
Measuring Household Consumption Expenditure

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Drawing on joint work with

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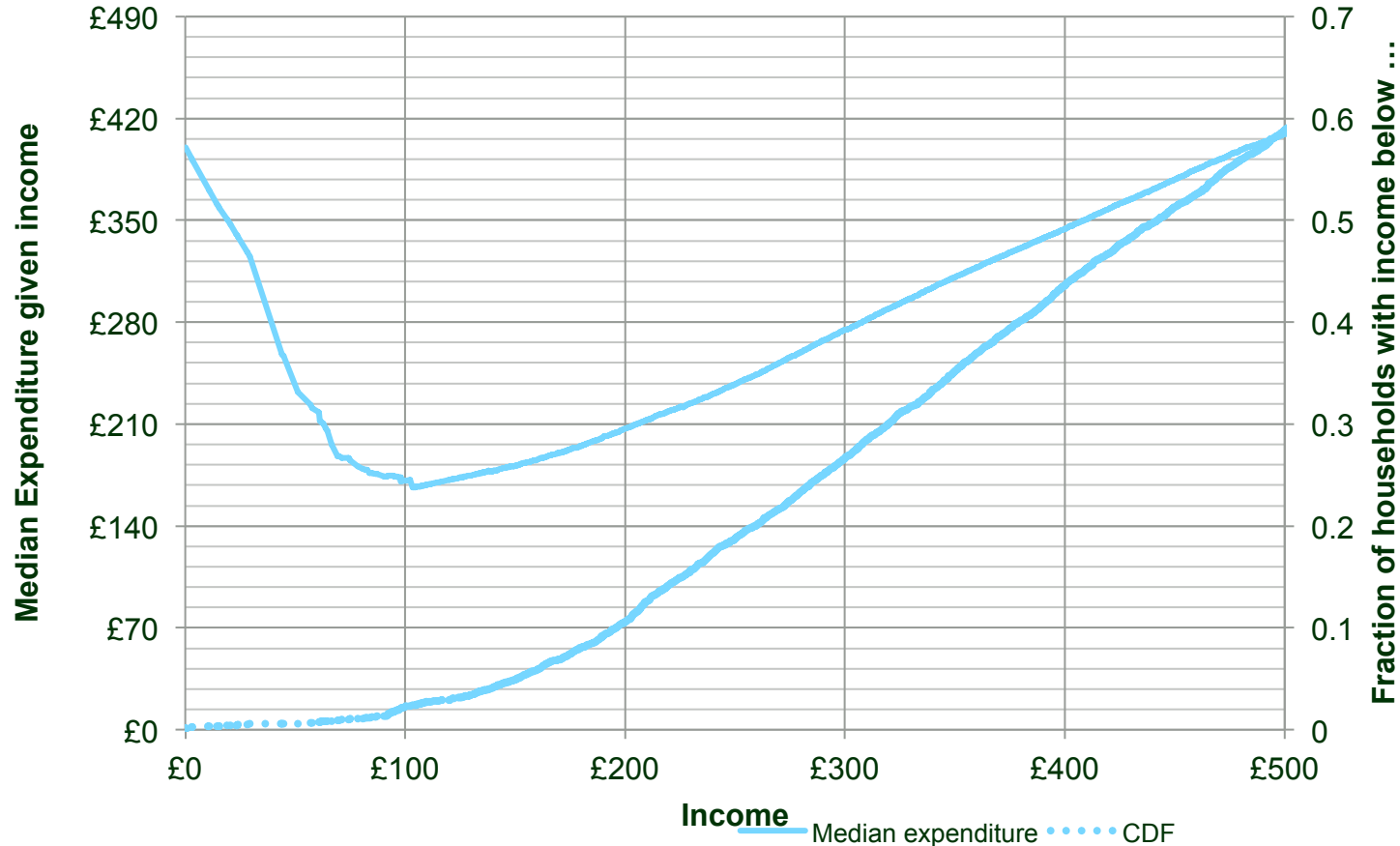
HFCN, November 2014

Motivation:

Why Measure Household Consumption Expenditure?

- How has the well-being of the poor evolved over time?
- How well insured are households against job loss? Disability? Major changes in the economy?
- How do consumption and saving respond to interest rates?
- Do tax-favored savings accounts generate net new savings?
- Do house price movements have a causal effect on consumer spending?
- How effective are tax rebates and other payments for fiscal stimulus?
- How can we have confidence in the models we use for macro policy analysis?

Those with the lowest cash incomes do not have the lowest cash outlays.



