An Index of Economic and Social Rights Fulfillment: Concept and Methodology

By

Sakiko Fukuda-Parr
Graduate Program in International Affairs
The New School
Fukudaps@newschool.edu
(212) 206-3524 ex 2343

Terra Lawson-Remer
Law & Society Institute
New York University
tlr229nyu.edu
(858) 449-1010

Susan Randolph
Department of Economics
University of Connecticut, Storrs
Susan.Randolph@uconn.edu
(860) 486-4171

Abstract: In response to an increasing demand for rigorous monitoring of States in meeting their human rights obligations, a growing literature has emerged on measuring human rights fulfillment. Data are increasingly used in human rights assessment and advocacy but with an ad hoc approach, with three common limitations: frequent use of subjective indicators; focus on the right bearer enjoyment of right without taking account of duty bearer conduct; and event or country specific analysis that does not allow comparisons over time or space. This paper explores a methodology for measuring economic and social rights fulfillment that is reliable and authoritative. It proposes a composite index that: uses available survey-based objective, rather than subjective data; focuses on state obligations rather than solely on individual enjoyment of rights; and captures progressive realization of human rights subject to maximum available resources. Two calculation methods are proposed: the ratio approach and the achievement possibilities frontier approach. The paper identifies key conceptual and data constraints. Recognizing the complex methodological challenges, the aim of this paper is not to resolve all the difficulties, but rather to contribute to the process of building rigorous approaches to human rights measurement. The proposed index provides important new information compared with other measures of economic and social rights fulfillment, although it still does not fully capture some desired features such as the right to non-discrimination and equality, and the right to social security. The paper also outlines an agenda for longer term research and data collection that would make more complete measurement possible.

Keywords: Human rights; Economic and Social Rights; Measurement; Indicators; Progressive realization; Inequality; Poverty; Human Development.

Index of Economic and Social Rights Fulfillment: Concept and Methodology

I. Introduction

In response to an increasing demand for rigorous monitoring of State accountability for human rights obligations, a growing literature on human rights measurement has emerged[1]. Recently, the UN Office of the High Commissioner for Human Rights (OHCHR 2008) has begun to develop proposals for indicator sets that can be used in UN processes[2]. Quantitative indicators are being increasingly used in human rights advocacy and assessment by national and international civil society advocates, academics, and state monitoring agencies. However, these multiple efforts are tentative and there are no consensus indicators of human rights fulfillment. Moreover, the current and proposed use of indicators suffers from three limitations.

The first limitation is the use of subjective opinion based indicators, particularly with respect to civil, political and cultural rights. These rights are inherently difficult to quantify, and in the absence of objective, observed data, indicators are developed based on subjective opinions of 'experts'[3]. These indicators cannot be independently verified nor replicated, such that their legitimacy can be easily challenged.

The second common limitation is the focus on the right bearer perspective while neglecting the duty bearer perspective. Standard socio-economic indicators of human outcomes (such as infant mortality or school enrolment) are used as a proxy for fulfillment of social and economic rights. Such indicators go some way towards reflecting the extent to which a population is enjoying a particular social or economic right, but do not reflect the obligations of the duty bearer which are complex, as explained in the following sections of this paper. The fundamental conceptual difference between development progress and human rights fulfillment is that the latter entails not only the enjoyment of a right by individuals but a correlate obligation of duty bearers (Sen 2001)[4]. A conceptually adequate measure of human rights accountability therefore must reflect both improvements in the human condition and also the effort being made by the state to comply with its obligations (UNDP 2000; Raworth 2001; Cignarelli and Richards 2007).

The third limitation is the use of event or country specific data that does not permit comparison over time or place[5]. Rigorous monitoring of state obligations to make sustained efforts cannot be made without evaluating trends over time. Comparison between countries or sub-national units such as

