

european capacity building initiative
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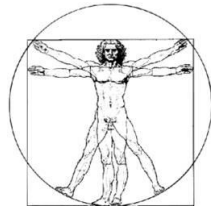
The Oxford Framework

Operationalising the UNFCCC Principle of ‘Respective Capabilities’

by
Benito Müller and Lavan Mahadeva

OIES Working Papers
(forthcoming)

What Capability?



Article 3.1: *Parties should protect the climate system ... in accordance with their common but differentiated responsibilities and respective capabilities*

There are a host of different capabilities relevant to protecting the climate system, such as:

- Institutional Capability
- Technological Capability
- ***Economic Capability***

What 'Economic Capacity'?

Ability to Pay

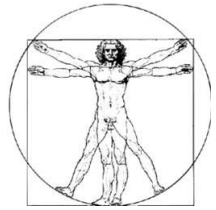
Why measure Capability?

Article 3.1: *Parties should protect the climate system ...on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities*

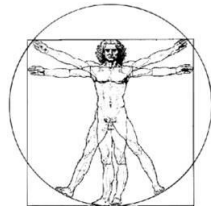
- Respective capabilities are one (among a number of) factors to be taken into account in establishing an equitable climate change regime.
- An equitable climate change regime requires a fair/just sharing of costs/burdens (of protecting the climate system)
- ‘This, then, is what the just is – the proportional; the unjust is what violates the proportion.’ *Nicomachean Ethics*, Book V
- Proportional to what? To an index based (among other things) on a capability index

Oxford Framework:

Proposal of how to define such a capability index



Proportionality Parameters for Economic Capability



A country ability to pay measure is likely to involve reference to macro-economic measures such as GDP (as a measure of overall size of the economy) or GDP per capita (as a measure of ‘prosperity’)

Would it be fair to use **GDP/cap** (gdp) as measure of (economic capability)?

	gdp	GDP (bn)
Belize	6658	2
China	6863	9137
Switzerland	45104	349
United States	45793	14059
Brunei	49935	20

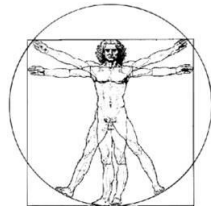
If $gdp_n \approx gdp_m$ then $Capability_n:Capability_m \approx GDP_n:GDP_m$

Would it be fair to use **GDP** as measure of (economic capability)?

India	3167	3658
Japan	32050	4088

If $GDP_n \approx GDP_m$ then $Capability_n:Capability_m \approx gdp_n:gdp_m$

Capability as Ability to Pay – A Taxation Model



Capability = Gross Capability minus Capability Adjustments

$$C_k = GC_k - Ca_k \quad [\text{cu} : \text{capacity unit}]$$

taxable income = gross income minus tax allowances

Homogeneous World Solution ($gdp_k \equiv gdp_m$)

Base Capability = National Income

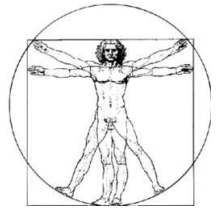
$$BC_k = GDP_k$$

Oxford Gross Capability

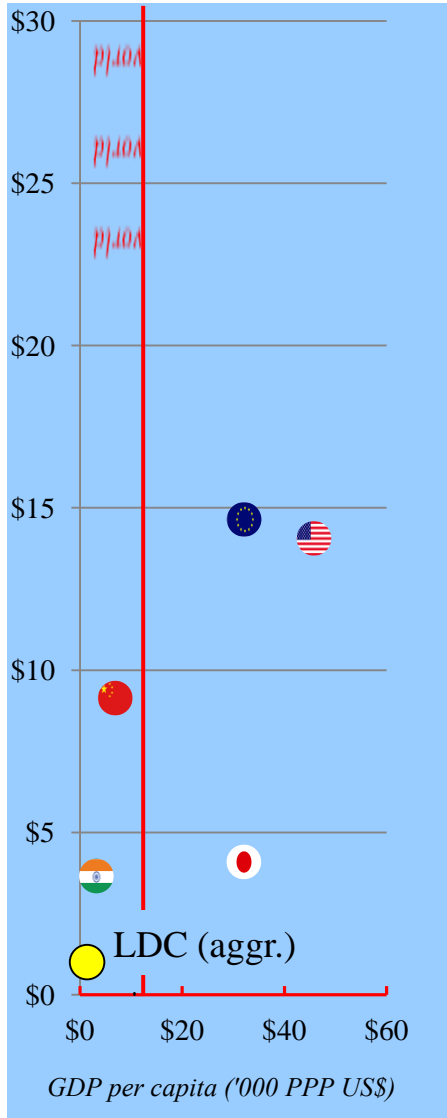
Gross Capability = Progressively weighted National Income:

$$OGC_k = (\gamma_k)^\delta \quad GDP_k \quad \text{with } \gamma_k = gdp_k / gdp_{world} \quad [\text{cu}/\$]$$

