To what extent has income inequality increased? Some data issues 1

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#### ... has income inequality increased?

• For many – or most? – people, it's "obvious" that the one-word answer is yes, at least for rich countries







#### Rising inequality in most OECD countries: 'mid-2000s' to 2011/12

Source: OECD (2014), Focus on inequality and growth – December 2014

- Gini index rising in majority of OECD countries (N = 21 in chart below)
  - But choice of start and end year can make big difference to country ranking (level; size of increase): UK example



#### Top income shares up recently in many countries

Source: Atkinson, Piketty and Saez, JEL, 2011. Choice of period and country matters re trends



#### Simple vs. detailed answers

- Measurement issues and the various subtleties relevant to answering the Question in my title are ECINEQ's specialist interest
- This lecture is in that specialist spirit
- "To what extent is income inequality increasing?" is used as an organising framework to argue, with specific illustrations, that Data Issues Matter
- Data issues are not a 'sexy' topic and their importance is perhaps not sufficiently well acknowledged, even among ECINEQ members (?)
- A suitable topic for a "LIS Lecture"!
  - Also note: forthcoming JEI special issue on cross-national data sets about income inequality

#### Outline

- 1. Motivating preamble, with example answers to the Qn
  - Note the nature of the data used, with contrasts between household surveys and tax data (and registers)
    - Definitions used; data quality at the top and at the bottom, in particular
- 2. Data and the (very) bottom
  - Reliability issues
  - Validation studies, and "multiple measurement" studies
- 3. Data and the (very) top
  - Combining sources: from 'using survey data *or* tax data' to 'using survey data *and* tax data'?
- 4. Conclusions and lessons



#### Caveats

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- Illustrations mostly focus on the UK
  - Reflecting this, I mainly contrast household survey and tax data, largely ignoring data from (multiple) registers
- Income inequality, not wealth inequality or earnings inequality
- About the Facts, not the Causes
  - But *rerum cognoscere causas* requires first knowing the facts
- A 'fruit salad' presentation based around work-inprogress from several projects, all of which are at a preliminary stage



## 1. Motivating preamble

#### Is income inequality increasing?

- *Journalist to SPJ* at the Festival Economia (Trento, June 2015): "of course, income inequality has been rising recently ..."
- SPJ to journalist: "um, well, yes and no" ...
  - Is he thinking about Italy, or more widely e.g. EU?
  - Which period is he thinking about the longer-term or short-term, e.g. since Great Recession onset in 2007/08?

- Economically salient "increase": 2 ppt 3 ppt?
  - see discussion by Atkinson (2015, p. 54)
  - cf. statistically significant



#### Income inequality in Europe since GR onset

Source: SPJ et al., OUP, 2013, from EU-SILC

• Income inequality *not* rising significantly, mid-2000s through 2009



Jenkins, Brandolini, Micklewright, and Nolan

Figure 2.19. Inequality of household incomes, 15 European countries, 2005–10 (Gini coefficient, %)

Source: EU-SILC data summaries at http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/ search\_database (series ilc\_di12) [accessed 19 December 2011].

Notes: The data refer to distributions of equivalized net household income among individuals (the equivalence scale is the modified-OECD scale). For the definitions of the income reference period, see the note to Figure 2.17.

2. The Great Recession and household incomes in 21 countries



Figure 2.20. Inequality of family incomes, USA, 2005-10 (Gini coefficient, %)

Source: US Census Bureau http://www.census.gov/hhes/www/income/data/historical/inequality/ (F04\_2010.xls).

Notes: Figure shows Gini coefficients calculated for the distribution of family money income among families.

#### Income inequality in Europe 2005–13: update

Source: SPJ download from Eurostat EU-SILC database

• Over full period: no rise for EU-15; falling trend for UK; shallow-U for IT; and much other heterogeneity (e.g. LU)



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#### Recent inequality trends in Italy (Gini)

Source: SPJ downloads from LIS, OECD, and Eurostat databases

- 3 sources of harmonised household survey data provide different information about levels and perhaps also trends
  - Net household income ('Canberra') among individuals, square-root-household size equivalence scale (except EU-SILC: modified-OECD scale) but differences in bottom-coding and trimming [?]





