Development Economics

Slides 1

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- Convergence, Divergence and Uneven Growth
- Multiple Equilibrium
- History Dependence
- Behavioral Poverty Traps / Credit Markets
- The Economics of Conflict

World Income Distribution

- 2009, World \$59.2t, population 6.8b. Average \$8700.

Definitions (World Bank)

- Low income countries: under \$995. Many African countries fall under this category, as do countries such as Bangladesh, Haiti, Myanmar and Nepal.

846m people, total income 0.4t, average \$509.

- Low middle-income countries \$996–\$3945; members include China, India, Nicaragua, Nigeria, and Thailand.

3.8b people, total income 8.8t, average \$3397.

- Upper middle-income countries \$3946–\$12195. Richer Latin American economies, such as Argentina and Brazil, countries such as Lebanon, South Africa and Turkey.

  1b people, total income 7.5t, average \$7500.

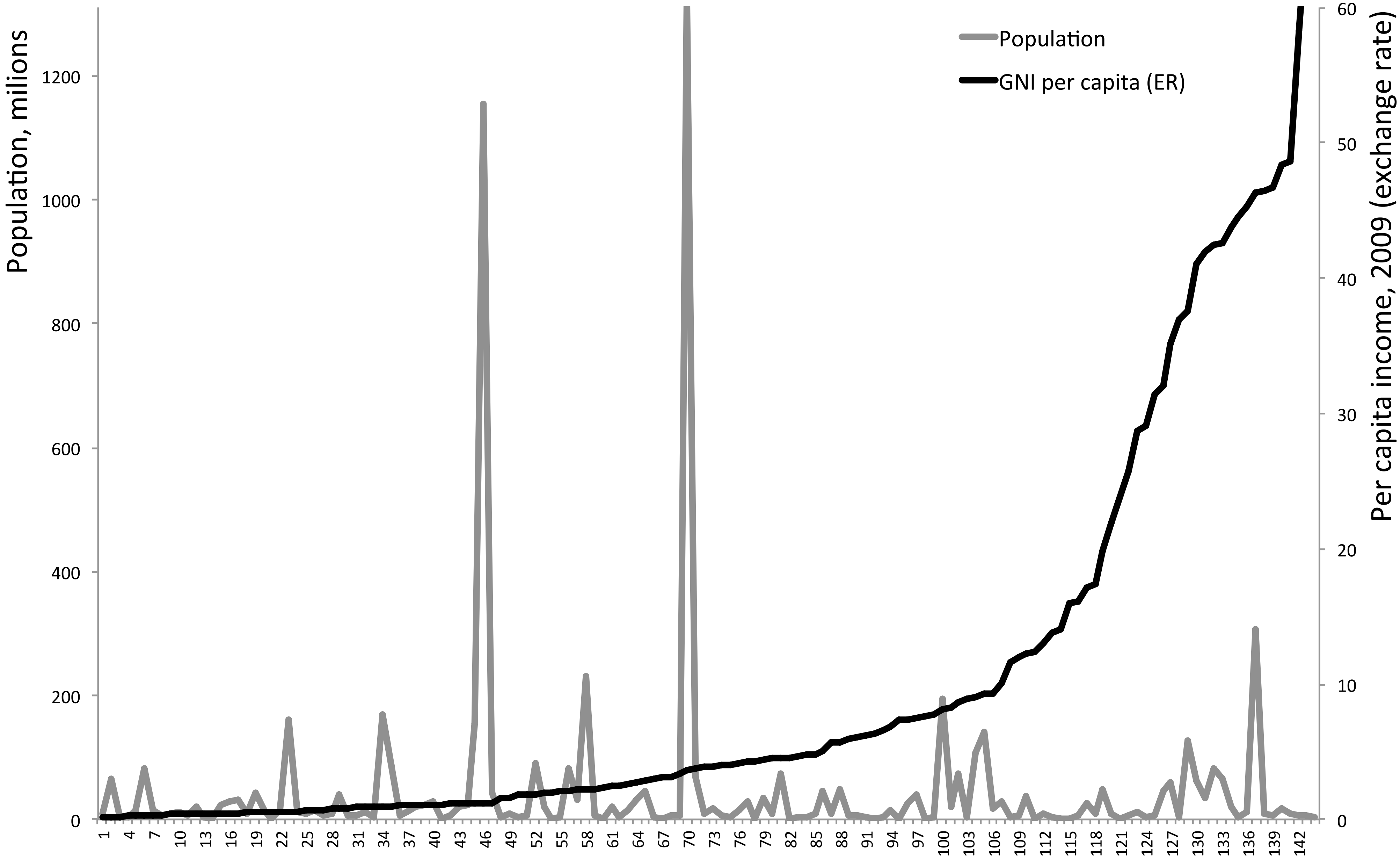
- High income countries, above \$12195. US, Western and Northern Europe, Japan, Singapore, some Middle East countries.

  1.1b people, total income 42.4t, average \$40,400.

- 70% world pop (low + low middle) have 16% of world income.

- Norway (\$85,000) 500 times as rich as Democratic Republic of Congo, 150 times as rich as Bangladesh.

■ Population and per capita GDP (exchange rate method), 2009.



Corrections

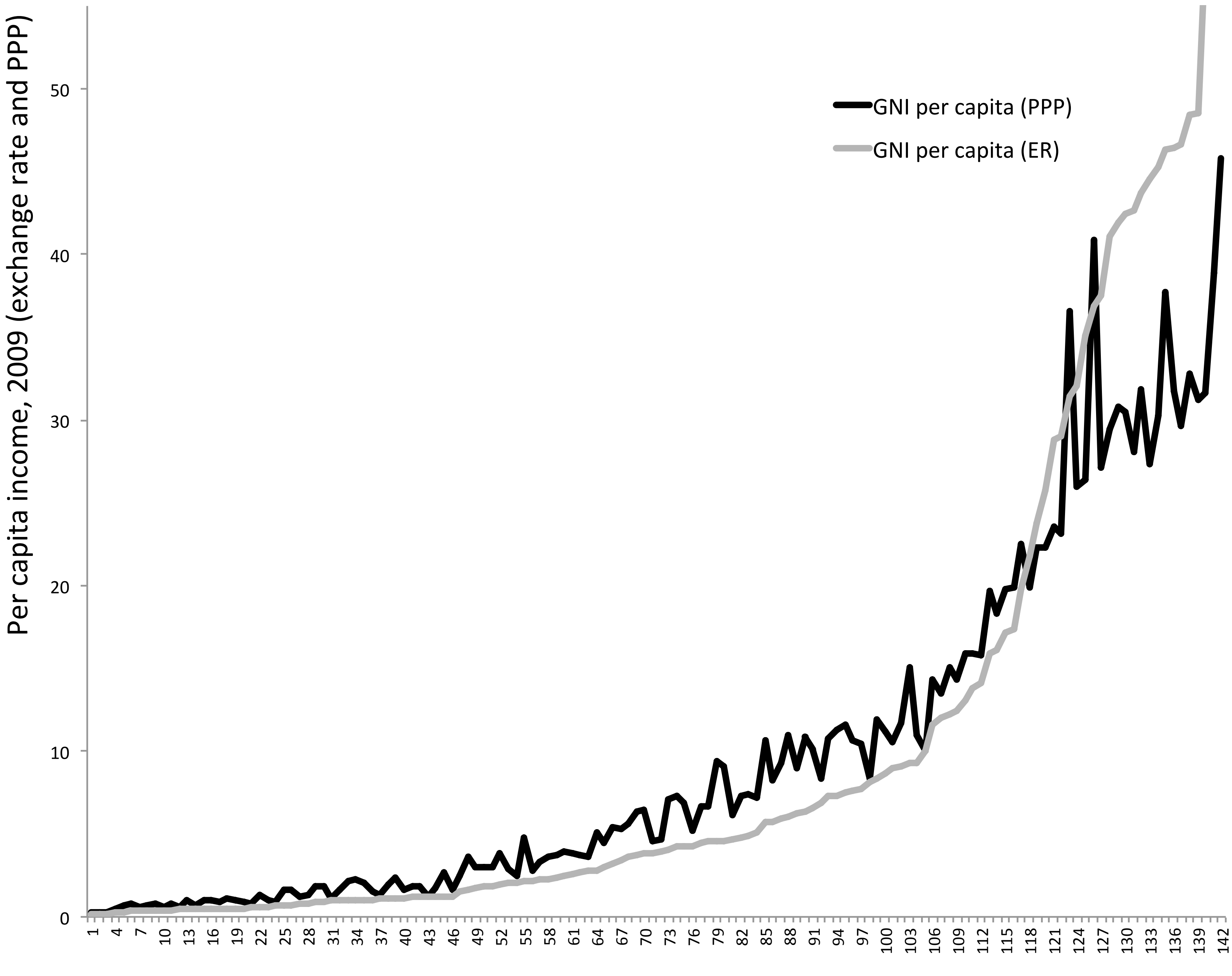
- Underreporting of income (tax evasion, subsistence production)

- Distorted pricing may not reflect preferences or relative scarcities (monopolies, oligopolistic competition, public sector companies).

