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Asking Flexible Disaggregated Income Gross or Net Figures vs Single Total Question: Evaluation from Panel on Household Finance

Junyi Zhu

David Johnson

University of Michigan

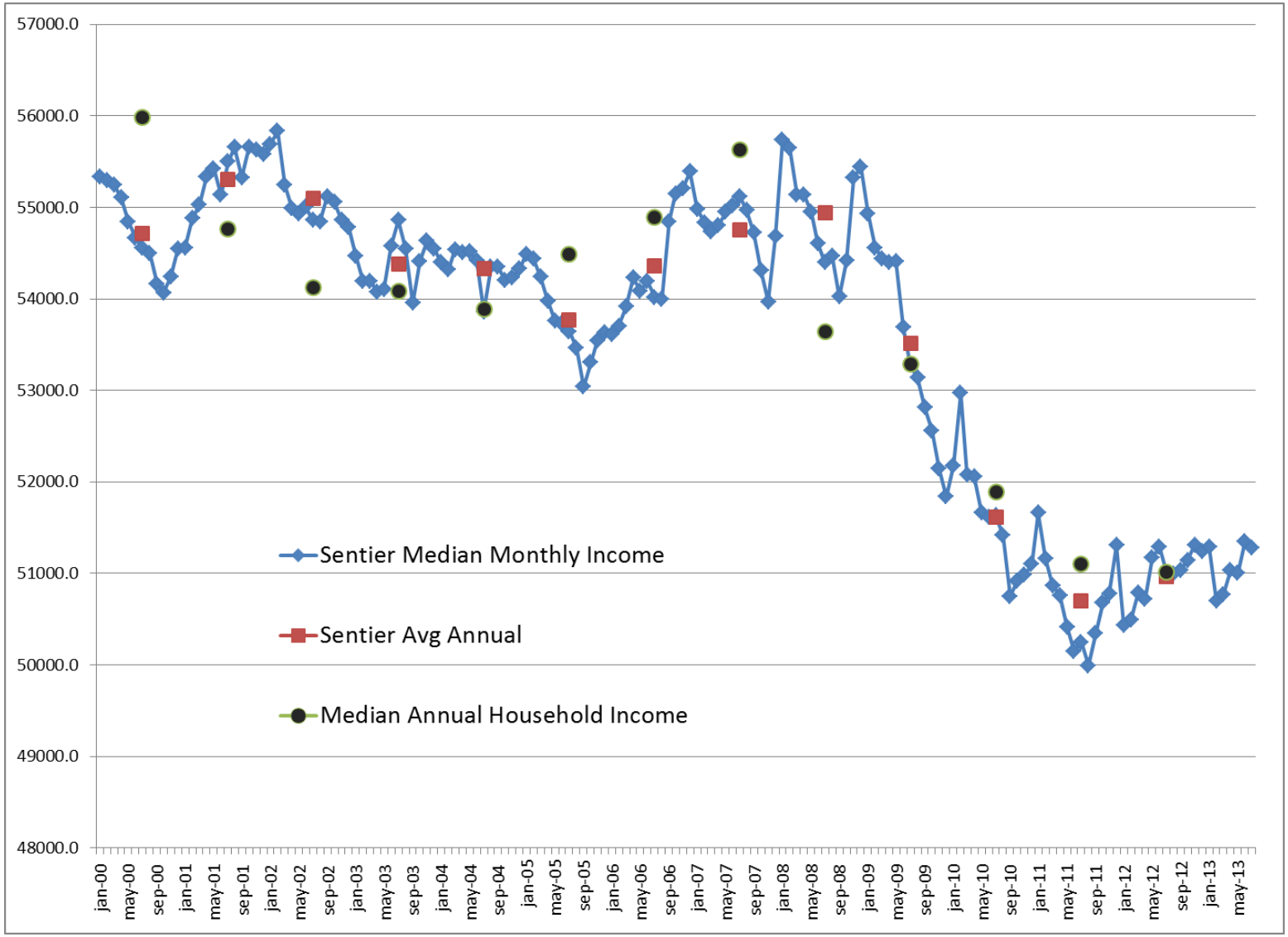
Issues in Income Measurement

- Issue in survey collection of income is how many questions are needed
- Single question vs. multi-questions
- Usually more questions yields more income (SIPP vs CPS vs ACS)
- But it is costly
- And there is a need to determine disposable income

