Global inequality of opportunity:

How much of our income is determined at birth?

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Remember that you are an Englishman, and have consequently won first prize in the lottery of life.

Cecil Rhodes (attributed)

“Original position”

- Assume a situation where citizenship and parental income class are “allocated” to each individual in the world.
- How much of her income will be determined by her location (country of citizenship) and by parents’ income class (both are circumstances; not effort; in Romer’s terminology)?

Imagine…

- A fairy that draws your “fate” from two large bowls: one contains the names of all countries in the world; the other, income classes (ranging from 1, the bottom, to 100, the top) of your parents
- Will the number of pieces of paper with country names be proportional to population sizes, total births in a given year, or just equal for each country?

- **(1) Country allocation**. Two public goods: mean income of the country, its inequality (Gini).
- There is no migration: country allocation is “fate” (but “morally arbitrary” or “circumstance”). True for 97% of the world population.
- **(2) Income class allocation**. With perfect mobility (that is, if ρ between parents’ and own income=0) => all is effort and luck. With no mobility at all, all circumstance. Real life: ρ in rich countries between 0.2 and 0.5, poor, 0.6+.
- Note: country allocation determines mobility and hence also the share of circumstance vs. effort in the second element.

Short review of the data we use

(WYD database, 2005)

Population and income coverage of the surveys (in %)

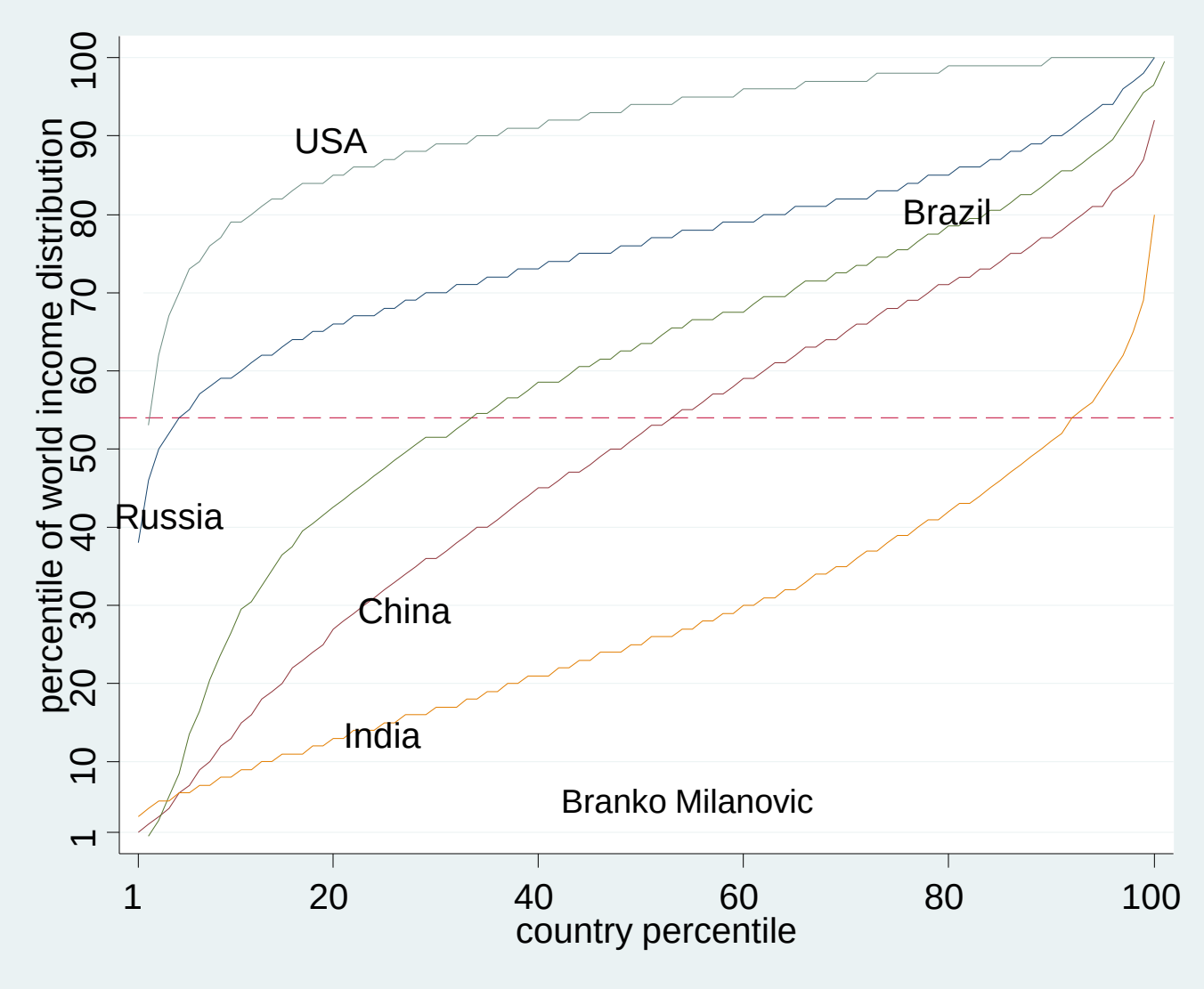
	Africa	Asia	Latin America	E.Europe	WENAO	World
Population	77	96	96	97	99	**94**
Income	71	95	95	99	100	**98**
Number of surveys (countries)	29	26	21	26	21	**123**

Source: World Income Distribution database.
Note: WENAO is Western Europe, North America and Oceania (Australia and New Zealand). Eastern Europe included all formerly Communist countries (including CIS countries).

Definitions of variables:

- *Income:* Household per capita income expressed in $PPP.
- *Income class:* parental income position in national income distribution (running from 1 to 20: ventiles, or 1 to 100: percentiles)
- *Gini* and *mean country income* from household surveys

Different countries and income classes in global income distribution in 2008 (ranked by per capita PPP dollars)



From calcu08.dta

Note…

- Richest percentile in India reaches only the level of the lower middle class in the USA
- The poorest people in the US at the level of median income of China
- About 70% of the population of Brazil or 90% of Russia better off than the very poorest percentile in the US
- Russians better-off than Brazilians at any given point of the distribution except at the top (note convexity at the top in Brazil)

Role of circumstance and effort: from general statement to estimation

Income as function of circumstance and effort (most general)

$$y_{ij} = f(\alpha_{j....}^{1} \alpha_{j}^{m}; \gamma_{ij}^{1} ... \gamma_{ij}^{n}; E_{ij}; u_{ij})$$

α = country circumstances 1 to m (mean income, Gini, mobility)

γ = individual circumstances 1 to n (parental income class, gender, race)

E_i = individual effort

u_i = luck (random term)

How to proceed? The objective, and two issues to be resolved

- Key objective: estimate the effect of country (not directly individual) circumstances on one's income
- Should we take population sizes of countries into account or not?
- Add individual circumstance. How to substitute parents' income class (unobserved) for own income class (observed in the data)?