Gross Capability Examples

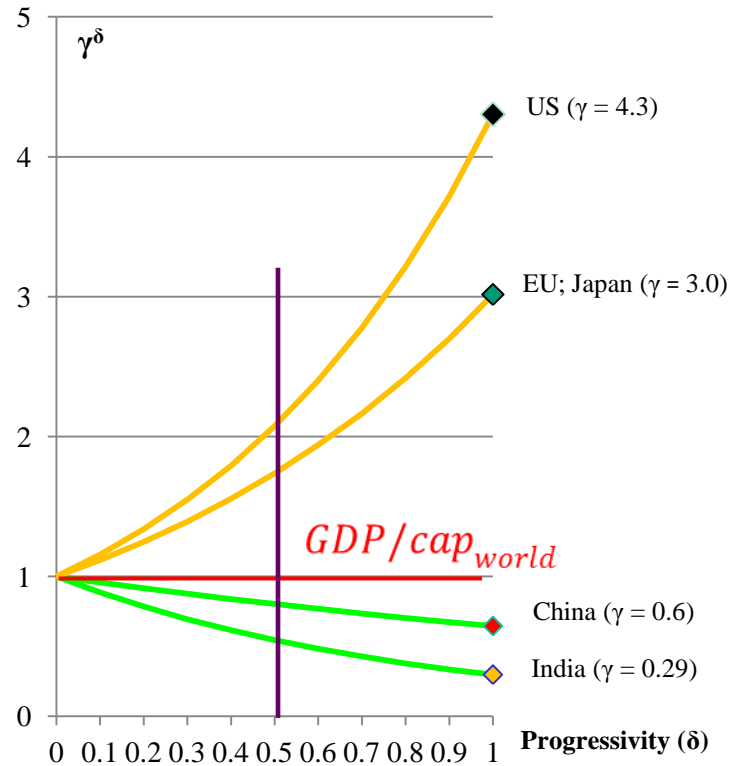


GDP [PPP \$ trillion, 2009]



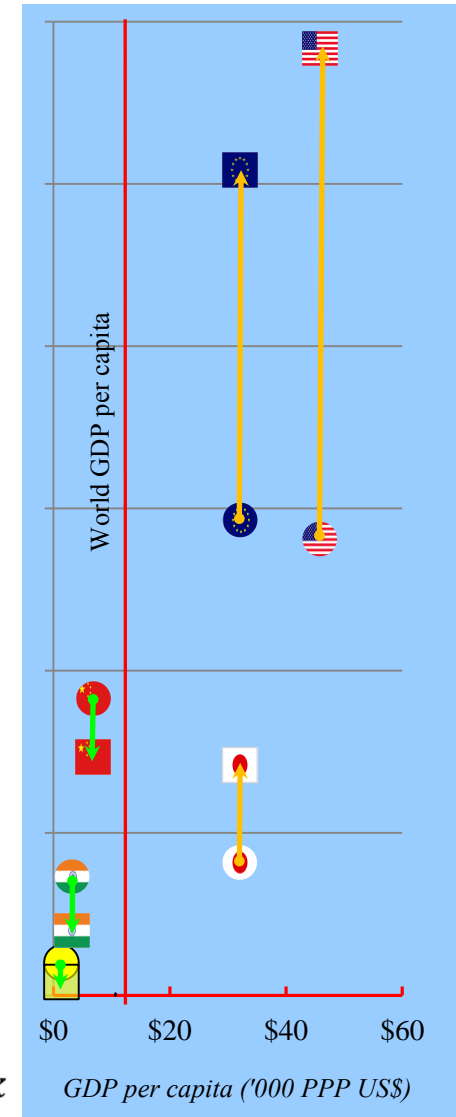
$$OGC_k^\delta = (\gamma_k)^\delta \times GDP_k, \delta \geq 0$$

$$\gamma_k = \frac{GDP/cap_k}{GDP/cap_{world}}$$



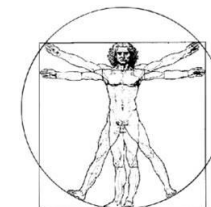
$$\delta = 0.5 : OGC_k = \sqrt{\gamma_k} \times GDP_k$$

Gross Capabilities $\delta=0.5$



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Oxford Measure – Capability Adjustment



Capability = Gross Capability minus Capability Adjustment

Adjustment for what?