Comparison of US Income Surveys

Income Estimate	CPS	ACS	SIPP	PSID
All Persons	22,893	22,854	20,514	25,710
Family Income Quintile				
Lowest	6,513	6,526	6,962	7,178
Second	13,789	14,259	13,355	15,261
Third	19,293	19,576	17,946	21,132
Fourth	25,604	25,496	23,250	28,785
Highest	49,316	48,543	41,062	56,220
Ratio of fourth to lowest	3.93	3.91	3.34	4.01
Ratio of highest to lowest	7.57	7.44	5.90	7.83

Comparing Monthly (single question) to Annual (50 questions) in CPS



1st concern in collecting income information
Who knows net vs gross

- Most surveys only ask either gross or net income values (esp gross) - item-nonresponse can be high resulting in imputation bias:
  - the average wage earners are more aware of the net employment income through their bank statement
  - collective bargaining typical in Germany wage reduces the likelihood for wage earners to remember the gross figure
  - wage earners in the top distribution know their gross income better
  - above-average self-employment income earners are more likely to answer the gross figure

2nd concern in collecting income information – is many better than one

- Micklewright and Schnepf (2010): the total recall question is cheaper and the item-nonresponse may be lower
- Microlevel evidence suggests a mean-reversion of the income reporting errors. In USA: the bottom reports more income and top less than benchmark estimates
- Hokayem, Bollinger and Ziliak (2015) treat both income from either external (administrative data) or internal (supposedly superior questions) as possible “truth” – can we use both

Goals of paper

- Use (PHF) Panel on Household Finance survey
- Examine respondents answer to income questions using different accounting periods (e.g., annual, quarterly, monthly or other specific ones) and gross or net figures- among many flexibilities
- Develop tax calculator to convert the gross and net figures bilaterally which considers complexities in the German tax- and social insurance contribution system.
- Document the conversion infrastructure and the quality: low item-nonresponse and good comparsion with benchmarks.

