Presentation and Discussion for:

The Joint Distribution of Income, Wealth, and Consumption in Germany

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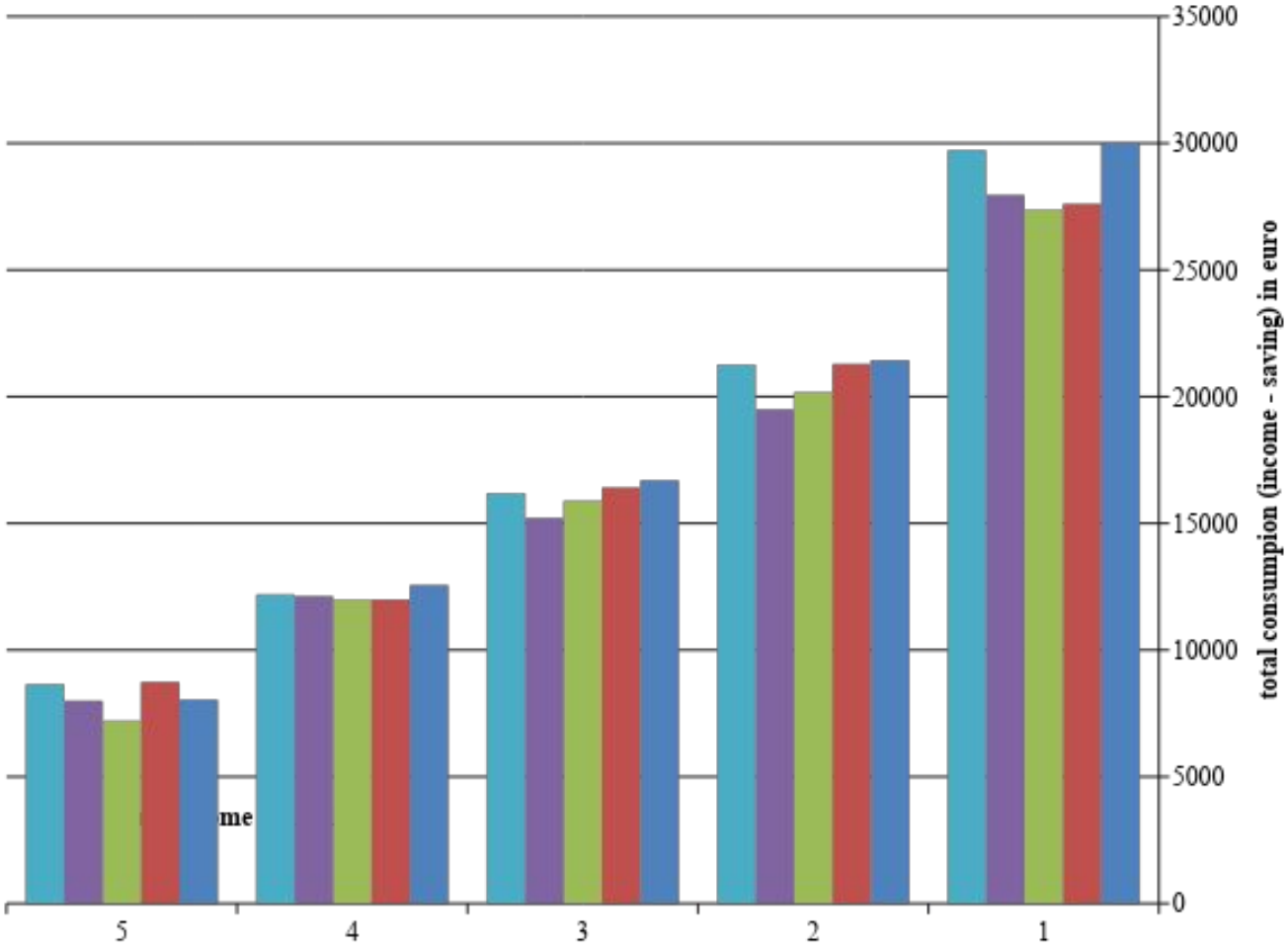
Motivation

- Goal is to empirically estimate the joint distribution of income, consumption, wealth
  - Most empirical work focuses on uni/bi variates
  - Direct evidence on 3D limited (Fisher et al 2018)
- Why do we want the joint distribution?
  - Different measures of resources may give different assessment of levels and trends in inequality
  - Joint distribution => how to build and calibrate heterogeneous agent models, i.e., c=f(y,w)

