 \leq$ income < 10700	0.111203	0.265119	0.0950
$10700 \leq$ income < 13000	0	0	-0.0037
$13000 \leq$ income < 15958	0	0	-0.0075
$15958 \leq$ income < 19500	-0.027745	-0.0292107	-0.0753
$19500 \leq$ income < 23372	-0.105666	-0.11512	-0.1303
$23372 \leq$ income < 27450	-0.158298	-0.143061	-0.1497
$27450 \leq$ income < 32400	-0.1598	-0.160562	-0.1503
$32400 \leq$ income < 43200	-0.126376	-0.12849	-0.1495

Earned Income Only (continued)

- Tables for when EITC and MTRs are conditional upon Earned Income only.

Table 7: Two Children

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$10 \leq$ income < 7233	0.4	0.4	0.3680
$7233 \leq$ income < 11900	0.4	0.4	0.3591
$11900 \leq$ income < 14150	0.298991	0.3767	0.1968
$14150 \leq$ income < 15830	0	0	-0.0100
$15830 \leq$ income < 18720	-0.0132779	-0.00885272	-0.0803
$18720 \leq$ income < 22700	-0.123012	-0.111432	-0.1574
$22700 \leq$ income < 26700	-0.194094	-0.200291	-0.1966
$26700 \leq$ income < 31800	-0.2106	-0.212218	-0.1978
$31800 \leq$ income < 37100	-0.2106	-0.212351	-0.1969
$37100 \leq$ income < 48300	-0.187199	-0.191373	-0.1966

Table 8: Three or more Children

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$1 \leq$ income < 7620	0.45	0.45	0.4291
$7620 \leq$ income < 12160	0.45	0.45	0.3884
$12160 \leq$ income < 14470	0.260764	0.381338	0.1653
$14470 \leq$ income < 17060	0	0	-0.0201
$17060 \leq$ income < 21270	-0.0896429	-0.111519	-0.1331
$21270 \leq$ income < 25030	-0.162402	-0.16653	-0.1692
$25030 \leq$ income < 29900	-0.2106	-0.195736	-0.1956
$29900 \leq$ income < 34670	-0.2106	-0.197584	-0.1975
$34670 \leq$ income < 41430	-0.2106	-0.198197	-0.1979
$41430 \leq$ income < 51500	-0.192896	-0.192566	-0.1956

Earned Income, AGI and Investment Income

- Tables for when EITC and MTRs are conditional upon Earned Income, AGI and investment income.

Table 9: Childless

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$10 \leq$ income < 1100	0.0709465	0.0743338	0.0706
$1100 \leq$ income < 2500	0.0709143	0.0707168	0.0682
$2500 \leq$ income < 3900	0.071331	0.0579746	0.0663
$3900 \leq$ income < 5300	0.0669224	0.0705516	0.0619
$5300 \leq$ income < 6700	0.0615447	0.0689154	0.0404
$6700 \leq$ income < 8100	-0.00289353	0.0108536	-0.0171
$8100 \leq$ income < 9800	-0.0605858	-0.0542516	-0.0658
$9800 \leq$ income < 11600	-0.0599463	-0.0679287	-0.0627
$11600 \leq$ income < 13200	-0.0595059	-0.075697	-0.0644
$13200 \leq$ income < 19600	-0.0183274	-0.0137053	-0.0705

Table 10: One Child

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$44 \leq$ income < 4930	0.30974	0.318638	0.3120
$4930 \leq$ income < 8600	0.327723	0.32524	0.3093
$8600 \leq$ income < 10700	0.106091	0.248494	0.0950
$10700 \leq$ income < 13000	-0.00624408	0.137998	-0.0037
$13000 \leq$ income < 15958	-0.0047473	-0.0509731	-0.0075
$15958 \leq$ income < 19500	-0.0333948	-0.0100799	-0.0753
$19500 \leq$ income < 23372	-0.108413	-0.0991987	-0.1303
$23372 \leq$ income < 27450	-0.149284	-0.150368	-0.1497
$27450 \leq$ income < 32400	-0.15164	-0.146736	-0.1503
$32400 \leq$ income < 43200	-0.108528	-0.114032	-0.1495

Earned Income, AGI and Investment Income (continued)

- Tables for when EITC and MTRs are conditional upon Earned Income, AGI and investment income.

Table 11: Two Children

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$10 \leq$ income < 7233	0.373136	0.363637	0.3680
$7233 \leq$ income < 11900	0.371972	0.366652	0.3591
$11900 \leq$ income < 14150	0.286754	0.40762	0.1968
$14150 \leq$ income < 15830	-0.00814719	-0.0199638	-0.0100
$15830 \leq$ income < 18720	-0.0279123	-0.0848346	-0.0803
$18720 \leq$ income < 22700	-0.125531	-0.136038	-0.1574
$22700 \leq$ income < 26700	-0.189397	-0.223559	-0.1966
$26700 \leq$ income < 31800	-0.20316	-0.152609	-0.1978
$31800 \leq$ income < 37100	-0.199646	-0.198611	-0.1969
$37100 \leq$ income < 48300	-0.168162	-0.17177	-0.1966

Table 12: Three or more Children

MTR for Income Decile			
Income Decile	Program MTR	Reg MTR (β_1)	TC MTR
$1 \leq$ income < 7620	0.434894	0.434846	0.4291
$7620 \leq$ income < 12160	0.436132	0.439823	0.3884
$12160 \leq$ income < 14470	0.236224	0.447933	0.1653
$14470 \leq$ income < 17060	-0.00804344	-0.124165	-0.0201
$17060 \leq$ income < 21270	-0.0929892	-0.060698	-0.1331
$21270 \leq$ income < 25030	-0.161095	-0.136958	-0.1692
$25030 \leq$ income < 29900	-0.207045	-0.201289	-0.1956
$29900 \leq$ income < 34670	-0.202038	-0.197005	-0.1975
$34670 \leq$ income < 41430	-0.194671	-0.151967	-0.1979
$41430 \leq$ income < 51500	-0.17619	-0.178928	-0.1956