

# Mind the Gap

Disparities in Assessments of Living Standards  
Using National Accounts and Surveys

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# Background and motivation

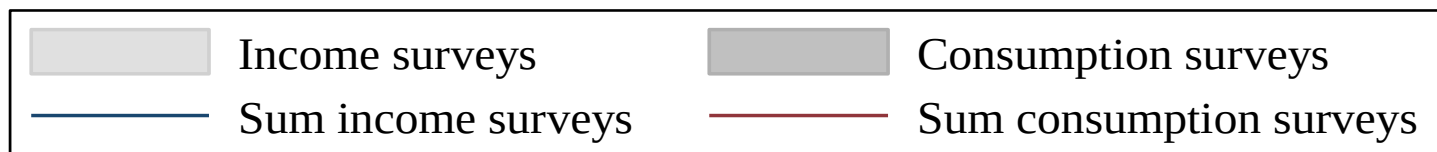
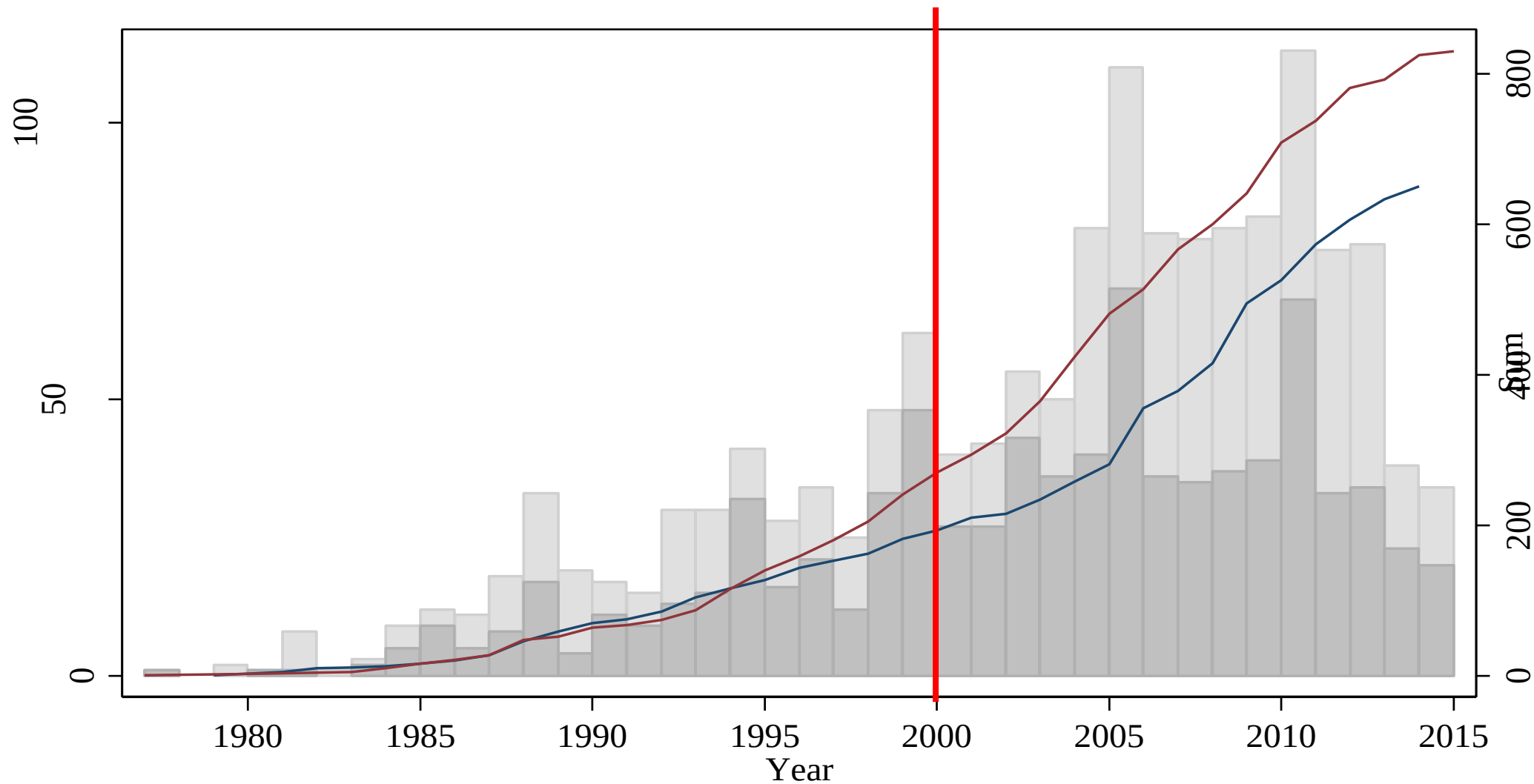
- Revisit gap in measures of average income and consumption from household survey (**HHS**) and national accounts (**NAS**)
- Important for World Bank's poverty and inequality monitoring, goals
  - World Bank uses national accounts data to align survey estimates to reference years without surveys. Nowcasts and forecasts use national accounts growth with a passthrough rate.
  - Understand differences with alternative methods based on NAS data, and to reconcile economic growth and shared prosperity data.
- Gap in HHS-NAS measures widespread. E.g.
  - Pakistan in 2015: NAS household consumption expenditure per capita: \$9.3 per day; HHS household consumption per capita: \$4.9 per day at 2011 PPP.
  - Botswana 2010-13: HHS contraction of -3.3 percent, NAS (HFCE) expansion of 3.9 percent
- Reasons that measures from national accounts and household surveys can (and should) differ, but magnitude large and important to map out to untangle different stories. We map the gaps and illustrate the implications.