Overview

- New data for Germany
  - Panel of Household Finances (PHF) for 2014/2010
  - Part of HFCS, oversamples wealthy
  - Has income and wealth, estimate consumption
  - Rivals Scandinavian registries for content!
- Main takeaways
  - Wealth more unequal than income, consumption
  - Consumption and income more closely linked than consumption and wealth or income and wealth
  - 3D overlap tighter at low resource levels

Last picture says it all…



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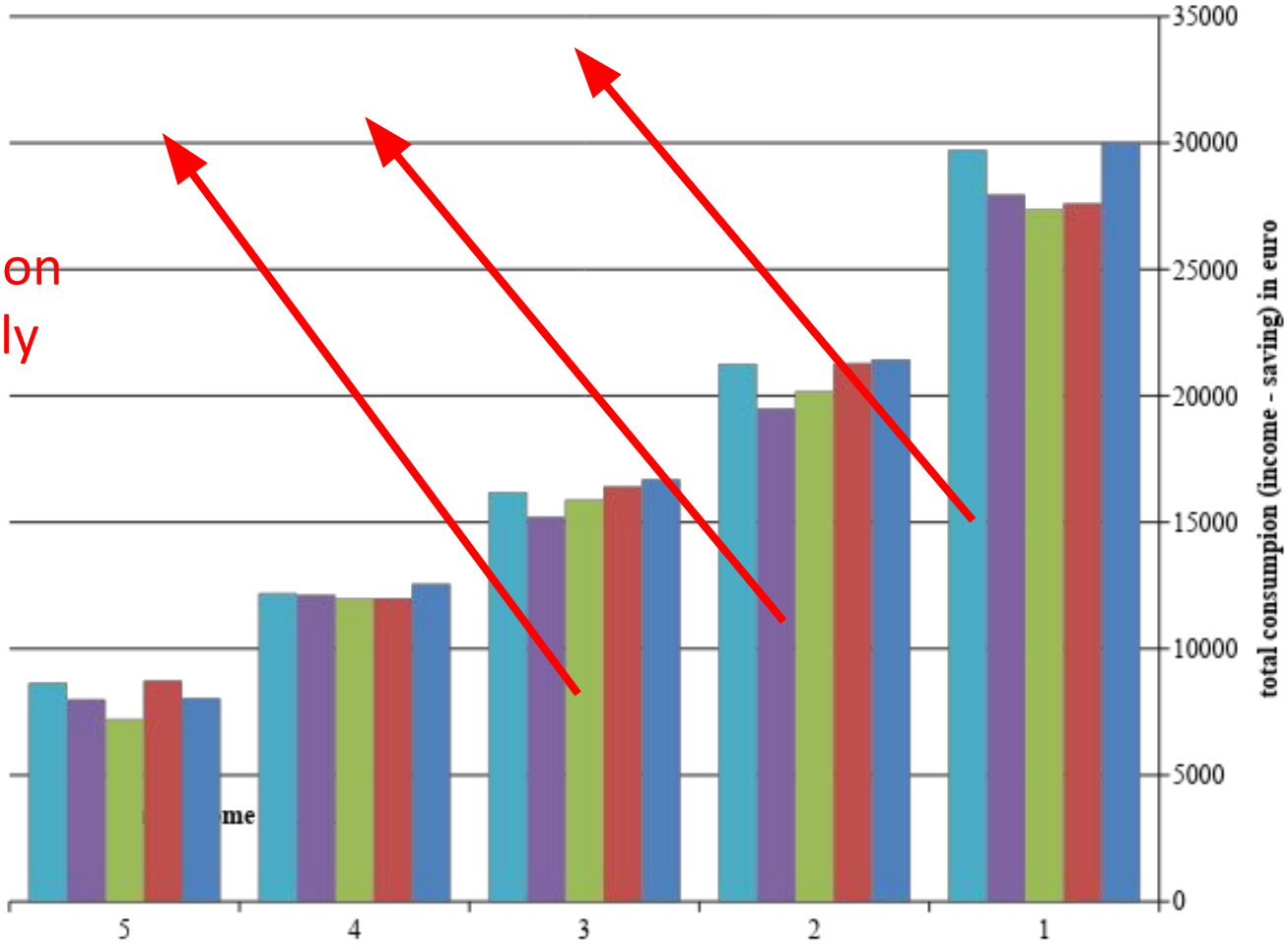
Consumption rises sharply with income…