- Externalities: pollution, environmental damage, resource depletion, human displacement.

- Purchasing power parity and the International Comparison Program

PPP versus exchange-rate GDP per capita, 2009.



Historical Experience

- Richest and poorest 10% of nations relative to world average:

GNI per capita PPP

	1982	1988	1994	2000	2006	2009
top 10%/World av	4.05	3.99	4.06	4.20	4.15	3.96
bottom 10%/World av	0.10	0.09	0.07	0.06	0.06	0.06

GDP per-capita PPP

	1982	1988	1994	2000	2006	2009
top 10%/World av	4.12	3.95	4.04	4.11	4.05	3.84
bottom 10%/World av	0.10	0.09	0.07	0.07	0.07	0.07

In 2010, the richest state in the United States (not counting DC) was Alaska and the poorest was Mississippi, and the ratio of per capita incomes worked out to slightly over 2!

Lots of Movement Within the Distribution

- World GDP per capita grew at 1.5% per year over 1970–2010.

- East Asia danced to a tune all its own.

  - 1960–1990: Japan 5.3%, Korea 6.1%, Hong Kong 6.6%, Indonesia 3.8%, Malaysia 4.2%, Singapore 6.4%, Thailand 5.1%

  - 1990–2010: slower: Japan $< 1\%$ (less than world average), rest stayed in the 3s and 4s.

  - China! 1980–1990, 7.6%. 1990–2010: 9.5%.

- India, another fast-moving newcomer: 2.6% over 1960–1990, 3.6% over 1990–2000, 6.2% over 2000–2010.

- Latin America not too hot (from an economic point of view).

  - 1960–1980: around 2.9% annually.

  - 1980–1990, the "lost decade" for Latin America, decline of over 0.7% year over year, overall decline of around 10%. Argentina -2.9%, Brazil -0.5%, Mexico -0.3%, Peru -3.0%, Uruguay -0.7%.

  - Only Chile (2.1%) and Colombia (1.4%) had higher per capita income in 1990 than they did in 1980.

  - 1990–2010, still slow, around world average (exceptions Chile, 4.7%, and Argentina, 3.6%).

  - 2000–2010, much better. Average well in excess of 2%. Argentina 3.3%, Brazil 2.4%, Chile 2.6%, Peru 4.3%, Uruguay 3.0%. Mexico not so well at 0.8%.

- Sub-Saharan Africa more stagnation.

  - 1980–1990 decline at 1% annual.

  - 1990–2000 decline at 0.4% annual.

  - 2000–2010 better, with growth at 2.2%.

- Examples.

  - Nigeria (-1.6%) and Tanzania (-2.0%) in the 1980s, stagnation 1990s, robust recovery over 2000–2010 (3.9% Nigeria, 4.0% Tanzania).

  - Kenya barely grew in the 1980s, declined in the 1990s, some recovery 2000–2010; overall 0.2% over 30 years.

- Uganda stagnated over the 1980s (-0.1%) before picking up pace and making substantial progress over 1990–2010, growing at over 3.5% annually.

- Rwanda, crippled by negative growth in the 1980s (-1.2%) and 1990s (-0.7%) before a remarkable recovery over 2000–2010 (4.8%).

- Yet Burundi's negative growth rate of 3.2% in the 1990s made worse by near-stagnation over 2000–2010 (0.4%).

- The Democratic Republic of the Congo in freefall over 1980–1990 (-2.2%) and 1990–2000 (-8.5%!) before 1.8% 2000–2010.

- Zimbabwe stagnated in the 1980s (0.7%) and 1990s (-0.3%) before entering a freefall of its own (-4.8%) over 2000–2010.

- OECD: 20 original members, fourteen additions. All the developed countries, a few middle-income countries also members.
  - 1970–1990, OECD growth a bit over 2.4%
  - 1990–2000 1.8%, a bit higher than world average
  - 2000–2010 Under world average at 0.8%
- The United States mirrors OECD reasonably well:
  - 2.2% over 1970–1990
  - a bit under 2.2% in 1990–2000
  - 0.7% in 2000–2010

Summary So Far

- Over 1980–2010, the *relative* distribution of world income stable or somewhat worsening.
  - Richest 10% of nations 4 times the world average
  - Poorest 10% had 6–10% of world average, generally declining.
- But lots of movement within the distribution.
  - Rise of Asia: Japan, then China and now India
  - Languishing of sub-Saharan Africa
  - Relatively slow growth in many parts of Latin America

The Calibration Game

- Solow model: a production function

$$Y_t = A_t K_t^{\theta} L_t^{1-\theta},$$

  - where labor grows at rate n, and A_t is TFP:

$$A_t = A(1+\gamma)^{(1-\theta)t},$$

  - γ: growth rate of labor productivity.

- Capital accumulation equation with constant savings rate s:

$$K_{t+1} = (1-\delta)K_t + sY_t,$$

- Normalized capital-labor ratio: $k_t \equiv K_t / L_t(1+\gamma)^t$; then

$$(1+n)(1+\gamma)k_{t+1} = (1-\delta)k_t + sAk_t^{\theta},$$

- so that $$k_t \to k^* \simeq \left[\frac{sA}{n+g+\delta}\right]^{1/(1-\theta)}.$$

- So K/L ultimately deepens along the path

$$(1+\gamma)^t \left(\frac{sA}{\gamma+\delta+n}\right)^{1/(1-\theta)},$$

- while $y \equiv Y/L$ ultimately grows along the path

$$\begin{aligned} y_t &= A(1+\gamma)^t \left(\frac{sA}{\gamma+\delta+n}\right)^{\theta/(1-\theta)} \\ &= A^{1/(1-\theta)}(1+\gamma)^t \left(\frac{s}{\gamma+\delta+n}\right)^{\theta/(1-\theta)}. \end{aligned}$$

Explaining the Spread

- If two countries have similar γ, n and δ,

$$\frac{y_1}{y_2} = \left(\frac{A_1}{A_2}\right)^{1/1-\theta} \left(\frac{s_1}{s_2}\right)^{\theta/1-\theta}.$$

  - θ is share of capital.

- Lucas (1990): $\theta \simeq 0.4$, so $\theta/(1-\theta) \leq 2/3$.
  - Doubling $s \Rightarrow$ income ratio approx $2^{2/3}$, around 60%.
- Parente-Prescott (2000): 70% labor, 5% land, so $\theta \simeq 0.25$.
  - Doubling $s \Rightarrow$ income ratio approx $2^{1/3}$, around 25%.

- 1970–2010, average per capita income (PPP) of richest 10% about 40 times corresponding figure for the poorest 10%.

Calibration, TFP

- TFP differentials give us a better chance: whereas

$$\frac{y_1}{y_2} = \left(\frac{s_1}{s_2}\right)^{\theta/(1-\theta)},$$

for TFP differences more amplified:

$$\frac{y_1}{y_2} = \left(\frac{A_1}{A_2}\right)^{1/(1-\theta)}.$$

- When $\theta = 1/3$, square root of s-ratios translate to income ratios while technology ratios are taken to the power 1.5.

- So a doubling of TFP "explains" a ratio of 3. Better.

Calibration, rate of return

- Lucas (1990): differentiate production function to get

$$r = A\theta k^{\theta-1},$$

or equivalently

$$r = \theta A^{1/\theta} y^{(\theta-1)/\theta}.$$

- If $\theta = 1/3$, then

$$\frac{r_1}{r_2} = \left(\frac{y_2}{y_1}\right)^2.$$

- Yields absurd numbers. If the per-capita income in the US is 15 times larger than that of India, the rate of return on capital in India should be over 200 times higher! Even if $\theta = 0.4$ (used by Lucas), get a ratio of 60, lower but also absurd.

Regression Approach

- Related approach due to Mankiw, Romer and Weil (QJE 1992):
- Recall our normalized steady state:

$$k^* = \left(\frac{sA}{n+\delta+\gamma}\right)^{\theta/(1-\theta)},$$

- so that

$$y(t) \simeq A^{1/(1-\theta)}(1+\gamma)^t \left(\frac{s}{n+\delta+\gamma}\right)^{\theta/(1-\theta)}.$$

- Take logarithms:

$$\ln y(t) = \left[\frac{1}{1-\theta}\ln A + t(1+\gamma)\right] + \frac{\theta}{1-\theta}\ln s - \frac{\theta}{1-\theta}\ln(n+\delta+\gamma).$$

Regression Approach

$$\ln y(t) = \left[\frac{1}{1-\theta}\ln A + t(1+\gamma)\right] + \frac{\theta}{1-\theta}\ln s - \frac{\theta}{1-\theta}\ln(n+\delta+\gamma).$$

- Motivates the regression that we need to run:

$$\ln y_i(t) = [C + Dt] + b_1 \ln s_i + b_2 \ln(n+\delta+\gamma)_i + \epsilon_i.$$

- And also pins down what we should expect to find:
  - $b_1 > 0$, $b_2 < 0$, and $b_1 = -b_2 = \theta/(1-\theta) \simeq 0.6$.
- Implementation: take $\delta + \gamma = 0.05$ (exact numbers don't matter much).
  - Regress y^{1985} on parameter averages over 1960–1985.
  - Get $b_1 = 1.42$ and $b_2 = -1.97$. Signs ok, but way too big.