# Literature on NAS-HHS gaps

- About the gap
  - Ravallion (2003) – established gaps: attributed to income surveys (not consumption) and Eastern Europe
  - Karshenas (2003) – Small but significant gaps using different method.
  - Deaton (2005) – Larger sample, more robust concerns about gaps.
  - More recent: Nolan, Roser, and Thewissen (2019) – focus on rich countries.
- About the implications
  - Pinkovsky and Sala-i-Martin (2016), Bhalla (2003) – use national accounts for poverty measurement
  - Chandy and Seidel (2017), Lakner and Milanovic (2016) – adjust top of distribution with gap
  - Distributional national accounts data.
- Key findings and contributions of this paper
  - Larger dataset than used previously for assessing gaps
  - We find larger and more robust gaps between the measures than previously established
  - Gap not a matter of income vs consumption surveys; rather function of income level (largest in middle income countries)
  - Quantify and illustrate implications for measures of global poverty and inequality

# A new, large harmonized dataset of HHS and NAS per capita mean income and consumption

- Household surveys (HHS)
  - 1,780 household survey means for 163 countries from 1977 until 2015, representing 93 percent of the world population
  - Main source PovcalNet, complemented with national and other sources, especially for rich countries. E.g. Eurostat's Household Budget Surveys.
- National accounts data (NAS)
  - WDI national accounts aggregates
    - Household Final Consumption Expenditure (HFCE, aka PCE)
    - Gross Domestic Product (GDP)
- Merged dataset: 1,664 household surveys matched to national accounts (to be expanded, metadata on comparability added)



Gaps in Levels

# Assessing gaps in levels

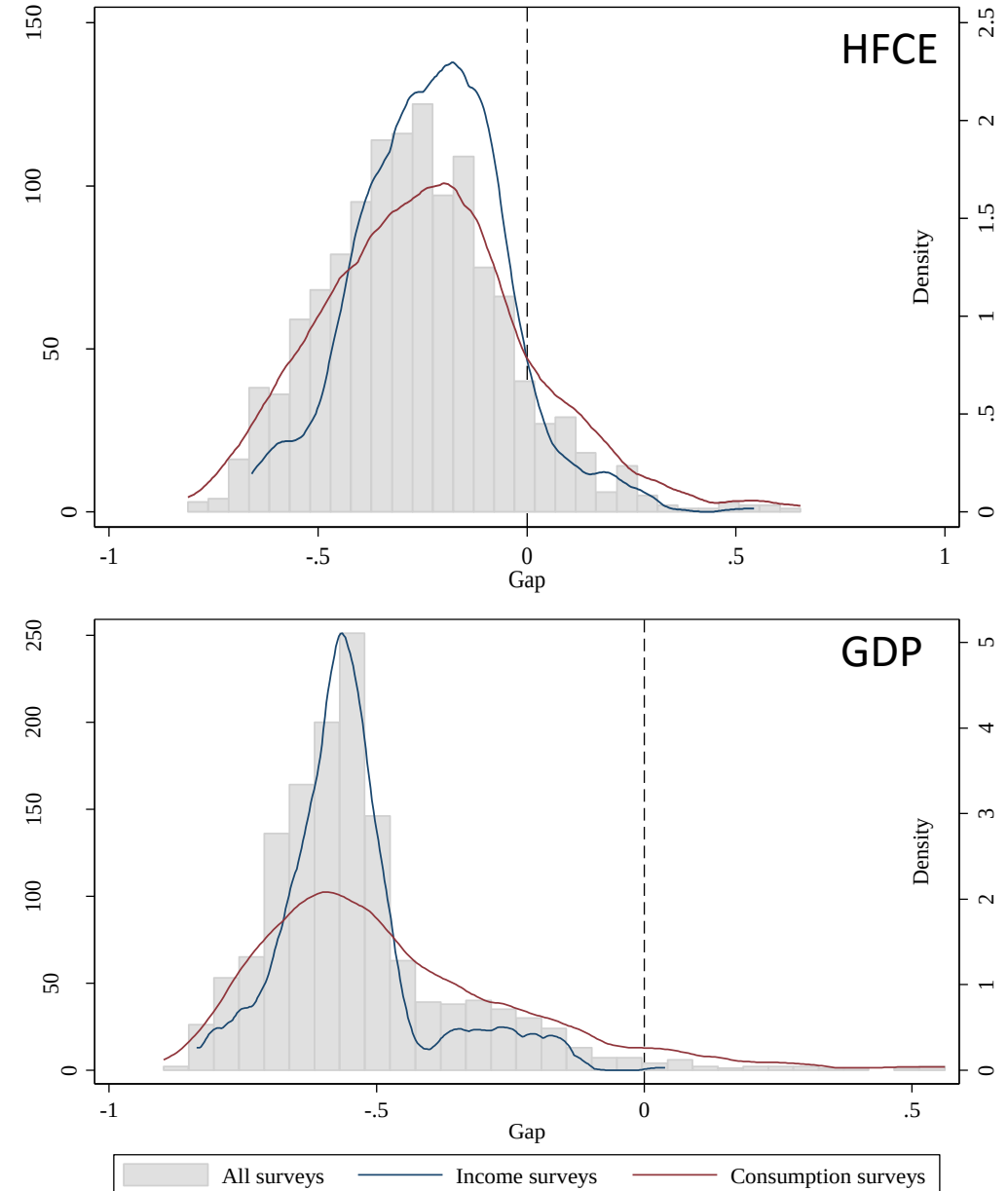
- Measure gap with simple measure:

$$\text{Gap} = (\text{HHS}/\text{NAS}) - 1$$

Assess statistical significance of gap with robust SE clustered on country. Two weighting schemes, each country equal weight, each observation equal weight.

Key result:

- HHS mean 23 percent lower than HFCE NAS means
- No significant difference in the gap observed for consumption surveys (25 percent) and income surveys (23 percent).
- Contrast to:
  - Deaton: 14 percent for consumption surveys, 9.6 percent for income surveys.
  - Ravallion: 17.4 percent for income surveys and 6.9 percent for consumption surveys
  - Difference between income and consumption surveys being statistically significant.
- HHS mean 49 percent lower than GDP mean.



