

OPERATIONALIZING ‘RESPECTIVE CAPABILITIES’

Submission to the Ad hoc Working Group on the Durban Platform regarding the implementation of all the elements of decision 1/CP.17, (a) Matters related to paragraphs 2 to 6; (ADP), in particular the “Application of the principles of the Convention to the ADP”.

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The appended submission serves as summary for policy makers of a technical report by the same authors published by the Oxford Institute for Energy Studies, available at:

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Whether or not the regime emerging from the current UN negotiations will be based on an explicit cost/burden sharing formula, the debate about (implied) costs/burdens will be central and it cannot be genuinely meaningful in the absence of an acceptable operationalisation of Art 3.1, in general, and of the concept of ‘respective capability,’ in particular.

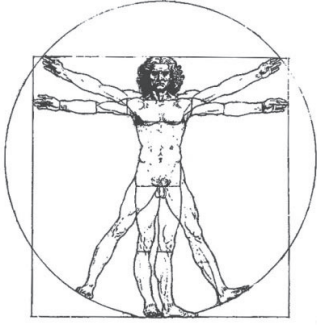
We propose a framework (‘The Oxford Approach’) for measuring national ‘differentiated economic capabilities’ (‘ability to pay’) as integral part of an operationalisation. It is based on the well-known income tax paradigm:

- A measure of overall economic size is progressively modified in terms of relative prosperity levels to produce a ‘gross capability measure’ (analogous to gross taxable income). As such, gross capability represents a measure of general ability to pay.
- Drawing further from the tax paradigm, the framework introduces deductions in order to take into account other costs deemed to have priority. In keeping with the global priority to address poverty explicitly stated in the UNFCCC and the Rio+20 Declaration, Poverty Capability Adjustments are deducted from the gross capability measure, to arrive at what we call the net ‘Oxford Capability Measure’ (OCM) to pay for climate change cost/burdens.

The primary purpose of the OCM is to define or assess climate change cost/burden sharing (schemes). We believe the Oxford Approach to be acceptable for this purpose not only because it is modelled on namely progressive income tax with deductions, a burden sharing scheme used by most, if not all countries of the world, but also because of the progressiveness calibration through countries’ revealed preferences.

To illustrate the potential use of this methodology we consider two examples, namely assessing the fairness of a given cost distribution, and developing a (rule-based) ‘graduation scheme’ regarding obligations to pay. For one, we assess the fairness of the 2010 distribution of climate change impact costs as reported in the second edition of the Climate Vulnerability Monitor with reference to an OCM equity benchmark. We then turn to the question of defining a fair benchmark for taking on cost/burden obligations, concluding that while an OCM per capita scheme would be first best, one could use ‘poverty intensity of GDP’ as a second best surrogate.

Benito Müller



The Oxford Approach: Operationalising 'Respective Capabilities'

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SUMMARY FOR POLICY MAKERS

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ABSTRACT

The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

- Article 3.1, UN Framework Convention on Climate Change

Whether or not the regime emerging from the current negotiations under the UN Framework Convention on Climate Change (UNFCCC) will be based on an explicit cost/burden sharing formula, the debate about (implied) costs/burdens will be central. Such a debate cannot be genuinely meaningful in the absence of an acceptable operationalisation of Article 3.1 in general, and of the concept of ‘respective capability’ in particular.

We propose a framework (‘The Oxford Approach’) for measuring national ‘differentiated economic capabilities’ (‘ability to pay’) as integral part of an operationalisation. It is based on the well-known income tax paradigm:

- A measure of overall economic size is progressively modified in terms of relative prosperity levels to produce a ‘gross capability measure’ (analogous to gross taxable income). As such, gross capability represents a measure of general ability to pay.
- Drawing further from the tax paradigm, the framework introduces deductions in order to take into account other costs deemed to have priority. In keeping with the global priority to address poverty explicitly stated in the UNFCCC and the Rio+20 Declaration, Poverty Capability Adjustments are deducted from the gross capability measure, to arrive at what we call the net ‘Oxford Capability Measure’ (OCM) to pay for climate change cost/burdens.

The primary purpose of the OCM is to define or assess climate change cost/burden sharing (schemes). We believe the Oxford Approach to be acceptable for this purpose not only because it is modelled on progressive income tax with deductions, a burden sharing scheme used by most if not all countries of the world, but also because of the progressiveness calibration through countries’ revealed preferences.

To illustrate the potential use of this methodology we consider two examples: assessing the fairness of a given cost distribution; and developing a (rule-based) ‘graduation scheme’ regarding obligations to pay. We assess the fairness of the 2010 distribution of climate change impact costs as reported in the second edition of the *Climate Vulnerability Monitor* with reference to an OCM equity benchmark. We then turn to the question of defining a fair benchmark for taking on cost/burden obligations, concluding that while an OCM per capita scheme would be best, one could use ‘poverty intensity of GDP’ as a second best surrogate.

WHAT IS THE ISSUE?

Article 3.1 of the UNFCCC stipulates that Parties *should protect the climate system ... in accordance with their common but differentiated responsibilities and respective capabilities*. The question of how this should be achieved has become a central issue in the deliberations of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) established in 2011 *to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties*.

During the climate conference in Doha in December 2012, the ADP held a number of round table discussions on the question of how UNFCCC principles should be applied in the new agreement. The ADP Co-Chairs' summary of these discussions records a number of comments related to capabilities, including: *"Commitments should be defined and differentiated on the basis of equity, the principle of common but differentiated responsibilities and respective capacities, and historical responsibility"; "Countries with the greatest capacity should take on economy-wide quantified emission reduction targets, while other countries should contribute in accordance with their national circumstances and on the basis of equity"; "No Party should be forced to do something it is not capable of."*

Although there are a multitude of important questions arising in this context, we believe there are two that are paramount: (i) how to distribute the costs/burdens associated with climate change equitably (in a fair or just manner) among countries; and (ii) how to design a fair system of 'graduation', i.e. a typology of ways in which countries may/should engage under the ADP outcome.