Ways Out

- Differences in Human Capital

- Krueger (1968): relative productivity across US/Indian workers.

- US estimates: how age, education, sector affect productivity.

- Obtains ratio of one US worker = approx. 5 Indian workers.

- $\Rightarrow$ the ratio of income per effective capita is 3.

- Still generates a rate of return differential between 5 (if capital's share is 40%) and 9 (if that share is set lower at 1/3). Too large.

- For more, see Erosa, Koreshkova and Restuccia (2010).

Differences in TFP

- Implicit TFP ratios needed to equalize r *and* maintain per-(effective) capita income ratios around 3.

- Equality of the two rates of return:

$$A_I y_I^{\theta-1} = A_U y_U^{\theta-1},$$

$$\frac{y_U}{y_I} = \left(\frac{A_U}{A_I}\right)^{1/(1-\theta)} \simeq \left(\frac{A_U}{A_I}\right)^{1.5} \text{ if } \theta \simeq 1/3.$$

$$\frac{A_U}{A_I} \simeq 3^{2/3} = 2.08.$$

- Big or small? If the US and India put in the same amounts of capital and quality-corrected labor into production, the US will produce twice as much as India. This may be a tall order.

Misallocation of Capital

- Generate productivity differences from capital misallocation (Banerjee-Duflo (2004)).
- Tension: misallocation implies small values of θ, bigger problem.
- Cannot provide an unambiguous fix.

The Share of Capital

- Is θ underestimated?
  - Parente-Prescott (2000) on intangibles and mismeasurement.
  - Piketty (2014) and others on the Cobb-Douglas restriction.
- But as long as θ in this general range, not enough.

Government Failure

- Expropriation of new investors.

- Incumbent elites not necessarily the best entrepreneurs, but can control the entrance of others more efficient than they are.

- (Engerman-Sokoloff and Acemoglu-Johnson-Robinson)

- Parente and Prescott consider a variant of this point of view, in which they regard the government as intervening excessively and thus lowering productivity.

- Or can have *lack* of intervention, such as lax protection of property rights. Certain types of long-run investment may then not be made (see Besley, Bandiera, or Goldstein-Udry). Or free-rider problems in joint production, as also overexploitation of the commons.

Understanding the Basic Tradeoff

- The larger is θ, the greater the calibrated spread.

- Extreme example: $Y = AK$ (set $\theta = 1$).

- The Solow equation can then be written as

$$(1+n)k(t+1) = (1-\delta)k(t) + sy(t) = (1-\delta)k(t) + sAk(t)$$

- Define $g \equiv [k(t+1) - k(t)]/k(t)$; then

$$sA \simeq g + n + \delta$$

- This is the Harrod-Domar model.

- Notice how s and n now affect the rate of growth.

- But θ measures the share of capital, which is not close to 1.

$r > g$: A Remark on Piketty (2014)

- Third of Piketty's "three fundamental laws."
  - Supposedly explains widening inequalities via capital income.
  - But it is implied by our model, and so can do no such thing.
  - Rate of return on capital is given by the marginal product:

$$
\begin{aligned}
r_t &\equiv \theta A_t (K_t/L_t)^{\theta-1} \\
&= \theta A (1+\gamma)^{(1-\theta)t} (K_t/L_t)^{\theta-1} \\
&= \theta A e_t^{\theta-1} \\
&\to \theta A \left[\frac{sA}{n+\gamma+\delta}\right]^{-1} \\
&= \frac{\theta}{s}[n+\gamma+\delta],
\end{aligned}
$$

  - While the rate of growth converges to $n+\gamma$.

- So down to comparing $r = \frac{\theta}{s}[n + \gamma + \delta]$ with $g = n + \gamma$.
  - We win if $\theta \geq s$, surely true empirically.
  - Deeper argument: $\theta \geq s$ because of the transversality condition.
- s is inefficient if consumption can be improved in all periods.
  - Easy example: $s = 1$.
  - More generally, recall that per-capita output converges to

$$A^{1/(1-\theta)}(1+\gamma)^t \left(\frac{s}{\gamma + \delta + n}\right)^{\theta/(1-\theta)}$$

  - so that per-capita consumption converges to the path

$$A^{1/(1-\theta)}(1+\gamma)^t \left(\frac{s}{\gamma + \delta + n}\right)^{\theta/(1-\theta)} (1-s).$$

It follows that if $s > \theta$, the growth path is inefficient.

Resolving the Tradeoff

- Two Routes

1. Deliberate accumulation of factors other than physical capital.

2. Accumulation has externalities not captured in private return.

- Note:

- This deals with stable income distributions

- Won't be enough to handle divergence (later)

Example 1: Deliberate Accumulation

- Write

$$Y = AK^{\theta}U^{\beta}H^{\gamma}$$

  - where U is unskilled labor and H is educated labor.

- Divide through by U; then

$$y = Ak^{\theta}h^{\gamma}$$

- Now there are two accumulation equations:

  - Physical capital:

$$K(t+1) = (1-\delta_k)K(t) + s_kY(t),$$

  - Human capital:

$$H(t+1) = (1-\delta_h)H(t) + s_hY(t),$$

- No technical progress for simplicity. Just divide by U; then

$$(1+n)k(t+1) = (1-\delta_k)k(t) + s_k y(t),$$

$$(1+n)h(t+1) = (1-\delta_h)h(t) + s_h y(t),$$

- In steady state $k(t) = k(t+1) = k^*$, $h(t) = h(t+1) = h^*$, $y(t) = y^*$:

$$k^* = \frac{s_k y^*}{n+\delta_k}$$

$$h^* = \frac{s_h y^*}{n+\delta_h}$$

- Recall $y = Ak^\theta h^\gamma$; combining:

$$y^* = A{k^*}^\theta {h^*}^\gamma = A\left(\frac{s_k y^*}{n+\delta_k}\right)^\theta \left(\frac{s_h y^*}{n+\delta_h}\right)^\gamma, \text{ or}$$

$$y^* = A^{1/(1-\theta-\gamma)} \left(\frac{s_k}{n+\delta_k}\right)^{\theta/(1-\theta-\gamma)} \left(\frac{s_h}{n+\delta_h}\right)^{\gamma/(1-\theta-\gamma)}.$$

- Take logarithms:

$$\ln y^* = \frac{\ln A}{1-\theta-\gamma} + \frac{\theta \ln s_k}{1-\theta-\gamma} + \frac{\gamma \ln s_h}{1-\theta-\gamma} - \frac{\theta \ln(n+\delta_k)}{1-\theta-\gamma} - \frac{\gamma \ln(n+\delta_h)}{1-\theta-\gamma}.$$

- As before, motivates the regression we need to run:

$$\ln y_i = C + b_1 \ln s_{ki} + b_2 \ln s_{hi} + b_3 \ln(n+\delta_k)_i + b_4 \ln(n+\delta_h)_i + \epsilon_i.$$

- Comparing, we get the predictions: $b_1 = \frac{\theta}{1-\theta-\gamma}$, while the coefficient on $\ln n$ is approx. $-\frac{\theta+\gamma}{1-\theta-\gamma}$.
- Now income differences higher than that predicted by θ alone.
- The coefficients on s_k and n will be larger.
- The coefficient on s_k smaller than that on n (in absolute value).
- 1 versus -2 if $\theta = \gamma = 1/3$.

TABLE II

ESTIMATION OF THE AUGMENTED SOLOW MODEL

Dependent variable: log GDP per working-age person in 1985			
Sample:	Non-oil	Intermediate	OECD
Observations:	98	75	22
CONSTANT	6.89	7.81	8.63
	(1.17)	(1.19)	(2.19)
ln(I/GDP) (i.e., ln s_k)	0.69	0.70	0.28
	(0.13)	(0.15)	(0.39)
$\ln(n + g + \delta)$	−1.73	−1.50	−1.07
	(0.41)	(0.40)	(0.75)
ln(SCHOOL) (i.e., ln s_h)	0.66	0.73	0.76
	(0.07)	(0.10)	(0.29)
$\overline{R}^2$	0.78	0.77	0.24

Source: Mankiw, Romer and Weil (1992).

Example 2: Externalities

- Recall: TFP ratio of approx 2 equalizes r *and* maintains per-(effective) capita income ratios $\simeq 3$.

- (Romer 1986, Lucas 1990) Suppose TFP an externality proportional proportional to h^a, where $a > 0$. Then

$$\frac{A_U}{A_I} = \left(\frac{h_U}{h_I}\right)^a.$$

- Lucas estimates $a \simeq 0.36$, using Denision's productivity comparisons within the United States over 1909 and 1958, and combining them with human capital endowments over the same period.