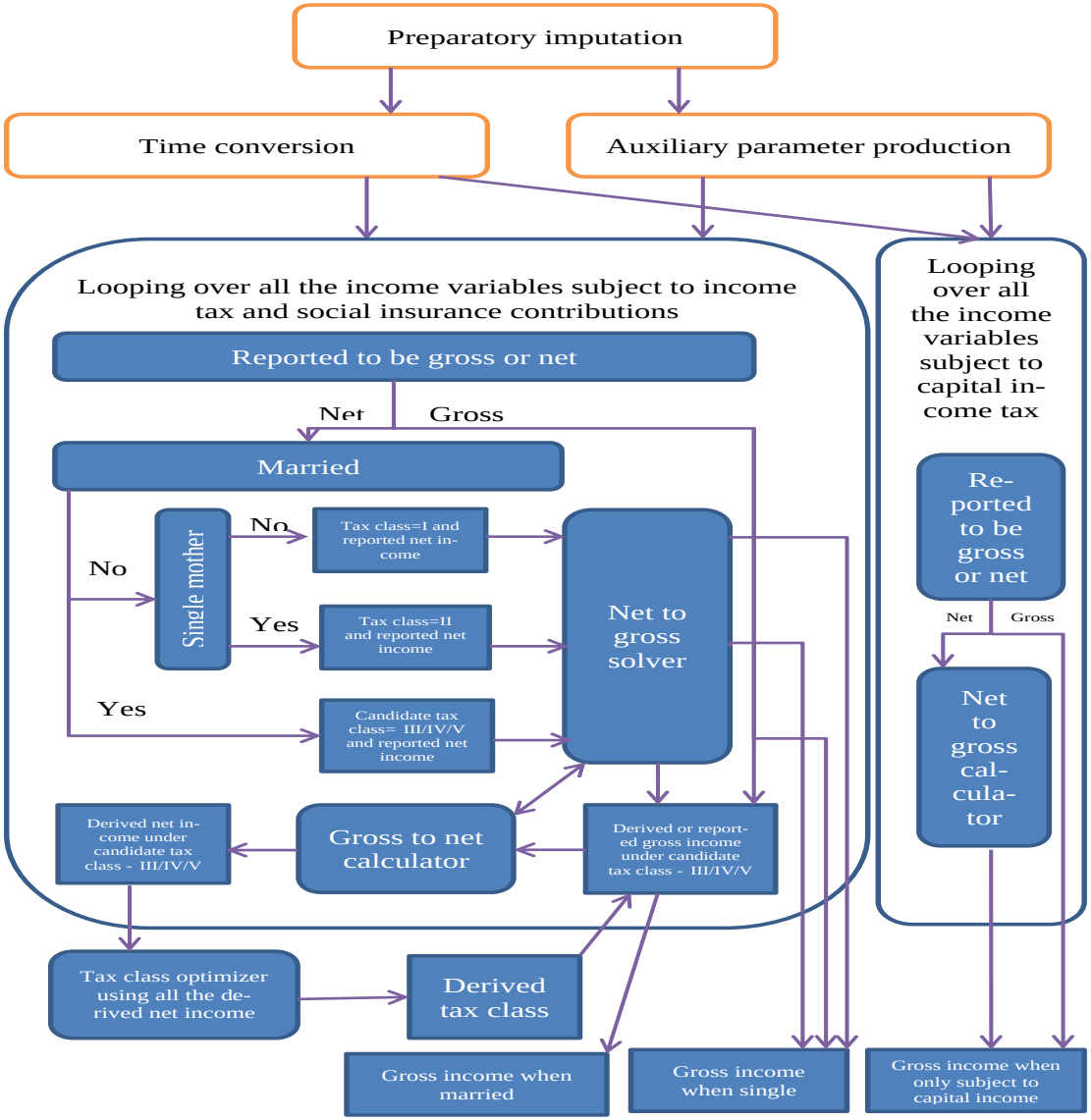
Goals of paper

- Evaluation 1: to access data quality, establish a counterfactual environment - all of our respondents answering the net figures would have yielded an item-nonresponse for the same income in the counterfactual design – the traditional survey only asking gross figures.
- Evaluation 2: a micro-level evaluation between single total and derived aggregate (net) income.

What paper finds

- Evaluation 1 – Use only gross responses: counterfactual distribution does not always shift up as predicted by the pattern to report net or gross in the bottom: shifting down in the bottom around the area of basic
- Evaluation 2 – Compare single and aggregate: the single total value is usually less than the derived aggregate net figure while the former can be much higher than the latter in the bottom of distribution :
  - single total income response for those with positive tax liability in survey can be similar to the report towards tax authority.