Neither of these issues is new. For example, William Nordhaus, the well-known American economist, asked in 2007: *What should be the distribution of emissions reductions among countries, and how should the costs be allocated? ... Economics offers a simple, unambiguous, but elusive answer: emissions reductions should be carried out in the most efficient way; and the burden of reducing emissions should be shared in a fair way. ... Neither science nor economics can provide a "correct" answer to the question of how to share the burden of reducing emissions. Disinterested observers might argue that the costs should be allocated on the basis of ability to pay, with richer countries and generations paying a larger fraction of the costs. ... It is crucial to have a mechanism whereby countries "graduate" into a set of obligations that are commensurate with their abilities to pay – in a way similar to the "ability to pay" principle of an income tax system.*

The Oxford Approach is a methodology to quantify 'respective capabilities' of countries and attempt to answer the two questions (i & ii) posed above. More precisely, it introduces a capability measure that can be used in designing both a benchmark for a country's fair/just/equitable capability-based share of a given climate change cost/burden, and a graduation scheme that fairly reflects some of the most basic national circumstances, such as the degree of prosperity and the magnitude of poverty. It needs to be stressed that we do not advocate the position that equity in cost/burden sharing or graduation should only be measured in terms of respective capabilities. Our focus on capabilities in this context is due to the desire to complement some earlier work at the OIES on measuring (historic) responsibilities, and on how to combine different indices (*see Box 1*).

Box 1. Combining respective capabilities with differentiated responsibilities

The issue of distributing a homogeneous divisible, such as a cost, has one significant advantage over other distributional issues, namely the fact that different criteria/points of view can easily be numerically aggregated. For example, if c_k and r_k denote the capability and responsibility indices of a country k (i.e. k 's share in the total capability/responsibility), then it is possible to obtain an aggregate distribution by forming a weighted (arithmetic) mean $a_k = w'_k \cdot c_k + w''_k \cdot r_k$.

Moreover, the element of arbitrariness associated with the choice of weights w_k in such aggregations can easily be overcome, for example by using the preference score method proposed in Benito Müller (2001) 'Varieties of Distributive Justice in Climate Change', *Climatic Change*, Vol. 48 No. 2-3:273-88.

Also, while there are many different types of 'capabilities' that are relevant to dealing with climate change, we focus on **economic capability** interpreted as ability to pay (as referred to by Nordhaus), which we believe is the most important capability in the context of both (i) and (ii). As regards the former the idea is in particular to define a measure for a country's economic capability (ability to pay), and then define equitable distributions in terms of the proportions between these economic capabilities, implying, in particular, that if two countries have the same 'capability level', then they should shoulder the same share of the cost/burden.

We do not think that economic capability ('ability-to-pay') – as indicator of how much a country should pay for climate change – lends itself per se to define country categories as required for graduation schemes. But we do believe that, as such an indicator, it is a multi-dimensional function involving (at least) measures of overall economic size (e.g. GDP) and of economic prosperity (e.g. GDP per capita), none of which will result in a fair distribution of costs/burdens when used on their own.

For instance, if GDP per capita figures are used as sole indicators of economic capability China and Belize, with roughly the same GDP per capita, would have to shoulder the same share of the cost/burden under consideration (see Table 1). Given that China's GDP is more than four thousand times that of Belize, this would be blatantly unfair. A similar example can be made at the other end of the prosperity spectrum with the US and Switzerland.

Table 1. 2009 PPP \$

	GDP/cap	GDP
Belize	\$6'658	\$2bn
China	\$6'863	\$9'137bn
Switzerland	\$45'104	\$349bn
US	\$45'793	\$14'059bn
India	\$3'167	\$3'658bn
Japan	\$32'050	\$4'088bn
Sierra Leone	\$799	\$5bn
Liechtenstein	\$132'177	\$5bn

The use of economic size on its own as a capability measure would lead to equally unfair outcomes. Take the situation of India and Japan with roughly equal GDP. We find it morally counterintuitive that they should in fairness be asked to pay the same amount, given that Japan’s level of prosperity is ten times that of India. If this is not self-evident, then one might wish to consider the case of Liechtenstein and Sierra Leone, again both with the same absolute economic size, but a 165-fold divergence in prosperity level. To ask both to pay the same amount clearly cannot be right.

Such intuitive comparisons break down in the absence of a *ceteris paribus* situation where at least one of the component parameters is roughly the same. Thus is not intuitively clear whether China and Japan should have the same capability or not, given that the former is five times more prosperous, but the latter twice as large.¹

All that can be concluded from these examples is that being of similar size (e.g. ‘being large’), on its own, does not imply having the same capability, and the same holds for being similarly prosperous (‘same GDP per capita’). Any other conclusions can only be drawn in the context of an explicit capability measure.

THE OXFORD APPROACH

The Measures

The Oxford Capability Measure (OCM) developed in the Report combines both GDP and per capita GDP figures (as measures of overall economic size and relative prosperity), together with a measure (based on the Multidimensional Poverty Index: MPI²) that reflects the size of the poverty problem facing some countries. Examples of the interaction of the different measures of this Oxford Approach are illustrated at the end of the section.

The OCM is modelled on the well-known methodologies used to assess people’s taxable income – seen as their ‘income tax capability’. Starting with the overall economic size – i.e. (purchasing power parity) gross domestic product GDP_k ³ – as **Base Capability Measure**, a progressive adjustment is introduced to reflect differences in average income (‘prosperity’) levels – i.e. GDP per capita gdp_k – leading to a country’s **Gross Capability Measure** (akin to an individual’s gross taxable income):

$$GCM_k^\delta = (\gamma_k)^\delta \times GDP_k$$

with $\gamma_k = gdp_k / gdp_{world}$, and δ as progressivity parameter, which – **calibrated against the progressiveness of national income tax regimes**⁴ – is set to be 0.5. The **Oxford Gross Capability** measure is accordingly defined as:⁵

$$OGC_k = \sqrt{\gamma_k} \times GDP_k.$$

¹ As it happens, under the Oxford Approach they would, see Figure 1.