#### Long-run trends in inequality in Italy

Source: Brandolini and Vecchi (2011), 'The well-being of Italians: a comparative historical approach', Quaderni di Storia Economica No. 19, Banca d'Italia, Table 1

- SHIW survey data since late-1960s; estimation from budget surveys (with fitted model) before that
- Over very long-run: falling inequality
- Since mid-1980s: inequality rise which is greater, the less bottom-sensitive the measure





#### Inequality trends in Italy: share of top 1%

Source: SPJ from World Top Incomes Database

- Similar U-shape to survey, but sharper increase in inequality in 2000s
- Income share of top 1% is an example of a top-sensitive measure
- Tax data: different income and unit definitions from the household survey ones



#### Gini trends in the UK, 2005/6–2012/13

- FRS-HBAI: main official income statistics (HBAI) based on FRS income survey; includes small imputation at top from tax data ('SPI adjustment')
- LCFS-ETB: based on household budget survey (LCFS); smaller sample than FRS, no SPI-adjustment
- EU-SILC: based on LCFS, no SPI-adjustment



#### Top income shares in the UK

Source: SPJ from World Top Incomes Database, derived from UK Survey of Personal Incomes (SPI)

- Long-run: U-shape trend. Since mid-2000s: similar pattern to official (survey) Gini
- SPI uses different income and unit definition from survey (FRS-HBAI)
- 1990: change in definition of 'tax unit' (from married couple to individual)
- 2009/10: 50% tax rate introduced in April 2010 → incentives for high income tax payers to bring forward income to 2009–10 that would otherwise have been reported in 2010–11 income tax returns or possibly later = 'forestalling' (cf. effect of US TRA in 1986); affects FRS-HBAI Gini too (previous slide)



#### Lessons so far

Broad brush answers to the Qn depend on:

- 1. Time period covered: length and start/end dates
- 2. Country: cross-national heterogeneity

Detailed precise answers to the Qn also depend on:

- Nature of the data source used: e.g. survey vs tax data
  - Different income distribution definitions; different summary measures
- Range of 'adjustments' made to the data before summarising
- Changes in survey design and to tax collection
- Useful to contrast features of surveys and tax data: ...

#### Characteristics of data sources

Feature	Household survey	Tax data	[Registers]
Definitions	Equivalised household net income among all individuals ('Canberra'), with much flexibility to explore variants	Unequivalised pre- tax tax-unit income among tax-units, with limited flexibility for variants	
Covariates	Many	Few	
Coverage	Relatively poor at the top	Relatively poor at the bottom	
Accuracy	Potential weakness	Potential strength	
Number of obs	Not huge	Typically very large	
Temporal coverage	May be limited	Typically long-run	
Summary measures of inequality and poverty	Flexibility	Limited	
Overall focus	BOTTOM and MIDDLE	ТОР	

## 2. Data and the (very) bottom

## Are household survey data on incomes sufficiently reliable?

What's happening at the bottom in the UK?



#### UK inequality trends, survey data, and the bottom

Source: SPJ, from IFS 'Inequality' spreadsheet (= DWP's FRS-HBAI SPI-adjusted estimates)

- Inequality trends from early 1990s to 2012/13 depends on measure
  - Gini: fluctuations round much same level *versus p*90/*p*10 declining slightly
- Different index sensitivities: is the 'action' at the bottom?





#### UK inequality trends (indexed 1994/95 = 100)

Source: SPJ from DWP-HBAI SPI-adjusted unit-record data

• Untrimmed

• Trimmed (drop top 1% and bottom 1% per year)

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Discounting GE(2) as over-sensitive, inequality changes greater for more bottomsensitive indices: see GE(-1)



#### UK inequality trends, survey data, and the bottom

• Conventional 'bottom-half' inequality measure (*p*50/*p*10) falling after 1990, but *p*50/*p*05 not



**ISF** 

# Can we trust survey measures of income at the very bottom?

- Social security and 'welfare' benefits particularly important for those at the bottom of the income distribution
- Surveys play a particularly important role in monitoring living standards during an Austerity Age within which cuts hit the those at the bottom

#### Reliability checks: 3 types

- 1. Macro: compare survey aggregates for income components with macro (national account) counterparts
- 2. Validation surveys: compare survey responses for income components with matched admin data responses
- 3. Micro (multiple measures): do measures of living standards other than income show expected patterns?