provinces is an important approach to assessing whether a level of human rights enjoyment, such as primary school attendance, is realistically feasible. This is essential to the assessment of the state obligation to realize rights progressively, taking account of available resources. The principle of progressive realization recognizes that a country will be constrained in full realization of rights, such as the right to education, by the resources available. A primary enrolment rate of say 20% cannot be raised here and now to 100%, however committed a government may be, because it takes finance, skills, organization and time to build schools, train teachers and organize enrolment. Yet many human rights advocates have argued against country comparisons for methodological and strategic reasons (Carr Center 2005): that human rights are too complex to be quantified, especially in a composite index; that human rights challenges are country specific; and that country comparisons can be abused to attack countries in the context of North-South politics and create perverse political dynamics[6]. These arguments assume that all sets of rights are difficult to measure, and that only states and NGOs of the North would use indicators or indexes. Some rights, notably civil, political and cultural rights, are inherently difficult to quantify but others are more measurable. In particular, socio-economic indicators are available and are being used in assessing economic and social rights (thought not systematically nor always appropriately). Human rights measures can be used by advocates in the South to hold their own governments to account just as international NGO networks can do. The political dynamic will depend on *what* measurement tool is developed and *who* uses it.

The aim of this paper is to propose a methodology for an index of economic and social rights fulfillment that overcomes these limitations as far as is possible with the current state of the art in measurement methods and data availability, and to propose an agenda to address those that cannot be resolved. The index measures economic and social rights fulfillment and does not extend to civil, political and cultural rights. The index uses survey-based objective data from authoritative national and international series, rather than subjective assessments. The index captures both the right bearer and duty bearer perspectives, and the obligations of progressive realization of human rights subject to maximum available resources. Two calculation methods are proposed: the ratio approach and the achievement possibilities frontier approach. The paper identifies key conceptual and data constraints. Recognizing the complex methodological challenges, the aim of this paper is not to resolve all the difficulties, but rather to contribute to the process of building rigorous approaches to human rights measurement.

The purpose of this effort is to develop a tool that can be used by advocates to advance the realization of human rights and a rights-based agenda to eradicate poverty. For this reason, the methodology has been designed so that it can be used by advocacy groups across the world. It is deliberately simple and transparent; uses data that are widely available and legitimated through national and international processes; is easy to interpret for policy makers; and aims at an appropriate level of aggregation that is narrow enough in scope to capture rights in a manner meaningful for assessing policy effectiveness, but broad enough to give a summary assessment of overall State conduct.

II. Measuring Human Rights Fulfillment: Conceptual and Data Issues
Rights holder and duty bearer perspectives

A country's performance in terms of Economic and Social Rights (ESR) Fulfillment depends on both (i) the actual ESR outcomes people enjoy, as indicated by socio-economic statistics that proxy for particular rights, and (ii) a society's capacity for fulfillment, as determined by the amount of economic resources available overall to the duty-bearing state.

The relevant issue from the perspective of rights-holders is the extent to which one enjoys the fundamental ESRs guaranteed to all people under international law. The core ESRs put forth by the Charter of the United Nations; the Universal Declaration of Human Rights; and the International Covenant on Economic, Social & Cultural Rights include: the right to food,[7] the right to education,[8] the right to adequate healthcare,[9] the right to adequate housing,[10] the right to decent work[11], and the right to social security[12]. These are fundamental to a guarantee for meeting survival needs, and broadly refer to a right to a decent standard of living, employment, and minimum guarantees that would secure 'basic rights' (Shue 1980).

But the evaluation of Human Rights fulfillment cannot rely solely on a measure of the well-being of the individual. In contrast to development, the concept of human rights must be concerned with both the perspective of the duty-bearer and the perspective of the right-holder, in the context of the key principles of human rights that are explicit in international human rights instruments. International human rights instruments are grounded in the fact that particular entities have a duty to protect, promote, and fulfill specific rights[13]; and the holders of these rights can correspondingly make claims

on these duty-bearers.[14] Therefore, evaluation of human rights fulfillment must address the extent of the obligation of the duty-bearers as well as the extent of enjoyment of rights-holders.

State governments have the duty to protect, promote, and fulfill the human rights of citizens and residents.[15] These duties include obligations of conduct as well as result. The principles of equality and non-discrimination are at the core of all human rights obligations[16], and require that all people be treated as ends in themselves and not merely as means to an end. The obligations are legally secured by international and national law[17], and measurement should be conceptually rooted in these commitments.