² The MPI was launched in July 2010 by the UNDP *Human Development Report Office* and the *Oxford Poverty & Human Development Initiative* (Department of International Development, University of Oxford). See <http://hdr.undp.org/en/statistics/mpi/>.

³ The Report considers other potential measures of overall economic size – such as net national income, or wealth – with the conclusion, for a number of reasons, that (PPP) GDP or GNI are the most appropriate.

⁴ See Section II.2 and Appendix 2 of the Report.

⁵ Note: $(\gamma)^{0.5} = \sqrt{\gamma}$.

A further adjustment is then introduced to reflect the domestic obligation generally acknowledged to take precedence over international obligations regarding sharing climate change costs/burdens: the obligation to address/eradicate domestic poverty.⁶ Following the income tax paradigm, this is done by allocating '*Poverty Capability Adjustments*' (PCA_k) in proportion to the number of poor people and the poverty intensity,⁷ which are deducted from the figure for gross capability. The resulting (net) amount is the *Oxford Capability Measure*:

$$OCM_k = OGC_k - PCA_k$$

Examples

Before we turn to discuss some of the characteristics of this measure in a bit more detail, it may be useful to illustrate the transition from (Oxford) base, to gross, to net capabilities, say by looking at five large economies (India, China, Japan, the EU, and the US) and the aggregate of all LDCs. The vertical axes in *Figure 1* depict the relevant capabilities (base capability as squares, gross capabilities as circles, net capabilities as diamonds).⁸ The horizontal axes represent 2009 per capita GDP in thousands of US\$ (PPP).

Figure 1.a shows the way in which the Oxford Base Capability (measured by GDP) of countries with per capita GDP more/less than the world average of US\$10,643 gets magnified (yellow arrows) or contracted (green arrows) in the transition to Oxford Gross Capabilities. Countries with (roughly) the same per capita GDP – such as the EU and Japan – will have the same level of progressive magnification/contraction, the degree of which is in proportion to the distance from world average GDP per capita. US Base Capability is roughly doubled (+100 per cent); the EU and Japan following, each with a three-quarter addition (+74 per cent); China a one-fifth contraction (–20 per cent); and India just under halving its Base Capability (–45 per cent).

Figure 1.b, in turn, depicts the relevant transitions from gross to net capability *after* deducting the Poverty Capability Adjustments (where applicable). Not surprisingly, there are no such adjustments for the three rich economies. China's capability contraction due to these poverty adjustments is relatively small (an additional 5 base capability percentage points), while India and the LDCs have significant additional reductions of 56 and 136

⁶ "Affirming that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the **legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty**," [UNFCCC preamble, emphasis added]

⁷ The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and **poverty eradication are the first and overriding priorities of the developing country Parties**." [UNFCCC, emphasis added]

⁷ $PCA_k = \Pi \times P_k \times MPI_k$, with P_k = population size, MPI_k = multidimensional poverty index, and Π = a general poverty capability allowance [per poor person per year], calibrated with respect to the Group of Least Developed Countries and denominated in the same units as GDP.

⁸ Note that while the Base Measure, given by a country's GDP, can be associated with monetary units in the sense of there being certain sums of money associated with the Base Measure figures, the same is not true for the other two measures. By contracting or expanding these figures (progressively) in order to get our Gross Measure, such an association with actual amounts of money is lost. The adapted GDP figures no longer refer to actual monetary amounts but are 'merely' (dimensionless) numbers, used to fix relative proportions. Hence the absence of measurement units for vertical the capability axes.

percentage points respectively, leaving India 1 and the LDCs 67 percentage points below zero capability.