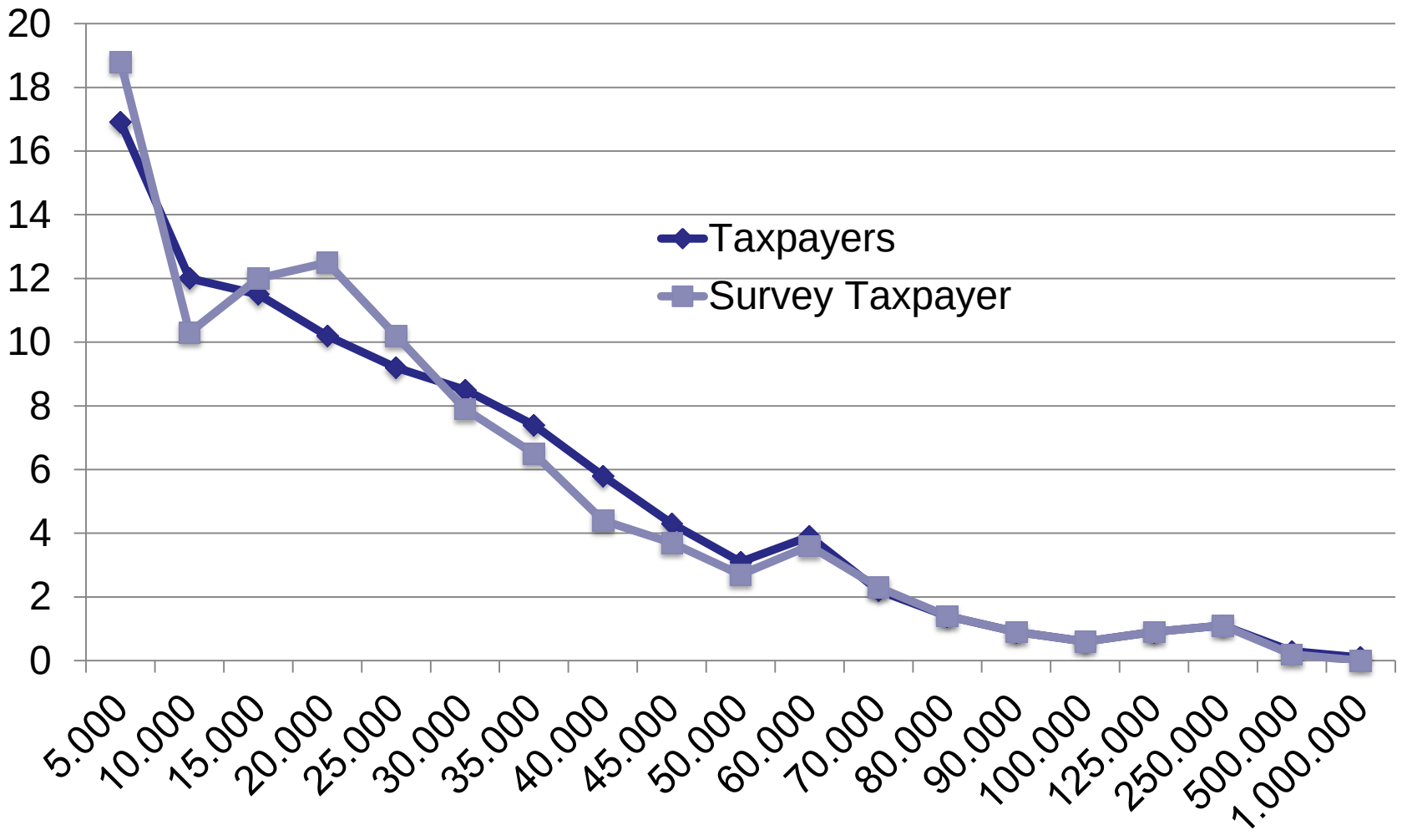
The flowchart of tax conversion program



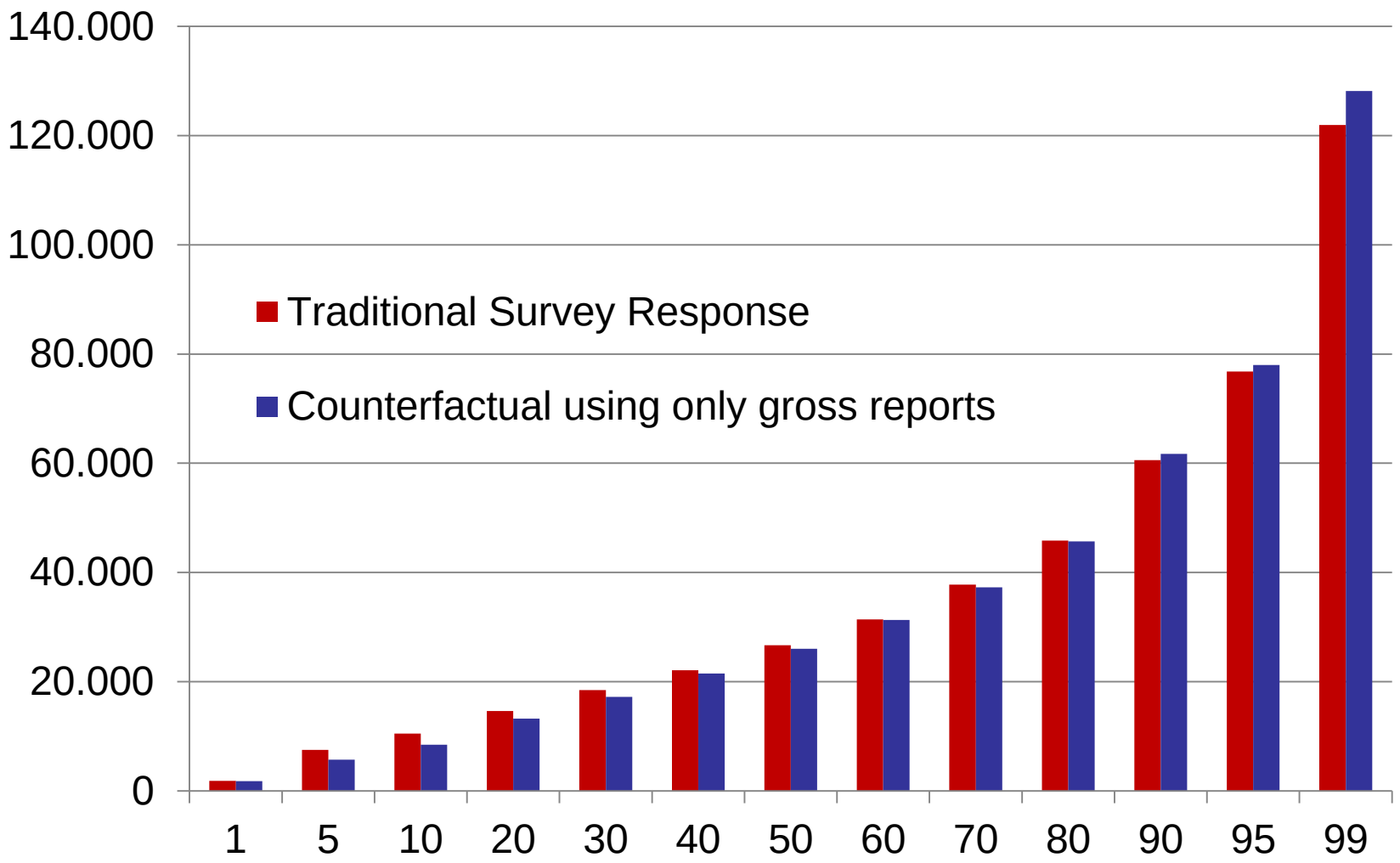
Pre-imputation tax conversion

1. The observed income components are converted one by one to the gross figures under all possible tax classes he/she can apply
2. In determining the couples to choose between III/V and IV/IV classes, determine the optimal tax class
3. We assign the gross figure, as produced in the first step, to each variable which is associated with the optimal tax class

Comparison of distribution of taxpayers to actual tax records



Success of evaluation