Two points of view

- *Individual viewpoint* (IV): ”how well would I have fared had I been born in a different country”. Population sizes of countries do not matter.
- *The world as it is* (WAII): Population sizes of countries taken into account. Role of circumstance as it really is in the world.

Estimation

$$y_{ij} = b_0 + b_1 m_j + b_2 G_j + b_3 C_{ij} + \varepsilon_{ij}$$

mj = mean country income

Gj = Gini coefficient

Cij = income class of i-th individual in j-th country

The issue: How to substitute parental income class (C_{ij}*) for own income class (C_{ij}), and thus have the entire regression account for the effect of circumstances only?

Some issues

- The validity of the identification strategy relies on exogeneity of mean income, Gini and parental income class to one's effort
- Clearly no reverse causality, but can country circumstances affect effort? Possible. Social norms influence effort at school (homework hours, behaviour in class, etc.) and at work (working hours, concentration at work, productivity etc.)
- Higher mean income result of greater past effort which leads to current greater effort, so the role of circumstances can be overestimated

Creation of the synthetic sample

- Use country-specific ρ_j between own and parents' income
- *The objective*: Replace own income class by parents' income class (in regressions)
- Run a random generation process over 100,000 observations for each *j* country

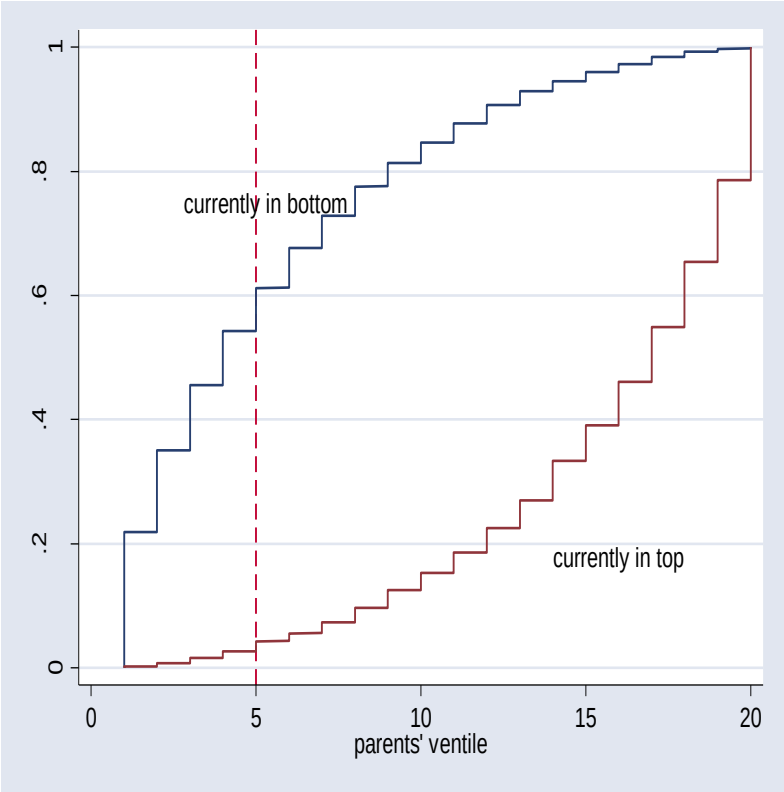
$$y_{ij} = \rho_j y_{ij}^{*} + e_j$$

- Where y_{ij}=own income (logs;normally distributed), y_{ij}^{*}=parents' income (logs;normally distributed), e_j=N(0,1)

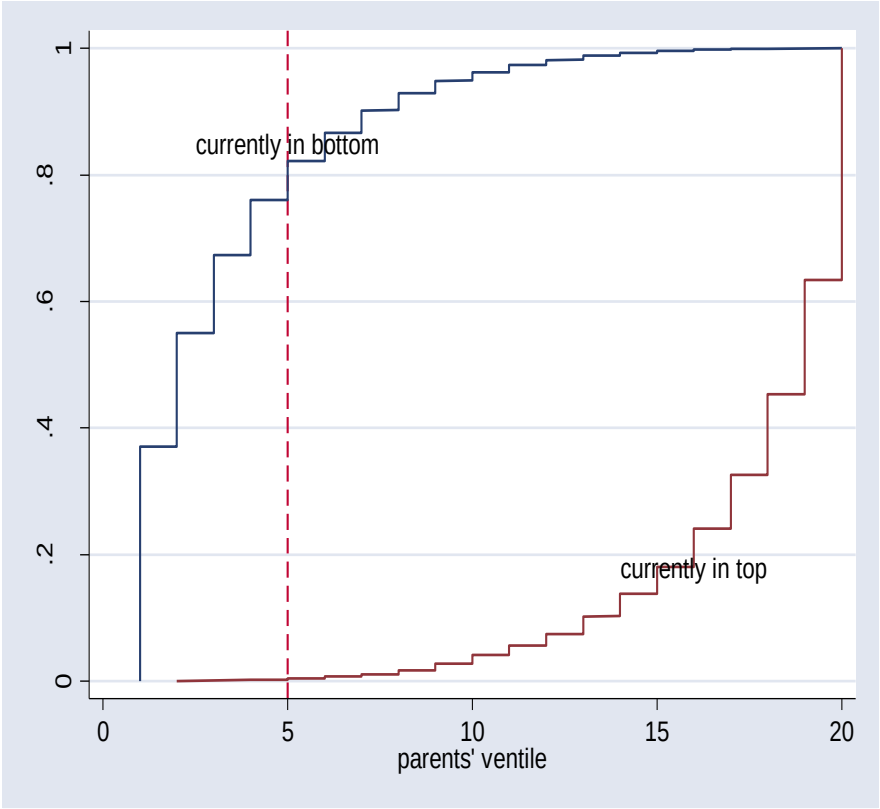
- Partition both y_{ij} and y_{ij}^* into 20 ventiles
- For each given children's ventile, we have a distribution of parents' ventiles (the higher the correlation, ρ, between the two, the more will the ventiles be similar)
- E.g., if ρ=0, the expected parents' ventile would be the same for all children (regardless of what ventile they are); if ρ=1, the parents' and children's ventiles would be the same except for the random error term