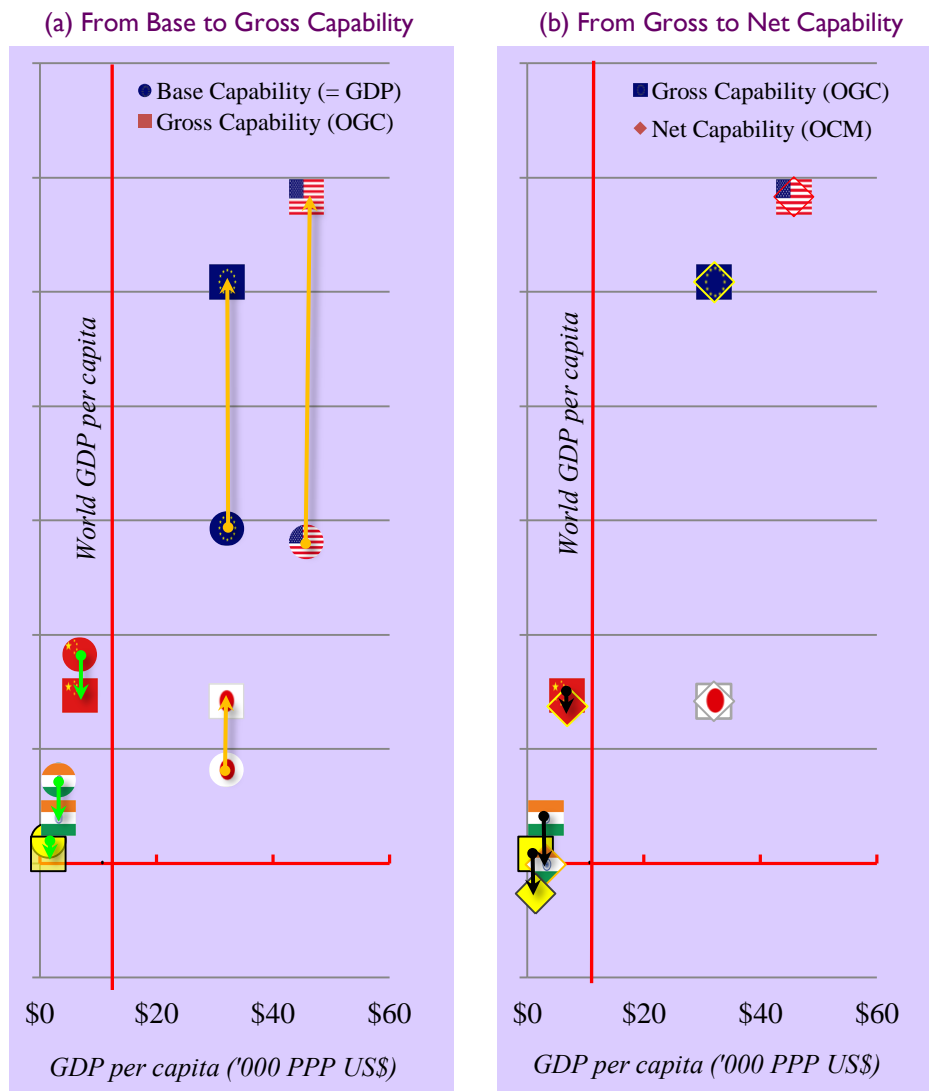


Figure I. Capability Adjustments under the Oxford Approach

Two features of the Oxford Approach that deserve a special mention in this context: it incorporates an empirically calibrated degree of (prosperity) progressiveness, and it accommodates the primacy of poverty reduction/eradication.

Prosperity Progressiveness

As indicated above, a capability measure based solely either on economic size/income (GDP) or levels of prosperity (per capita GDP) would lead to outcomes (exemplified in Table 1) that are counter-intuitive from an equity point of view. However, the two parameters can be used jointly to form such a measure.

While it is relatively simple to show that such a measure should be '*income proportional*' – meaning that, all else being equal, an n -fold income ratio leads to an n -fold capability ratio –

the degree of *prosperity progressiveness* required to accommodate the Sierra Leone/Lichtenstein issue (*see above*) is more difficult.

Following the general idea of the Oxford Approach, i.e. modelling economic capability on income taxation, the Report uses the progressiveness of domestic tax regimes to calibrate the progressiveness of the relevant gross capability measure. This is done by looking at the cost that would be allocated to a country under the Oxford Approach in terms of average inhabitant (per capita terms) and calibrate the resulting per capita distribution by looking at existing domestic income tax distributions. The idea was that what is deemed to be acceptable for individuals (domestically) should also be acceptable for average inhabitants (internationally).

Prioritizing Poverty

The language of the UNFCCC,⁹ as well as the recent acknowledgment by the international community at Rio+20 that eradicating poverty is the greatest global challenge facing the world today and an indispensable requirement for sustainable development,¹⁰ clearly indicate that the demands of poverty on a country's capability to pay should have priority over those of climate change. The key in designing a capability measure is to ensure that this is respected.

Probably the best known formulation of a capability measure – at least in the world of climate change negotiations – is the concept of 'capable income' introduced in the *Greenhouse Development Rights* (GDR) approaches in order to develop their 'capacity indicator' (which serves the same function as our capability index).¹¹ It measures a country's capability in terms of the 'surplus' annual income of its 'rich' inhabitants over and above a US \$9000 'development threshold'. Poverty, in other words, is taken into account by exempting the income of poor people from being counted as 'capable'.

This, however, means that no matter how large a country's poor population (and its poverty problem), under the GDR capability measure it is deemed to have some capability to pay for climate change, and expected to share the burden/cost of climate change.¹² This failure to reflect the magnitude of 'development needs' of countries with poor populations is, we believe, not compatible with the idea that countries should have the option to prioritise spending on poverty eradication over climate change cost/burdens.

The *Oxford Approach* incorporates the priority of demands of addressing poverty on a country's capability to pay over payments for climate change by following the income tax model of providing allowances to be deducted as adjustments from (gross) tax liability. *Poverty Capability Adjustments* PCA_k are deducted from gross capability to reflect the magnitude of the poverty problem/development needs. While there is a normative element in specifying these adjustments – in the Oxford Approach chosen to be that LDCs should generally not be deemed economically capable – it is important to point out that no reference is made to domestic income distribution or degrees of domestic inequity. For

⁹ See footnote 14.

¹⁰ *The Future We Want*, I. Our Common Vision, para. 2;
www.un.org/disabilities/documents/rio20_outcome_document_complete.pdf

¹¹ The GDR Approaches are discussed at some length in Part III of the Report.

¹² The assumption being that every country will have an inhabitant who earns more than \$9000.

reasons explained in *Box 2*, we felt these are not relevant to capability in the present context.

The key feature of these deductions is their ability to reduce the resulting net-capability to zero or even to be negative. Following the income tax paradigm, the idea is that a net-capability measure of less or equal to zero means a capability index of zero, i.e. an exemption from having to contribute to costs, in the same way in which earning less than ones tax allowances entails an exemption from paying income tax.¹³ The magnitude of negative net-capability can be interpreted in terms of ‘capability headroom’, indicating (under certain growth assumptions) how long a country will be exempt from contributing to climate change costs/burdens and consequently be able to prioritise poverty eradication to the fullest possible degree. The Oxford Approach cannot guarantee that countries will actually act accordingly, but it gives them the benefit of doubt by providing the opportunity to do so.