## HFCE

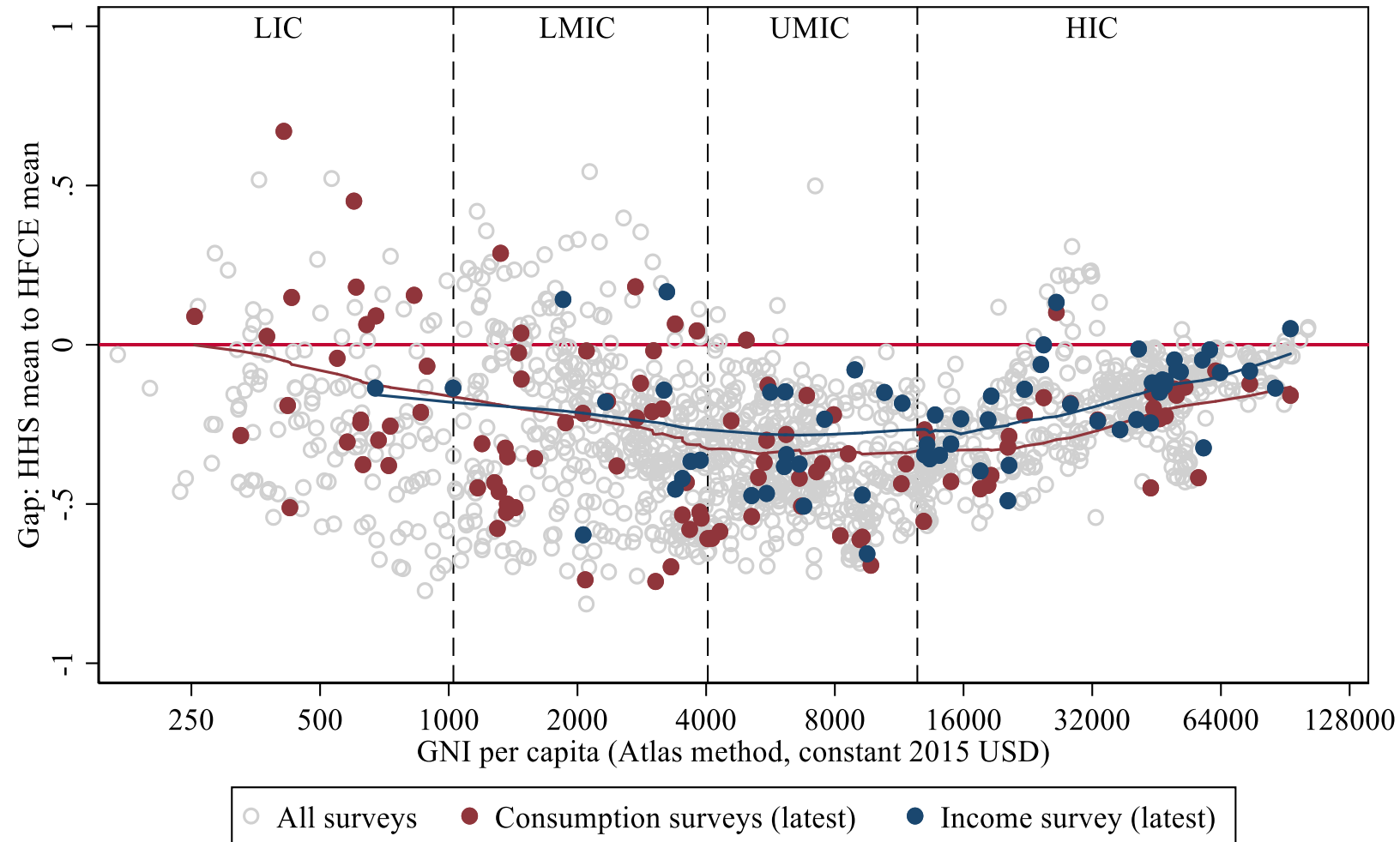
| Group                      | All  |       |        |     | Consumption |       |        |     | Income |       |        |     |
|----------------------------|------|-------|--------|-----|-------------|-------|--------|-----|--------|-------|--------|-----|
|                            | N    | Gap   | S.E.   |     | N           | Gap   | S.E.   |     | N      | Gap   | S.E.   |     |
| All                        | 1139 | -0.23 | (0.02) | *** | 588         | -0.25 | (0.02) | *** | 551    | -0.23 | (0.02) | *** |
| Low income                 | 153  | -0.17 | (0.03) | *** | 139         | -0.17 | (0.04) | *** | 14     | -0.12 | (0.03) | **  |
| Lower Middle Income        | 340  | -0.27 | (0.03) | *** | 203         | -0.31 | (0.03) | *** | 137    | -0.19 | (0.05) | *** |
| Upper Middle Income        | 326  | -0.33 | (0.03) | *** | 151         | -0.39 | (0.03) | *** | 175    | -0.29 | (0.04) | *** |
| High Income                | 359  | -0.22 | (0.02) | *** | 122         | -0.23 | (0.03) | *** | 237    | -0.21 | (0.02) | *** |
| East Asia & Pacific        | 94   | -0.25 | (0.07) | *** | 82          | -0.27 | (0.08) | **  | 12     | -0.22 | (0.11) |     |
| Europe & Central Asia      | 575  | -0.26 | (0.02) | *** | 324         | -0.28 | (0.03) | *** | 251    | -0.22 | (0.03) | *** |
| Latin America & Caribbean  | 289  | -0.26 | (0.04) | *** | 22          | -0.46 | (0.06) | *** | 267    | -0.24 | (0.04) | *** |
| Middle East & North Africa | 43   | -0.26 | (0.09) | **  | 38          | -0.25 | (0.09) | **  | 5      | -0.29 | (0.00) | *** |
| North America              | 48   | -0.31 | (0.16) |     | 32          | -0.46 | (0.13) |     | 16     | -0.15 | (0.12) |     |
| South Asia                 | 35   | -0.33 | (0.09) | **  | 35          | -0.33 | (0.09) | **  | ..     | ..    | ..     |     |
| Sub-Saharan Africa         | 91   | -0.19 | (0.05) | *** | 91          | -0.19 | (0.05) | *** | ..     | ..    | ..     |     |