Cumulative distributions of parental ventiles for the bottom and top children's ventiles and two different values of ρ

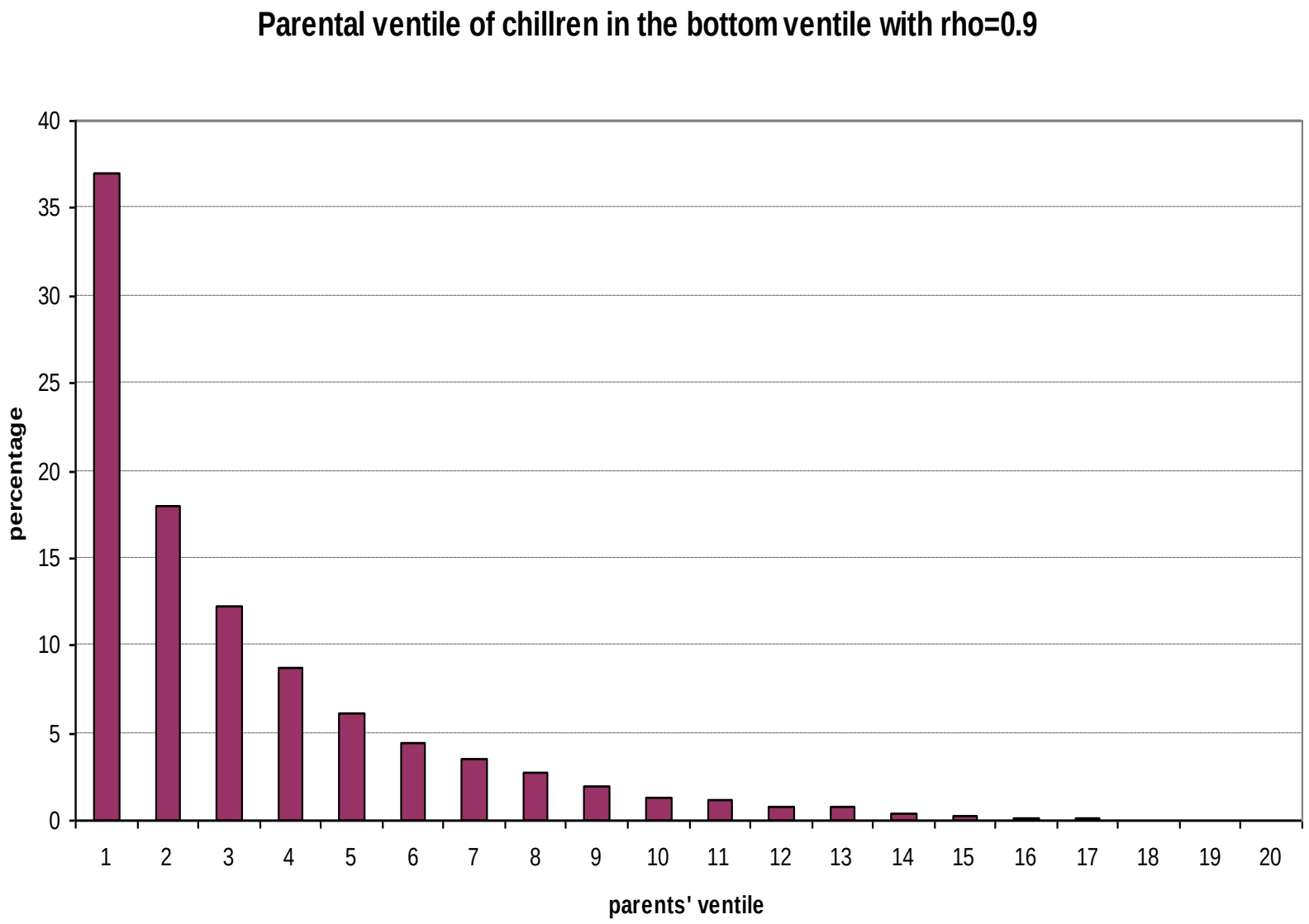
ρ=0.5



ρ=0.9

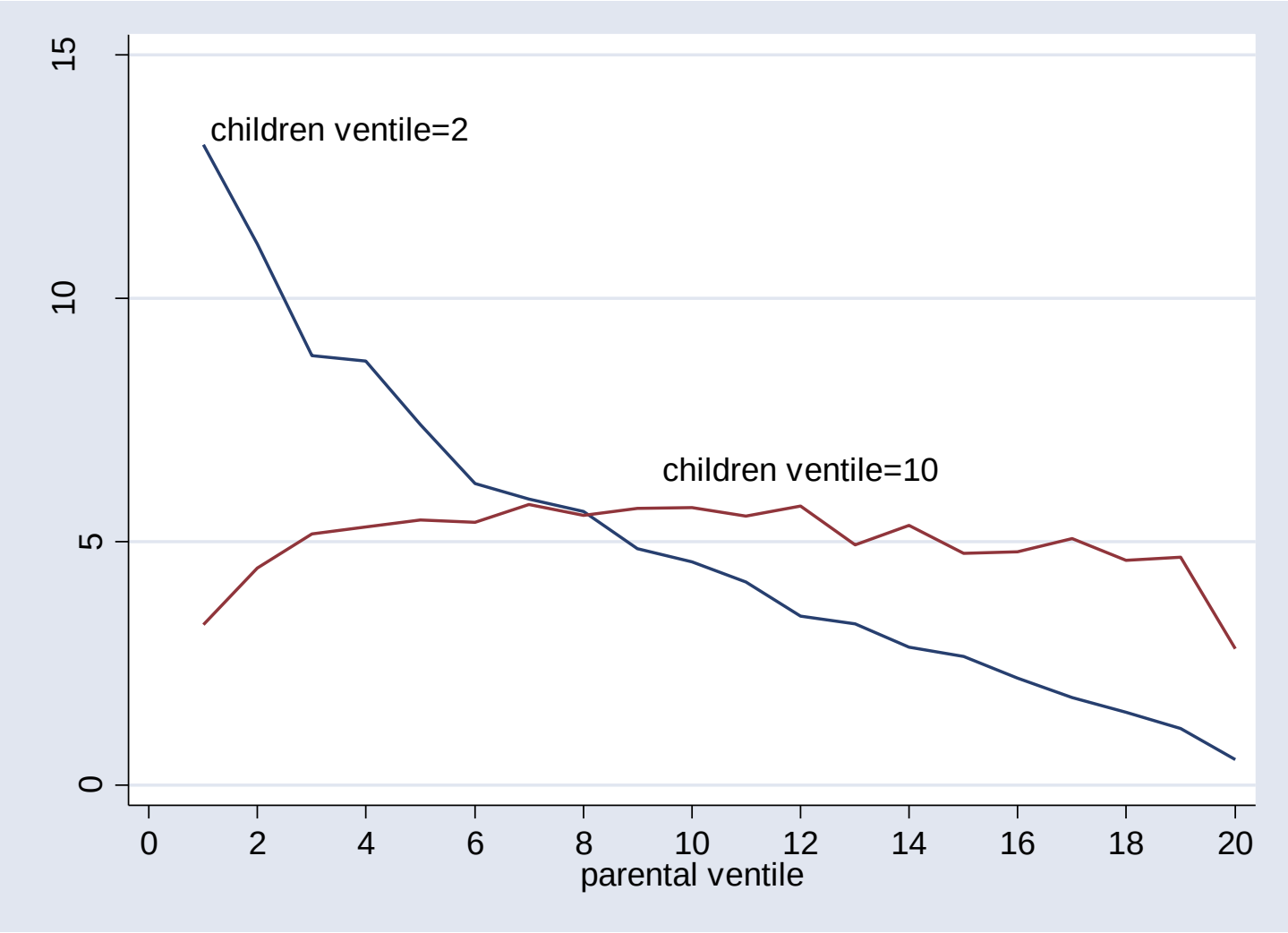


Heterogeneity of parental ventiles within a *given* children's ventile



- Expand each children's ventile by a factor of 100
- Ascribe to each children observed in *i*-th ventile, an estimated parental ventile (see the previous slide): if 37% of children from *i*-th ventile have parents from the first ventile, then 37 children are assigned 1, etc.
- We thus get parental income class heterogeneity both *between* and *within* children ventiles

Distribution of parental income ventiles for two children's ventiles when ρ=0.5



Assumed ρ's for different parts of the world

	Base case	Optimistic (high mobility)	Pessimistic (low mobility)	Average Gini (year 2002)
Nordic	0.2	0.15	0.3	27.5
Rest WENAO	0.4	0.3	0.5	33.7
E. Europe	0.4	0.3	0.5	30.6
Asia	0.5	0.4	0.6	37.6
LAC	0.66	0.5	0.9	53.8
Africa	0.66	0.5	0.9	42.6

Also a super-optimistic: ρ=0.2 for all; and super-pessimistic: ρ=0.9 for all.
ρ's based on literature review.

Results

How one's income depends on circumstances (IV): (dependent variable: own household per capita income, in $PPP, logs)

Eq.	4 (Base)	5 (Optimistic)	6 (Pessimistic)
Mean per capita country income (in ln)	0.986 (0.00)	0.987 (0)	0.991 (0)
Gini index (in %)	-0.019 (0.00)	-0.019 (0.00)	-0.019 (0.00)
Parents' estimated income class (ventile)	0.105 (0.00)	0.100 (0.00)	0.109 (0.00)
Constant	-0.513 (0.00)	-0.462 (0.00)	-0.582 (0.00)
Number of observations	232,000	232,000	232,000
R^2 adjusted	0.81	0.80	0.83