Evaluation 1- Households or persons reporting net value as % of respondents for each decile and each variable

Poor more likely to answer the net figures for employee and self-employment incomes

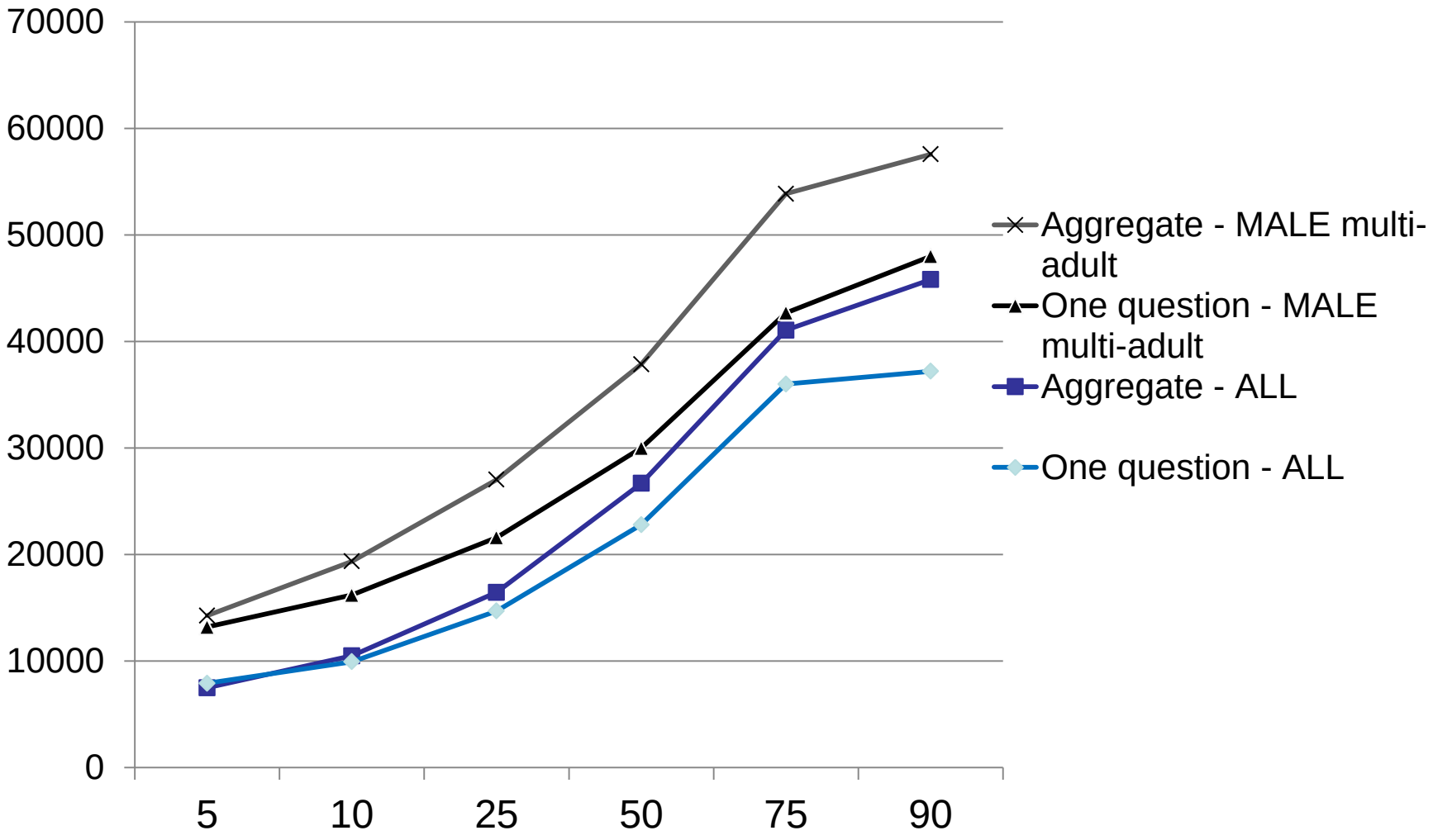
Deciles	INCOME FROM FINANCIAL INVESTMENT	EMPLOYEE INCOME	INCOME FROM BONUS PAYMENT	SELF-EMPLOYMENT INCOME	INCOME FROM STATUTORY PENSION	INCOME FROM PRIVATE PENSIONS
1	41	60	52	61	51	30
2	29	57	55	59	86	31
3	27	56	42	46	74	65
4	52	43	53	47	78	74
5	48	49	42	46	78	66
6	49	54	61	27	73	72
7	34	51	50	36	60	46
8	39	49	44	52	66	61
9	33	46	51	35	60	59
10	25	35	37	27	60	50
mean	37	48	48	38	71	57
p50	0	0	0	0	1	1
count (unweighted)	1,588	3,089	1,452	640	1,950	439