The size of the domestic poverty problem

- **Poverty Capability Adjustment** PCA_k

Measuring the size of the poverty problem – two dimensions:

- **Poverty Headcount** PH_k [number of poor people]
- **Poverty Intensity Index:** PI_k [scalar]
- **Global Poverty Capability Allowance** Π [cu/person]
- **Differentiated Poverty Capability Allowance** $\Pi_k = \Pi \cdot PI_k$ [cu/person]

$$PCA_k = \Pi_k \cdot PH_k \text{ [cu]}$$

Multidimensional Poverty Index: MPI_k [scalar]

$$PCA_k = \Pi \cdot P_k \cdot MPI_k, \text{ with } P_k = \text{population}$$

Oxford Measure – Global Capability Allowance Π

Poverty Capability Adjustment =

Global Capability Poverty Allowance (Π)

Population Multidimensional Poverty Index

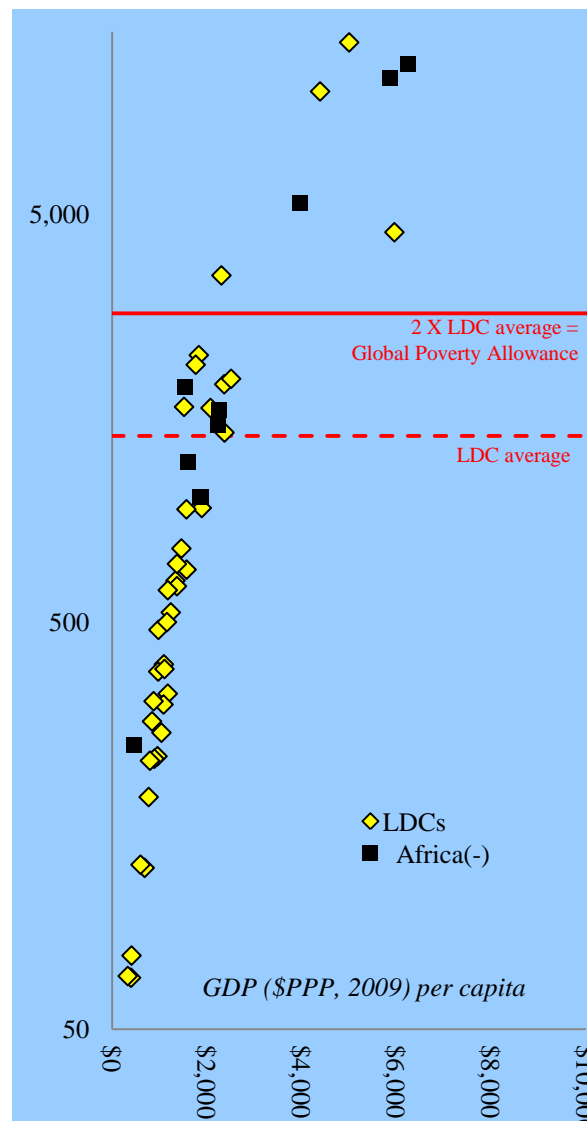
$$PCA_k = \Pi P_k MPI_k,$$

Zero Capability Allowances (ZCA_k)