Notes: LCFS 2009; Great Britain only

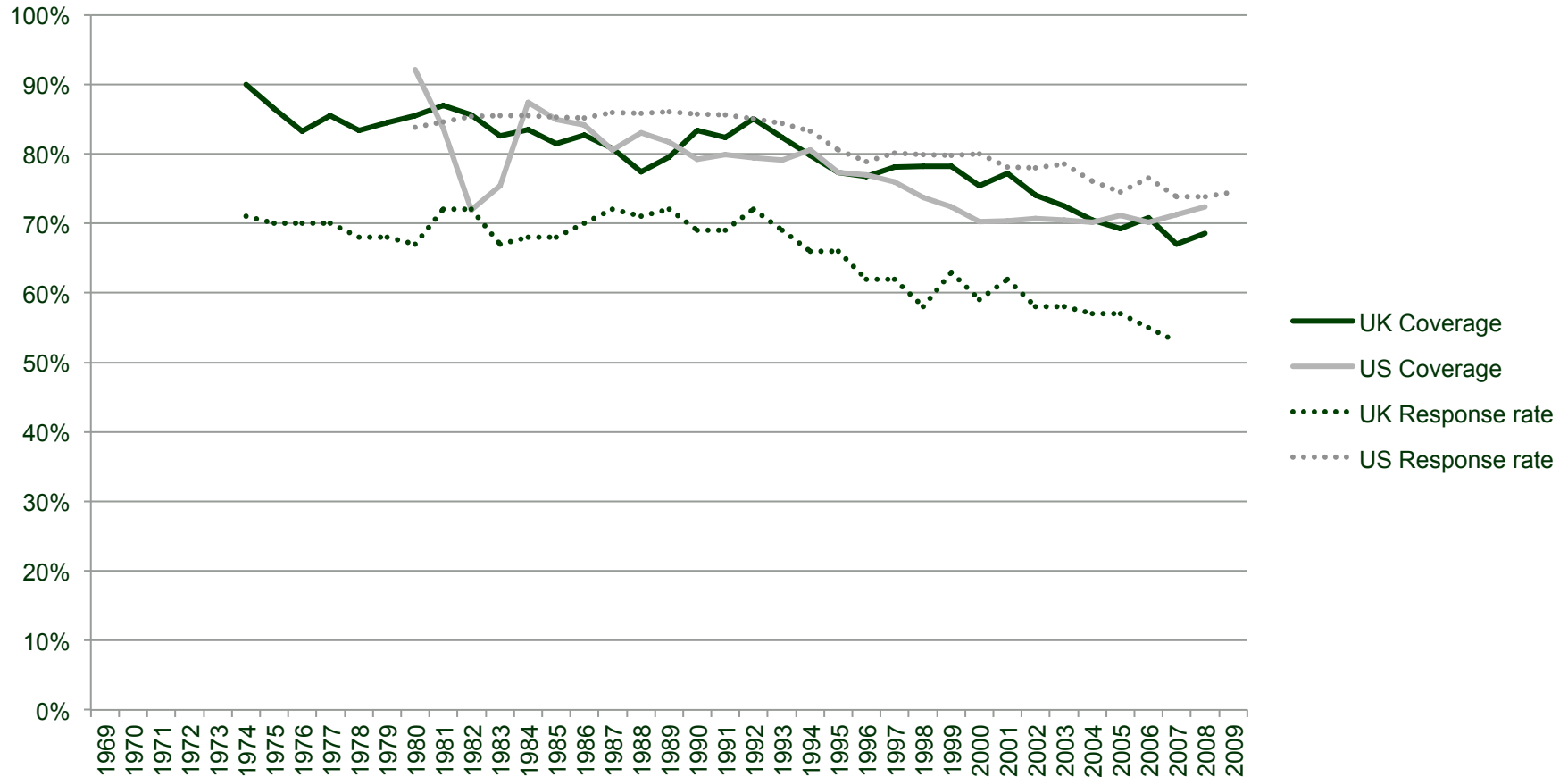
Source: see Brewer, Etheridge and O'Dea, "Why are households that report the lowest incomes so well-off?"

<http://ideas.repec.org/esx/essedp/736.html>

Aren't Budget Surveys Sufficient?

- Limited information in other domains (WEALTH, health, employment, time use.....)
- Not longitudinal (often interested in *changes*)
- Some concerns with sustainability of budget surveys
 - Will budget surveys be able to continue to meet many needs?

Response Rates and Coverage of Household Expenditure in National Accounts, UK and US budget surveys