#### Validation surveys

- Most validation surveys about employee earnings not benefits, and most refer to the USA (arguably benefits less universal than in the UK)
  - Bound et al. (2001), 'Measurement error in survey data', *Handbook on Labor Economics*, chapter 59
  - Example exception: Marquis and Moore (1990), using SIPP
- UK validation study on employee earnings (SPJ, in progress)
  - Responses on gross earnings in 2011/12 Family Resources Survey linked to HMRC (tax) data records on earnings, for consenting survey respondents
  - Different definitions of gross earnings, notably time periods in survey (vary) and tax data (annual)
  - But 80% of tax data obs have missing dates! Interpretation?
  - No further discussion here (unfortunately) ...

#### UK validation survey on benefits

- ISMIE project (Jenkins, Lynn, et al.): linked records from a BHPS-ECHP survey sample to DWP admin data on benefits, for consenting survey respondents
- See e.g. Lynn et al. (2012), *JRSS(A)*, also comparing 3 different dependent interviewing (feed forward) methods
  - Small sample numbers
- Showed existence of potential *over*-reporting, not simply *under*-reporting, though the latter more prevalent
- Confusion about types of benefit received, rather than deliberate under-statement
- Complicated nature of UK benefit system: large number of benefits, inter-related assessments, individual versus BU
  - DWP's cognitive testing of FRS respondents and interviewers (cf. Balajaran & Collins 2011)



### UK ISMIE validation survey on benefits

• Under-reporting prevalence, by benefit type





• Over-reporting prevalence, by benefit type





#### Checks using multiple measures

- Living standards measures: income *vs.* consumption expenditure *vs.* multiple deprivation (*multidep*) indicator scores, etc.
- Comparisons point to measurement error (underreporting) problems at the bottom
- Meyer-Sullivan: consumption-income comparisons for the USA
- Nolan-Whelan, et al.: multidep scores versus income in Ireland, and elsewhere in EU
  - 'consistent poverty' = overlap of income poor and multidep poor
- Brewer and colleagues: consumption, multidep, and income comparisons for the UK
  - Earlier work: e.g. Davies (1995) DSS Analytical Note, and HBAI Report appendices in early 1990s

#### Income vs. multidep scores in UK FRS

Brewer et al. (2009), *The living* standards of families with children reporting low incomes, DWP Research Report 577

- Income: standard 'Canberra' definitions (DWP HBAI)
- Matdep score: prevalence-weighted sum of binary multiple deprivation indicators re 'daily living' (HMT 2007):
  - 11 'adult' indicators, 10 'child' indicators; range for index is 0–100
- Would expect matdep score to decline monotonically with income, but rises over lowest income range!
- Same pattern for each of the three family work status groups (all receive benefits)





Note: The values for workless families with incomes above £500 a week are not shown. Base: All children in the UK. Sample size: 25,249 families. Source: FRS, 2004/05 to 2006/07.

#### Income vs. consumption expenditure in UK LCFS

Brewer et al. (2015), 'Why are households that report the lowest incomes so well-off?', *Econ J*, forthcoming

- Striking "tick" relationship between household spending and income (and becoming more evident over time)
  - Tick shape also present if break down by family employment status, household type, head's education



#### $p10 \approx \pounds 200 \text{ p.w.}$

Fig. 5. Median Expenditure by Period (Five Year Averages)

Notes. Data is from for the five years from the year shown in the legend. For other notes, see Fig. 1.