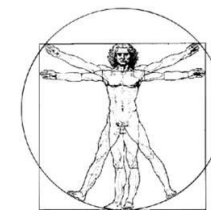
$$OCM_k = OGC_k - \Pi P_k MPI_k$$

$$0 = OGC_k - ZCA_k P_k MPI_k$$

$$\Pi =_{\text{def}} 2 ZCA_{LDC}$$

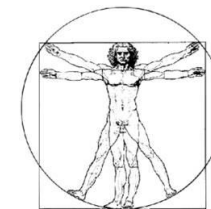


Africa(-) = Sub-Saharan w/o South Africa

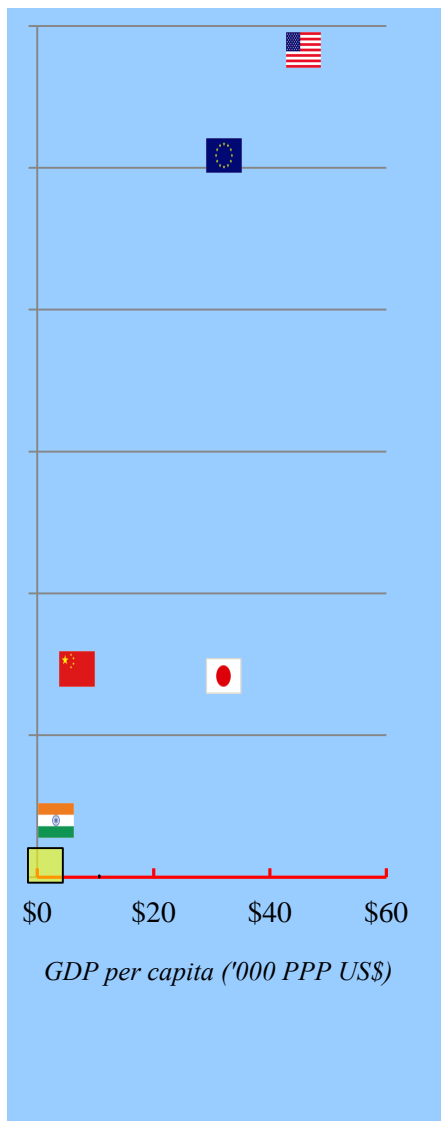


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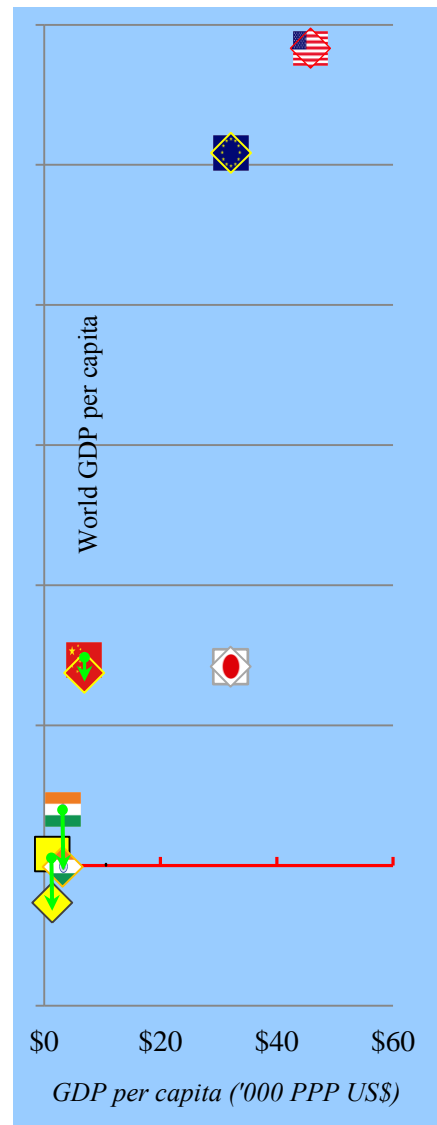
Oxford (Net) Capability Examples