- Because $5^{0.36} \simeq 1.8$, this takes care of the problem as far as Lucas is concerned.

Convergence?

- Option 1. Small number of countries, long horizon.
- Option 2. Large number of countries, short horizon.

- 1. Baumol (AER 1986):

- 16 countries, among the richest in the world today.

- In order of poorest to richest in 1870: Japan, Finland, Sweden, Norway, Germany, Italy, Austria, France, Canada, Denmark, the United States, the Netherlands, Switzerland, Belgium, the United Kingdom, and Australia.

- Angus Maddison: per-capita incomes for 1870.

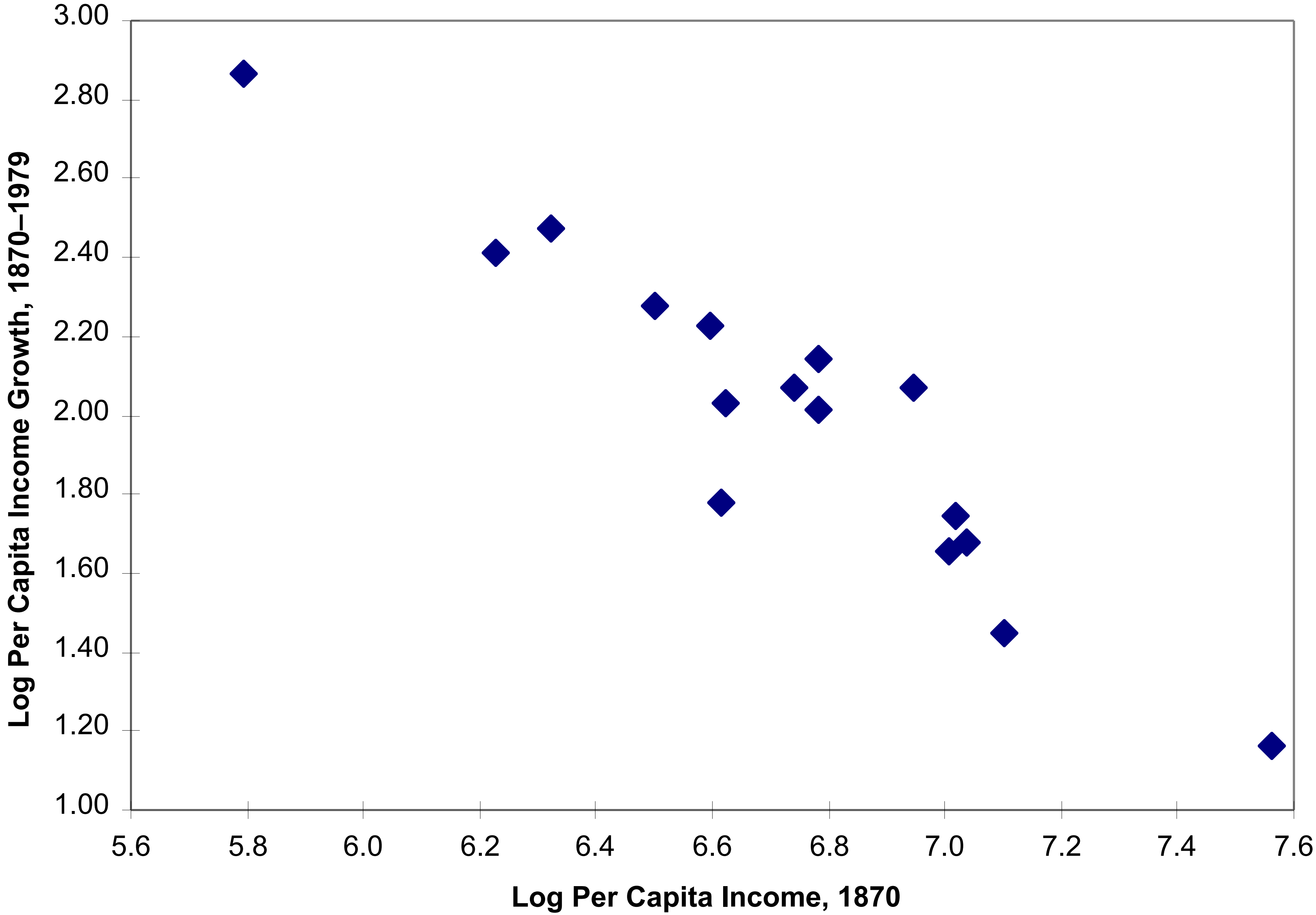
- Idea: regress 1870–1979 growth rate on 1870 incomes.

$$\ln y_i^{1979} - \ln y_i^{1870} = A + b \ln y_i^{1870} + \epsilon_i$$

- Unconditional convergence $\Rightarrow b \simeq -1$.

- Get $b = -0.995$, $R^2 = 0.88$.

- What's wrong with this picture?



- De Long critique (AER 1988):

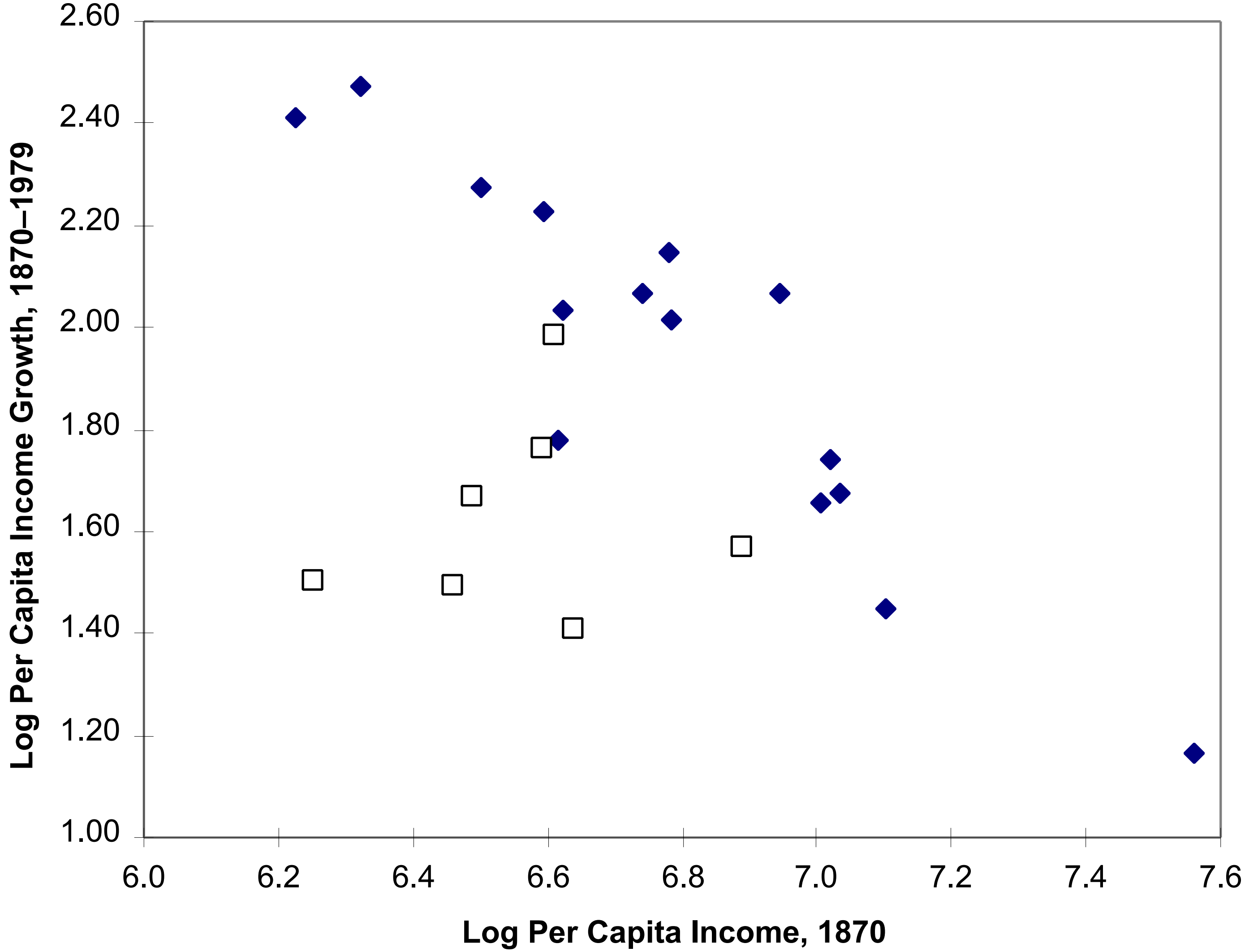
- Add seven more countries to Maddison's 16.

- In 1870, they had as much claim to membership in the "convergence club" as any included in the 16: Argentina, Chile, East Germany, Ireland, New Zealand, Portugal, and Spain.

- New Zealand, Argentina, and Chile were in the list of top ten recipients of British and French overseas investment (in per capita terms) as late as 1913.

- All had per capita GDP higher than Finland in 1870.

- Strategy: drop Japan (why?), add the 7.