#### Is measurement error in income the explanation?

Brewer et al. (2015), 'Why are households that report the lowest incomes so well-off?', *Econ J*, forthcoming

Careful examination of potential explanations:

- 1. Under-reporting of income, especially benefits?
- 2. Over-reporting of spending?
- 3. Consumption-smoothing by poorest?
- #2 ruled out with reference to e.g. diary/survey evidence
- #3 ruled out, using a calibrated model of life-cycle consumption; and reference to the limited options for the poorest to smooth in practice
- #1 ruled in, also with reference to macro-level evidence about under-reporting

# How universal is the income measurement problem?

- Poor countries: Deaton's (*The Analysis of Household Surveys*, 1997) argument in favour of consumption expenditure rather than income refers to measurement issues
  - "The practical and conceptual difficulties of collecting good income data are severe enough to raise doubts about the value of trying" (p. 30)
  - The arguments are not about benefits (typically unavailable in poor countries); more about agricultural and family business incomes; seasonality; etc.
- Rich countries: see earlier
- Middle-income countries: ??
  - Typically have more developed benefit system than poor countries, but also retain relatively large agricultural and family business sectors
  - Both features likely to lead to income mismeasurement at bottom?
  - Let's look at Turkey as a case study ...

#### Income vs. consumption expenditure in Turkish HBS

Source: Sırma Demir Şeker & SPJ, 'Reliable identification of the poorest', work in progress. 2013 HBS (follows WB design recommendations), broad consumption spending, household income; both equivalised by official scale

- Tick is much less apparent (for range of other smoothing bandwidths too)
  - Graph shows relationship for poorest 25% of all individuals (LHS) and poorest 99% (RHS)



#### Income vs. multidep scores in TR SILC

Source: Sırma Demir Şeker & SPJ, 'Reliable identification of the poorest', work in progress. 2013 EU-SILC cross-section, 9-item 'EU' material deprivation indicator sum-score; household income equivalised by official scale

- Graphs refer to individuals in poorest 25%: LHS (all households with kids); RHS (all households)
- No inverse-tick as for UK (see earlier)
- Also not apparent if look at relationship between DHS-type 'asset index' and income (in HBS data)



#### Lessons about the reliability at the bottom

- Country context does matter
- Arguments about income measurement error are not necessarily arguments for using the other measures of living standards
  - The measures differ conceptually (with different merits) and are used for different purposes (including monitoring programme eligibility): Meyer-Sullivan, Brewer et al., Atkinson (2015)
- Need to compare like with like: data collection instruments and costs (and benefits) of each measure
  - Improvements to survey instrument design
    - What elements of design cause the problems?
    - How better can the various components be captured accurately?
  - It's great to have multiple measures in the same survey
    - Would be good to be able to 'reconcile' income, spending and saving
    - Multidep scores are in some ways strange indicators but provide relatively large 'bang for buck' (mainly because relatively cheap to collect)
    - Future might bring 'real time' admin data on benefits? (UK's Universal Credit)

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### Lessons about the reliability at the bottom

- Clash between normative and practical matters in choice of indices
  - Desire to use full range of bottom-, middle-, and top-sensitive indices to summarise inequality and its trends, yet ...
  - Bottom-sensitive inequality measures may be "over-sensitive", and similarly "poverty gap" poverty indices (e.g. FGT1, FGT2)
- Trimming or bottom-coding one's data provides no magic solution
  - It simply sweeps the problem under the carpet, or forgets that measurement problems may extend further up than the standard 1% cut off – outliers and systematic measurement error do not necessarily correspond to the same patterns at the bottom (or top)
- But measurement error less of a problem for assessing trends if its structure remains the same over time?
  - We know little about the "if"; but we do know that under-reporting relative to NA totals is increasing, and Brewer et al.'s "tick" worsening



## 3. Data and the (very) top

How to take the under-coverage of the richest people and their income by a household survey when assessing inequality levels and trends?

What's happening in the UK?