Box 2. Domestic income inequities and the issue of the “global rich”

Domestic income distributions are most frequently invoked in discussions on the issue of “the global rich in developing countries hiding behind their poor” and not pulling their weight compared to their developed country peers. This is often raised as point of interpersonal equity based on, say, the Aristotelian imperative to *treat like cases as like*.*

Aristotle is obviously right. However, his imperative should not be applied selectively. If it is applied to climate change, it should also be applied to addressing global poverty. The global rich should – like everybody else – be made to pay their fair share wherever they may live, for climate change *and* for poverty eradication (anywhere in the world).

If developing countries, in addition to addressing poverty, are mandated to pay for climate change on the grounds that they have inhabitants who should be treated like their global rich peers in developed countries, then Aristotle’s imperative would entail that developed countries should be mandated to pay for poverty alleviation in proportion to what developing country rich are asked to pay for that purpose.

In an ideal world, this could take place through a (progressive) global income tax, levied by a world government that would ensure that both the plight of the global poor and the cost of climate change are addressed. In the absence of such a regime that tackles both issues on an equal footing, however, Aristotle’s imperative cannot be evoked because the cases of the rich living in developing countries and the rich living in the developed world are *not* alike.

The equal treatment of the global rich is not the only reason why one might wish to consider domestic income distributions in this context. For example, one might think that extreme in-country income inequalities need to be remedied as a matter of equity.** However, we do not think that this issue, no matter how legitimate, is one that should flow into considerations of how to measure capability to pay for climate change.

* *Nicomachean Ethics*, V.3. 1131a10-b15; *Politics*, III.9.1280 a8-15, III. 12. 1282b18-23

** One might wonder why this issue is restricted to in-country income differences.

¹³ Although negative net capability does not entail ‘negative-cost’ in the cost/burden sharing context, its magnitude can be regarded as a capability ‘headroom’ indicator

APPLICATIONS

Assessing Cost/Burden Distributions: The Oxford Capability Index¹⁴

As mentioned above, a country's share in the total (positive) OCM amounts – its **Oxford Capability Index** (OCI) – is meant to define its fair/just climate change cost/burden share, from a capability point of view. This (capability) equity benchmark – in combination with other benchmarks reflecting other pertinent features, such as differentiated responsibilities – could thus be used to allocate to countries how much they are meant to pay for a given purpose, say to replenish the Green Climate Fund. Alternatively it could be used to assess the fairness/justice of a given *ex ante* cost/burden distribution.

Take, for example, the 2010 climate change impact cost estimates recently published in the second edition of the **Climate Vulnerability Monitor** (CVM2).¹⁵ Figure 3 displays, in (a), the respective total cost shares of the top five impact cost sufferers/sharers, together with the share of the EU and the LDC Group aggregates. It also represents (b) the benchmark shares given by the (net) Oxford Capability Index (OCI).

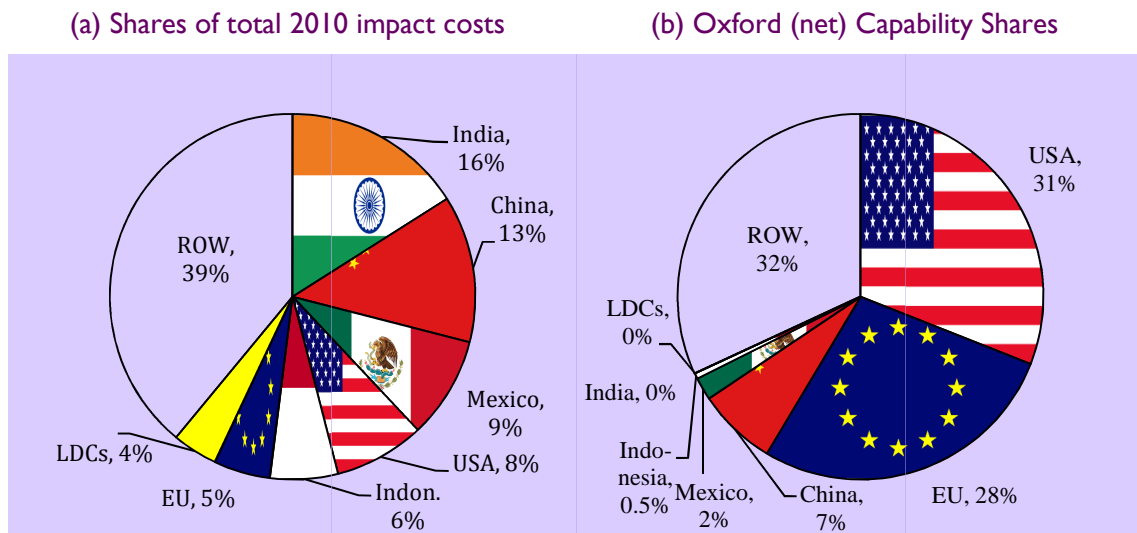


Figure 2. 2010 CVM Impact Cost Distributions

What is apparent at the first glance is the striking difference between the two. Consequently, if one were to judge the fairness of this distribution of actual costs just in terms of respective (economic) capabilities, this would suggest a significant degree of unfairness.

There is, in principle, a simple way to rectify this situation, namely through **Excess Cost Transfers** (ECT):

$$ECT = (Actual\ Share - Benchmark\ Share) \times Total\ Impact\ Costs$$

¹⁴ See Section VI.1 of the Report.

¹⁵ DARA (2012). *Climate Vulnerability Monitor (2nd Edition): A guide to the cold calculus of a hot planet.* <http://daraint.org/climate-vulnerability-monitor/climate-vulnerability-monitor-2012/report/>

– where countries receive ($ECT > 0$) or pay ($ECT < 0$) money in order to rectify the inequity. *Table 2* lists some of the resulting transfers that would have to be carried out in order to render the DARA impact cost distribution equitable relative to the OCI benchmark. The practical problem with this solution is, of course, its magnitude: the sum total of transfers that would be required to rectify the inequity would be US\$352bn relative to the OCI benchmark.