- Slope still negative, though loses significance.
- Correct for measurement error, game over.

Divergence, Big Time (Pritchett)

- What about yet other countries?

- Problem: no data going back to 1870.

- Pritchett assumption: no country can fall below $250 per capita (1985 PPP)

- Defense 1: lowest 5-year average ever is Ethiopia $275 (1961–5).

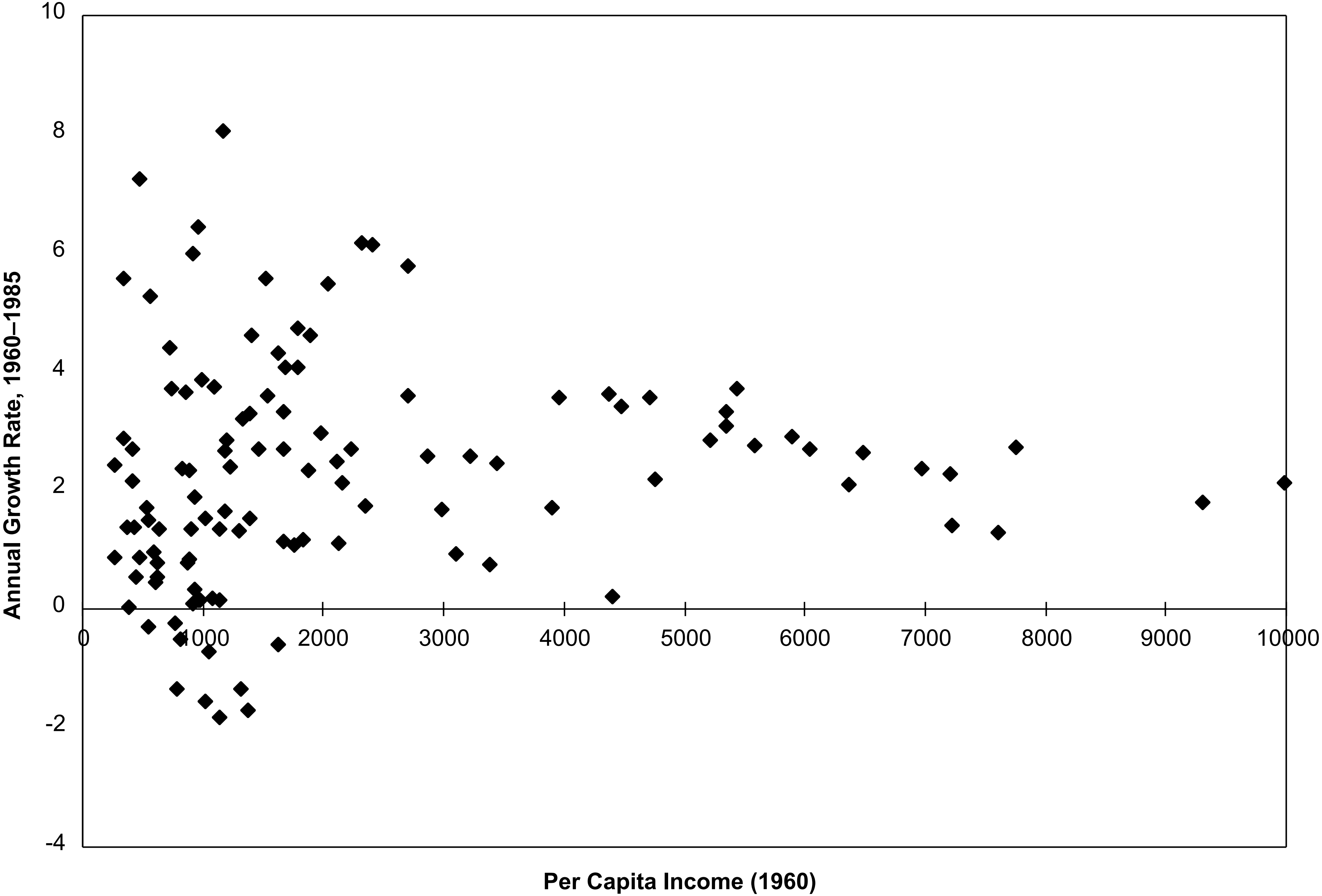
- Defense 2: below extreme nutrition-based poverty lines actually used in poor countries (see Ravallion, Dutt and van de Valle 1991, or nutrition lines at 2000Kcal)

- Defense 3: at any lower income, population too unhealthy to grow. Child mortality rate estimated to climb well above barrier of 600 per 1000.

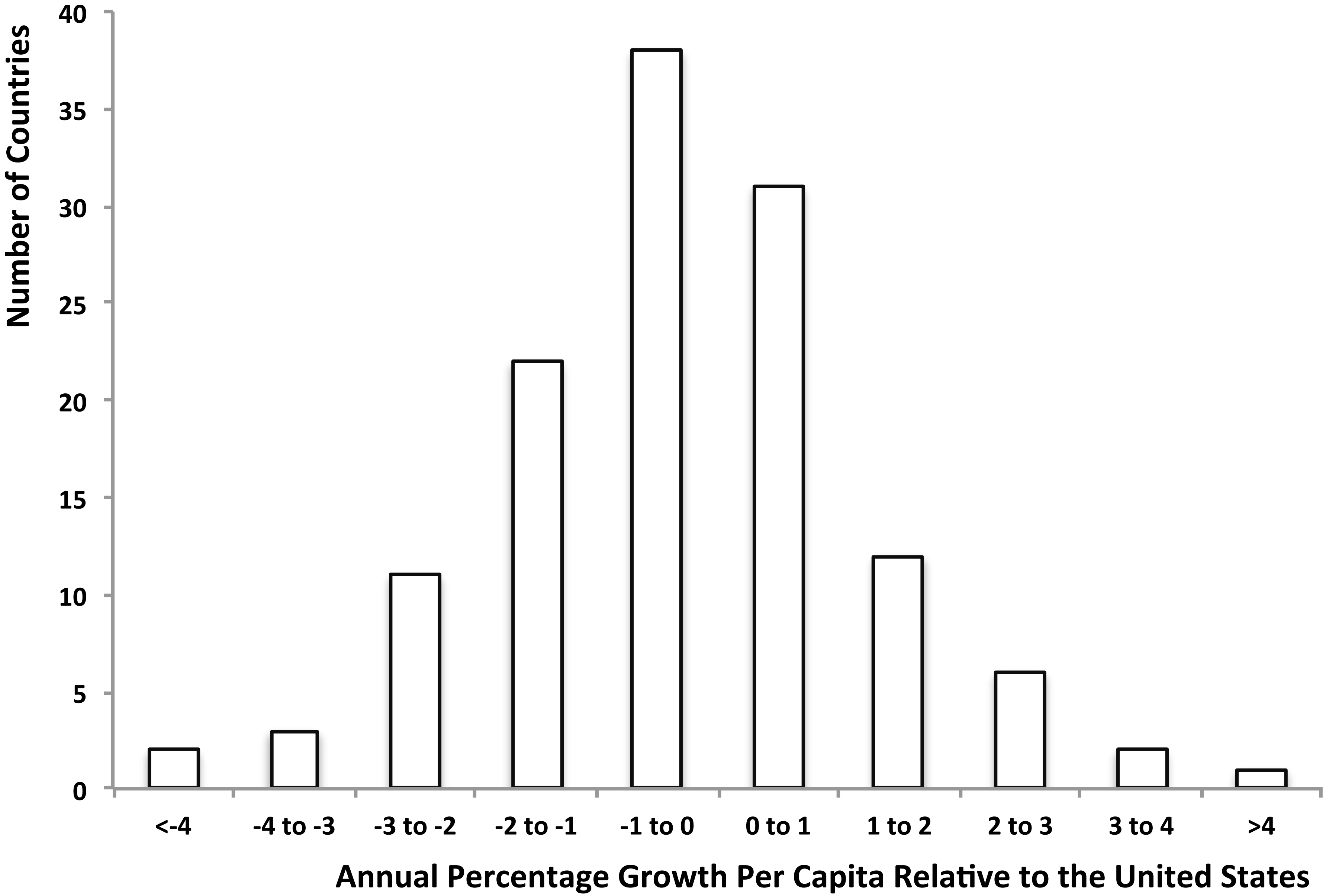
- Claim: the \$250 bound "proves" divergence over long-run.
  - The US grew four-fold from 1870 to 1960.
  - Thus, any country whose income was not fourfold higher in 1960 than it was in 1870 grew more slowly than the United States.
  - 42 out of 125 countries in the PWT have pcy below \$1,000 in 1960.
- Or try this:
  - extrapolate back so poorest country in 1960 hits exactly \$250 in 1870.
  - US: use actual figures.
  - preserve the relative rankings of all other countries (see footnote 11 of Pritchett)