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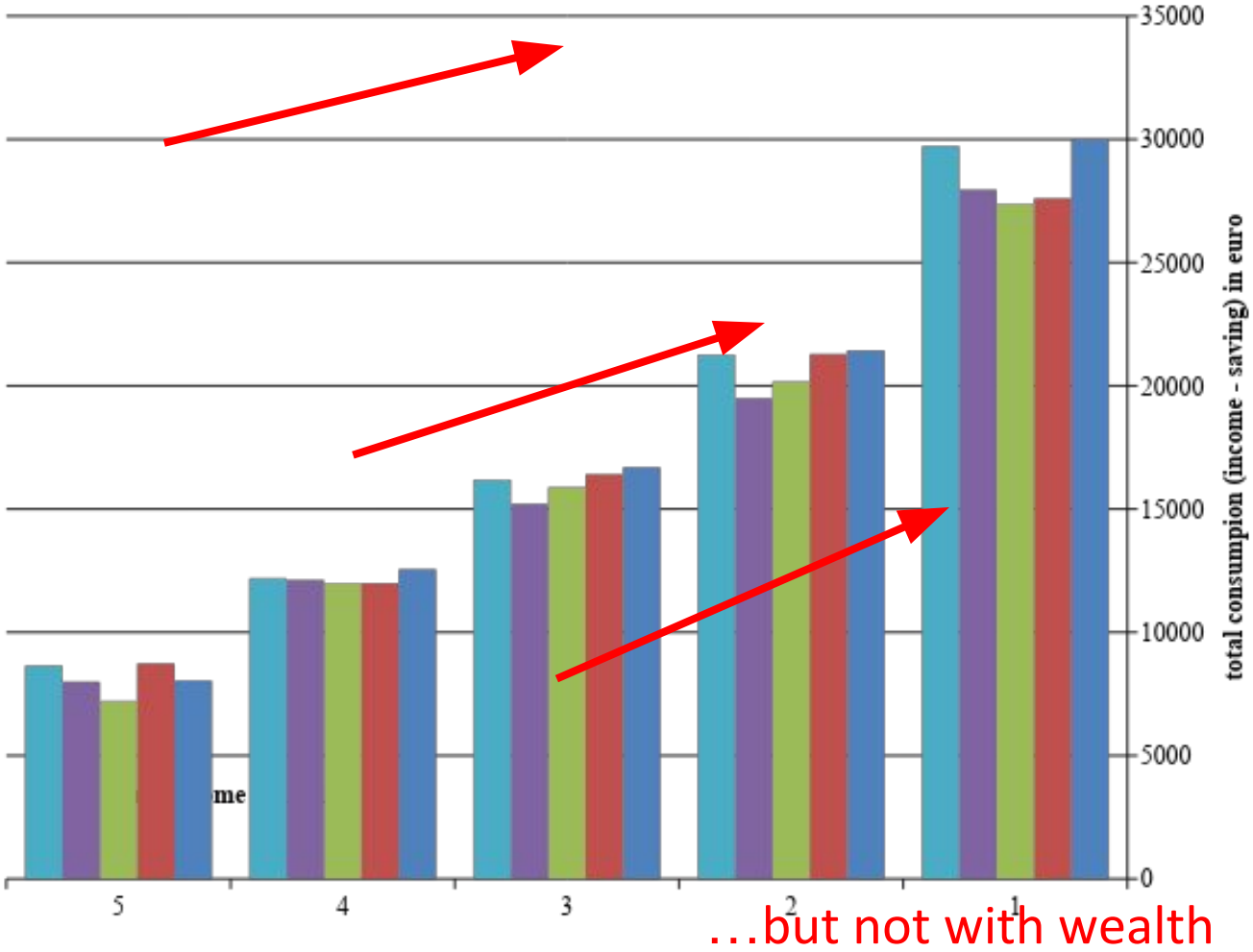


…but not with wealth

Outline

- Intertemporal budget identity
- Estimating/imputing consumption
- Univariate distributions
- Two- and three-dimensional overlaps
- Questions, possible extension