Number of countries	116	116	116

- ***Citizenship premium***. If mean income of country where you live increases by 10%, your income goes up by about 10% too. (Unitary elasticity.)
- ***Parental premium*.** If your parents are one income class higher, your income increases by about 10.5% on average.
- ***Inequality***. Higher Gini, on balance, negative because more people lose from higher inequality than gain (but we shall see that the effect varies across y class).

- Country of citizenship and parental income class explain 80% of variability in global income position. Citizenship alone explains between 50% and 60%.
- Their role increases in the pessimistic scenario, but the differences are very small.
- As expected, coeff. on parental income class increases with the pessimistic scenario (0.109 vs. 0.105).
- Also, whether we use IV or WAII approach, the results are the same.

Introduce 2008 more detailed and recent data

- 2008 country percentiles for 117 countries all expressed in $PPP
- Use different proxies for country income to avoid possible reflexivity btw one's income and country mean income in HH surveys (bias of the coefficient toward 1)
- Use GDP per capita, average years of schooling and best---just country dummies
- How much of variability of individual incomes will just country dummies explain?

Dependent variable: mean household per capita income in PPP dollars (in logs)			
	Country's GDP per capita in logs	Average number of years of schooling	Country dummies
Mean country income proxy	0.868**	0.335**	---
Country Gini	-0.015**	-0.013**	---
No. of obs	11483	9083	11638
No of countries	115	91	117
R^2	0.66	0.48	0.73