## GDP

| Group                      | All  |       |        |     | Consumption |       |        |     | Income |       |        |     |
|----------------------------|------|-------|--------|-----|-------------|-------|--------|-----|--------|-------|--------|-----|
|                            | N    | Gap   | S.E.   |     | N           | Gap   | S.E.   |     | N      | Gap   | S.E.   |     |
| All                        | 1210 | -0.49 | (0.02) | *** | 658         | -0.49 | (0.02) | *** | 552    | -0.55 | (0.02) | *** |
| Low income                 | 188  | -0.39 | (0.03) | *** | 175         | -0.39 | (0.03) | *** | 13     | -0.41 | (0.09) | **  |
| Lower Middle Income        | 369  | -0.52 | (0.02) | *** | 232         | -0.55 | (0.03) | *** | 137    | -0.50 | (0.03) | *** |
| Upper Middle Income        | 335  | -0.60 | (0.02) | *** | 161         | -0.63 | (0.02) | *** | 174    | -0.59 | (0.02) | *** |
| High Income                | 363  | -0.57 | (0.01) | *** | 126         | -0.58 | (0.01) | *** | 237    | -0.57 | (0.01) | *** |
| East Asia & Pacific        | 105  | -0.49 | (0.05) | *** | 93          | -0.48 | (0.05) | *** | 12     | -0.57 | (0.01) | *** |
| Europe & Central Asia      | 595  | -0.57 | (0.02) | *** | 345         | -0.57 | (0.02) | *** | 250    | -0.59 | (0.01) | *** |
| Latin America & Caribbean  | 297  | -0.48 | (0.03) | *** | 29          | -0.58 | (0.05) | *** | 268    | -0.47 | (0.04) | *** |
| Middle East & North Africa | 49   | -0.51 | (0.08) | *** | 43          | -0.50 | (0.08) | *** | 6      | -0.58 | (0.00) | *** |
| North America              | 49   | -0.56 | (0.04) | *** | 33          | -0.60 | (0.04) | **  | 16     | -0.50 | (0.01) | *** |
| South Asia                 | 37   | -0.56 | (0.06) | *** | 37          | -0.56 | (0.06) | *** | ..     | ..    | ..     |     |
| Sub-Saharan Africa         | 120  | -0.39 | (0.04) | *** | 120         | -0.39 | (0.04) | *** | ..     | ..    | ..     |     |



# Gap in levels show economic u-gradient



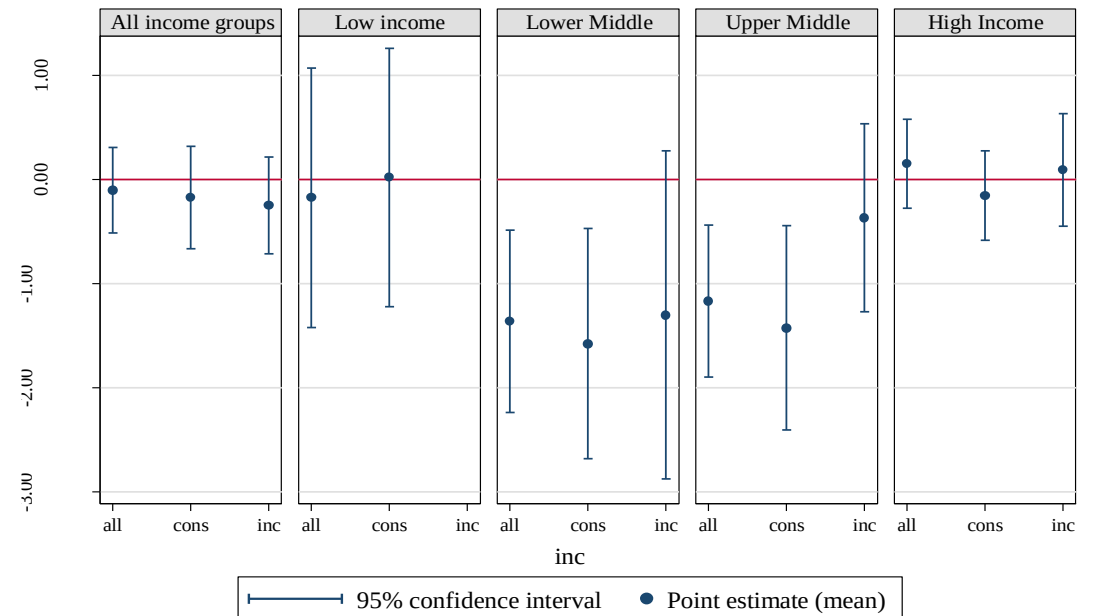
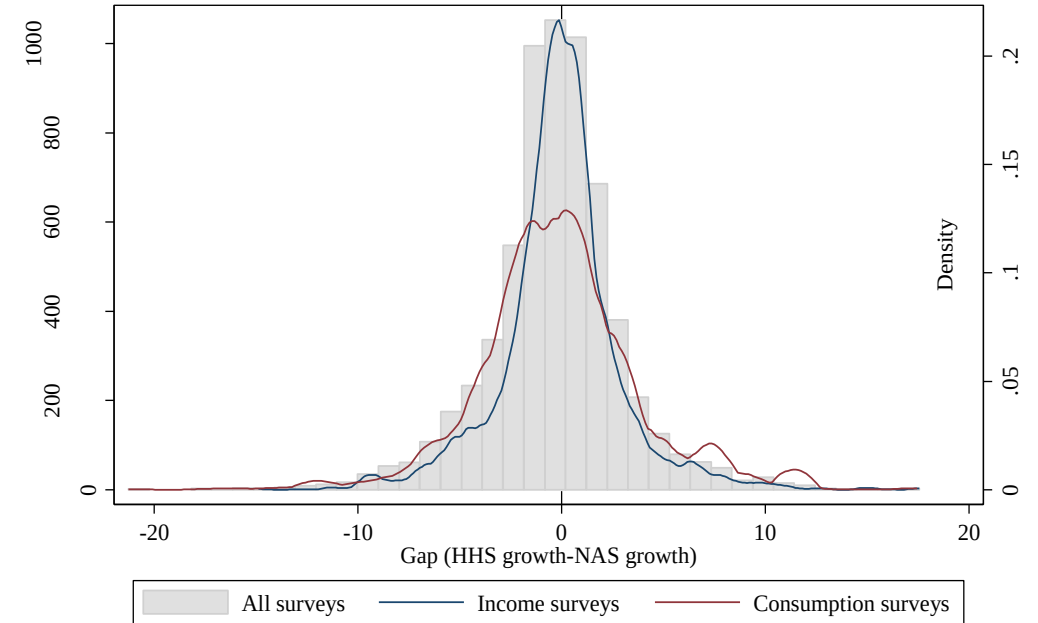
# Gaps in Growth Rates

# Gaps in growth rates

- 1: Measure gap in terms of difference in annualized growth rates

$$\text{Gap} = g_{\text{HHS}} - g_{\text{NAS}}$$

- 2: no-constant OLS regression (as Ravallion, 2003)
- Finding:
  - Significant gaps, but also lots of noise
  - No-constant regression indicate more robust uniform gaps compared previous assessments
  - More careful dissecting of sample needed, metadata on comparability.