Evaluation 2: Distribution of the relative percentage difference between single and derived total disposable income by the quintiles of derived total disposable income

	Quintiles of derived total disposable income					Total
	1	2	3	4	5	
mean	9	-19	-25	-28	-65	-26
p1	-162	-285	-177	-257	-518	-343
p5	-67	-100	-96	-109	-253	-127
p10	-30	-52	-71	-80	-179	-80
p25	-11	-23	-34	-37	-75	-34
p50	3	-12	-15	-14	-31	-13
p75	39	4	-2	-1	-9	3
p90	70	24	14	10	5	25
p95	88	40	24	21	13	44
p99	100	51	45	40	33	89

- Single total question is less than aggregate - the average difference is -26%.
- Underreporting increases with quintiles of derived total disposable income.

Aggregate is greater than single
And difference larger for multi-adult HH



Conclusion

- This paper documents their microsimulation model that can accurately implement German income tax system.
- Evaluations:
  - comparing the distributions from ours and a counterfactual asking only gross incomes
  - comparing the difference between the disposable incomes derived by tax microsimulation and aggregation and the single self-reported one
- Both comparisons reveal the disagreements appearing to be correlated with the income tax schedule and become significant in most progressive area of the distribution.
- Problems exist at top and bottom of distribution

Comments

- How many questions for income
- Could you ask tax questions
- Why not link to tax data
- Compare tax model to tax data by component
- Test tax model on GSOEP or use GSOEP tax model (?)
- Try using a hybrid approach – using the “best” responses
- What about under-reporting