Conclusions

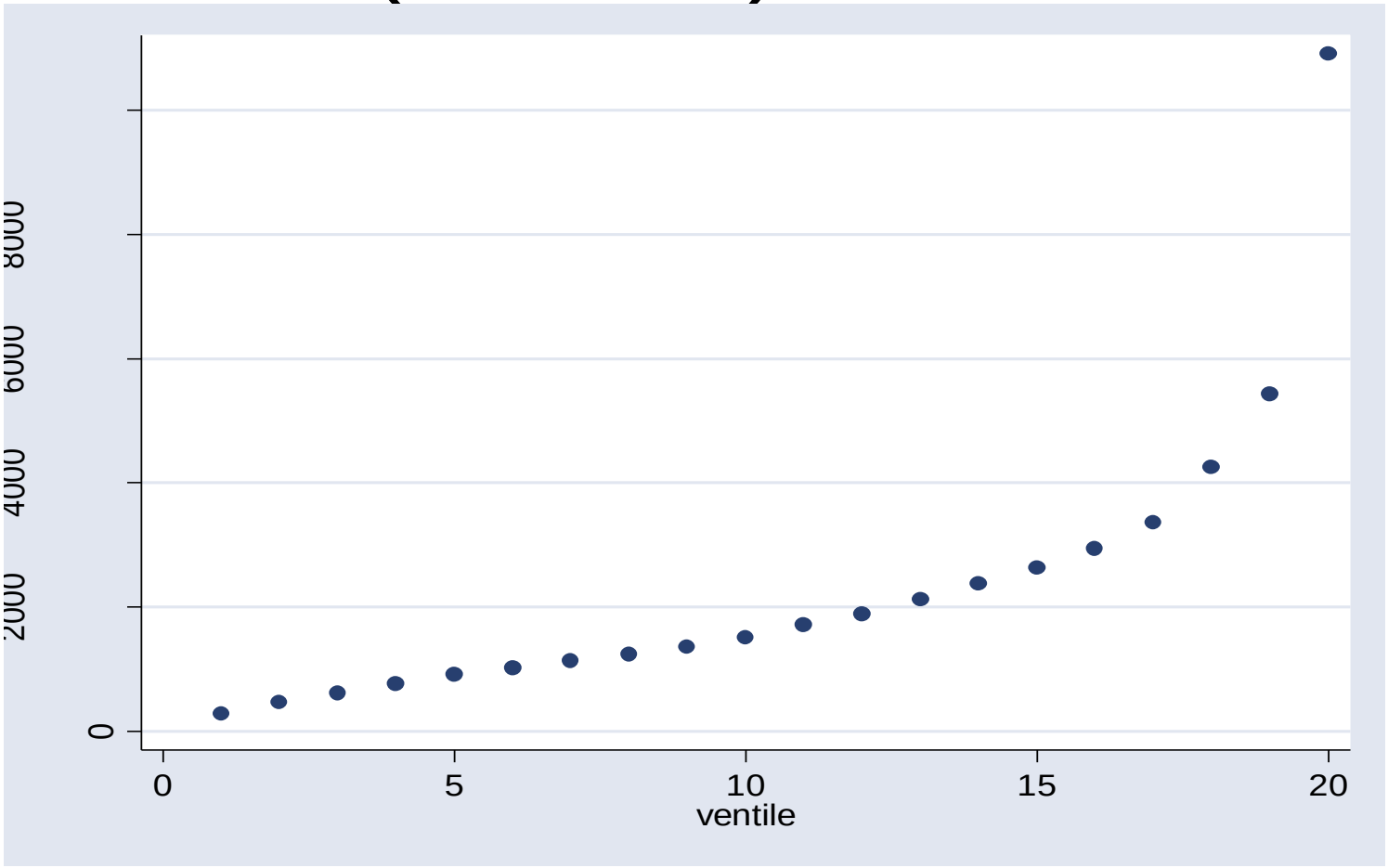
- Very minimalist country characteristics (GDP per capita, average number of years of education or simply country dummy, unobservable set of country characteristics) are responsible for between 48 and 73 percent of variation of global individual incomes
- The percentage does not decrease significantly with the introduction of percentiles instead of ventiles, but if we had all 7 billion individual incomes it probably would have gone down

Suppose now that your income class (low or high)is ***given;*** what can be your income then (i.e., does country matter equally regardless of your income class)?

Intuition

- Whether your income class is low or high, it is good for your to be a citizen of a rich country…yes, but…
- …would the citizenship premium be greater if you are in a low or high income class?

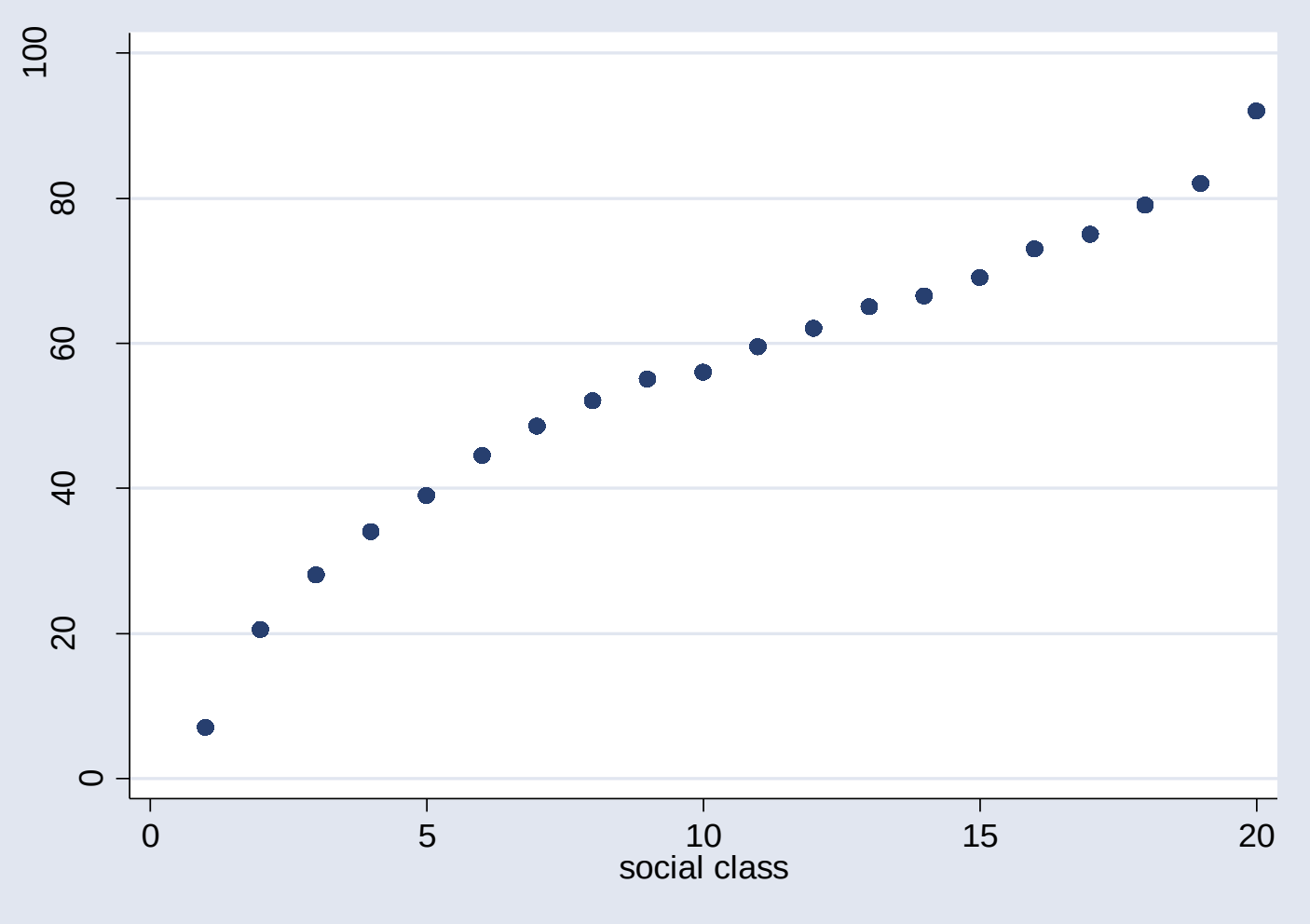
Expected median income for each (national) ventile



