

1

Lecture 2

Getting prices right. *Mysteries of the index*

Prices and poverty

2

- We have seen how in US and India, poverty lines were set
 - ▣ Originally with respect to some (unsatisfactory) relationship to food and hunger
 - ▣ And then held constant in real terms
 - ▣ To calculate poverty using current incomes or consumption, the line must be scaled up by some consumer price index
 - ▣ Poverty lines as fractions of mean or median income no need
- Consumer price indexes play an enormous role in measurement beyond poverty
 - ▣ GDP growth for example
 - ▣ Without them, we cannot compare living standards over time or space, within or between countries
 - ▣ Yet they are controversial, politically and technically

A challenge to US CPI

3

- Senate Finance Committee (under Republican control) set up an Advisory Committee to Study the Consumer Price Index in June 1995
 - ▣ The Boskin Commission: Chaired Michael Boskin, ex-chair of Council of Economic Advisors for President George H. W. Bush
 - ▣ Work by Lebow et al at Federal Reserve argued that the CPI was overstating inflation by 1 percentage point per year
 - Substitution bias, new goods bias, and unmeasured quality change
 - ▣ Alan Greenspan noted this during Congressional Testimony
 - ▣ Firestorm: Newt Gingrich threatened to “zero out” the Bureau of Labor Statistics
- Lower inflation would reduce indexation: Social Security, income tax brackets, food stamps et al and reduce budget deficit

More claims

4

- Hausman claimed that introduction of apple-cinnamon cheerios *alone* added \$78 million to consumer welfare (about double today)
 - ▣ Cellphones were not in the index
- Nordhaus on light, and that the huge benefits of technical improvements are nowhere included in our accounts
 - ▣ Is the CPI the place to fix this?
- Boskin Commission claimed 1.1 percentage point a year overstatement of inflation, 0.6 percent of which was new goods and/or quality change
 - ▣ Fixing reduces Federal budget deficit by \$691 billion over a decade
 - ▣ If not, “bias” would be fourth largest federal outlay program
 - ▣ Heavily criticized for making up numbers on quality change
- Still used: Commission found “errors” in what BLS was doing
 - ▣ Still in the mix for deficit-reduction plans

On (not) measuring quality

5

- Neutral committee of National Academy of Sciences noted the importance of quality change, but found no credible way of dealing with it
- The problem is real, and intractable
 - ▣ Easy to accept that there is unmeasured quality change in the US
 - ▣ Not easy to measure it given knowledge
 - ▣ Agencies can't do Hausman-type imputations!
- Healthcare: rapid increase in price, perhaps all quality?
 - ▣ We could measure healthcare by output, e.g. mortality rates
 - ▣ Nordhaus estimates that health improvements would have doubled GDP growth in 20th century
 - ▣ Extra life is worth a lot

Mortality and the COLA

6

- BUT: how much of mortality rate decline is due to behavior change, especially smoking, how much to better nutrition, and how much to better healthcare?
 - ▣ Only the last should be in the accounts
 - ▣ US spends more but has higher mortality and morbidity rates
 - ▣ Women's LE has increased MUCH less than men's. Healthcare only worth it for men? Difference is mostly smoking, not healthcare
- Politics: pharma companies finance work that shows pharmaceuticals are effective in prolonging life
- Generally: should a price index be a COLI, approximating a "true", utility constant (Konüs) price index?
 - ▣ Does mortality decline reduce the price level?
 - ▣ How about cold weather?
 - ▣ How about the contraceptive pill? Viagra?