	1870	1960	1990
USA (*P*$)	2063	9895	18054
Poorest (*P*$)	250 (assumption)	257 (Ethiopia)	399 (Chad)
Ratio of GDP per capita of richest to poorest country	8.7	38.5	45.2
Average of seventeen "advanced capitalist" countries from Maddison (1995)	1757	6689	14845
Average LDCs from PWT5.6 for 1960, 1990 (imputed for 1870)	740	1579	3296
Average "advanced capitalist" to average of all other countries	2.4	4.2	4.5
Standard deviation of natural log of per capita incomes	.51	.88	1.06
Standard deviation of per capita incomes	*P*$459	*P*$2,112	*P*$3,988
Average absolute income deficit from the leader	*P*$1286	*P*$7650	*P*$12,662

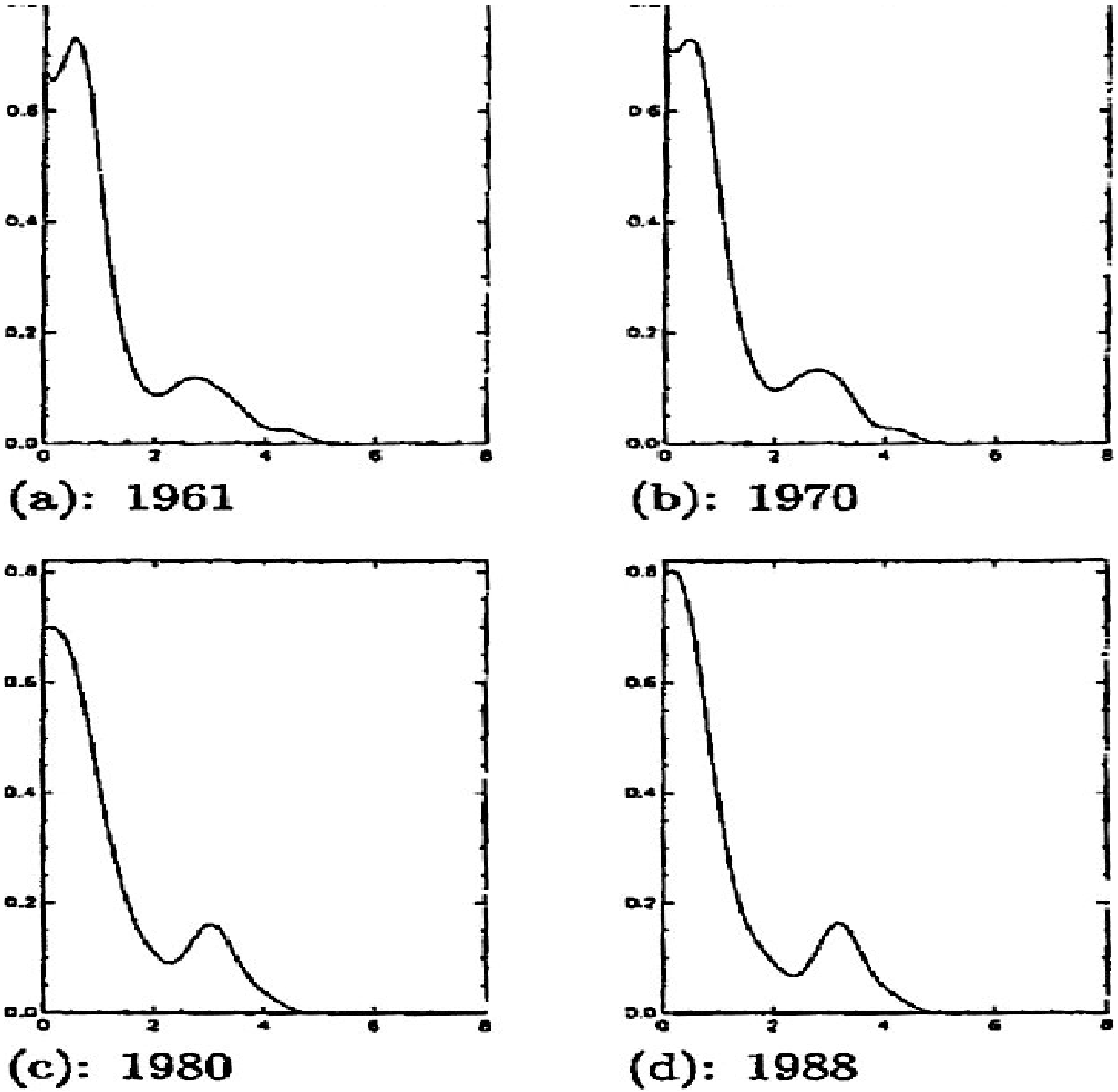
- 2. Barro (QJE 1991): 100+ countries over 1960–1985.



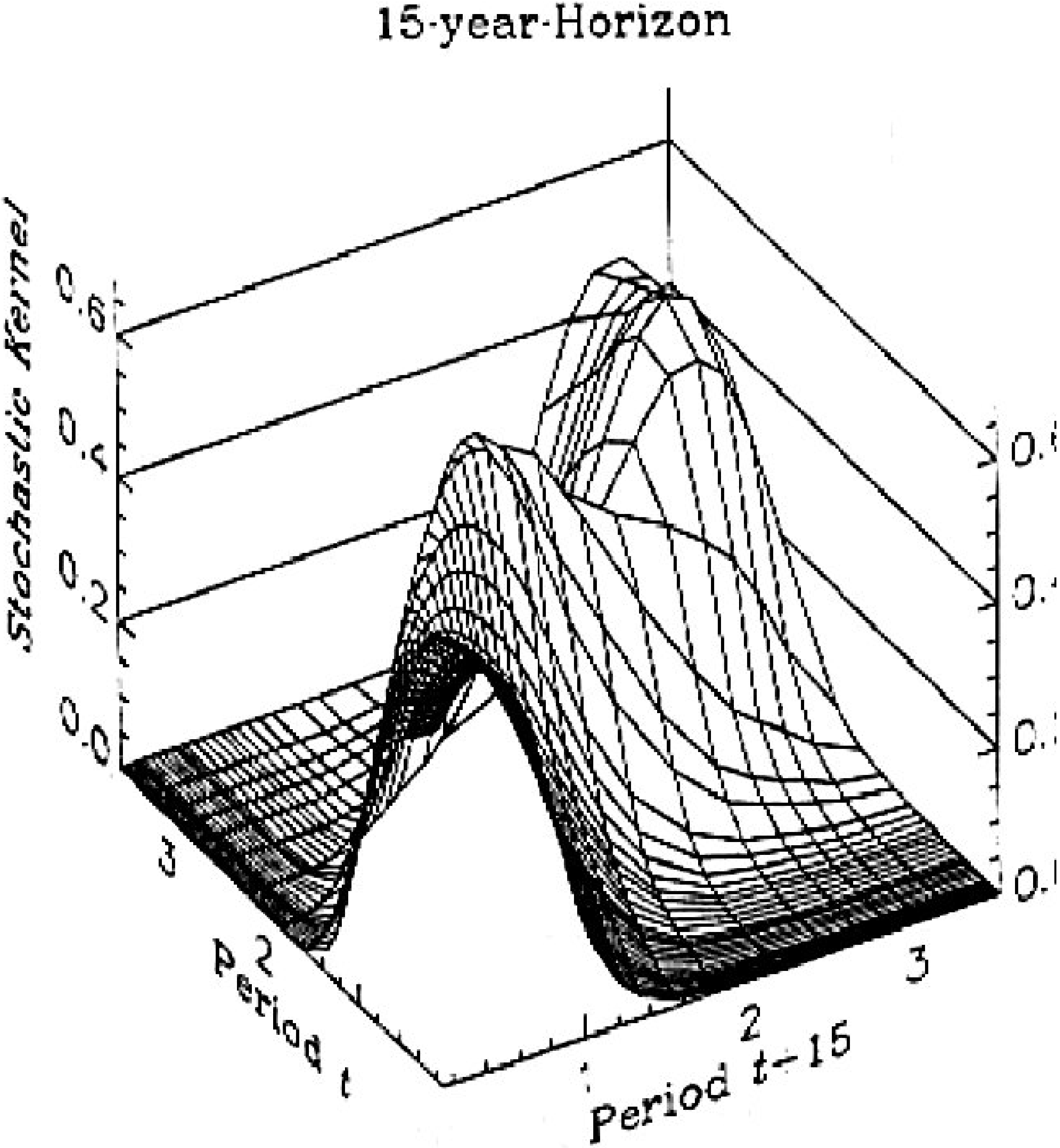
- Movement relative to the US, 1982–2009.