HFCE

| Grouping                   | Spells | Gap (bias) |        |     | Precision |      |
|----------------------------|--------|------------|--------|-----|-----------|------|
|                            | N      | $\alpha$   | (s.e.) | sig | RMSE      | AE   |
| All                        | 6341   | -0.10      | (0.21) |     | 3.63      | 2.58 |
| Low income                 | 387    | -0.18      | (0.62) |     | 4.89      | 3.73 |
| Lower Middle Income        | 1853   | -1.36      | (0.44) | *** | 4.73      | 3.42 |
| Upper Middle Income        | 2400   | -1.17      | (0.36) | *** | 3.89      | 2.88 |
| High Income                | 1791   | 0.15       | (0.21) |     | 2.64      | 1.81 |
| East Asia & Pacific        | 507    | 0.05       | (0.58) |     | 3.53      | 2.65 |
| Europe & Central Asia      | 2920   | -0.44      | (0.26) | *   | 3.75      | 2.59 |
| Latin America & Caribbean  | 2252   | -0.50      | (0.39) |     | 3.17      | 2.33 |
| Middle East & North Africa | 88     | -0.11      | (0.47) |     | 2.96      | 2.17 |
| North America              | 395    | -0.45      | (0.68) |     | 2.28      | 1.66 |
| South Asia                 | 93     | 0.53       | (0.87) |     | 2.87      | 2.22 |
| Sub-Saharan Africa         | 170    | 0.71       | (0.59) |     | 4.14      | 3.01 |

GDP

| Grouping                   | Spells | Gap (bias) |        |     | Precision |      |
|----------------------------|--------|------------|--------|-----|-----------|------|
|                            | N      | $\alpha$   | (s.e.) | sig | RMSE      | AE   |
| All                        | 6700   | -0.27      | (0.19) |     | 3.63      | 2.62 |
| Low income                 | 486    | -0.52      | (0.5)  |     | 4.68      | 3.52 |
| Lower Middle Income        | 2046   | -1.25      | (0.42) | *** | 5.03      | 3.63 |
| Upper Middle Income        | 2483   | -0.69      | (0.3)  | **  | 3.67      | 2.63 |
| High Income                | 1787   | -0.14      | (0.26) |     | 2.96      | 2.06 |
| East Asia & Pacific        | 558    | -0.24      | (0.38) |     | 2.82      | 2.04 |
| Europe & Central Asia      | 3102   | -0.38      | (0.28) |     | 3.99      | 2.89 |
| Latin America & Caribbean  | 2307   | 0.00       | (0.4)  |     | 3.37      | 2.37 |
| Middle East & North Africa | 113    | -1.63      | (0.55) | *** | 3.50      | 2.49 |
| North America              | 408    | -0.57      | (0.28) | **  | 1.98      | 1.46 |
| South Asia                 | 110    | -0.27      | (0.65) |     | 2.42      | 2.03 |
| Sub-Saharan Africa         | 264    | 0.15       | (0.5)  |     | 3.83      | 2.85 |

Implications of gaps for common poverty and  
inequality measures

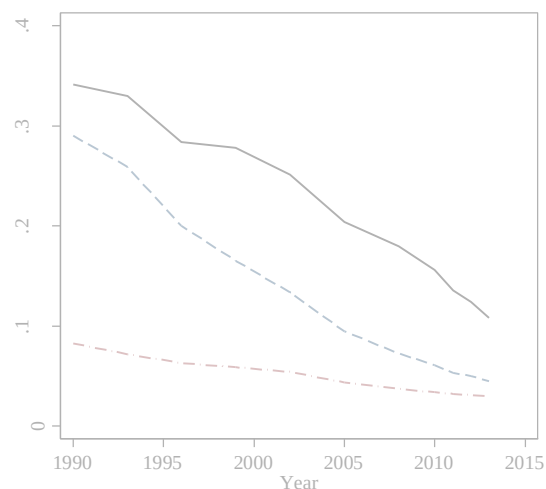
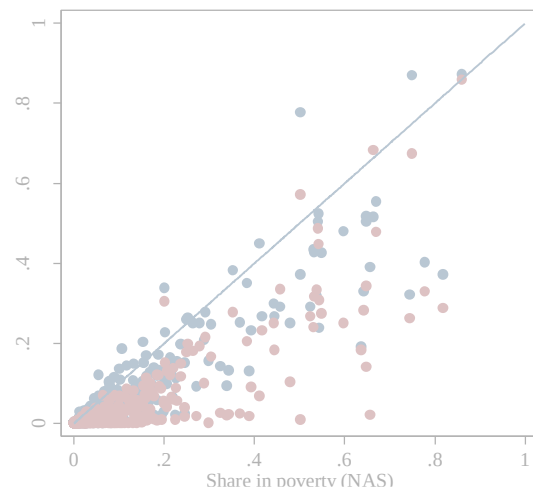
# Implications of HHS-NAS gaps: two scenarios

- Scenario 1: 'distribution neutral' adjustments
  - Assume that HHS is not capturing complete income or consumption (underreporting, error), but that NAS does, and that error is uniform across distribution.
  - Scale HHS distribution to use NAS mean.
  - E.g. Pinkovskiy & Sala-i-Martin (2009, 2016), Bhalla (2002)
- Scenario 2: 'top income' adjustments
  - Assume (part of) gap originates from top incomes underreported or not captured fully in HHS, bias/error (positively) correlated with income
  - Fit a Pareto distribution to allocate the NAS-HHS gap to the richest household of the survey distribution. (Lakner and Milanovic, 2016; Atkinson 2007, others)
  - We allocate gap and elongate distribution following approach by Chandy and Seidel (2017). Allocate half to the gap to top tail.