Consequences of CPI bias

7

- A wide range of indicators
 - ▣ Argument that growth used to be in quantity, now in quality, especially new goods, and that we are missing a lot of it
- Stagnant median wages and incomes could be actually increasing
- Inequality would be growing less rapidly
 - ▣ Because a lot of healthcare is redistributed to the poor and paid for by the rich
 - ▣ Though we don't know how to do the accounting

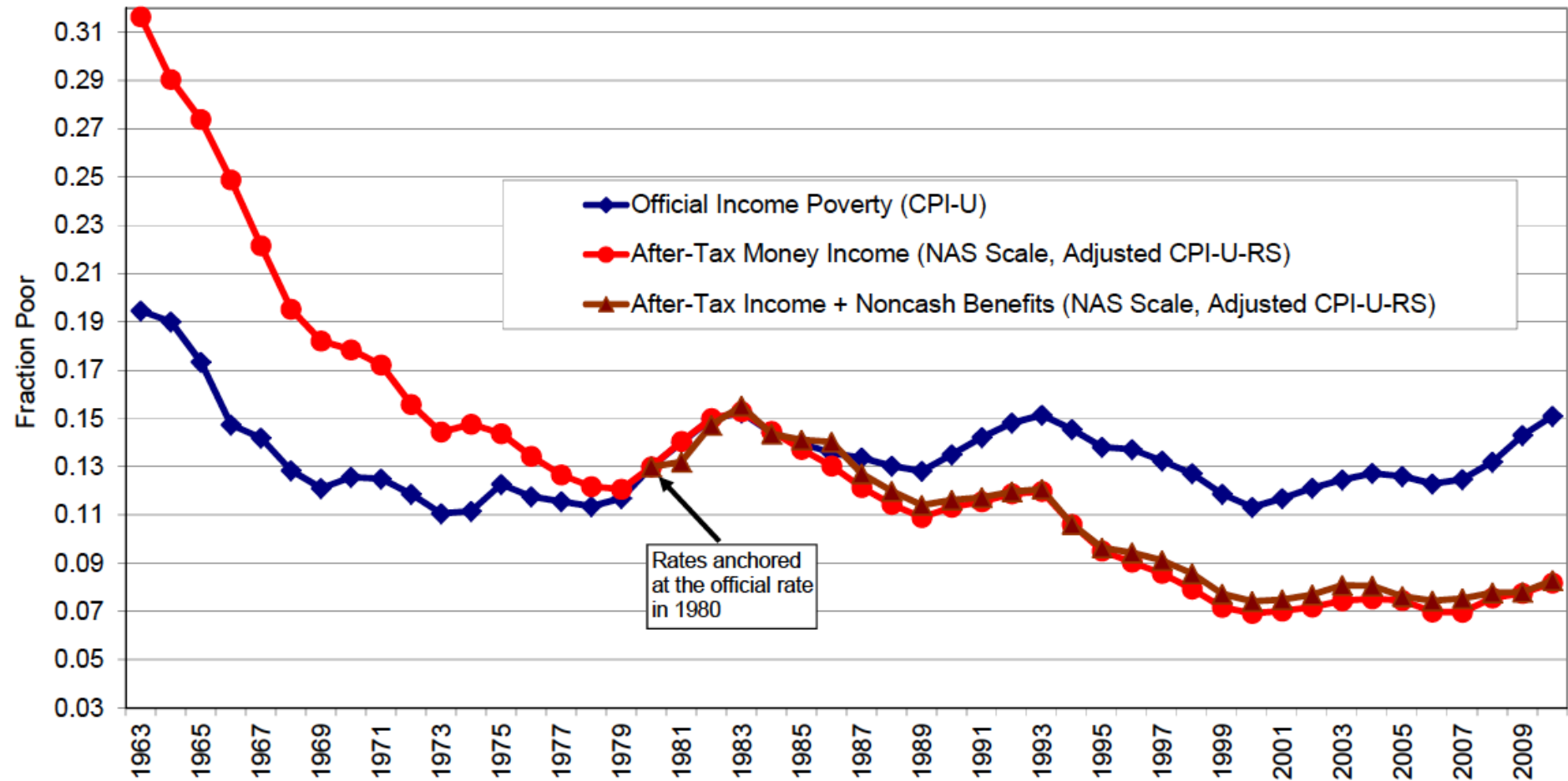
Effects of CPI “bias”