Quah's twin peaks (1993)



- Quah's twin peaks (1993)



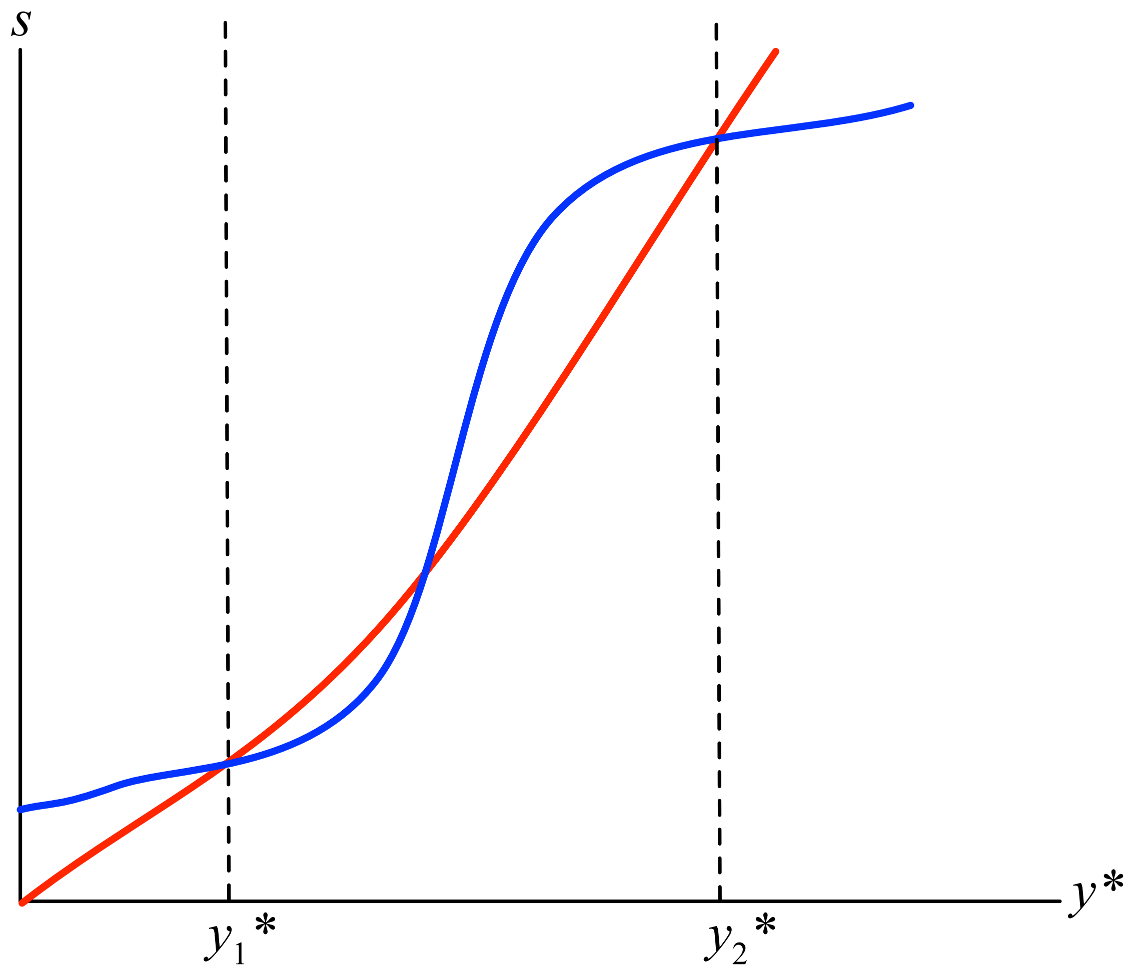
- Mobility matrix, 1982–2009

Cat 1: income $<$ 1/4 world av; Cat 2: between 1/4 and 1/2 world av; Cat 3: between 1/2 world av and world av; Cat 4: between world av and twice world av; Cat 5: income $>$ twice world av.

Obs	Cat	①	②	③	④	⑤
32	①	**84**	**13**	**3**	**0**	**0**
21	②	**43**	**43**	**14**	**0**	**0**
26	③	**0**	**27**	**50**	**23**	**0**
20	④	**0**	**0**	**20**	**70**	**10**
29	⑤	**0**	**0**	**0**	**3**	**97**

- The general problem: there is "too little" convergence.
- Of course we can keep conditioning; e.g.:
- one country is more corrupt than another,
- or less democratic,
- or is imbued with a horrible work ethic,
- or is prone to reproducing like rabbits,
- or is intrinsically predisposed not to save,
- but then what is the point of "conditional convergence"?
- Too little emphasis on the *process*
- endogenous variable $\longrightarrow$ economics $\longrightarrow$ endogenous variable

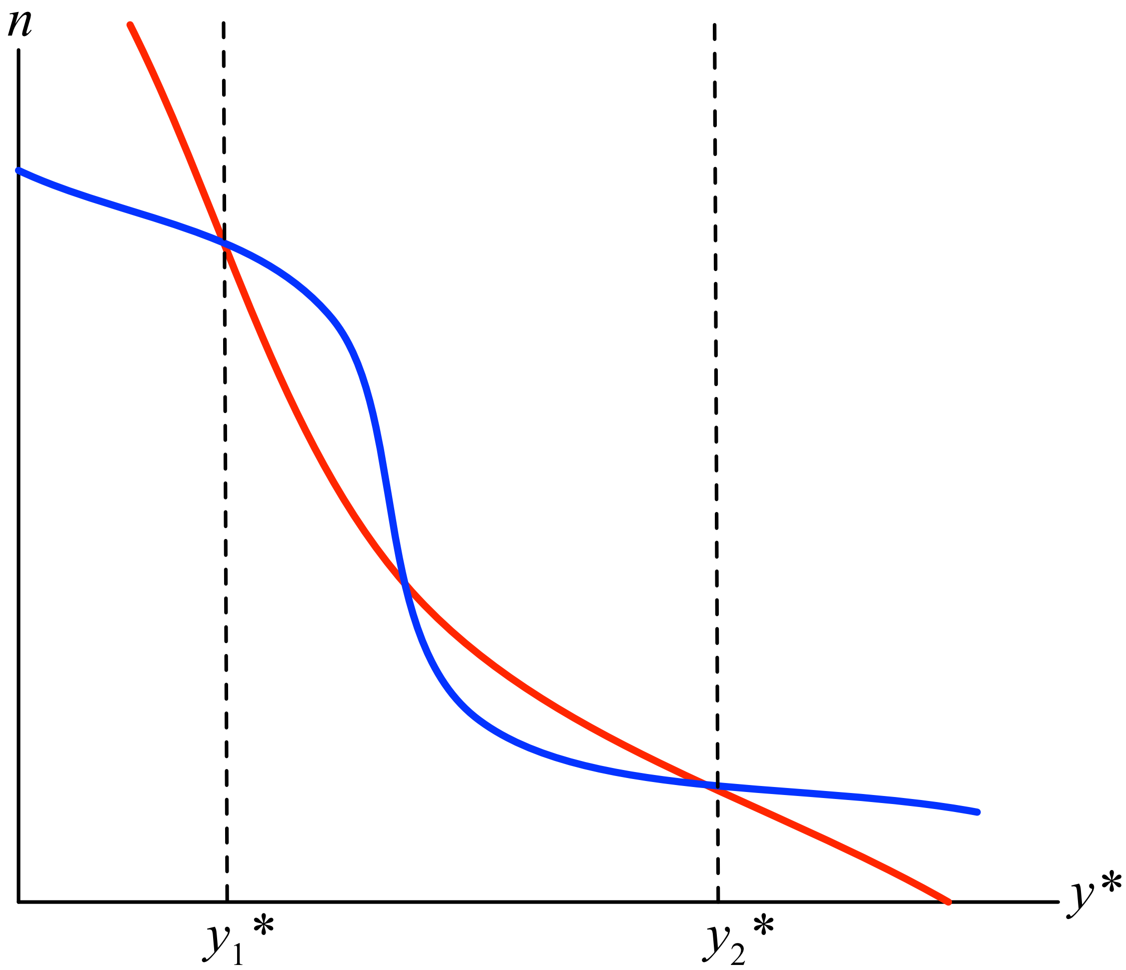
Example: The Endogeneity of s



Blue line: How s is affected by steady state income y^*.

Red line: How y^* is determined by s (as in Solow model).

Example: The Endogeneity of n



Blue line: How n is affected by steady state income y^*.

Red line: How y^* is determined by n (as in Solow model).