Under international law, the obligation of human rights fulfillment is one of progressive realization, and thus contingent on the availability of resources[18]. The concept of 'progressive realization' is premised on the recognition that fulfilling ESR obligations requires economic resources, and the financial constraints faced by many developing countries may make simultaneous and immediate fulfillment of all ESR rights obligations impossible. States must strive to fulfill economic and social rights obligations to the maximum extent possible in the face of economic resource constraints.[19] Inherent in this idea of 'progressive realization', therefore, is the principle that countries with greater economic resources – and thus an increased capacity to devote more resources to food, education, health, and water & sanitation – have a correspondingly greater duty to ensure equitable and widespread enjoyment of ESR guarantees. Within a human rights framework States are the relevant duty-bearers; assessing ESR fulfillment means incorporating state capacity for fulfillment into the measurement of how well a country is doing in meeting its ESR obligations under international law.

Quantification and Data

In a given country, ESR enjoyment can be measured by the socio-economic statistics that correspond to specific human rights guarantees. Most countries have been collecting data relevant to many of the core ESRs, and international efforts have developed internationally harmonized data sets. However, there are gaps in data collection efforts as well as conceptual challenges for measuring discrimination and inequality.

Gaps in data: In areas of education, health, survival, hunger and nutrition, and employment, there is a rich array of indicators that have been developed, and for each of these areas, there are international series on select indicators. The available indicators are not all adequate for capturing the

full complexity of the human right in question but many serve as appropriate proxies. The coverage of many – though not all – indicators extends over the majority of countries, except in the case of employment where data sets are mostly limited to high income countries where the structure of employment is predominantly formal. In areas of housing (quality and security of tenure) and social security, no international data sets have been published that assess the level of rights enjoyment with broad coverage of countries.

Discrimination and inequality: The enjoyment of rights cannot be measured by national averages alone since human rights are emphatically concerned with the equal rights of all persons, and the state has an explicit duty to remove discrimination with immediate effect – a duty that is not subject to progressive realization. However, measuring equality of rights enjoyment is problematic for both conceptual and data availability reasons. Conceptually, inequality of outcomes such as differences in child mortality between population subgroups may not reflect discrimination in access to healthcare but instead result from historical disadvantages that the current state government has taken steps to redress. Whether equal rights enjoyment and non-discrimination should be evaluated by assessing if all persons enjoy the same outcomes (such as child survival) or the same opportunities (such as access to nourishment, water and sanitation, and healthcare) is subject to debate. Moreover, discrimination manifests itself in different ways in different contexts, so is not amenable to a single set of universal measures even within a single country, let alone across countries. The nature of discrimination is historically determined and context specific. Exclusion may occur along ethnic, tribal, or racial lines, or be based on religion, gender, or geographical location; because the social constructions that determine group identities cannot be applied across countries, inter-country comparison of discriminatory outcomes is difficult. In order to measure inequality in socio-economic outcomes we would first have to identify the privileged and marginalized populations within each country (as delineated according to ethnic, racial, gender, religious, or other lines), and then compare the levels of ESR enjoyment for these marginalized populations with ESR enjoyment levels in aggregate and for privileged groups. This approach is also problematic from a data availability standpoint, since cross-country data on socio-economic outcomes disaggregated by ethnic and racial sub-groups does not exist for most countries. Data of any kind on the distribution of outcomes is sparse. The Gini coefficient of income distribution is available and used in many economic studies, but coverage and quality are weak, income inequality is a poor proxy for disparities between sub-groups, and high income inequality may result from non-discriminatory policies, can occur in the context of equal protection of

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the relevant ESRs, or even reflect macro-economic policies that facilitate ESR fulfillment by increasing state resource capacity or individual economic opportunities. While data on disparities in health and education outcomes are available in some countries for rural-urban, gender, and income quintile divides, the coverage is far from complete, and these divides are a poor proxy for disparities based on ethnicity or race. Further, they may reflect historical conditions or nearly universal statistical correlations, rather than failures in state fulfillment of equal protection and non-discrimination obligations.