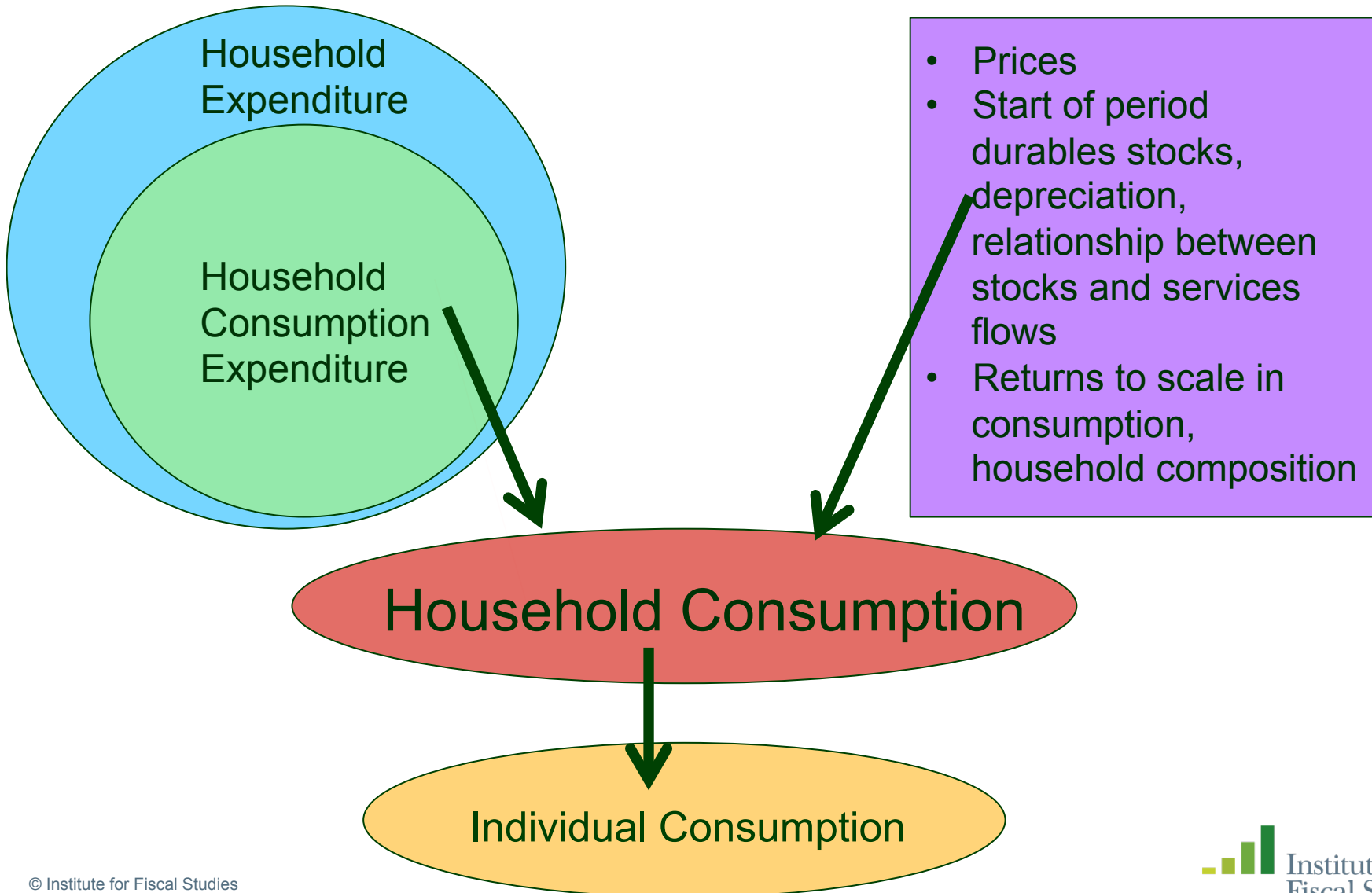


Source: Barrett et al. A comparison of micro and macro expenditure measures across countries using different survey methods, NBER Working Paper 19544

Preliminary Remarks:

- Will focus on *Household Consumption Expenditure*
- Will focus on survey-based methods
 - Lots of interesting possibilities with administrative data
 - But we will continue to need survey data
- Will focus on multiple domain surveys (not budget surveys)

Household Consumption Expenditure



Preliminary Remarks:

- How do we know what works?
 - The problem of benchmarks
 - National Accounts (but reconciliation important)
 - Other survey and administrative data
 - Beegle et al. (JDE, 2012), Tanzania: Each Adult a diary; each dependent assigned to an adult; Daily visits.
 - Higher totals probably better (evidence of underreporting)
 - Lower variance might be better
 - Theory and guesses about the nature of measurement error

Possible Approaches:

1. Capture total expenditure with a single ('one shot') question or small, but complete set of categories.
2. Use the inter-temporal budget constraint:
income minus saving
3. Ask a subset of expenditure categories and *impute* total expenditure at the household level.
4. Ask a subset of expenditure categories and estimate objects of interest directly.

One-Shot Questions

- The Italian SHIW has asked the following:
 - *What was your family's average monthly expenditure in 1995 for all consumption items?*
 - *Consider all expenses, including food, but excluding those for: housing maintenance; mortgage installments; purchases of valuables, automobiles, home durables and furniture; housing rent; insurance premiums.*
- Also: COEP, Spanish Survey of Household Finances (also French), AHEAD pilots, Centre Panel (Netherlands)

One-Shot Questions

- Theoretical underpinning: two-stage budgeting.
- High response rates (often better than household income).
 - Except AHEAD pilots.
 - Respondents view questions about broad categories of expenditure as being less sensitive than comparable income questions (see focus groups, below).
- One-shot questions generate useful data.
 - Engel Curves look good (Browning et al. 2003, Bottazzi et al. 2008).
 - Data from one-shot questions have been successfully employed in a number of research papers (e.g., Browning & Crossley 2001, 2008).

What to Worry About?