Gross Capabilities $\delta=0.5$

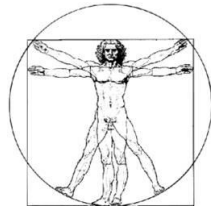


Poverty Adjustments

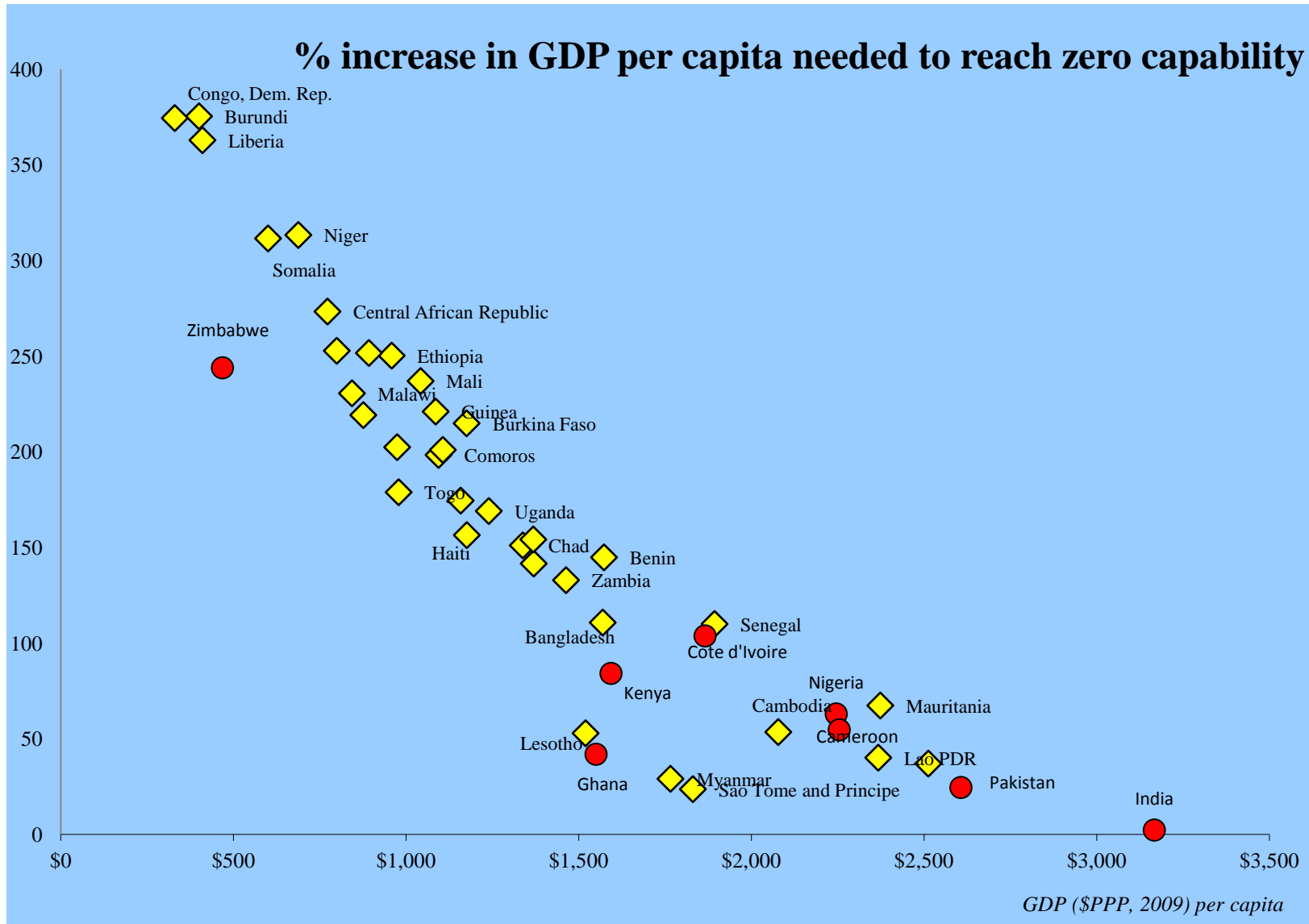


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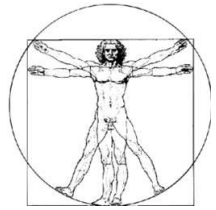
Oxford Measure – Headroom



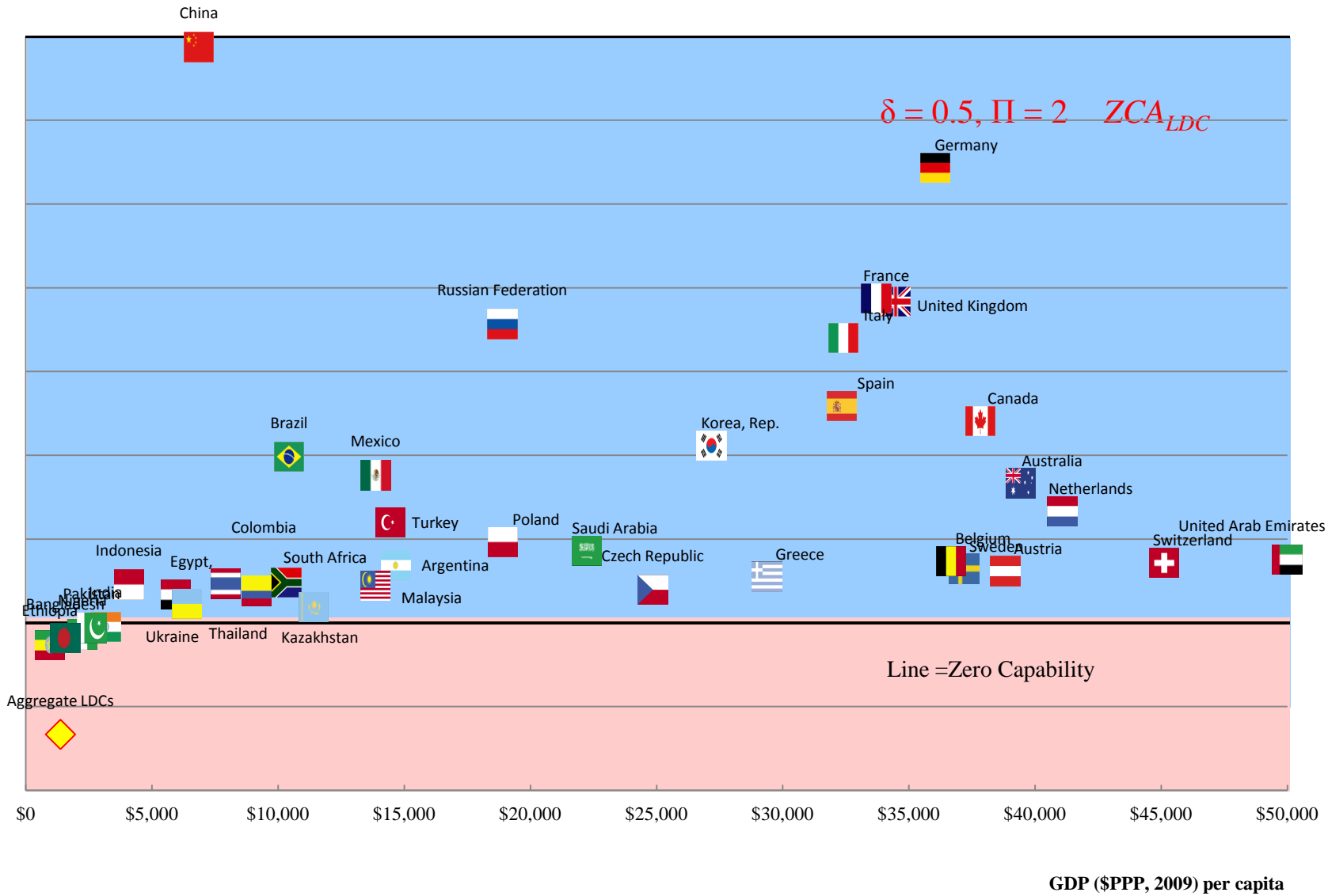
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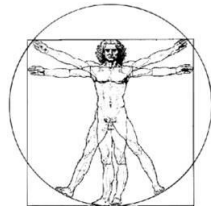
Oxford Measure – Medium to low values