Duty-bearer obligations of conduct: Measuring obligations of conduct is more difficult than measuring rights-holder enjoyment and duty-bearer obligations of result, and confronts a number of challenges. First, assessing policy choice is both difficult and fundamentally inappropriate since 'one size fits all' policy prescriptions are not effective[20]. Appropriate policies to promote ESR fulfillment vary depending on the challenges and constraints within each country. An approach that focuses on policy objectives (obligations of ESR results), rather than conduct, encourages states to pursue the policies that most effectively promote ESR objectives given a country's particular constraints and opportunities, allowing for innovation, adaptability, and bottom-up solutions. Second, at a practical level, it is quite difficult to credibly aggregate and compare state conduct across countries. Assessing conduct would require far more than merely examining official policies or levels of resource expenditures in specific sectors, since paper commitments can mask corruption and other political-economy failures that often prevent policies from being implemented effectively. However, a focus on obligations of result rather than obligations of conduct does have drawbacks, in that this approach may fail to accurately gauge state conduct designed to realize obligations of results. For example, it is entirely feasible that a government could engage in all the "right" policies to promote the fulfillment of ESRs, but intervening forces – such as external economic shocks, natural disasters, or refugee crises in neighboring countries – can still render these policies impotent. Likewise, a government could pursue policies that would be likely to diminish the enjoyment of ESRs, but exogenous forces – such as favorable rainfall leading to bountiful harvest - may buffer a population from the adverse effects of these policies and allow continued widespread enjoyment of ESRs, despite a government's policy choices.

Participation: The obligation to apply principles of participation is difficult to measure because participation – the idea that citizens should have voice in decisions that affect their lives – takes many

different forms in different contexts, within a single country let alone across countries. Often, elections are used as a proxy to capture this process, but it is well known that this is a poor indicator of effective voice. Unlike school enrollment rates, for example, an 'election' can take different forms and may have different implications for citizen voice in different types of decisions.

III. Rights and Indicators

The index measures ESR fulfillment in the five dimensions of education, food, health, housing, and decent work. Two other core rights: social security and non-discrimination should be included but cannot be due to data availability constraints. Although rights are universal, the level of enjoyment spans a significant range that is difficult to capture with the same indicator for low and high income countries. Most indicators differentiate better among countries along a particular segment of the spectrum. For example, primary schooling and literacy rates differentiate among countries with low levels of achievement in education, but most high income countries achieve nearly 100% on both measures, or are assumed to do so and so data on these indicators are no longer collected in high income countries. Moreover, international law grants people the right to the "highest level attainable" of certain rights, so that the higher income countries are held to a higher level of enjoyment. For these reasons, it is not practical to construct a single index for all countries. Therefore two indices have been constructed: ESRF-1 for low and middle income countries, and ESRF-2 for high income countries. Table 1 shows the indicators selected for the two indices. **[Insert Table 1 here]**

Indicators were chosen based on: relevance to the specific ESRs assessed, data reliability, coverage, policy responsiveness, sensitivity to current government policies (flow variables), and the extent to which the indicator is a "bellwether" determined by low (or high) levels of rights enjoyment in multiple dimensions. For example, malnutrition (low height for age) – also known as the stunting rate – is caused by deprivation of nutrients as well as low caloric intake, tainted water, ill health, and poor caregiver knowledge about child nutrition. It is thus a "bellwether", indicative of low levels of ESR enjoyment in a number of inter-related and inter-dependent rights dimensions. Primary and secondary school completion and enrollment rates were chosen over adult literacy rates because adult literacy is a stock variable that reflects past education policies, while school enrollment and completion more directly measure current government policies. However, these considerations required trade-offs, and inevitably judgment was exercised in selecting indicators that balanced, as best as possible, these multiple criteria.

The right to food includes both the right to adequate nourishment (calories), and the right to sufficient nutrition (micronutrients and a proper balance of proteins and other nutrients). The height for age measurement of malnutrition is sensitive to nutrient deprivation as well as undernourishment. In high income countries, this data is not available but the indicator "low birth weight infants" reflects poor health status and care of mothers and infants. There is some evidence that obesity is a good indicator of poor nutrition in some countries, but it has not yet been established that this is the case for most countries. Data on food insecurity are increasingly available for high income countries, but are not yet harmonized across countries.