#### Approaches to addressing under-coverage at the top

• Combine the 2 sources (approaches B, C) rather than use separately



#### Approaches to addressing under-coverage at the top

The 'combining' approaches require that both sources:

- a) refer to the same population; and
- b) use the same 'income' definitions
  - Preferably the broader 'Canberra' definitions, as in household survey (cf. Burtless review of Piketty in JPAM 2015)
    - Currently not possible given limitations of tax data?
    - [Except maybe in countries with extensive registers?]
  - Else, we have an "adding apples to bananas" problem
- More positively: with survey data, one can do a "cross-walk" from survey to tax data definitions and population = (UK) gross (pre-tax) income among adults
  - Burkhauser, Hérault, Jenkins, Wilkins (BHJW) project in progress
  - [Cf. Bach et al. for DE matching SOEP and tax data records]

#### Approach B: combine inequality measures

- Formulae for Gini derived by Atkinson (2007) assuming top group infinitesimal in size; extended by Alvaredo (2011), not making this assumption
  - Example of inequality decomposition for two nonoverlapping population subgroups:
  - Total inequality = Within-group Inequality + Between-group Inequality = (weighted sum of top-group Inequality and bottom-group Inequality) + (Inequality between top and bottom groups)
  - Can estimate inequality for top group by fitting Pareto distribution to top incomes in each year and deriving implied Gini
    - Especially useful if only have grouped top income data
- Method extends to other additively decomposable inequality indices too (SPJ)

#### Approach B: APS and the USA

- Atkinson, Piketty, Saez (*JEL*, 2011) show the undercoverage of top incomes by CPS relative to IRS data
  - despite the best efforts of Burkhauser, Feng, Jenkins, and Larrimore (*REStat*, 2012) to "fix" CPS top-coding problems



Figure 5. Comparing Top 1 Percent Income Share from Tax and CPS Data

#### Approach B: AP&S and the USA

- Atkinson, Piketty, and Saez (2011) adjust official CPS "P-60" Gini with tax data using Approach B
- "the top percentile [group] plays a major role in the increase in the Gini over the last three decades and CPS data that do not measure top incomes fail to capture about half of this increase in overall inequality" (p. 32, using preferred 'K gains' series).
- But 'apples and bananas' problem and also use an approximation formula (AP&S fn 23, p. 32)



#### Approach B: Alvaredo and USA

Alvaredo (2011), *Economics Letters*:

- top 1% data from IRS (AP&S 2011)
- poorest 99% data from CPS (Burkhauser et al., *REStat* 2012)
- No 'apples and bananas' problem: uses estimates based on Burkhauser et al.'s cross-walk of CPS data to IRS data definitions
- Estimated increase in Gini (income excluding K gains), 1976–2006:
  - 8.5 ppt (Burkhauser et al.) *vs*.
  - 10.0 ppt (Atkinson formula: Case A in table below) *vs*.
  - 10.1 ppt (Alvaredo formula: Case B in table below)

Top income shares and Gini coefficient in the US, 1976 and 2006.

		Case A: top group considered infinitesimal		considered	Case B: top group considered small but not infinitesimal					
	Top 1% income share from CPS data (%)	Top 1% income share from tax data excluding K gains (%)	Top 1% income share from tax data including K gains (%)	Gini Coeff. G CPS data	Gini Coeff. <i>G</i> * bottom 99%	Gini Coeff. G corrected with tax-based top 1% excluding K gains	Gini Coeff. G corrected with tax-based top 1% including K gains	Inverted- Pareto coefficient $\beta$	Gini Coeff. G corrected with tax-based top 1% excluding K gains	Gini Coeff. <i>G</i> corrected with tax-based top 1% including K gains
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1976	6.7	7.9	8.9	50.3	48.2	52.3	52.8	1.69	50.9	51.4
2006	13.7	18.0	22.8	58.8	54.0	62.3	64.5	2.83	60.9	63.2
Point increase	7.0	10.1	14.0	8.5	5.8	10.0	11.7		10.1	11.8



• See also Alvaredo's application to Argentina, Gini levels and trends, annually 1997–2004

#### Approach B: SPJ and UK, Ginis

SPJ, work in progress as part of BHJW project:

- FRS-HBAI data (not SPI-adjusted) for poorest 95%, HMRC SPI unit record data for richest 5%, 1995/96 to 2010/11. [Results 'top' = top 1% as well: not shown.]
- Income data cross-walked to SPI definitions (individual gross income among individuals aged 15+)
- Pareto fits to SPI data (with WTID control totals) for each year for richest 5% yield R<sup>2</sup> ≈ 0.995 or greater (and for richest 1%, R<sup>2</sup> ≈ 0.999)
- Gini level much higher than official HBAI Gini ('Canberra' definitions), but trends similar





#### Approach B: SPJ and UK, other indices

Estimates for MLD (LHS chart) and Theil (RHS chart)

- A very clear increase in inequality is revealed by the more top-sensitive index (Theil), and differs from MLD and Gini in this respect
  - Middle-sensitive indices less affected by (changes in) inequality at the top
  - What happens if we use a more top-sensitive index than Theil?
  - But  $\frac{1}{2}CV^2$  is undefined in UK case: the fitted Pareto shape parameter  $\alpha \Rightarrow$  infinite variance



## Approach C: combining data, UK

#### Tax data

- Survey of Personal Incomes (SPI)
- Stratified sample of administrative records about individuals who could be liable to UK tax drawn from three databases covering (i) [COP] employees and occupational pension recipients with a Pay-As-You-Earn record, (ii) [CESA] people with self-employment, rental or untaxed investment income (and directors, those subject to higher rate tax and other people with complex tax affairs, and (iii) people without COP or CESA records who have had too much tax deducted at source and claim repayment
- Annual  $N \approx$  c. 50,000 individuals in unit record data, 1995/6–2010/11 (not 2008/9)
- Control totals for population aged 15+ and their total income from WTID

#### Household income survey data:

- Family Resources Survey (FRS)
  - Specialist income survey (cf. Living Costs and Food Survey = HBS)
- Additional derived income variables created from FRS 'raw' variables for 'Households Below Average Income' (HBAI)
  - Used to prepare UK's official income distribution and poverty statistics produced annually by Department for Work and Pensions (DWP)
  - Annual  $N \approx$  c. 20,000 benefit units; unit record data from 1994/95 to 2012/13

### Approach C: UK SPI-adjustment

The FRS-HBAI unit record data contain an 'SPI-adjustment' to "improve the quality of data on very high incomes and combat spurious volatility" (DSS Working Group, 1996: 23)

- 1. Replacement of a small number of "very rich" FRS respondents' individual gross incomes in year t by cell-mean imputations 'projected' from tax data (SPI) for year t-1
  - Distinction between pensioner and non-pensioner households. In mid-1990s, about 0.2% of (weighted) individuals had incomes SPI-adjusted; proportion increased steadily in the early 2000s; since 2008/09, fixed at c. 0.5 %
  - Benefit-unit and household incomes recalculated post-imputation
- 2. Recalibration of FRS weights to better gross-up to population (shift in weight towards top income holders)
- Introduced first in 1992 (after DSS 'Stocktaking' report 1991), when HBAI used Family Expenditure Survey data, and originally imputed *tax/benefit unit* income from SPI, later changing to imputing *individual* incomes reflecting the change to individual taxation from 1990 and thence SPI data collection

### Approach C: UK SPI-adjustment

- Details of adjustment procedures are undocumented
- Previously relevant to estimating poverty line = 50% of mean income (but since changed to 60% median)
- HBAI-SPI and HBAI-noSPI distributions almost identical up to around *p*95
- Adjustment affects estimates of mean, quantile income group shares (including top income shares), summary inequality indices, ...



### Approach C: UK SPI-adjustment effect

- Compare distributions of individual gross income for 2010/11 (i) HBAI with SPI adjustment, (ii) HBAI without SPI adjustment, and (iii) SPI
- Chart shows densities of log incomes, if log income > 10
  - $\exp(10) \approx c. \pm 22,000$  p.a.  $\approx p75$  in HBAI distributions
- SPI adjustment income replacement and reweighting leads to 'clumping'



## BHJW project's "SPI2" adjustment

Aims:

- Make adjustments in the HBAI data in order to obtain top 1% income shares (and top 0.5% and 0.1% income shares) that are fully consistent with the WTID
- Then explore distributional trends, cross-walking between tax data and survey data definitions, and exploiting survey 'flexibility' (change receipt unit definition; summary index)