8

- Wide range of policy implications in public and private contracts
 - ▣ Social Security Indexation, Income tax brackets, ties to poverty line
 - ▣ “How and why did we come to this strange place, where extraordinary sums of money change hands based on small movements in a controversial and admittedly ambiguous statistic such as the CPI?” Thomas Stapleford
- Underlying failure here, if there is one, is in economic theory
- If we “fix” the CPI as Boskin suggests, we are winning the war on poverty
 - ▣ Graph from paper by Meyer and Sullivan

Meyer and Sullivan's recalculation of US poverty

Figure 1: Official and Alternative Income Poverty Rates, 1963-2010



Prices over space

10

- Perhaps surprisingly, US makes no allowance for different price levels in different places
- Recent indexes from BEA show substantial differences across MSAs
 - ▣ NY about 50 percent higher than Rome, GA
- These could be incorporated into poverty statistics
 - ▣ But perhaps prices reflect amenities? Already counted.
 - ▣ At least if people are freely mobile
 - ▣ Maybe the poor don't get the amenities: can't eat the scenery
- Life evaluation on log income and log price yields equal and opposite signs
 - ▣ So can't be all amenity

Geography and prices

11

- Have little effect on measured inequality, because income inequality is mostly within geographical areas
- In India, taken as axiomatic that spatial price indexes be used
 - ▣ World Bank adjusts global poverty counts for price differences within large countries
- But major issues for spatial price indexes are international, between countries
 - ▣ Where mobility is extremely limited