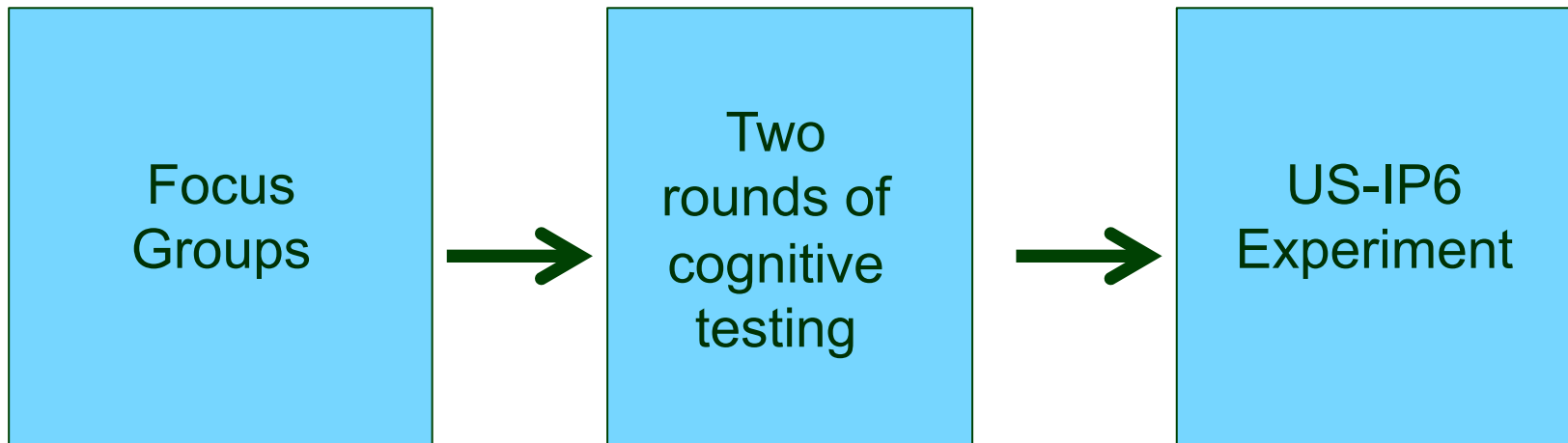
- One-shot questions always give significantly lower estimates of total consumption expenditure than more disaggregated data collection.
- Focus groups and cognitive interviews have also documented problems with one-shot questions (Gray et al. 2008, d'Ardenne & Blake 2012).
- Recall of total expenditure is challenging for many respondents.
 - But they appear to use a variety of methods for estimation (see below).
- Complex households a particular problem.

Short but Complete Sets of Expenditure Categories

- Some trials of `short breakdown' approach in web mode (US, Netherlands)
 - Useful data
 - Evidence that a reconciliation screen or expenditure check improves the data

New Evidence On Quick Expenditure Questions

- Blake, Crossley, D'Ardenne, Oldfield, Winter, “Testing Quick Expenditure Questions” (Preliminary)*



* With funding from the Nuffield Foundation

Some Lessons from the Focus Groups

- Importance of wording (“household” example)
- Problems with complex households
 - Higher aggregation easier?
- Keep questions short; avoid excessive examples
- Heterogeneity in household financial management
 - Heterogeneity in response strategies
- Total expenditure less intrusive than income or expenditure categories
- Income minus saving intrusive for some

Some Lessons from Cognitive Testing

- Essential/nonessential disaggregation unhelpful
- Income minus savings did not work well
- One-shot feasible
 - Strategy showcard unhelpful
 - example showcard rather than long question
- Break-down feasible
 - Reconciliation helpful
- ‘Benefit unit’ works well in UK (though: implementation)

US-IP6 Experiment

- Understanding Society is a major longitudinal survey of UK households.
 - 40,000 households, annual, mixed mode.
 - Follows on from (and incorporates) the British Household Panel Survey from 2008.
- Separate *Innovation Panel* of 1500 households for testing and development.
- Our experiment in Wave 6 of the Innovation Panel (IP6).
 - Field work Feb-July 2013.
 - 1137 benefit units.

US-IP6 Experimental Design

Strategy

Mode

One-shot/ web	Breakdown/ web
One-shot/ f2f	Breakdown/ f2f

US-IP6 Experimental Design

- The one-shot question, in F2F mode was:
- *“About how much did you [and [NAME OF PARTNER/SPOUSE]] spend on EVERYTHING in the LAST MONTH? Please **exclude** work expenses for which you are reimbursed, money put into savings and repayment of bank loans. Examples of what to include and exclude are shown on this card.”*
- The web mode was similar, with the exclusions and examples show below the answer box.
- The breakdown approach asked for spending in 12 specific categories plus an “other” category.
 - Categories developed from focus groups

US-IP6 Experimental Design

– Additional Elements

- One-shot
 - Examples and exclusions shown underneath the answer box
 - Strategy: *How did you work out your answer to the spending question?*
 - Usual spending follow up: *Would you say your spending last month was: higher than usual, lower than usual, typical of a usual month's spending?*
 - If higher/lower: *how much do you [and X] spend on everything in a usual month?*
- Breakdown
 - Reconciliation: *So in total in the last month you [and X] spent [total] pounds. Does that sound right?*
 - If no: *How much did you [and X] spend in the last month?*