The right to education refers to primary education, but in the contemporary world, compulsory education extends into secondary levels, and primary education does not accord an individual with the minimum level of capacity and knowledge necessary to participate meaningfully in contemporary society. Moreover, the quality of education is as important as the number of years of school attendance. In high income countries, primary education is almost universal so only secondary school attendance is used, whereas in low and middle income countries, both primary and secondary school attendance are used. PISA scores measure knowledge and skills needed in adult life but coverage is limited and is mostly for high income countries so we are unable to assess quality for low and middle income countries. Because of limited data coverage, the indicator used here for high-income countries is the average of the math and science literacy PISA scores. [21]

The right to health refers to the highest attainable standard of health. The under 5 mortality rate per 1000 live births (U5MR) is a 'bellwether' indicator that is indicative not only of access to primary medical services and policies promoting health, but also to other conditions necessary for health since most child deaths are preventable, particularly in developing countries. U5MR covers only children under age 5; probability of dying before 65 captures the whole population but data are not published annually. Life expectancy is used in its stead. Assisted births rates reflect access to broad health care services for the disadvantaged population in low and middle income countries better than other available indicators such as vaccination rates (since high levels of vaccination can be achieved with a one-time government campaign that neglects the many other aspects of health care), and has important implications for the health of a vulnerable group. It is also indicative of related conditions that affect access to healthcare, especially the empowerment of women.

Right to decent work refers to both access and conditions of work: work that is productive and in conditions that are consistent with human dignity. The ILO's Key Indicators of the Labour Market Programme (KILM) has developed concepts and measurement approaches as well as datasets on these aspects of decent work. However, the country coverage is not adequate on all these aspects for the purposes of this index. We therefore use long term unemployment (KILM 8 x KILM 10) to measure access to work in high income countries and the percentage of the population with income greater than 50% of median income to measure productive work in high income countries. Although the employment to population ratio (KILM 2) incorporates information on access to work in low and middle income countries, it tends to be higher in countries where educational opportunities are limited and acute poverty induces families to send their children to work. The primary concern in low and middle income countries is access to productive work that pays a living wage. As such, we use the percentage of the population with income above $1.25 (2005 PPP$) per day to measure the right to decent work in these countries. Measures of decent work conditions could be included when the KILM data set increases coverage. Their measure of vulnerable employment (KILM 3) is especially noteworthy in this regard**.**

Right to Adequate Housing refers to adequate access, quality in the form of provision of water and sanitation, and security of tenure (UN-Habitat and OHCHR 2003). Efforts have been made to develop indicators for these elements; access to clean water and sanitation is one element of adequate housing for which an international data set is available for low and middle income countries. Clean water and sanitation are also significant as rights in themselves[22]. An appropriate indicator of housing quality for high income countries is not yet available with sufficient comparable country coverage. Similarly, comparable indicators reflecting adequate access and security of tenure with sufficient country coverage are not yet available.

Resource Capacity: State capacity for human rights fulfillment depends on a number of factors, such as financial resources, the strength of administrative and organizational efficiency of state institutions, and the human resources (education, skills, and knowledge) within the country. GDP per capita reflects the per person economic resources available in a country. Total government budget is not used as a proxy for capacity because government revenue reflects policy choices, while the obligation of progressive realization is premised on the notion that governments should be pursuing

policies so as to realize ESRs to the maximum extent possible given the availability of resources. In other words, a State does not have a lesser degree of ESR obligations because it chooses to collect less government revenue; failing to collect the revenue necessary to pursue policies promoting ESR fulfillment itself reflects a failure in the State's human rights obligation. GDP is measured in constant purchasing power parity (PPP) dollars, since PPP$ more accurately reflects resource availability, and usage of a constant price index is necessary to make the index comparable across time. However, it is important to note that per capita GDP may be problematic as a proxy for state resource capacity because low GDP can result from poor macroeconomic policy choices by governments, rather than externally generated resource constraints. In other words, to the extent that GDP per capita reflects endogenous policy choices rather than exogenous constraints, per capita GDP does not accurately reflect capacity for fulfillment given available resources. In extreme cases, such as Zimbabwe, low GDP per capita can reflect a State's failure to take appropriate policy measures that would enable the realization of economic and social rights by generating sufficient financial resources.

IV. Methodology of Calculation

Two methodologies are proposed for constructing the index: (1) the Ratio approach, and (2) the Achievement Possibilities Frontier (APF) approach, with two variants for each of the approaches. All four methodologies focus on the same set of rights and use the same indicators.