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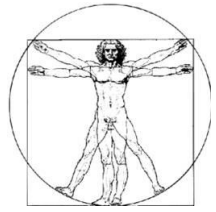


Three Conclusions

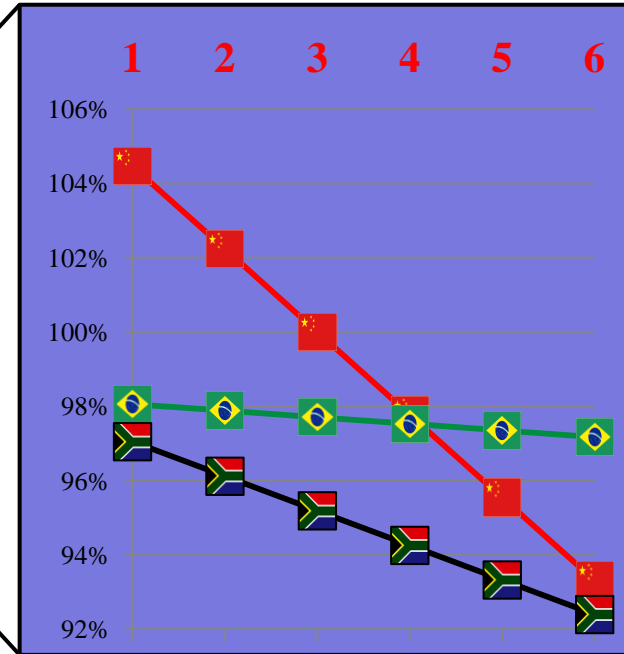
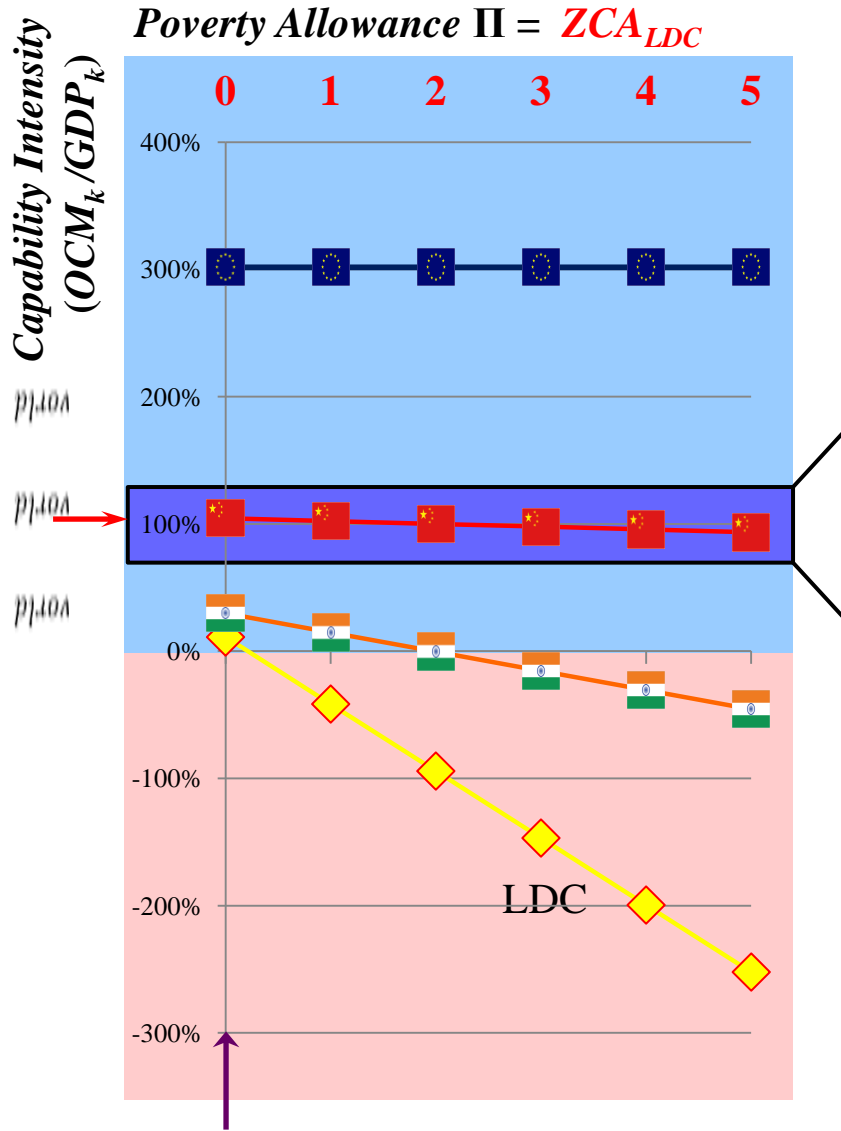