US-IP6 Experiment – Main Results

	Web			F2F		
	`One-shot`	`One-shot`	`Break-down`	`One-shot`	`One-shot`	`Break-down`
Month:	Last	Usual	Last	Last	Usual	Last
n	84%	85%	90%	93%	93%	99%
mean	2260	1646	1807	1312	1219	1801
median	1600	1500	1570	1000	980	1373
Std. dev.	4239	896	1265	1580	1544	1654

LCFS mean *household* monthly spend £2040

US-IP6 Experiment – Response Strategies

Strategies for answering the spending question (not mutually exclusive)	Web	F2F
Checked statements	28%	10%
Added up categories	35%	67%
Income minus saving	24%	8%
Recall without checking	21%	15%
Other	5%	5%

US-IP6 Experiment – Additional Results

- Reconciliation question in the breakdown approach improved data in two ways
 - Reduced variance/outliers
 - In web mode, overcame item nonresponse (raised fraction with usable total spend response from 69% to 90%).

Preliminary Conclusions From the Experiment

- Focus groups and cognitive testing also identified key improvements to the 'one-shot' question
 - Showing examples
 - Choice of response unit
 - Avoiding problem language (ex 'household' spending)
- Breakdown still gives better data (but takes longer)
- Web mode seems attractive
 - One-shot: less under-reporting
 - Breakdown: reconciliation helps

Use the Inter-temporal Budget Constraint

- Some surveys collect information on wealth and income
- An identity: $x_{t,h} \equiv y_{t,h} - S_{t,h}$,
- The inter-temporal budget constraint:

$$w_{t+1,h} = (w_{t,h} + y_{t,h} - x_{t,h})(1 + r_{t,h}),$$

- Inverted: $x_{t,h} = y_{t,h} - [(1 + r_{t,h})^{-1} w_{t+1,h} - w_{t,h}]$.
- Might be approximated by:

$$x_{t,h} \approx y_{t,h} - [w_{t+1,h} - w_{t,h}].$$

Use the Inter-temporal Budget Constraint

- Zilliak (1998): PSID.
- Administrative (tax) wealth data (Browning and Leth-Peterson, 2003; Kriener et al 2014; Koijen et al 2014; Browning et al., 2013)
 - Browning and Leth-Peterson (2003) use budget survey data to validate the administrative data; Kriener et al, (2014) and Koijen et al (2014) use the administrative data to validate budget survey data....
- Bozio, Laroque, O'Dea (2014): ELSA

What to Worry About?

- Resulting measure very noisy (Zilliak, 1998; Browning et al., 2013)
- Koijen et al (2014) show that ignoring capital gains and losses induces substantial errors.
- Estimating effects of wealth and income shocks?

$$\Delta x_{t,h} = \alpha + \beta \Delta y_{t,h} + \gamma \Delta w_{t,h} + u_{t,h},$$

$$\Delta[y_{t,h} - (w_{t+1,h} - w_{t,h})] = \alpha + \beta \Delta y_{t,h} + \gamma \Delta w_{t,h} + u_{t,h},$$

$$\Delta y_{t,h} - \Delta w_{t+1,h} + \Delta w_{t,h} = \alpha + \beta \Delta y_{t,h} + \gamma \Delta w_{t,h} + u_{t,h}.$$

Imputing Total Expenditure from a Subset of Categories

- Skinner (1987):

$$\text{CE : } x_{t,h} = \beta_0 + \sum_j x_{t,h}^j \beta_j + v_{t,h},$$

$$\text{PSID : } \hat{x}_{t,h} = \hat{\beta}_0 + \sum_j x_{t,h}^j \hat{\beta}_j.$$

- much employed
- Zilliak (1998) compares this measure to Y-ΔW in the PSID

Imputing Total Expenditure from a Subset of Categories

- Blundell, Preston, Pistaferri (BPP; 2004, 2008)
 - Engel Curve (theory and experience with demand modelling)
 - Consistency of parameter estimates (IV)

$$\tau(x_{t,h}^f) = Z' \alpha + \gamma \phi(x_{t,h}) + e_{t,h},$$

$$\hat{\phi} = \frac{1}{\hat{\gamma}} (\tau(x_{t,h}^f) - Z' \hat{\alpha}),$$

$$\hat{x}_{t,h} = \phi^{-1} \left[\frac{1}{\hat{\gamma}} (\tau(x_{t,h}^f) - Z' \hat{\alpha}) \right].$$