Global questions

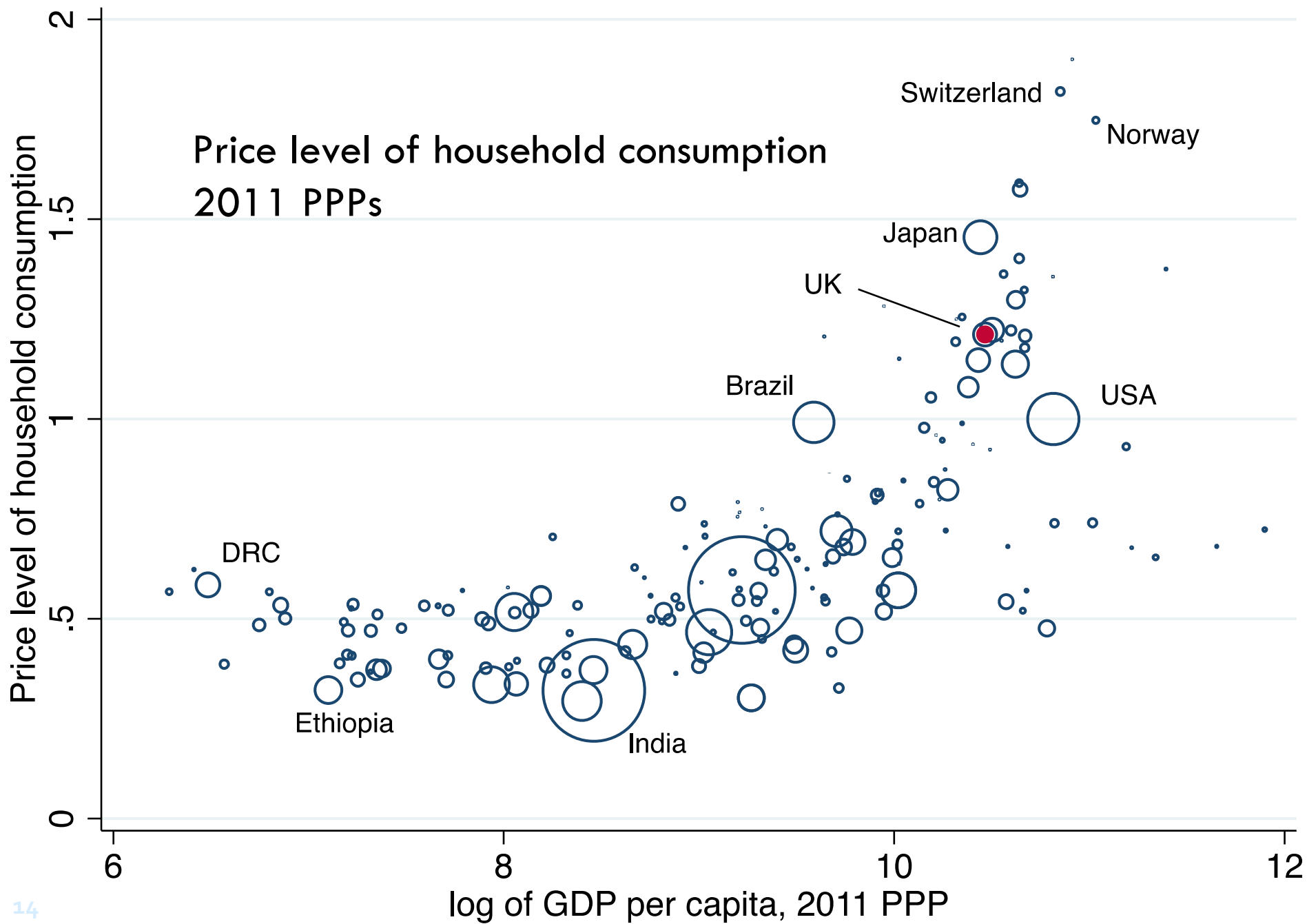
12

- Who is poor and who is rich?
 - ▣ How many poor people are there in the world?
 - ▣ How can we measure progress on income poverty?
 - ▣ How do the poor live? What is life *really* like in the poorest places in the world?
- How big are the differences?
 - ▣ What is the ratio of American to Indian income? To Chinese incomes?
 - ▣ Is China's economy bigger or smaller than America's?
 - ▣ Are Africans better off or worse off than South Asians?
- The global distribution of income?
 - ▣ Over countries, in per capita income?
 - ▣ Over all the citizens of the world?
 - ▣ Is global inequality narrowing or widening?

All require spatial price indexes

13

- How much does it cost to live in India compared with the US?
- Exchange rates as an approximation? How bad?
- Very bad when we compare rich and poor countries
 - ▣ Price levels in India are low relative to what the exchange rates suggest
 - ▣ About $2/3$ lower, so effect is substantial
- Ultimately, Balassa-Samuelson theorem says that countries with low productivity in traded goods will have low price levels



Purchasing power parities

15

- Deal with this, we need PPP exchange rates for consumption in each country
- Price level is then ratio of PPP exchange rate to market exchange rate
 - ▣ For India, exchange rate was 58.6 Rupees per USD in 2013
 - ▣ PPP for consumption was 17.5: ratio is about 0.3
- PPP is a price index that compares cost of consumption in India relative to the US
 - ▣ It has units, rupees to USD, and more stable than exchange rates

These numbers come from ICP

16

- ICP is like the Olympic Games, though somewhat less regular
 - ▣ Brings the whole world together giant price collection enterprise
 - ▣ First a few amateurs, farsighted visionaries
 - ▣ Over time, professionalized, lots of training
 - ▣ Huge improvement in technique
 - ▣ Increase in number of countries participating
- GDP in PPP terms also comes from ICP, money GDP divided by PPP
 - ▣ Such numbers are widely used by journalists, academics, and policymakers

International Comparison Program

17

- 1960s & 1970s, U. Penn plus UN
 - ▣ Six countries in 1967, Four more added in 1970
 - ▣ Prices for relatively small number of goods and services
 - ▣ Extended to other countries using interpolation, 100 countries real or interpolated by 1978
- 2005 ICP had 146 countries, 2011 ICP had 199
 - ▣ 2005 and 2011 housed in World Bank Global Office
 - ▣ With regional offices around the world
 - ▣ Price collection regionally organized
- Publication about 3 years after target year

Governance

18

- Governed by an Executive Board
 - ▣ Mostly chief statisticians: chaired by Martine Durand, chief statistician of OECD
- Guided by Technical Advisory Group
 - ▣ National accounts statisticians, academics, technical experts
 - ▣ Regional coordinators, who collect regional data
- Housed, under contract, in World Bank who appoints a Global Manager, technical, and support staff
- Owned collectively, not personally or by small group, contrast \$-a-day poverty
- Huge progress should not disguise fundamental difficulties

Why is it so hard?