# Implications for Global Poverty Measures

Using NAS means

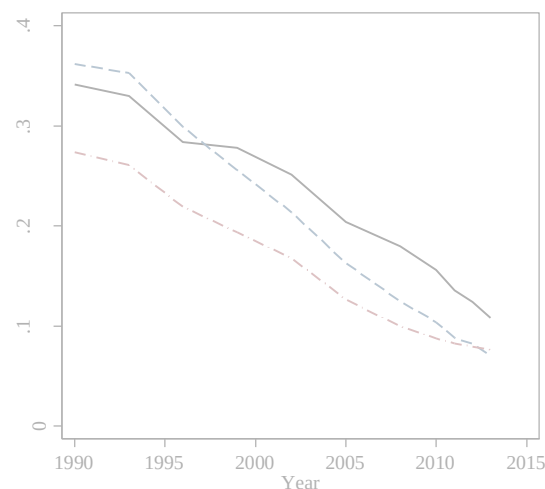
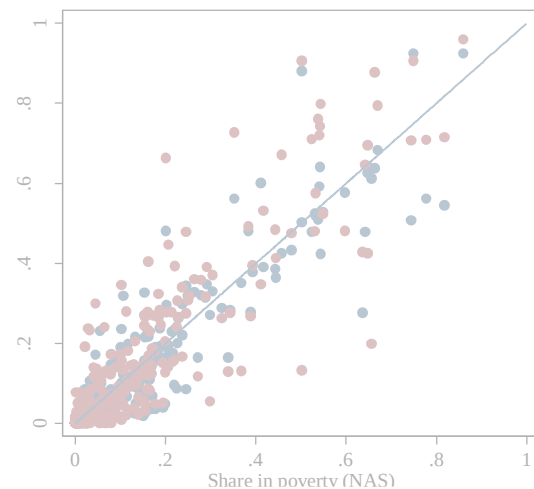
$z=\$1.90$



— HHS    - - - HFCE    - . - GDP

Using NAS means

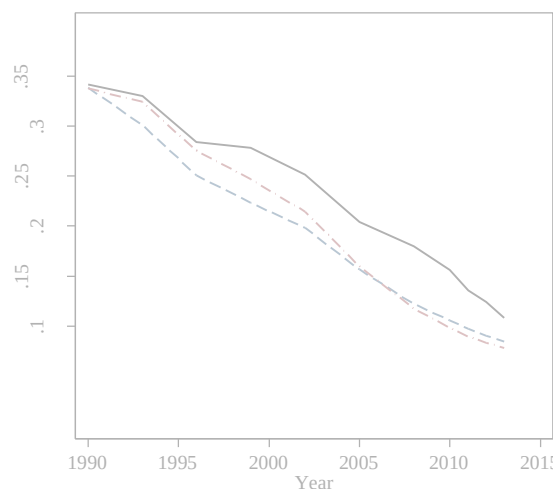
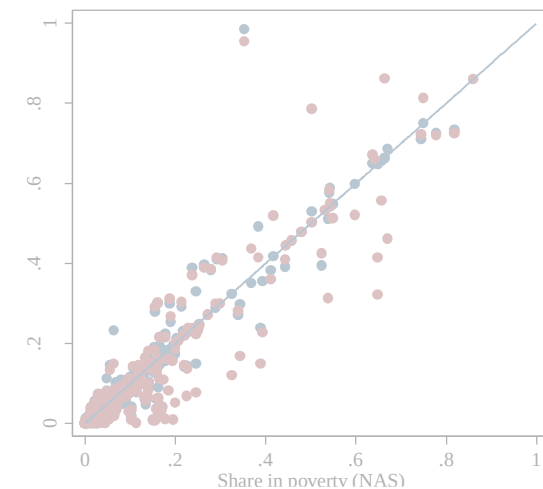
$z\text{HFCE}=\$2.46$ ;  $z\text{GDP}=\$3.73$