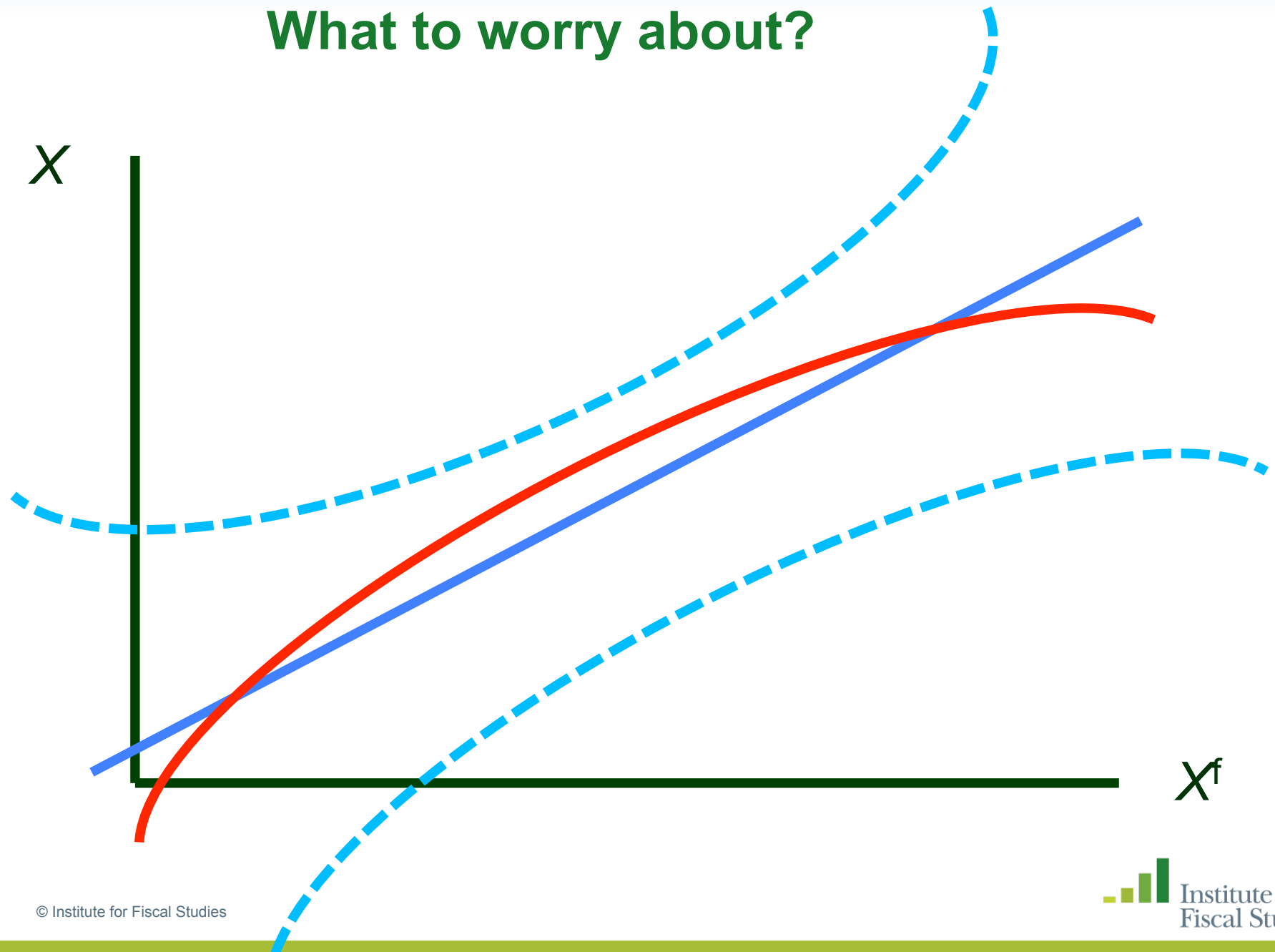
Imputing Total Expenditure from a Subset of Categories

- BPP (2004): when are $M[\hat{x}]$ and $V[\hat{x}]$ consistent estimates of $M[x]$ and $V[x]$?
- IF parameters of Engel curve estimated consistently then $V[\hat{x}]$ converges to $V[x]$ plus an additive term (allowing for comparisons over time.)
 - IV important
- Attanasio & Pistaferri (2014) use a version of this procedure with post 1997 PSID and earlier PSID.
 - Comparisons of (movements in) $V[x]$ and $V[\hat{x}]$ post 1997 are encouraging.

What to worry about?

- Requires external data
- BPP conditions are strong
 - Correct specification of Engel Curve
 - ME magnitudes and relationships stable
 - All sources of endogeneity dealt with (Campos and Reggio, 2014)
- Easy to show that prediction error variance depends on level of food expenditure
 - ME in household expenditure heteroscedastic
- Engel curve mis-specified (approximation error)
 - Expected ME depends on true value

What to worry about?



Estimating Other Moments Directly

- Might not be necessary (desirable) to estimate household level directly
- Basic idea: 2 measures with uncorrelated, classical measurement error

$$x_{t,h}^i = x_{x_{t,h}^i} + \varepsilon_{t,h}^i$$

$$V[x^1] = V[x] + 2C[x\varepsilon^1] + V[\varepsilon^1] = V[x] + V[\varepsilon^1]$$

$$C[x^1 x^2] = V[x] + C[x\varepsilon^1] + C[x\varepsilon^2] + C[\varepsilon^1 \varepsilon^2] = V[x]$$

- Consistency doesn't depend on reliability of measures (though precision does)