- EXTRA SLIDES

Validation – national account

		ITR-SOEP								PHF
	unit	1992	1995	1998	2001	2002	2003	2004	2005	2009
Income taxpayers (assessment)	1 000	29 479	29 676	28 673	29 104	27 557	27 300	35 406	26 625	26 062
Potential tax units total[2)]	1 000	42 990	43 644	44 528	45 160	45 584	45 945	46 257	46 559	45 362
Estimated non-filers	1 000	13 511	13 968	15 856	16 055	18 027	18 645	10 851	19 935	19 300
Taxpayers as percentage of potential tax units	%	68.6	68.0	64.4	64.4	60.5	59.4	76.5	57.2	*57.5*
Population of age >=20	1 000	63 806	64 088	64 425	65 025	65 314	65 538	65 708	65 870	65 398
Gross market income[3)] (integrated data base, less capital gains)	mill. Euro	1 071 999	1 156 930	1 227 134	1 291 502	1 294 412	1 296 403	1 340 708	1 311 767	1 252 872
Primary income of private households[4)]	mill. Euro	1 270 240	1 402 200	1 466 590	1 599 320	1 597 550	1 614 980	1 627 890	1 653 140	1 543 400
Gross market income as percentage of primary income private households	%	84.4	82.5	83.7	80.8	81.0	80.3	82.4	79.4	*81.2*
Wage income (integrated data base)[5)]	mill. Euro	902 253	984 404	1 019 664	1 073 345	1 080 355	1 081 356	1 114 243	1 063 751	983 320
Compensation of employees (national accounts)[5)]	mill. Euro	933 220	1 012 760	1 044 910	1 131 930	1 138 840	1 141 610	1 145 390	1 137 640	1 002 810
Wage income from integrated data base as percentage of wages from national accounts	%	96.7	97.2	97.6	94.8	94.9	94.7	97.3	93.5	*98.1*

Validation – income tax statistics

Brackets of total income (Summe der Einkünfte)			2010 wage and income tax statistics		PHF	
			Persons liable for tax	%	Persons liable for tax	%
0[1)]	-	5,000	7,725,718	16.9	12,115,932	18.8
5,000	-	10,000	5,486,101	12.0	6,636,510	10.3
10,000	-	15,000	5,255,273	11.5	7,732,530	12.0
15,000	-	20,000	4,669,959	10.2	8,030,584	12.5
20,000	-	25,000	4,195,657	9.2	6,533,975	10.2
25,000	-	30,000	3,901,934	8.5	5,095,524	7.9
30,000	-	35,000	3,366,891	7.4	4,171,173	6.5
35,000	-	40,000	2,637,706	5.8	2,812,074	4.4
40,000	-	45,000	1,956,018	4.3	2,411,172	3.7
45,000	-	50,000	1,434,029	3.1	1,709,532	2.7
50,000	-	60,000	1,775,482	3.9	2,289,549	3.6
60,000	-	70,000	1,017,166	2.2	1,463,212	2.3
70,000	-	80,000	626,003	1.4	887,994	1.4
80,000	-	90,000	411,558	0.9	610,824	0.9
90,000	-	100,000	274,976	0.6	402,759	0.6
100,000	-	125,000	389,225	0.9	596,308	0.9
125,000	-	250,000	489,366	1.1	701,465	1.1
250,000	-	500,000	119,367	0.3	97,763	0.2
500,000	-	1,000,000	30,567	0.1	26,601	0.0
1,000,000	oder mehr		13,909	0.0	1,000	0.0
Sum			45,776,905	100	64,326,480	100

Evaluation 2 - Distributions of single total vs derived aggregate between multi-adult or single person household and male or female respondents

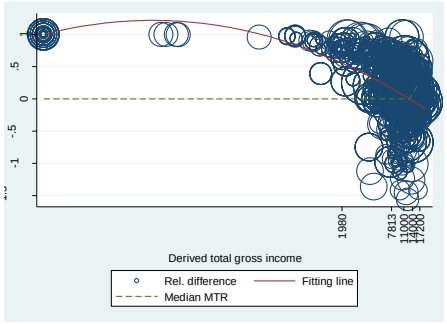
Percentile	All			Male (1,969 cases)						Female (1,596 cases)					
				Multiadult			Single			Multiadult			Single		
	Single	Derived sum	*Single as % of derived sum*	Single	Derived sum	*Single as % of derived sum*	Single	Derived sum	*Single as % of derived sum*	Single	Derived sum	*Single as % of derived sum*	Single	Derived sum	*Single as % of derived sum*
5	7,920	7,500	*106*	13,200	14,266	*93*	5,160	4,742	*109*	12,000	13,397	*90*	6,600	4,450	*148*
10	9,936	10,498	*95*	16,200	19,365	*84*	7,200	7,900	*91*	15,600	17,800	*88*	8,220	7,400	*111*
25	14,700	16,449	*89*	21,600	27,036	*80*	11,400	13,000	*88*	21,600	25,209	*86*	11,400	11,000	*104*
50	22,800	26,689	*85*	30,000	37,866	*79*	15,684	18,471	*85*	30,000	34,936	*86*	14,400	15,582	*92*
75	36,000	41,065	*88*	42,684	53,863	*79*	23,508	25,895	*91*	42,000	49,286	*85*	19,200	21,260	*90*
80	37,200	45,819	*81*	48,000	57,567	*83*	24,000	27,378	*88*	42,000	53,939	*78*	20,400	22,840	*89*