Looking Within Countries

- Inter-country inequality compounded within countries:

  - 0–4,000 PPP (2000):

Country	GDP pc (c. 2000)	Share bot. 40%	Share top 20%
Malawi	546	13	56
Uganda	765	16	50
Tanzania	866	19	42
Bangladesh	893	22	40
Senegal	1,492	17	48
Pakistan	1,898	21	42
Nicaragua	2,157	12	55
Sri Lanka	3,106	17	48
Bolivia	3,402	7	63
Guatemala	3,350	11	59

Looking Within Countries

- Inter-country inequality compounded within countries:
  - 4,000–13,000 PPP (2000):

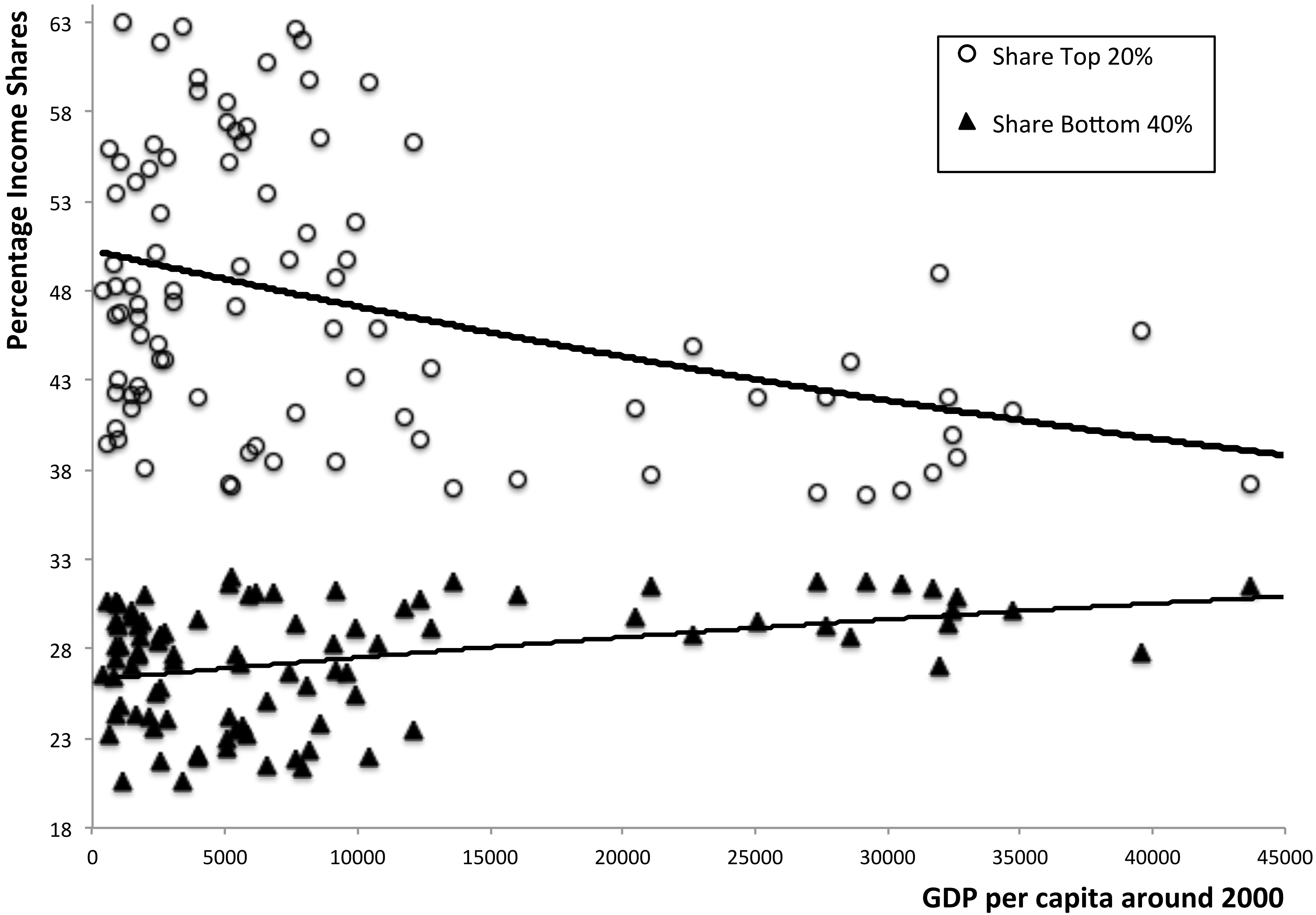
Country	GDP pc (c. 2000)	Share bot. 40%	Share top 20%
El Salvador	5,183	10	55
Peru	5,444	11	57
Costa Rica	5,520	13	50
Thailand	5,568	11	59
Panama	5,840	8	60
Colombia	6,617	9	61
Brazil	7,911	7	65
Costa Rica	8,113	13	51
Venezuela	9,924	12	52
Mexico	12,095	12	56

Looking Within Countries

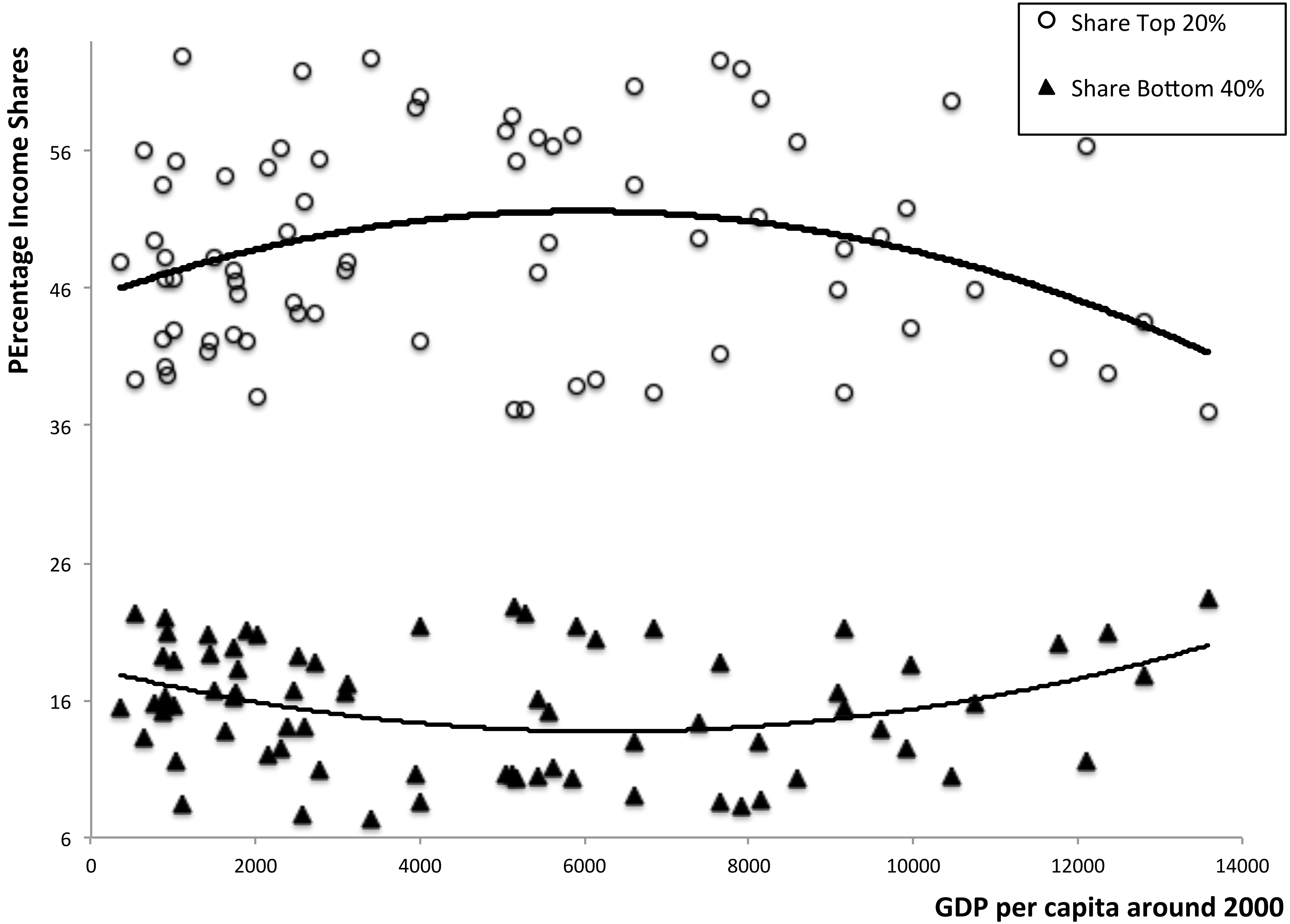
- Inter-country inequality compounded within countries:
  - 13,000+ PPP (2000):

Country	GDP pc (c. 2000)	Share bot. 40%	Share top 20%
Korea	16.015	21	37
Spain	25,129	19	42
UK	28,575	18	44
Sweden	29,126	23	37
Switzerland	34,713	20	41
USA	39,578	16	46
Norway	43,642	24	37

Inequality and per-capita income: the whole range



Inequality and per-capita income: up to $8000, an inverted-U?



Uneven and Compensating Changes

- Uneven growth, perhaps from a few sectors
- Then other sectors catch up, or people migrate
- Tends to generate an inverted-U, but no inevitability to it.
- Note: our diagram was on the cross-section.
- In fact, we can argue that we have rising inequality in many countries.

Uneven Growth

- Roots
  - Path-dependence (sensitivity to initial conditions)
  - Structural change (e.g., agriculture $\to$ industry)
  - Globalization (comparative advantage, FDI)
- Reactions
  - Occupational choice (slow, imprecise, intergenerational)
  - Cross-sector percolation (demand patterns, inflation)
  - Political economy (voting, lobbying)
  - Conflict (Hirschman's Tunnel)
- The great acceleration: UK, 1780, 58; US, 1839, 47; Japan, 1885, 34, Brazil, 1961, 18, Korea, 1966, 11, China, 1980$\to$, 7–9.