Measuring 3D Distribution

- Simplest intertemporal budget constraint

$$W_t = W_{t-1} + Y_t - C_t$$

- Holds (in principle) for individuals/groups
  - In practice, pieces confounded by various types of conceptual, measurement and sampling errors
- New approach to working with the identity
  - Active saving (S) from wealth *change* questions
  - Solve for consumption using C = Y - S

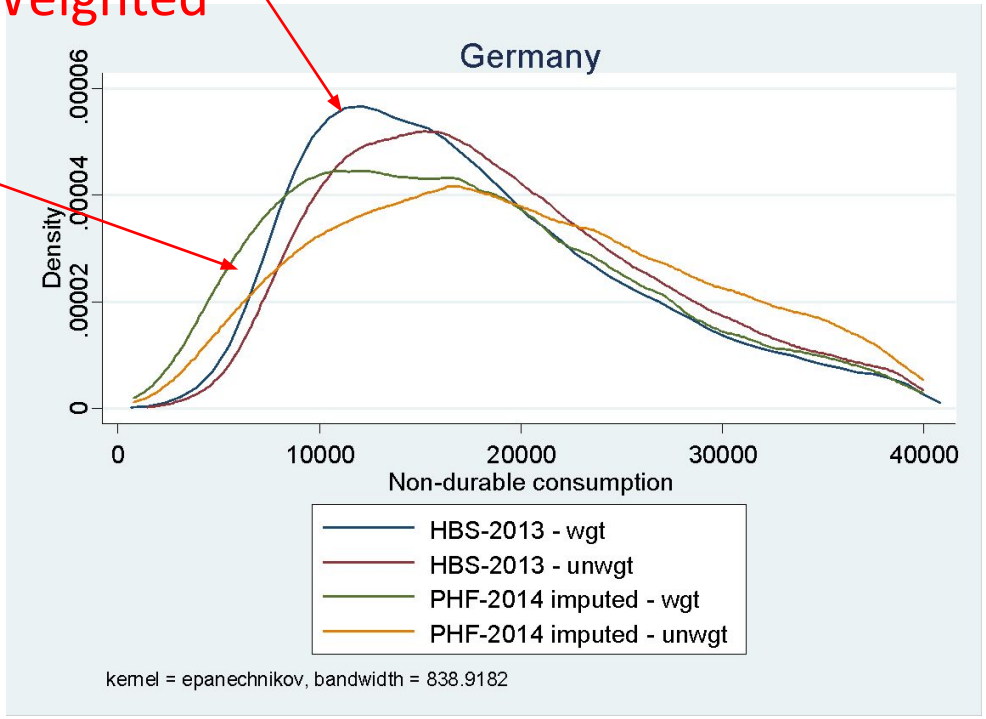
Two Measures: Non-Durable v Total Consumption

- Non-durable consumption imputed using budget study (EVS) + overlapping controls
  - Based on Lamarche (2017), other papers
  - Similar to Fisher et al (2018) for US
- Total consumption: subtract net change in liabilities from net acquisition of assets
  - PHF balance sheet questions cover levels and changes across asset and liability categories
  - Unique! SCF (e.g.) only some wealth changes