#### SPI2 adjustment (experimental!):

- 1. Rank individuals in the SPI according to total pre-tax income (TI)
- 2. Group individuals, with each group the size of 1/1000<sup>th</sup> of the total adult population (as given by WTID control totals) and group mean income
- 3. Repeat steps 1 to 2 with the HBAI data using our derived measure of (non-SPI'd) individual gross income
- 4. Replace individual income in the HBAI by the mean income of the same group in the SPI for the 10 top income groups (i.e. the top 1 per cent)
- 5. Total pre-tax income for the top 1 per cent is now the same in the HBAI and in the WTID/SPI

#### Approach C: UK early results, top 1% share

- HBAI-SPI2 matches SPI/WTID estimates exactly (by construction)
- HBAI-SPI under-estimates SPI/WTID estimates by ~ 2 ppt each year



## Approach C: UK early 'SPI2' results, top 1% share, changing definitions of income recipient and 'income'

- Changing recipient unit definition affects estimates of levels, not trends
- Change to market income to compare with US WTID top 1% estimates
  - 'Parallel' trends through to 2007/08 (NB UK 'forestalling' problem from 2009/10)



#### Approach C: 'SPI2', different recipient units, Gini

- Gini is larger, the narrower the sharing unit, and for market income compared to gross income; but 'parallel trends'
  - I.e. similar results to those for income share of top 1%



LSE

#### Approach C: SPI2, different inequality indices Gini MLD

0.44



0.56 0.54 0.52 0.52 0.52 0.52 0.52 0.52 0.54 0.55 

0.42 4 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Half CV<sup>2</sup>







LSE

#### Comparisons of Approaches B and C

- For both approaches, the more top-sensitive the index used, the greater the inequality increase that is estimated for the period 1994/95–2007/08
- Approach C (SPI2 imputation) suggests a slightly greater rise in inequality over the period than does Approach B (HBAI for bottom 95% & SPI for top 5%)
  - Intuition: SPI2 adjustment adding more "top income" coverage and, then, changes occurring at the top are weighted more by the more top-sensitive indices



#### Lessons about accounting for survey undercoverage at the top

- Approaches B and C to combining tax data with survey data are feasible, at least in the UK context
  - Approach B is relatively straightforward to implement
  - Approach C: salute the pioneering HBAI-SPI adjustment; we need to experiment further with "SPI2" adjustments
- "Apples and bananas" problem: solved via cross-walk from survey to tax data definitions (gross income)
  - but most distribution discussion in terms of net (post-tax post-transfer) incomes, and for all individuals
  - In longer-term, we hope to develop an improved SPI adjustment for the HBAI using HBAI definitions
- Has inequality increased? Depends on summary index
- Country-specific context important for what can be done
  - Contingent of nature of the survey and tax data sources available; definitions of "tax unit" and "income"; access to the sources
  - Register countries have greater flexibility (Approach C is "it")?
  - Cf. US SCF: tax data used as sampling frame for high-income over-sample

## 4. Summary and Conclusions

#### "To what extent has income inequality increased?"

- It's not always so easy to provide a straightforward answer
- Answers depend on country context and time period
  - and hence also data-related issues
- Household survey and tax data are both commonly used to provide ready answers to the Question
  - Can be hard to reconcile results from the two sources because of different definitions and summary measures



#### "To what extent has income inequality increased?"

- Unreliability of the very lowest incomes in survey data
  - not directly addressed by standard approaches (bottom-coding; choice of summary inequality or poverty index)
  - focus on survey design particularly relevant
    - a task for original data producer?
- Under-coverage of the very top by surveys
  - can be addressed by "combining" survey and tax data
    - a task best addressed by researchers (Approach B) or data producers (Approach C)?
    - Cf. SPI-adjustment by UK DWP
- LIS is a "Data Center": what role might it play in regard to the issues raised here?
  - 'Warehouser' rather than researcher or data producer; adding value to (mostly) survey data
  - Key Figures documentation
  - Health Warnings with worked examples in unit record data documentation