Estimating Other Moments Directly

- Browning and Crossley (2009):
 - $x_{t,h}$ is log total nondurable expenditure;
 - $x_{t,h}^i$ are expenditure categories (in logs)
 - Target is variance of log nondurable consumption

$$x_{t,h}^i = \alpha_i x_{t,h} + \eta_i(x_{t,h}) + e_{t,h}^i.$$

$$x_{t,h}^i \equiv x_{t,h} + \varepsilon_{t,h}^i.$$

$$\varepsilon_{t,h}^i \equiv x_{t,h}^i - x_{t,h} = (a_i - 1)x_{t,h} + \eta_i(x_{t,h}) + e_{t,h}^i$$

Estimating Other Moments Directly

- BC (2009):

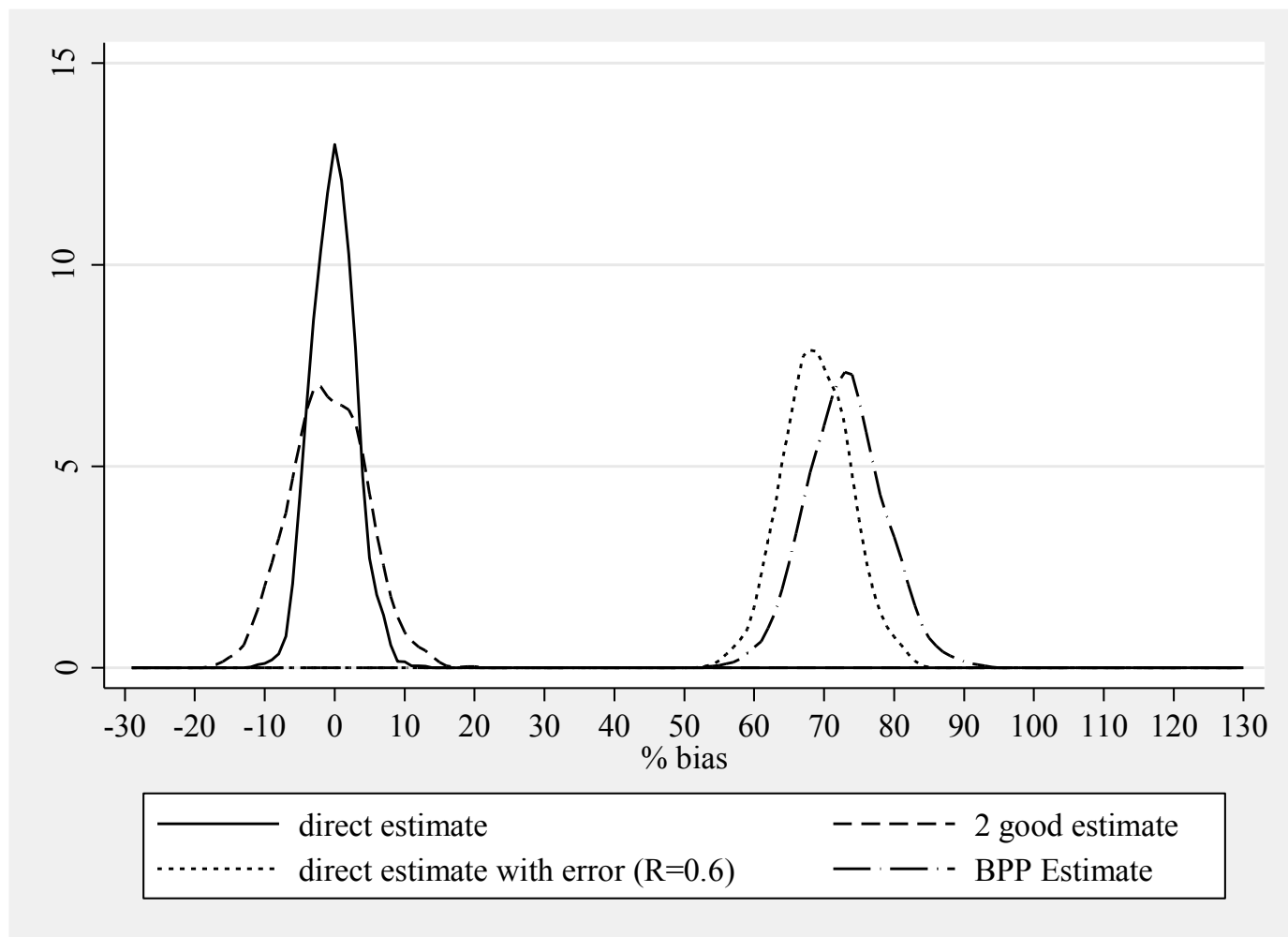
$$\varepsilon_{t,h}^i \equiv x_{t,h}^i - x_{t,h} = (a_i - 1)x_{t,h} + \eta_i(x_{t,h}) + e_{t,h}^i$$

$$C[x^1 x^2] = V[x] + C[x\varepsilon^1] + C[x\varepsilon^2] + C[\varepsilon^1 \varepsilon^2].$$

- $C[x\varepsilon^i]$ small if income elasticity close to 1, approximation error small; positive (negative) for luxury (necessity)
- $C[\varepsilon^1 \varepsilon^2]$ tends to positive (negative) for strong compliments (substitutes)
- Choose goods accordingly