19

- International price comparisons are inherently difficult
- Goods that are representative are rarely comparable, and vice versa
 - ▣ Brooks' Brothers Oxford Cotton Button-down shirt
 - Or a shirt
 - ▣ Bottle of Bordeaux, producer's name on label vintage 2001
 - Or a bottle of alcoholic drink
 - ▣ This is really a quality issue, as in domestic price indexes
- Scylla of precision, overstating poor country prices
- Charybdis of breadth, understating poor country prices
- Non overlapping consumption patterns
 - ▣ You consume beans, I consume wheat, or teff, or grits
- Measuring prices of housing, education, construction, government services, healthcare, all difficult
 - ▣ Same as domestic accounting, but sharper and more severe

Coverage of the ICP

20

- Earlier rounds, up to 1993, of lower quality with lots of imputations
 - ▣ Many countries had never participated, including China
 - ▣ Or very irregularly, India
- 2005 and 2011 much higher quality
 - ▣ Include China, never previously, and India, not since 1978
 - ▣ Large numbers of “new” countries, many in Africa
- Improvements in methods can make comparability difficult

Geopolitical issues

21

- China takes strong political interest in outcomes, and acts to exaggerate its price level
 - ▣ Which delays the date when it exceeds the US in size
 - ▣ But this exaggerates Chinese poverty, which they don't want
 - ▣ Reduces US pressure to allow appreciation of the yuan
 - ▣ Less than transparent about how it collects prices: most data are classified
- Eurostat has its own program which is carefully regulated by law, and ICP not allowed to question within-Eurostat PPPs
 - ▣ These price indexes are actually *used* to allocate EC funds
 - ▣ So they are carefully regulated
- Otherwise, politics do not seem to be central
 - ▣ World Bank and MDGs use PPP-dependent poverty counts

Uncertainty in PPPs

22

- Comparisons across widely different regions are very difficult
- Relative prices are *not* the same in different countries
 - ▣ Goods that are relatively cheap locally are relatively heavily consumed
 - ▣ Though causality runs in both directions: Marmite is 4 GBP per lb in Sainsbury's and 20 USD per lb in (my local) Wegman's
- Air travel in Africa is VERY expensive
 - ▣ But little consumed
 - ▣ In UK, cheap and heavily consumed
 - ▣ For UK v Kenya, say, price relative for air travel makes Kenya v expensive
 - ▣ If we use Kenya weight, Kenya price level is low & Kenya rich
 - ▣ If we use UK weight, Kenya price level is high, & Kenya poor
- PPP “solves” this by averaging weights
 - ▣ But this is no solution at all: there isn't one

Paasche and Laspeyres

23

- This shows up in Laspeyres (home country-weighted) price indexes being VERY different from Paasche (comparison country weighted)
 - ▣ With US as base, in 2011, Liberia and Belize have Laspeyres more than double Paasche
 - ▣ China and India 15 percent and 41 percent higher: France, Netherlands about 1 percent
 - ▣ PPPs take (geometric) averages, and then impose transitivity
 - ▣ Average buries the problem
- We can use these ideas to develop a way of calculating standard errors for PPPs
 - ▣ Depend on the variance of the ratios for different commodities
 - ▣ Closely related to the ratio of the Laspeyres to the Paasche

PPPs by commodities and overall: 2011

	India	China	Kenya	UK
Rice	12.4	2.6	42.3	0.65
Poultry	35.9	6.3	99.0	0.99
Milk	25.4	7.1	86.0	0.66
Edible oils	38.3	8.4	101.2	0.80
Sugar	23.3	4.9	52.1	0.68
Tobacco	8.6	2.8	19.0	1.05
Garments	13.7	4.7	34.2	0.55
Petrol	58.7	9.0	116.3	1.45
Air travel	63.6	10.8	96.2	0.79
Xrate	46.7	6.46	88.8	0.62
All PPP	15.0	3.7	35.4	0.76
S.D. logs	0.75	0.67	0.70	0.26