Ratio Approach

Index Version 1 measures ESR fulfillment as a ratio between the extent of rights enjoyment (x), and State resource capacity (y). A country's raw index score is determined by $z = x/y$. The ratio thus incorporates both the perspective of the rights-holder (in the numerator) and the extent of the obligation of the duty-bearing State (in the denominator). In the numerator, the extent of ESR enjoyment is assessed by looking at socio-economic indicators that measure ESR results, e.g., primary school completion rates, malnutrition rates, etc. In the denominator, the natural log of GDP per capita is used as a proxy for resource capacity, since the concept of 'progressive fulfillment' makes the extent of a State's obligation to fulfill ESRs contingent on resource availability. The natural log is used because the capacity for fulfillment does not increase linearly with per capita GDP, and assuming a linear relationship would penalize higher income countries too heavily. Therefore a country with high per capita GDP but poor socio-economic indicators fares worse on the index than a country with the same poor outcome indicator levels but lower per capita GDP.

Version 1A is calculated by using the percent achievement on each indicator to create an indicator score for each of the five dimensions. For example, if a country has a child malnutrition rate of 5 per hundred children, its score on the right to food dimension will be 95. In contrast, the achievement scores on each indicator for Version 1B are constructed by first setting the maximums and minimums for each indicator, and then determining where a given country falls between that max and min. We specify a maximum value of 85 years for life expectancy, and 100% achievement for all other indicators, while the minimum is specified as the minimum value observed in any country in our sample since 1990. For example, the achievement score for under 5 survival rate is constructed by dividing the difference between the survival rate for the given country and the lowest survival rate since 1990 for all countries by the difference between the maximum (100%) and the minimum survival rate observed in any country since 1990: (value – min) / (max – min). The second (Version 1B) method has the advantage of greater sensitivity, since if the minimum score for an indicator is relatively high, then all countries will score within a very narrow (high) range under Version 1A, while Version 1B will penalize the lowest performers more severely. The rights fulfillment indices for each component right are constructed as follow where z_k is the index score for right k, x_{ji} is the enjoyment indicator i (e.g., primary school completion rate; 100 – malnutrition rate) in j=H for high income countries and j=L for low and middle income countries, and y is the natural log of GDP per capita.

Version 1A:

1. Right to Food:

    Low & Middle Income Countries: $z_1 = x_{L1}/y$

            where: $x_{L1} = 100 -$ child stunting rate

    High Income Countries: $z_1 = x_{H1}/y$

            where: $x_{H1} = 100 -$ % infants with low birth rate

2. Right to Education:

    Low & Middle Income Countries: $z_2 = (.5x_{L2} + .5x_{L3})/y$

            where: x_{L2} = primary completion rate

                              x_{L3} = gross secondary school enrollment rate

    High Income Countries: $z_2 = (.5x_{H2} + .5x_{H3})/y$

            where: x_{H2} = (.5PISA science score + .5PISA math score)/10

                              x_{H3} = gross secondary school enrollment rate

3. Right to Health:

Low & Middle Income Countries: $z_3 = (1/3 x_{L4} + 1/3 x_{L5} + 1/3 x_{L6})/y$

where: $x_{L4} = [1000 - \text{child mortality rate (per 1000 live births)}]/10$

$x_{L5} = \text{Life expectancy}$

$x_{L6} = \%$ births attended by skilled health personnel

High Income Countries: $z_3 = (.5 x_{H4} + .5 x_{H5})/y$

where: $x_{H4} = [1000 - \text{child mortality rate (per 1000 live births)}]/10$

$x_{H5} = \text{Life expectancy}$

4. Right to Housing:

Low & Middle Income Countries: $z_4 = (.5x_{L7} + .5x_{L8})/y$

        where: x_{L7} = % access improved water source

                                    x_{L8} = % access improved sanitation

5. Right to Work:

Low and Middle Income Countries: $z_5 = x_{L9}/y$

        where: x_{L9} = 100 – (2005 PPP)\$1.25 poverty rate

High Income Countries: $z_5 = (.5x_{H6} + .5x_{H7})/y$

        where: x_{H6} = 100-long term unemployment rate as % labor force

                                      x_{H7} = 100 - % below 50% median income

Version 1B:

The indices (z variables) are defined as above while the indicators (x variables) are defined as shown below.