Non Durable Consumption Distribution

Budget Survey, Weighted

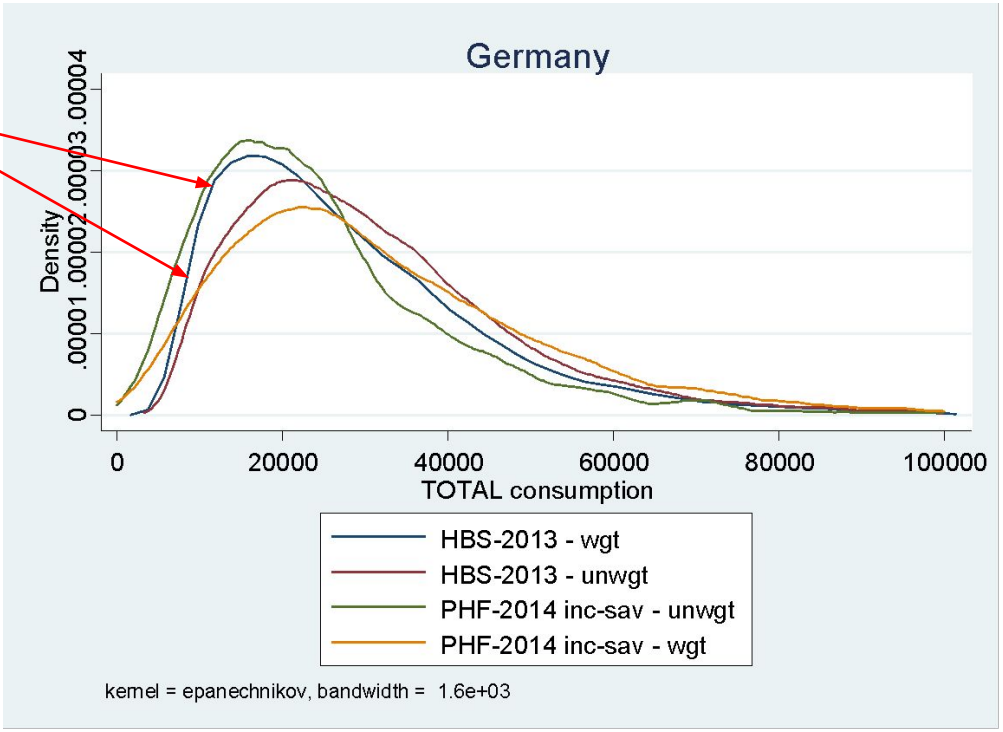
Imputed PHF, Weighted



Very close above 20,000 euros, imputed PHF lower consumption below that level

Total Consumption Distribution

Close on total consumption over entire distribution



Suggests C = Y - S estimation does a pretty good job matching the budget study total consumption!

Univariate Percentiles and P-Ratios

	Total Consumption	Non-Durable Consumption	Net Wealth	Net Income	Net Saving Flows
Mean	18114	13420	142121	19589	2166
P10	7716	5449	0	8400	-1020
P25	10888	8179	4000	12000	0
Median	15220	12033	43000	17112	720
P75	21600	17255	152000	24000	3600
P90	30267	22867	318100	32000	8771
SD	12604	7407	389498	11849	14447
P90/P10	3.9	4.2	.	3.8	-8.6
P90/P50	2.0	1.9	7.4	1.9	12.2
Gini-coefficient	0.317	0.292	0.708	0.295	0.645

- Net wealth most unequal, net income and consumption ≈ same
- Net saving very skewed, bottom half negative or zero!

Univariate Shares

	Total Consumption	Non-Durable Consumption	Net Wealth	Net Income	Net Saving Flows
Quintile 1	8%	8%	-1%	8%	-65%
Quintile 2	13%	13%	1%	13%	0%
Quintile 3	17%	18%	6%	20%	8%
Quintile 4	23%	24%	18%	20%	27%
Quintile 5	39%	37%	75%	38%	131%
Total	100%	100%	100%	100%	100%

- Headline univariate C, Y, W pretty well known and accepted
- Net saving is new, and striking
  - Top quintile (by saving) accounts for 131% of total saving!
  - Possible because of huge dissaving by net borrowers

Univariate Shares, Data Sorted by Wealth

	Total Consumption: Income - Saving	Non-durable Consumption: imputed	Net Wealth	Net Income	Net Saving Flows
Net wealth Q1	14%	16%	-1%	12%	-1%
Net wealth Q2	17%	19%	1%	16%	8%
Net wealth Q3	20%	20%	6%	20%	19%
Net wealth Q4	21%	20%	18%	22%	26%
Net wealth Q5	29%	25%	75%	30%	49%
Top 10% net wealth	15%	13%	58%	17%	31%

Univariate Shares, Data Sorted by Net Income

	Total Consumption: Income - Saving	Non-durable Consumption: imputed	Net Wealth	Net Income	Net Saving Flows
Net income Q1	9%	14%	6%	8%	0%
Net income Q2	15%	17%	10%	13%	2%
Net income Q3	21%	23%	17%	20%	10%
Net income Q4	20%	20%	19%	20%	26%
Net income Q5	35%	27%	48%	38%	63%
Top 10% net income	20%	14%	33%	23%	45%

- Net saving is more concentrated at the top of the net income distribution than at the top of the wealth distribution

Consumption/Income, Data Sorted by Wealth

	Consumption share 1: total consumption / net income	Consumption share 2: Non-durable consumption / net income
Net wealth Q1	100%	77%
Net wealth Q2	97%	75%
Net wealth Q3	90%	65%
Net wealth Q4	89%	64%
Net wealth Q5	91%	58%
Top 10% net wealth	90%	55%

Consumption/Income, Data Sorted by Income

	Consumption share 1: total consumption / net income	Consumption share 2: Non-durable consumption / net income
Net income Q1	100%	99%
Net income Q2	98%	78%
Net income Q3	95%	69%
Net income Q4	90%	61%
Net income Q5	88%	48%
Top 10% Net income	84%	43%

- Total C/Y ratios similar across income and wealth distributions
- Do high income/wealth buy a lot of durables or are we missing C?