— HHS    - - - HFCE    - . - GDP

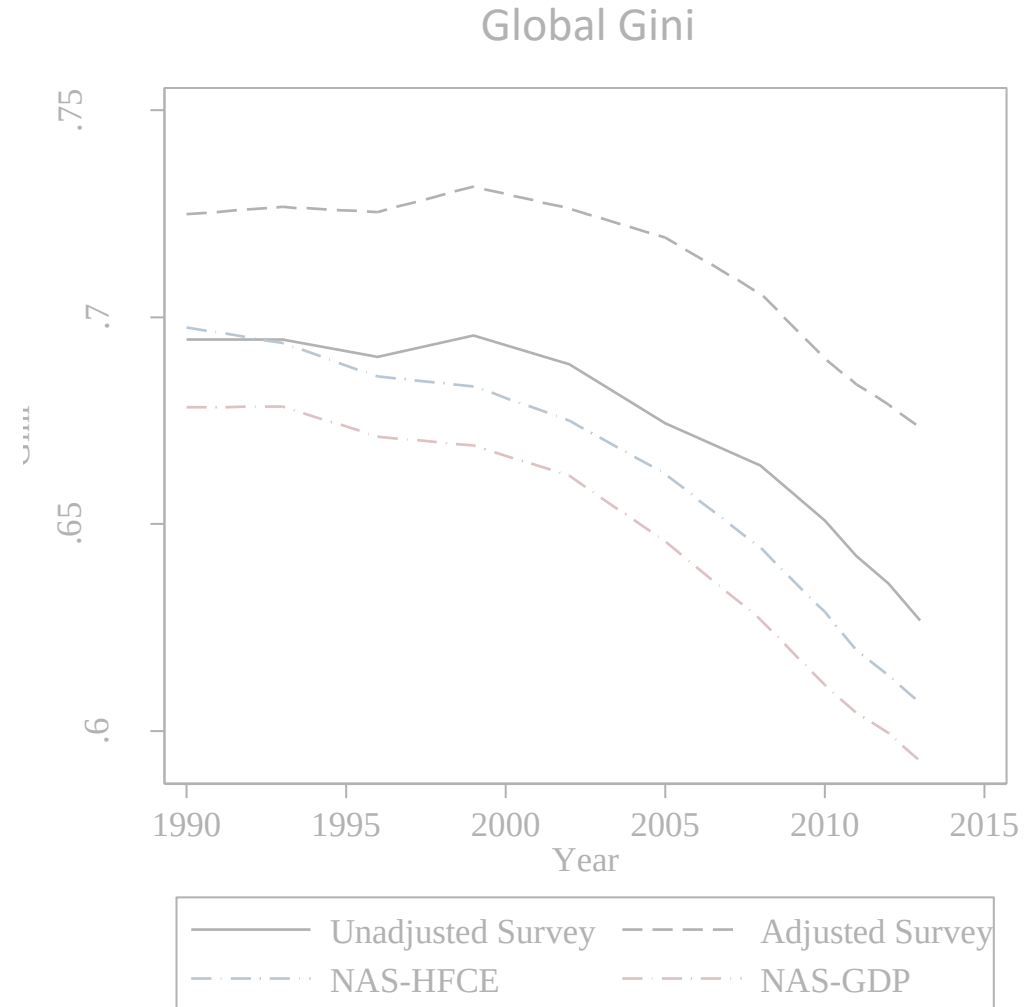
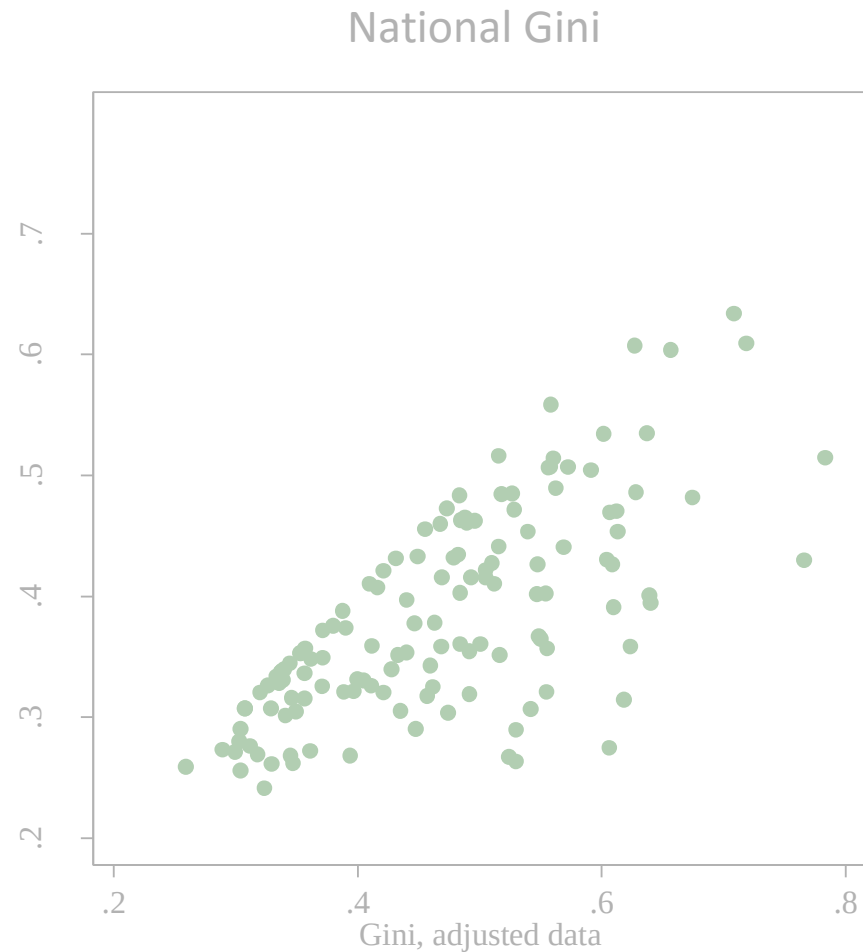
Using NAS means