Estimating Other Moments Directly

- BC 2009 Simulation Study
- Estimating $V[\log C]$
- Canadian Budget Survey
- Food, recreation (services and non/durable goods)



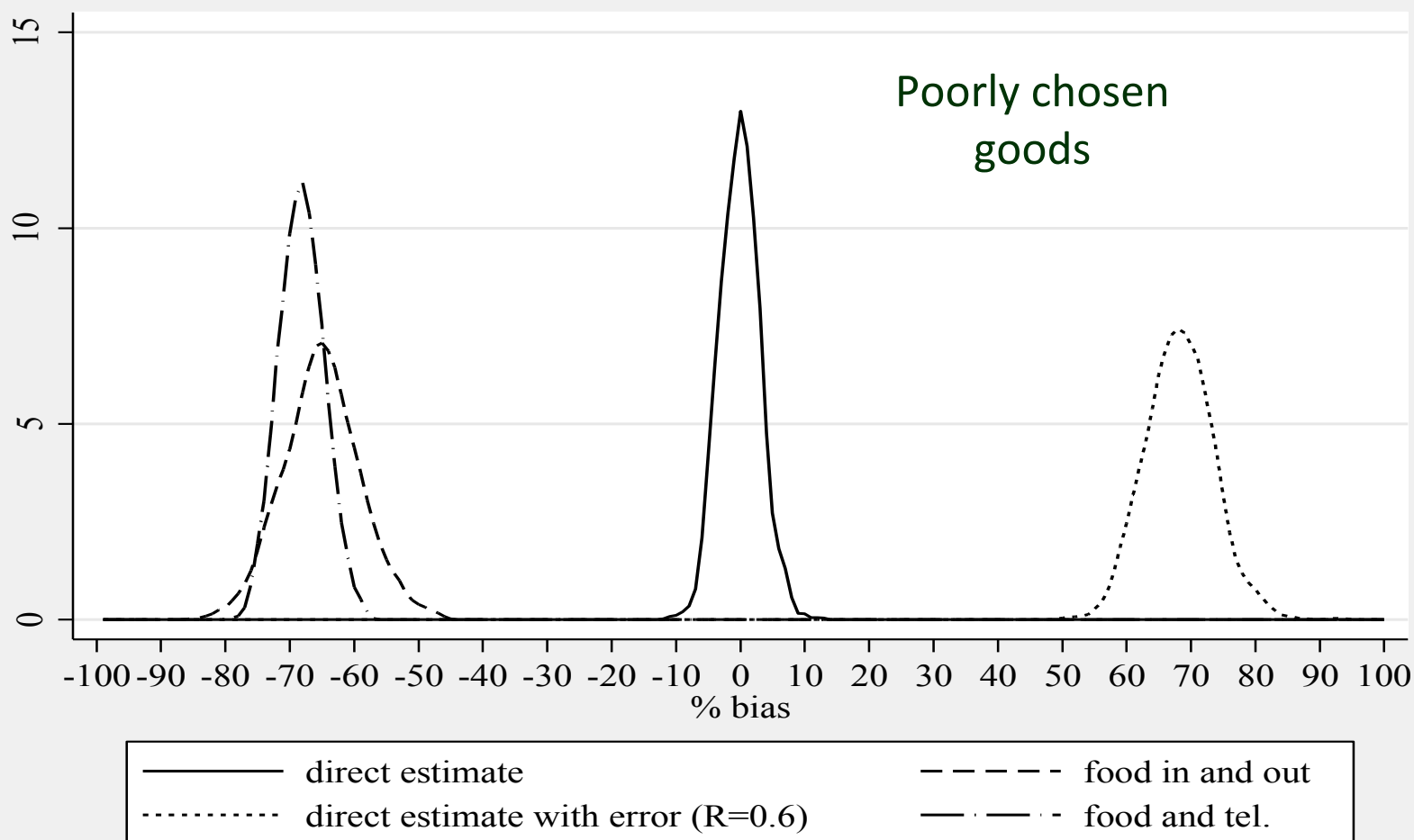
Estimating Other Moments Directly

- Related procedures in Attanasio, Hurst, Pistaferri (2014)
- Could be done with Skinner/BPP measure and $Y-\Delta W$ measure.
- Aguiar and Bils (2013) propose a somewhat different approach to exploiting multiple goods.
- As another example, the EIS for nondurable consumption can be recovered from the EIS for a good and knowledge of the Engel curve (See Browning and Crossley, 2000)

What to worry about?

- Requires good quality budget data to choose goods
 - Are these relationships stable?
- Poor choices lead to poor results
- How general?
 - General de-convolution methods to get whole distribution, but
 - Need one measure with mean zero ME to get location
 - Specific solutions

What to worry about?



Conclusions and Recommendations

- Data from these methods can be very useful in research
 - General release a harder question
 - Provide tools/guidance?
- If asking multiple (but not comprehensive) categories, consider how they might be used jointly.
 - May be tension with other uses (e.g., food security)

Conclusions and Recommendations

- Designing questions: wording is very important
 - Lots of cognitive testing
 - Language specific
- Longer run: consider web mode?