Two- and Three-Dimensional Cross Tabs

- Several charts focused on what fraction of observations are *jointly* in various percentile groups by C and Y, C and W, Y and W, all 3
- Two-D mostly reinforces points above: consumption more related to Y than W
- Three-D shows the overlap weaker at top of the resource distribution than at the bottom

Shares in Top and Bottom by C, Y, W

	PHF 2010/11	PHF 2014	PHF 2010/11	PHF 2014
	Share of households		Share of households / max share of households	
Top 5 - income, wealth and total consumption	0.88 %	1.04 %	18%	21%
Top 10 - income, wealth and total consumption	2.35 %	2.47 %	24%	25%
Bottom 50 – income, wealth and total consumption	30.1%	30.3%	60%	61%
Top 5 - income, wealth and non-durable consumption	0.61 %	0.44 %	12%	9%
Top 10 - income, wealth and non-durable consumption	1.59 %	1.37 %	16%	14%
Bottom 50 – income, wealth and non-durable consumption	24.5%	23.7%	49%	47%

- Only 1% of households in top 5% by all three measures
- 30% of households in bottom 50% by all three measures

Questions, Possible Extension

- Does consumption really not rise with wealth?
  - Method for imputing consumption driving result?
  - Some other conceptual/measurement issue?
- Is data beginning to outpace theory?
  - $W_t = W_{t-1} + Y_t - C_t$ is an identity, but concepts of W and Y are not independent of policy environment
  - Generous social insurance => largest component of W is future benefits and Y lower while working
  - What is “saving” in this broader context?

Reminder: Measurement Challenges

Measure	Challenges
Wealth	• Representative sample
Income	• Representative sample
Consumption	• Representative sample

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Wealth	• Representative sample • Concepts: Identifying balance sheet items
Income	• Representative sample • Concepts: Cash flow vs accrual, taxable vs non-taxable, public/private transfers, capital gains, retirement asset draw down
Consumption	• Representative sample • Concepts: Durables are part of wealth, expenditure vs flow consumption

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Wealth	• Representative sample • Concepts: Identifying balance sheet items
Income	• Representative sample • Concepts: Cash flow vs accrual, taxable vs non-taxable, public/private transfers, capital gains, retirement asset draw down • Recall: Tie incomes to balance sheet items
Consumption	• Representative sample • Concepts: Durables are part of wealth, expenditure vs flow consumption • Recall: Budget surveys => extreme cognitive burden, under-reporting problem at top

Measurement Questions

- Does geographic oversampling work?
  - Report comparisons of aggregated micro to national accounts data on three measures
- Are we really capturing “income”?
  - Wages and salaries generally well-measured
  - Capital income, other inflows usually less so
- Is Y-S a good estimate of consumption?
  - Probably better than direct C from budget studies!
  - Any mismeasured Y => errors pass through to C

Back to the Budget Constraint

- Panel makes it possible to conduct internal consistency checks on active saving measure
  - Is coverage of active saving complete?
  - Do *implied* capital gains make sense?
  - Where are interfamily transfers in accounting?
- If positive cash inflow missing, C=Y-S too low
  - If missing Y correlated with W => corr(C,W) biased
  - Does consumption increase with wealth (holding income constant) more than results suggest?

Lifecycle Theory vs Data

- In US, present value of Social Security benefits alone nearly size of total household net worth
  - Even more important in Germany?
- Social insurance usually redistributive
  - Dollar of tax paid by low earner => more future income than a dollar of tax paid by higher earner
  - We observe low earners accumulate little marketable wealth and say they "don't save"
- Decision to label public transfers "income" instead of wealth draw down and "taxes" instead of "contributions" is arbitrary

Thanks!

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