These figures must be treated with some caution. Apart from the fact that there may be methodological issues related to the calculation of the impact cost figures, it is likely that the figures reported do not include all impacts, and obviously they do not include other climate related costs such as those incurred in mitigation. On the benchmark side, we must re-emphasize that the benchmarks developed here only involve respective economic capabilities, thus not reflecting other aspects, in particular differentiated responsibilities.

Table 2. Cost Shares, Capability Shares, and Excess Cost Figures

2010	GDP/cap	Costs			Capabilities	
	2009 \$ PPP	Costs (\$bn)	%	% of GDP	OCI	OCI ECT (\$bn)
India	3167	89	16%	2.2%	0%	89
China	6863	72	13%	0.7%	7%	31
Mexico	13859	48	9%	3.1%	2%	38
USA	45793	45	8%	0.3%	31%	-129
Indonesia	4085	36	6%	3.5%	0.5%	34
EU	32099	26	5%	0.2%	28%	-128
LDCs	1373	25	4%	2.5%	0%	25

Yet, given the orders of magnitude (both absolute and relative) of the figures, we believe that the overall pattern emerging here would not change fundamentally and that some general lessons can be drawn despite all these caveats. Above all, the lesson has to be that, judging from the DARA impact cost figures, there is likely to be a significant level of inequity in the overall distribution of climate related costs across the globe regardless of which particular equity benchmark is chosen, and that it is highly unlikely that the level of climate finance available will suffice to remedy this through excess cost transfers.

This, in turn, has some implications. In particular, it means that the design of any international climate finance mechanism such as the Green Climate Fund should take these overarching issues into account, in order not to aggravate them. The design of the resource allocation and contribution frameworks should not be seen in isolation but reflect these general cost distribution issues, through, say eligibility prioritisations and contribution dispensations. In theory, the best way of doing so would be to restrict eligibility to receive funds to countries with overall positive excess costs, and demand contribution from countries with overall negative excess costs. In practice, however, it is difficult to see that there could be an agreement on the assumptions required to calculate such overall excess costs. Instead, one might *prioritise eligibility* in terms of (impact) *cost intensities of GDP* (% of GDP, Table 2), and introduce *exemptions from contributing* in terms of *poverty*

intensities of GDP (see below).¹⁶ While neither of these proxies can be guaranteed not to aggravate the overall cost distribution issue – not least because of its inherent specification difficulties – it stands to reason that they are likely not to do so, at least not excessively.

Graduation Schemes: Per Capita Capabilities and Poverty Intensity of GDP

Returning to Nordhaus' call for a scheme *whereby countries “graduate” into a set of obligations that are commensurate with their abilities to pay*, it is clear –but still in need of emphasis– that the Oxford Capability Measure *per se* can and should not be used to introduce country classifications for ‘graduation’ purposes. Consider the **obligation to pay for climate cost/burdens**. Would it make sense to exempt countries with a ‘low’ OCM from such an obligation?

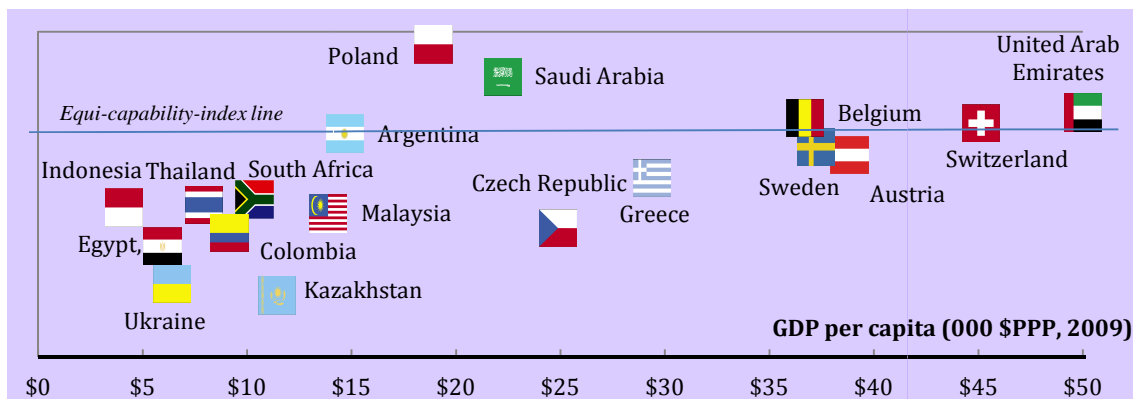


Figure 3 “Low Oxford capability” countries

Figure 3 depicts a number of countries with an OCM that could be called “low” – horizontally arranged in accordance with their prosperity level (per capita GDP). While it might seem reasonable to exempt countries such as Indonesia at the lower end of the prosperity spectrum, it seems difficult to do the same for Switzerland and the UAE at the other end. Given that in a graduation scheme, like cases (e.g. all ‘low capability’ countries) would have to be treated alike (see Box 2 above), this means that the OCM cannot generally be used to introduce graduation categories.

However, *if relativized to population size*, the Oxford approach could, we believe, provide graduation benchmarks, and it could do so in a manner which is more appropriate (equitable) than by reference to per capita GDP per se. Figure 4 depicts the per capita values of the three capability measures used in the Oxford Approach for the same economies as depicted in Figure 1. It illustrates nicely the way in which per capita OCM differs from the simple per capita GDP metric, since the latter is the starting point of the (per capita) Oxford Approach: **per capita Base Capability** = per capita GDP (), as depicted in the in the circular data points in Fig. 4.a.¹⁷ The square data points in (a) and (b) reflect the move to **per capita Gross Capabilities**, incorporating the derived level of progressiveness:
¹⁸ Finally, the diamond shaped data points in (b) reflect

¹⁶ The idea here is that while the level of contributions is assigned, say, in proportion to respective economic capabilities (and/or differentiated responsibilities), countries are exempted from contributing if their poverty intensity of GDP is higher than n people per million of GDP.