PPP and poverty uncertainty

25

- Standard errors are small for closely related countries, e.g. US and Canada, Ireland, or in Western Europe
 - ▣ Around 5 percent
- Standard errors are large for very different countries
 - ▣ Perhaps 15-20 percent for India and China relative to the US
 - ▣ Very large for, e.g. Mali versus Indonesia, or Ethiopia versus China
- We just don't know very clearly what are relative living standards in countries with widely different structures

PPP uncertainty and poverty

26

- This poses a problem for measuring world poverty
 - ▣ Where small changes in lines can have large effects on counts
 - ▣ E.g. reporting periods in India and 175 million people taken out of poverty
- World Bank says 33% of India's population live on less than \$1.25 a day
 - ▣ If PPP is +/- 20%, numbers poor are +/- 180 million.
 - ▣ High low diff 36% of total of global poverty.
 - ▣ That's only India!

ICP revisions

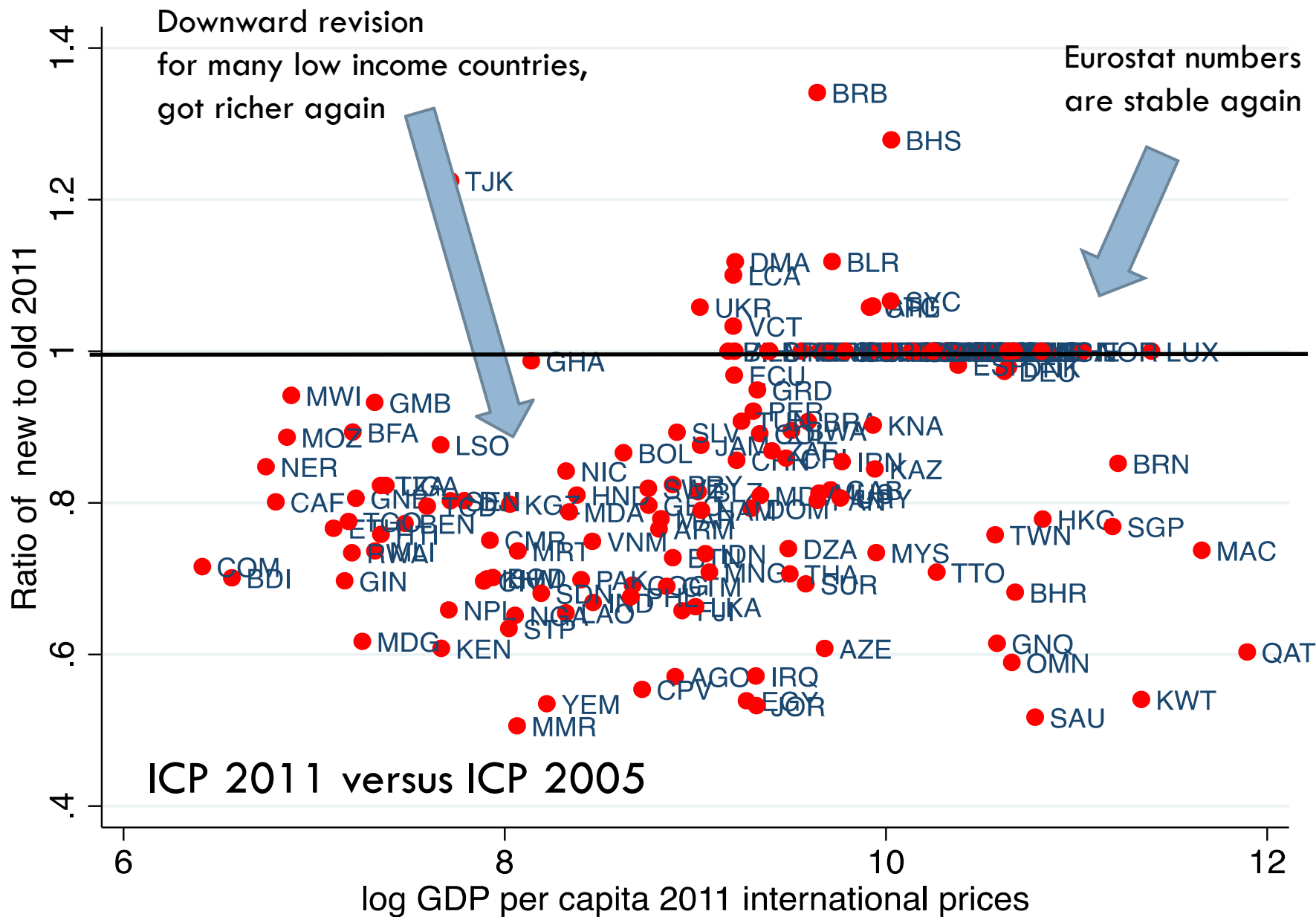
27

- Each round of the ICP reshapes the world, changing price levels and living standards between rich and poor countries, and between poor countries
- 1985 to 1993, published in 1997?
- 1993 to 2005, published in 2008
- 2005 to 2011, published in 2014
- This is what we might expect given the large standard errors
 - ▣ Plus substantial methodological changes

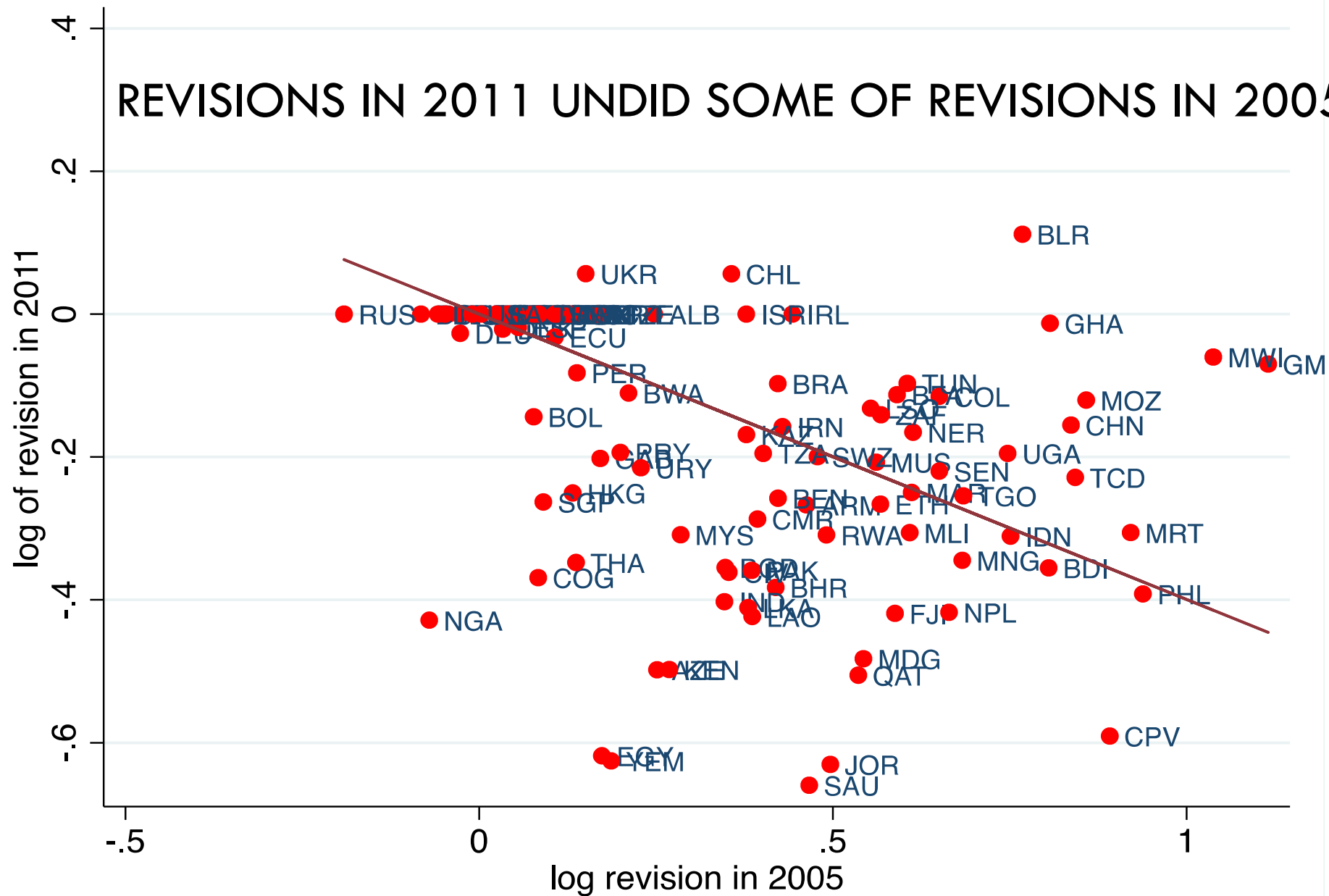
Using CPIs instead?