by group: egen yyy=median(inc) if whole==1 & maxgroup==20

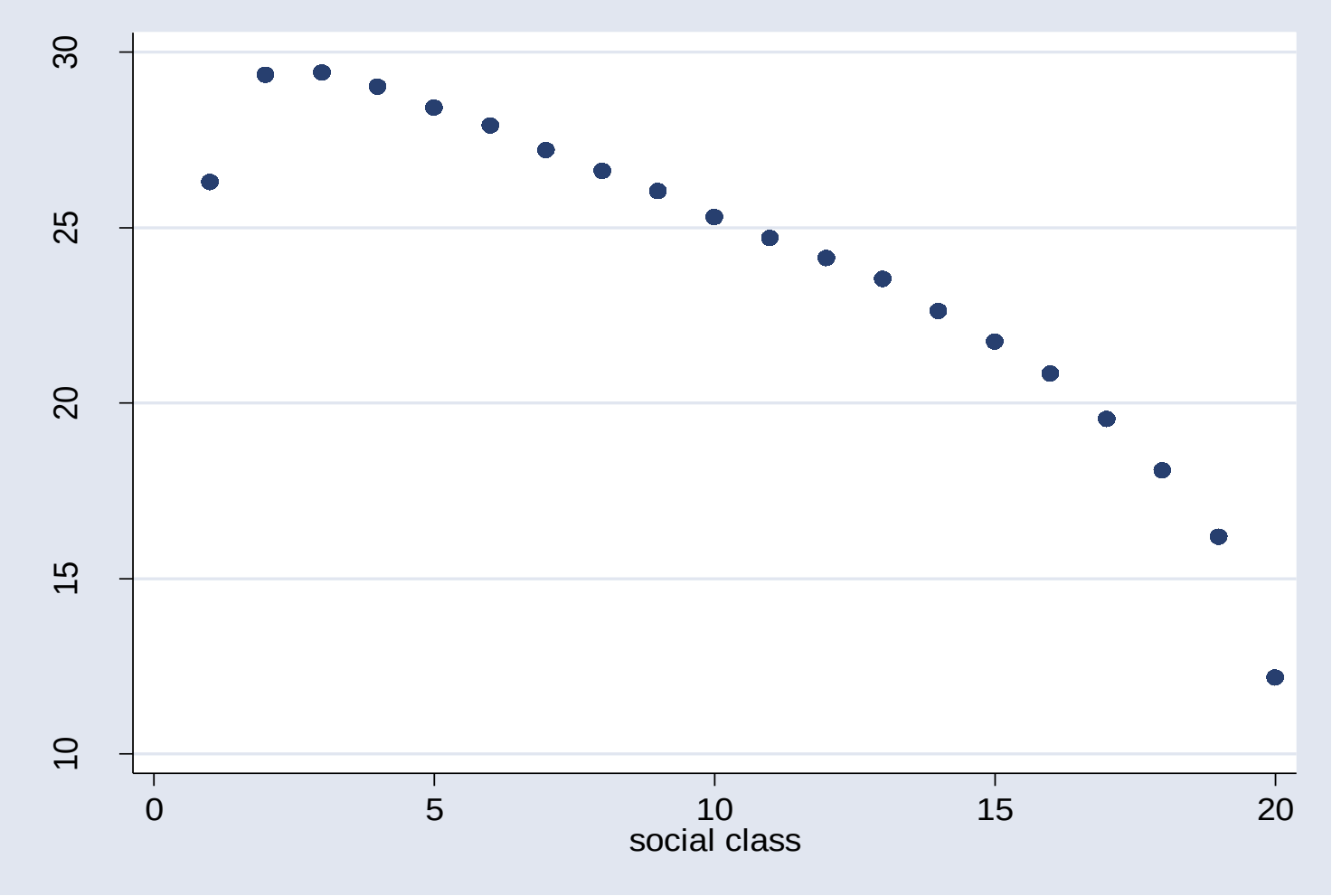
twoway scatter yyy group if contcod=="USA", ytitle(median income by ventile) xtitle(ventile)

Expected median global position (percentile in global income distribution) as function of national ventile