Country-adjusted  $z$ , 1990



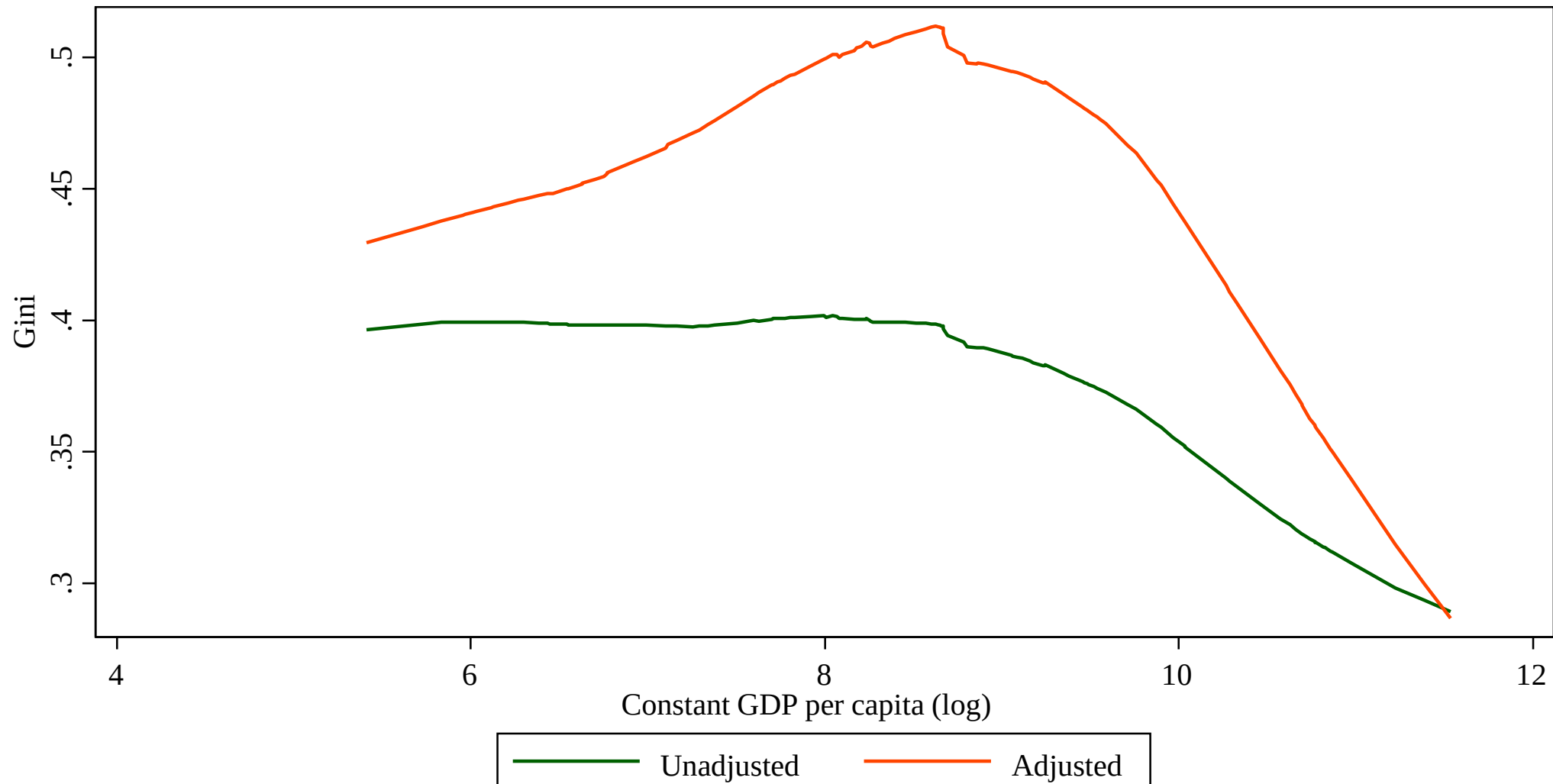
— HHS    - - - HFCE    - . - GDP

# Implications for inequality measures



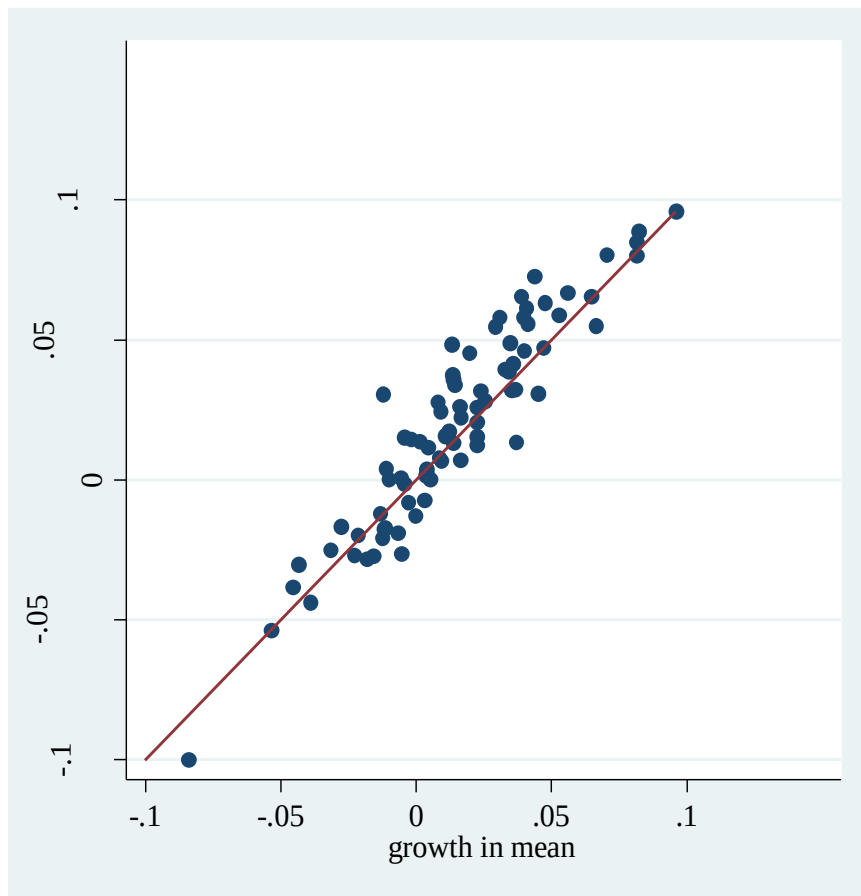


# Evidence of cross-sectional Kuznets curve

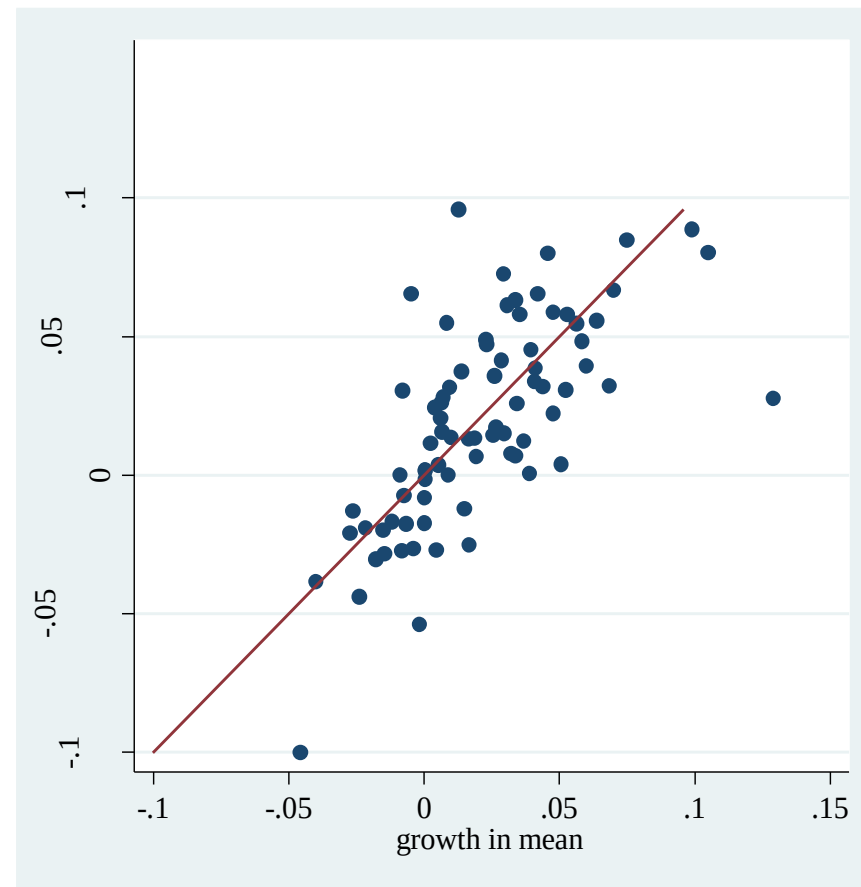


# Implications for “shared prosperity”

Official



Adjusted



# Conclusions

- Gap in levels - large and robust
  - Strong u-shaped economic gradient
  - Gaps largest in middle income countries
  - Implications for poverty depend on how we adjust poverty lines
- Gap in growth rates,
  - Large variation – most robust in middle income countries
  - Gap matters for extrapolation, nowcasting of poverty
  - Looking more closely and shorter time periods, comparable spells important
- Matters for our understanding of evolution of living standards, and for key goals and targets in international development.