¹⁷ Note that the EU and Japanese figures are very close, as reflected in the merged flags.

¹⁸ with = 1/World GDP per capita.

the move to *net per capita Oxford Capability Measure* (ocm_k) through the deduction of poverty capability allowances, themselves a function of the Multidimensional Poverty Index MPI:¹⁹

$$ocm_k = f(gdp_k) - g(MPI_k).^{20}$$

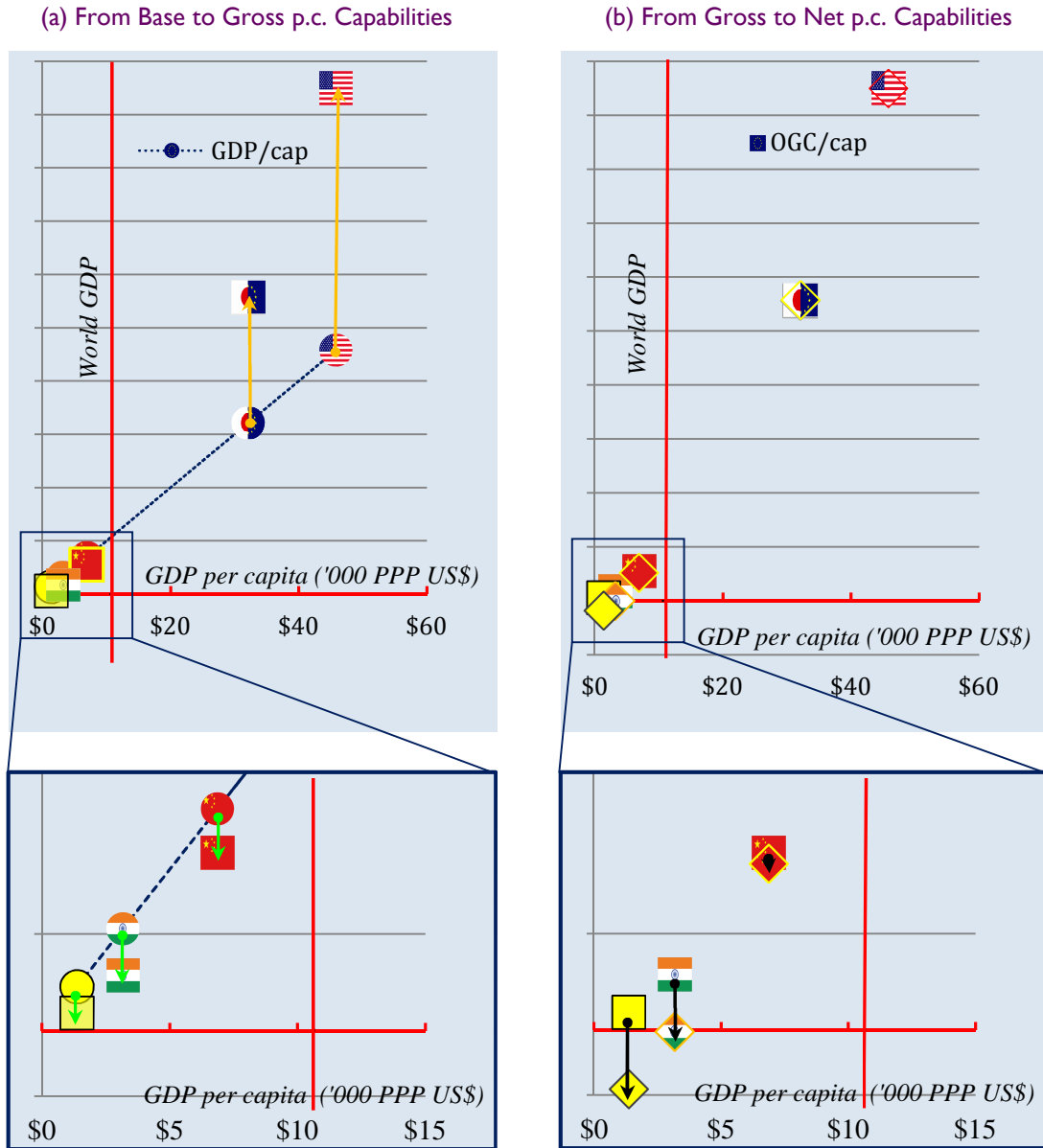


Figure 4. Oxford per capita capability measures

¹⁹ As the first of this transformation preserves order – implying, in particular, that if two countries have the same per capita Base Capability (i.e. GDP/cap) then they will also have the same per capita Gross Capability, and vice versa – the two measures are essentially the same, as concerns defining graduation schemes. The same is not necessarily true for the move from gross to net capabilities, which could give rise to genuinely different graduation schemes.

²⁰ $g(MPI) = \Pi_{2LDC}^0 \times MPI$ with $\Pi_{2LDC}^0 = 2 \times$ average Zero Capability Allowance of the LDC Group (see Report Section II.2).

With respect to graduating from not having to having an obligation to pay, the most natural benchmark would seem to be zero capability: $ocm_k \leq 0$, although one could consider a positive benchmark.²¹ We hence believe that a capability-based graduation with respect to payment obligations should simply be aligned with whether a country should, in fairness, be expected to shoulder some cost/burden, i.e. if it has a positive Oxford Capability Index (OCI):²²

k is obliged to pay if and only if $OCI_k > 0$.