1. It is possible to quantify a capability measure that reflects the overall economic size, the level of development, and the size of the poverty problem for use in determining fair shares in economic costs/burdens.
2. There is no right to abstain from engaging in actions that entail additional costs (over and above the fair shares), provided that these additional costs are compensated.
3. Economic capability levels (as defined here) are not suitable for use in defining country categories (such as ‘low’, ‘middle’ or ‘high capability’ countries)

Net Capacity: Sensitivity to Choice of Poverty Allowance II



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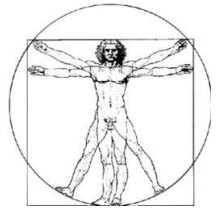


$$\begin{aligned} \text{Slope} &= -\text{Poverty Intensity of GDP} \\ &= -(\text{Poverty Headcount} - \text{Poverty Intensity})/\text{GDP} \\ &= -(PH_k - PI_k) / GDP_k \end{aligned}$$

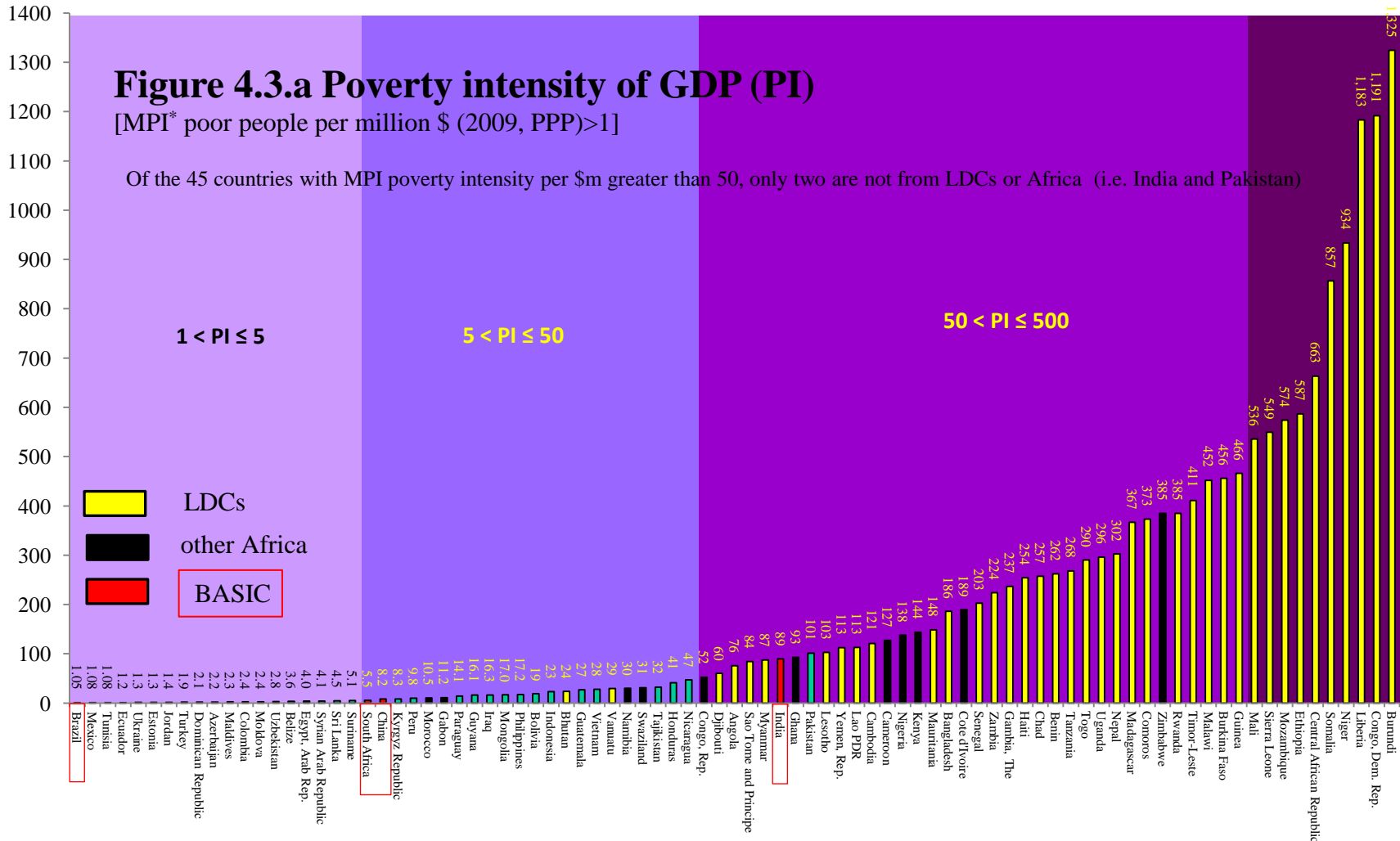
$$OGC_k / GDP_k = \sqrt{\gamma_k} = \sqrt{GDP / cap_k} : \sqrt{GDP / cap_{world}}$$