28

- Might think that PPP of country A relative to country B should change as the relative inflation rates of A and B
 - ▣ This is how World Bank and others update between rounds and extrapolate: NB we are in 2014 now and 2011 only just released
 - ▣ But it doesn't work in general, for many reasons, some technical, but some substantive:
 - CPIs use country weights, while PPPs use averaged weights over many countries
- Multilateral index numbers are different, and if we want them, we have to have an ICP from time to time



REVISIONS IN 2011 UNNID SOME OF REVISIONS IN 2005



Regional revisions to PPPs in 2005 and in 2011

Region	Mean log ratio 2005	Mean log ratio 2011
Africa	0.57	-0.24
Asia & Pacific	0.46	-0.34
CIS	0.40	-0.15
Eurostat/OECD	0.08	-0.00
Latin America	0.26	-0.13
Western Asia	0.38	-0.57

What happened?

33

- Bettina Aten and I have argued that the problem lies with 2005 ICP, not 2011 ICP
- Estimates within each region are broadly OK
 - ▣ Subject to standard errors
- Joining up the regions is hard: tectonic plates move continents
 - ▣ 2005 used a “ring” of 18 countries and about 1,100 items to be priced
 - ▣ Those used to join up the regions with four “tectonic” price indexes
 - ▣ Evidence is that the ring goods were overpriced in Africa and South Asia, making those countries price levels too high
 - ▣ Which made them poorer than they should have been
- This was not repeated in 2011, where there was a common core list
 - ▣ Goods priced in all countries
 - ▣ To which countries added their own regional prices

And the consequences?

34

- Poor countries got poorer **relative to rich countries** in 2005 revision
 - ▣ Or rich countries got richer relative to poor countries
- Poor countries got richer **relative to rich countries** in 2011 revision
 - ▣ Or rich countries got poorer relative to poor countries
- China became almost as large as the US in 2011
 - ▣ Much to their discomfort!
- So measured inequality went up and then down
- What happened to poverty is much more difficult
- Both poverty and inequality will be my topics tomorrow

Summary thoughts on ICP

35

- Though PPPs and GDP in PPP are widely used by economists, through Penn World Table
 - ▣ Much shakier than one might think or hope
 - ▣ Methodological changes over time, so linking “rounds” is hazardous
 - ▣ Conceptual difficulties of such price indexes
 - ▣ Specific problems with particular rounds
- No one should be using PWT between rounds
 - ▣ Repeatedly said and repeatedly ignored

ICP jumping around

36

- Combines with hypersensitivity of poverty rates to small changes in lines
 - ▣ Which changes in PPPs bring about
- As much a problem of using HCR near a well-populated line as it is of measuring prices
 - ▣ Perfect storm of measurement difficulties
 - ▣ Some politics, but less severe if only because we do not live in a cosmopolitan world: no one is ultimately responsible for global poverty
 - ▣ No one gets money depending on the numbers
- Which I shall talk about tomorrow