One might consider this sort of graduation to be ‘too formulaic’ to be generally acceptable, not least because the OCM does involve some ‘subjective’ calibrations. However, the reasoning put forward here hopefully demonstrates that any alternative ‘objective surrogate’ graduation measure would have to involve not only levels of prosperity (GDP/cap) but also levels of poverty (MRI). Moreover, it is clear that any such surrogate would have to vary directly with one and indirectly with the other.²³ A very simple combination that would satisfy this is: $MPI_k: gdp_k$. This, as it turns out, is nothing but the ‘**Poverty Intensity of the economy (GDP)**’ [measured in (poor) people per unit of GDP]:²⁴

$$PI = \text{Poverty Headcount} \times \text{Poverty Intensity Index} / \text{GDP}^{25}$$

Figure 5 lists the countries for which we can calculate this Poverty Intensity (with $PI > 1$). What is striking is the enormous range of these stresses, from around one person per million (e.g. Brazil) to a staggering 1325 (Burundi). Graduation would, of course, still involve the choice of a benchmark level, but whatever that may be, we believe it would be a fairer scheme than one based only on per capita GDP.²⁶

²¹ The main problem with a positive benchmark would be that countries could have a positive Oxford Capability Index (and thus should in fairness be expected to cover some cost/burden) but not be obliged to do so. This is not the case with a zero per capita capability benchmark, which aligns fairness with obligations.

²² Note that the Oxford Capability Index (OCI) is greater than zero if and only if $ocm > 0$.

²³ That is to say, an increase in per capita GDP should increase the likelihood of being obliged to pay, while an increase in MPI should decrease it.

²⁴ In the case of the MPI, this turns out to be the same as the MPI deprivation score per unit of GDP. See Report Section II.2.2.

²⁵ $MPI = (\text{Poverty Headcount} \times \text{Poverty Intensity Index}) / \text{cap}$

²⁶ However, to be quite clear, (i) we remain convinced that the (per capita) OCM based graduation, aligning fairness with obligation, is the first best solution, and (ii) while poverty intensity may be an acceptable surrogate for graduation, it is meant to be for this purpose only, and not for the sort of assessments described in the preceding section.

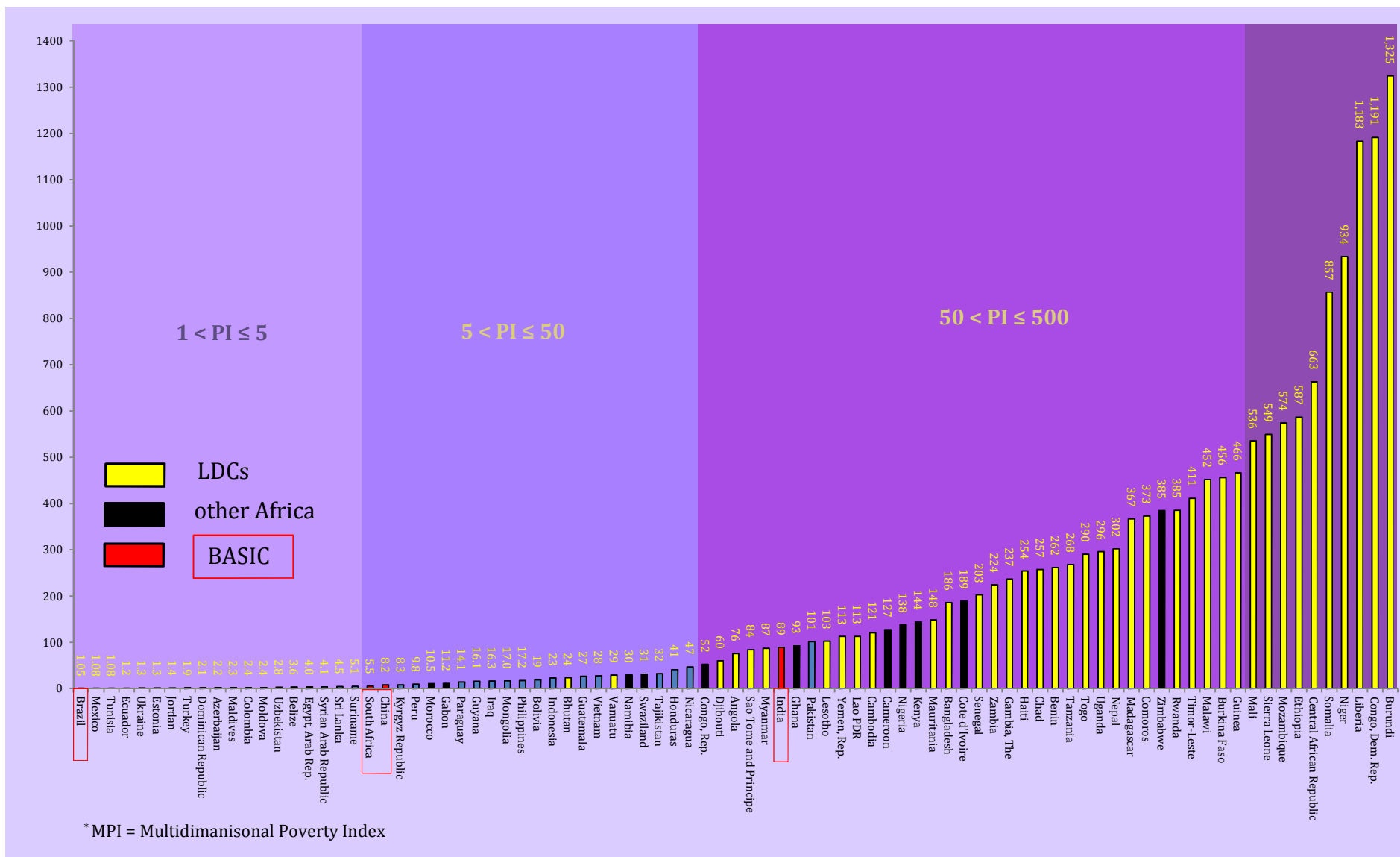


Figure 5. Poverty Intensity (PI) of 2009 PPP GDP > 1 person per \$ million