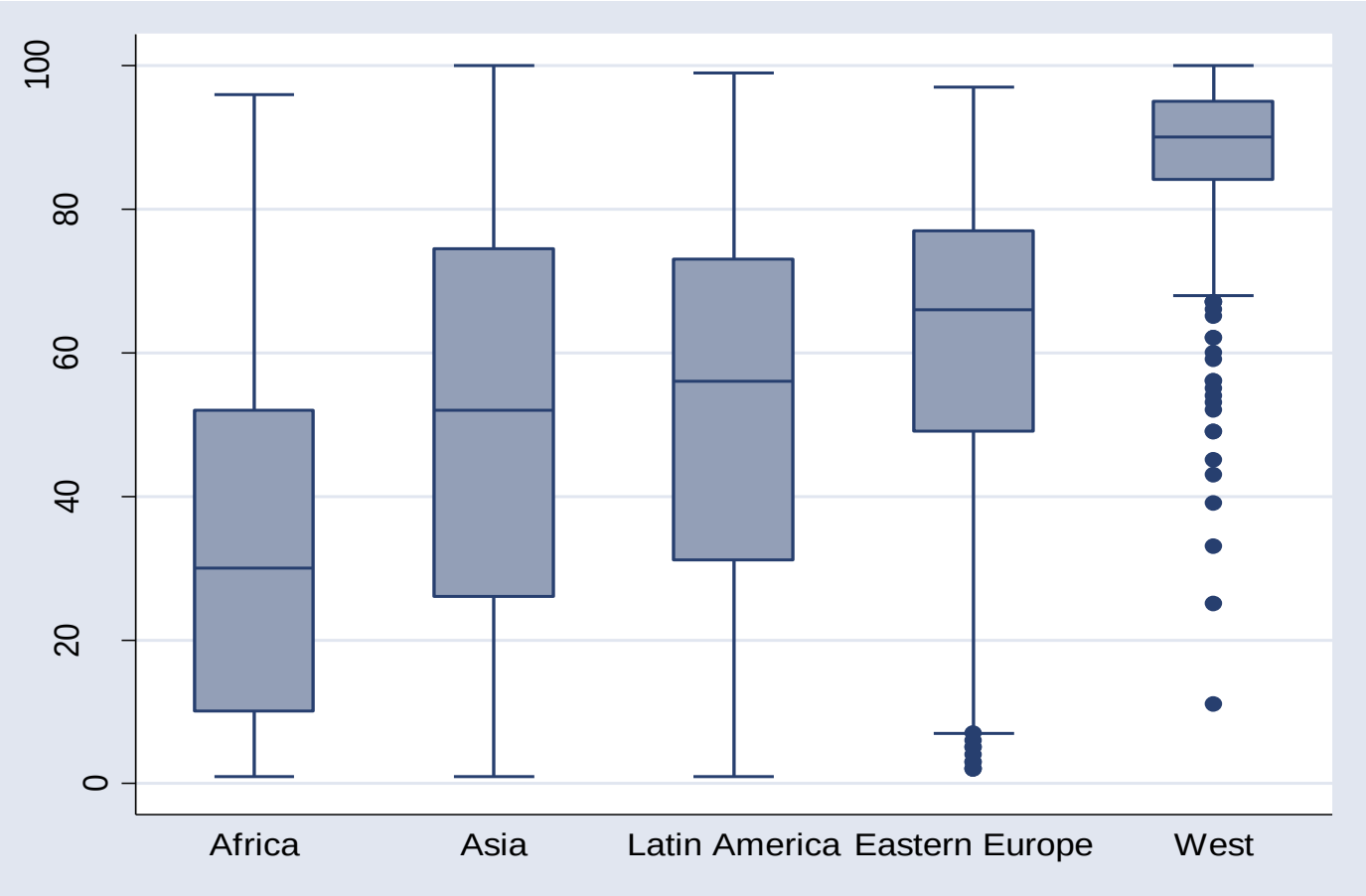


Note: unweighted data, each country's ventile represents one observation.

Variability: Standard deviation of one's position in world income distribution as function of national ventile



Distribution of percentile of global income distribution across five world regions



. graph box inc_c if maxgroup==20, over(region); use world2002.dta

Explaining a person's income—when his national income class is given (ventile)

ventile	**1**	**2**	**10….**	**19**	**20**
Mean country income ($PPP)	0.793 (0.00)	0.933 (0.00)	1.01 (0.00)	0.995 (0.00)	0.972 (0.00)
Gini (in %)	-0.101 (0.00)	-0.052 (0.00)	-0.016 (0.00)	+0.010 (0.00)	+0.027 (0.00)
Adj. R^2	0.69	0.95	0.998	0.990	0.990
No of observations	116	116	116	116	116
F value					

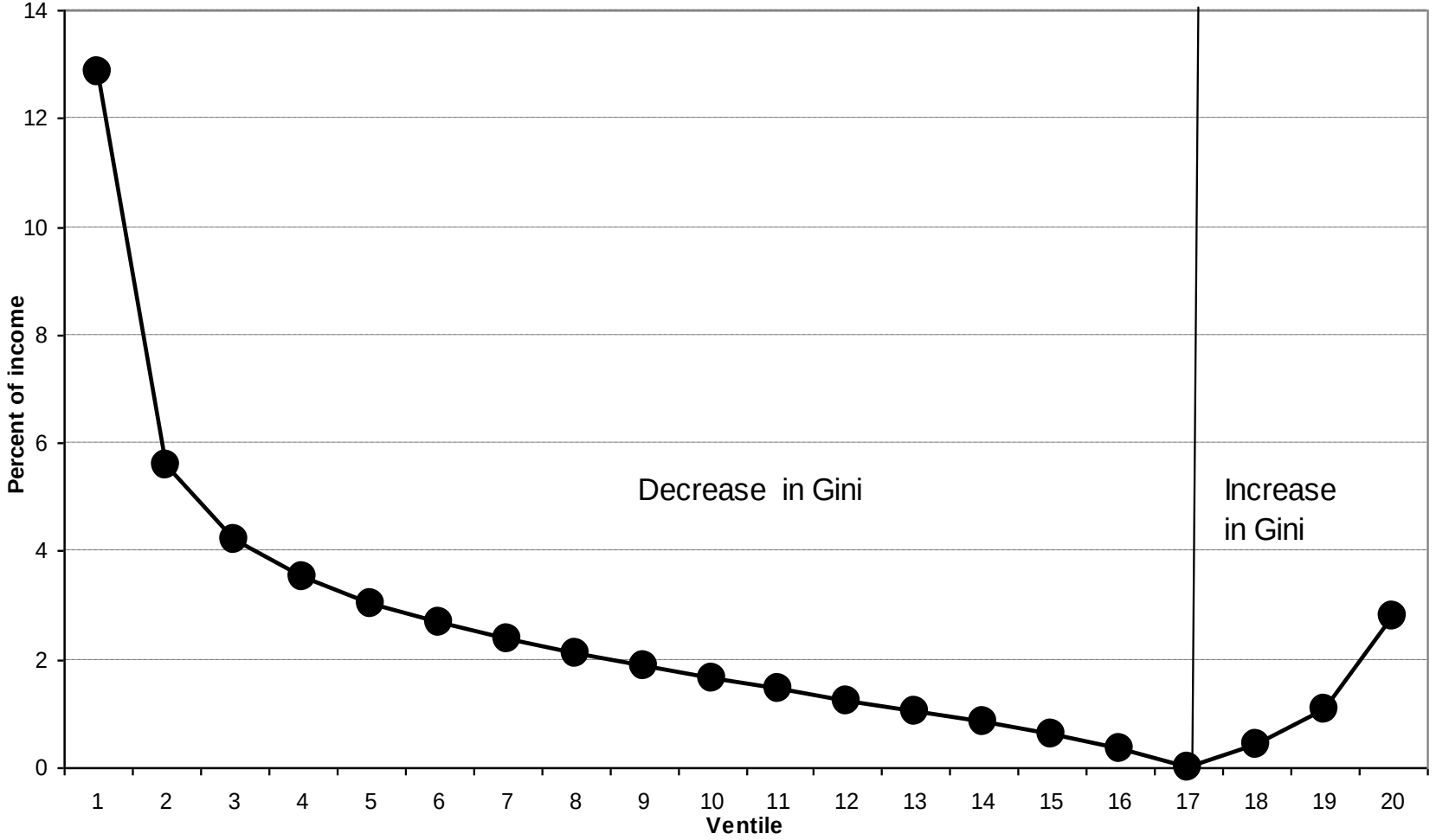
Note: Income and mean per capita income in (ln) $PPP per annum. *p*-values between brackets.