Poverty intensity of GDP > 1/\$m

[MPI* poor people per million \$ (2009, PPP)>1]

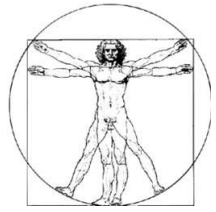


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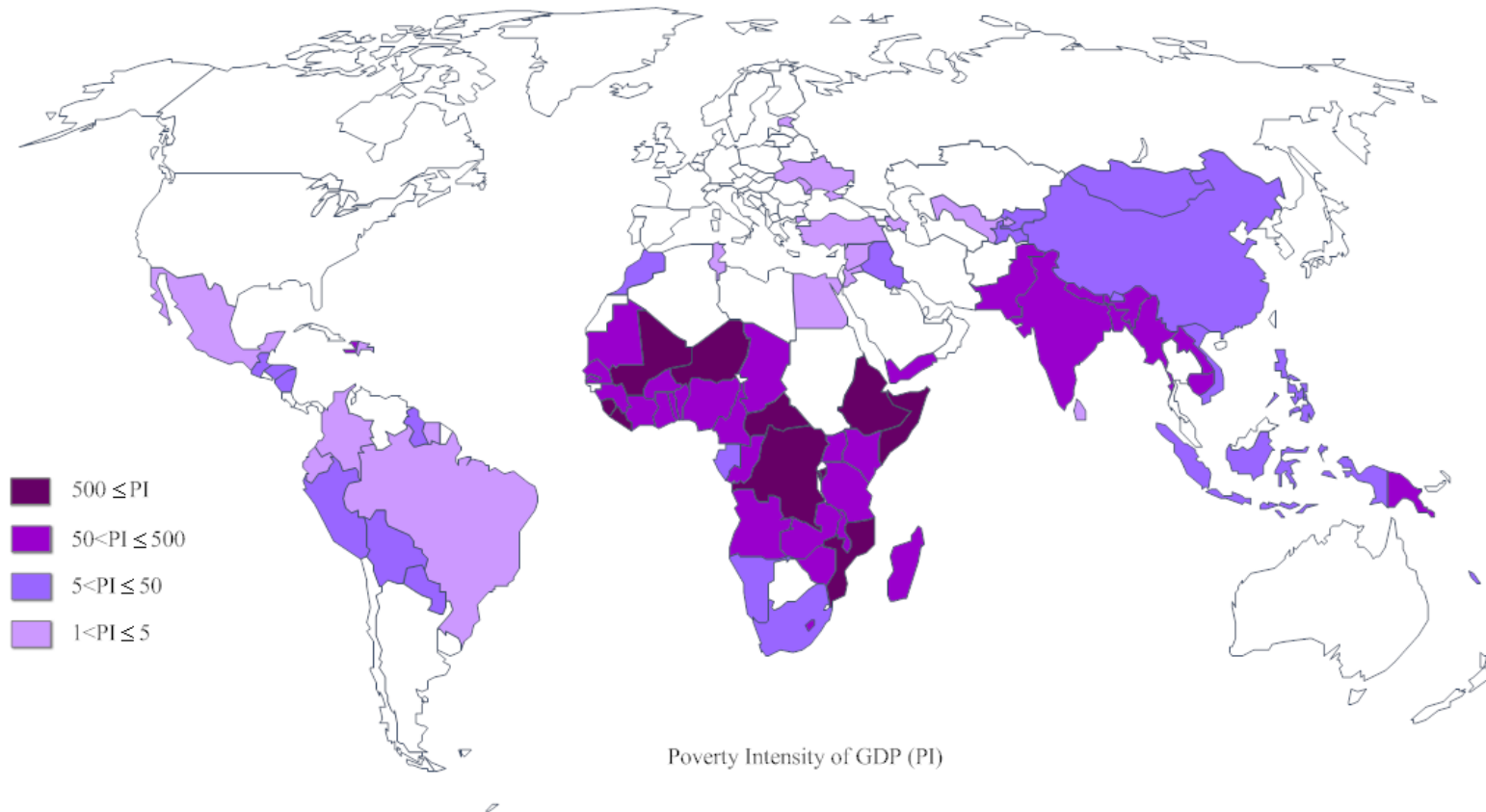


* MPI = Multidimensional Poverty Index

Poverty Intensity $> 1/\$m$, Geographical Distribution



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Note: Countries w/o colour coding either have no MPI, or a $PI < 1$