- Recall and aggregating bias <- larger impact on the multi-adult housholds than the single ones except some bottom percentiles AND underreporting is almost always increasing with income

Validation – other surveys

Decile	Thresholds from PHF	PHF	EU-SILC	GSOEP
1st	8,899	5,701	6,985	4,014
2nd	12,000	10,644	10,969	9,656
3rd	14,376	13,230	13,439	12,330
4th	16,587	15,520	15,570	14,460
5th	18,750	17,648	17,664	16,573
6th	21,398	19,918	19,849	18,751
7th	24,309	22,872	22,361	21,373
8th	28,310	26,326	25,680	24,720
9th	37,241	32,018	30,707	30,284
10th	-	57,591	50,362	55,764
Overall:				
Median		18,758	18,678	18,586
Mean		22,148	21,264	21,223
Gini		32.81	29.26	29.10

Evaluation 2- Relative difference between single and derived total disposable income (vertical axis) vs derived total gross income (horizontal axis) in the susbsamples classified by quintiles of derived total disposable income



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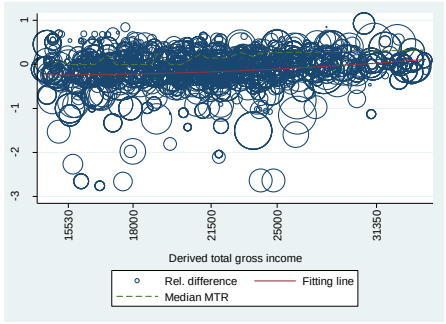

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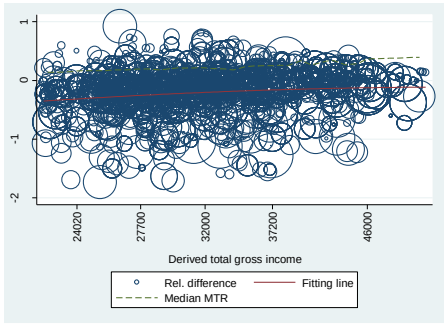

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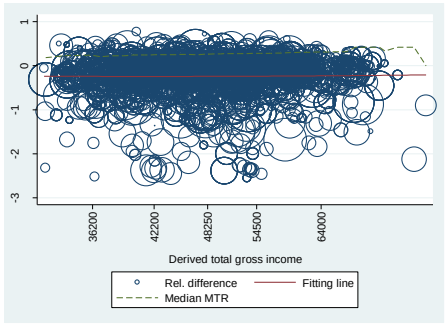

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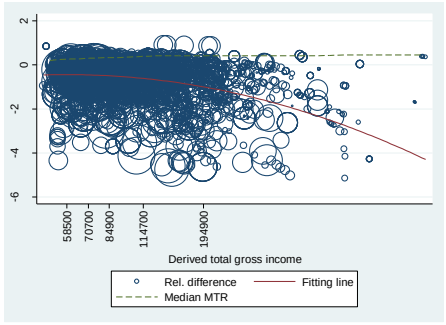

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Averagely more underreporting in all the quintiles except the first one.

Fifth quintile shows the most serious underreporting and the first one shows the other extreme.

Deviaton seems to correspond well with the evolution of local progression: the fitting line drops most sharply where marginal tax rate starts to pick up from the zero in the first quintile subsample and where marginal tax rate starts to become flat in the last quintile subsample. These two areas have the strongest local progression according to German tax schedule.

Evaluation 1 - Distributions of net income as derived sum - benchmark versus counterfactual

Percentile	Benchmark	Counterfactual	Counterfactual as % of benchmark
1	1,830	1,791	98
5	7,500	5,711	76
10	10,498	8,430	80
20	14,604	13,219	91
30	18,436	17,222	93
40	22,097	21,491	97
50	26,689	26,033	98
60	31,379	31,311	100
70	37,762	37,293	99
80	45,819	45,701	100
90	60,580	61,725	102
95	76,789	77,975	102
99	121,966	128,192	105