Results

- Citizenship premium smaller than unity for the bottom three ventiles, then remains statistically not different from 1.
- But how important is country's distribution relative to the citizenship premium (at different ventiles)?
- A person, if poor might prefer to be "allocated" into a more equal society even if its mean income is less: she could benefit more (if she is poor) by the first than lose by the second. The opposite for the rich.

What is the trade-off between citizenship premium and distribution premium: if Gini increases by 1 point by how much should mean income increase to compensate for it?

How much is 1 Gini point change worth (in terms of % of mean country income)



- If allocated to the lowest national income class, a point increase in Gini (which is bad for the income of the poor), will be exactly offset if country's mean income is 12.8% higher.
- The importance of distribution (expressed in terms of mean country income) decreases until it becomes nil around 14th ventile.
- Then, for the rich, the importance of the distribution increases again: now 1 Gini point *decrease* has to be compensated by 2.8% increase in mean country income

Conclusions

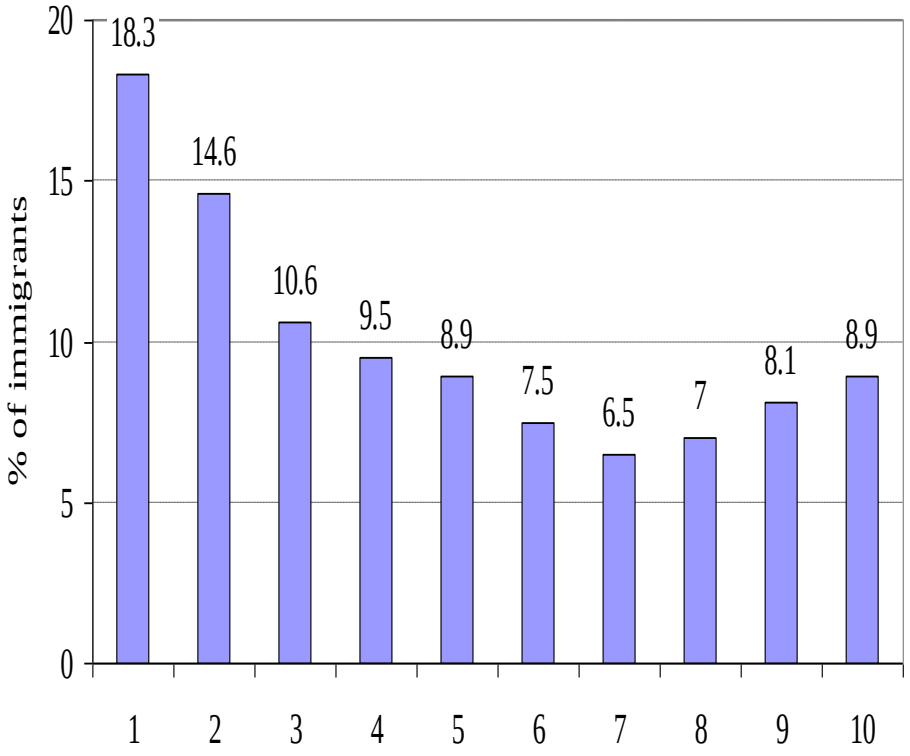
- Citizenship premium. Given income class, mean country income matters about equally for all income classes.
- But country's distribution (measured by the "equivalent citizenship premium") is very important for low income classes (if you are in a low income class, you may rather live in egalitarian Sweden than in mean-richer but inegalitarian US) and somewhat less so for top income classes. But does not matter at all for the middle (only how wealthy the country is matters)

Implications for migration

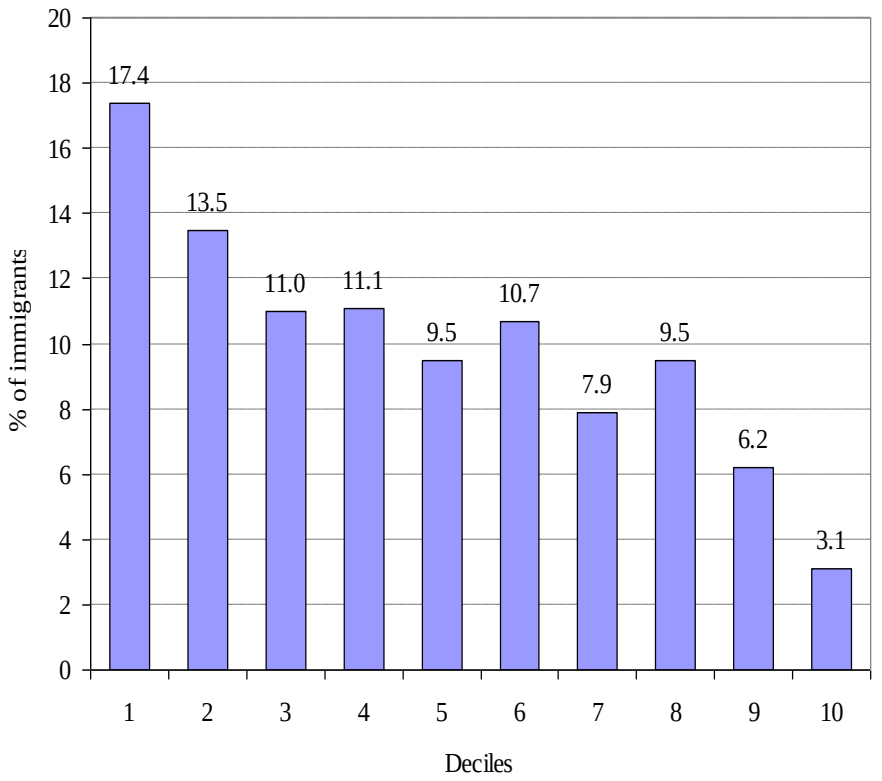
- Emigrants who expect to be in lower income classes the receiving country will tend to select egalitarian countries; those who expect to be in high income groups, will select inegalitarian countries
- For whose who expect to be in the middle, mean country income will matter only (not distribution)

Two examples: US and Spain

Percentage of immigrants in each income decide. US, 1990



Percentage of immigrants in each income decile. Spain, 2004



From Rafael de Bustillo, Migration and inequality: what do we know?