Low & Middle Income Countries

x_{L1} = (% children under 5 well nourished[23] – min % well nourished)/(100 – min)

x_{L2} = (primary completion rate – min primary completion rate)/(100-min)

x_{L3} = (gross sec school enroll. rate – min gross sec. school enroll. rate)/(100 – min)

x_{L4} = (child survival rate[24] - min child survival rate)/(100-min)

x_{L5} = (life expectancy – min live expectancy)/(85 – min)

x_{L6}= (assisted birth rate[25] – min assisted birth rate)/(100 – min)

x_{L7}= (% access improved water – min % access improved water)/(100-min)

x_{L8}= (% access improved sanitation – min % access sanitation)/(100-min)

x_{L9}= (non-poor rate[26] – min non-poor rate)/(100-min)

High Income Countries

x_{H1}= (normal birth weight rate[27] – min normal birth weight rate)/(100-min)

x_{H2}=(Av. % PISA score[28] – min Av. % PISA score)/(100-min)

x_{H3}=(gross sec school enroll. rate – min gross sec. school enroll. rate)/(100 – min)

x_{H4}=(child survival rate - min child survival rate)/(100-min)

x_{H5}=(life expectancy – min live expectancy)/(85 – min)

x_{H6}=(% not long-term unemployed[29]- min % not long-term unemployed)/(100-min)

x_{H7}= (% not relatively poor[30] – min % not relatively poor)/(100-min)

Aggregate ESRF Index Version 1A and 1B: The aggregate ESRF Index is defined identically for Versions 1A and 1B as shown below:

Low & Middle Income Countries: **ESRF-1 = $[((z_1)^{1/\alpha} + (z_2)^{1/\alpha} + (z_3)^{1/\alpha} + (z_4)^{1/\alpha} (z_5)^{1/\alpha})/5]^{\alpha}$**

High Income Countries: **ESRF-2 = $[((z_1)^{1/\alpha} + (z_2)^{1/\alpha} + (z_3)^{1/\alpha} + (z_5)^{1/\alpha})/4]^{\alpha}$**

A value of $\alpha = 1$ weighs all dimensions equally; increasing the value of α will weight more heavily the areas where fulfillment falls shortest.

We initially attempted to convert the raw "index Z-scores" to a scaled "S-score", which measured the degree of ESR fulfillment relative to other countries, taking the highest achieving country's score as the maximum possible. The advantage of the S score is that it would have turned the raw index Z score into an easily comprehensible number between 1 and 100, with 100 representing the maximum feasible fulfillment of ESR obligations. A quick glance at S scores therefore would tell the viewer where a particular country falls in percentage terms vis-à-vis the other countries evaluated. The Z score, taken alone, is difficult to interpret except as an ordinal ranking between countries.

However, we discarded the "S-score" approach due to two serious downsides. First, since the "best" raw Z score from the top scoring country can be expected to change each year, comparing S scores overtime is meaningless; for example, a country's Z score could increase (based on an improvement in ESR enjoyment despite continued resource constraints) but its S score still decreases if the top performing country's Z score increases by a greater amount. Second, using the best performing country as the benchmark for the maximum possible score implies that the top performer is completely fulfilling all ESR obligations, since that top performer receives a 100% score. Likewise, nearby performers receive marks of nearly 100%. However, a high Z score should be interpreted only as a relative achievement, not an absolute one. In other words, a particular country may be doing quite well in fulfilling ESR obligations in relation to other low and middle income countries, but substantial room for improvement might still remain. A 100% S score masks this need for continued improvement and implies that all ESR obligations have already been met.

Achievement Possibilities Frontier Approach

Index Version 2 uses an Achievement Possibility Frontier (APF) approach to measure ESR fulfillment. We first estimate an achievement possibility frontier for each ESR. This frontier

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determines the maximum level of achievement possible, (x_{max}) , on each ESR indicator at a given per capita income level, based on the highest level of the indicator historically achieved by any country at that per capita GDP level. A country's fulfillment score (x^*) on each ESR indicator is then determined as $x_{ji}^* = x_{ji}/x_{jimax}$ (where x is the country's raw score on the indicator, j=L or H for Low & Middle Income countries and High Income countries, respectively, and i refers to the specific indicator of concern as defined in Version 1 of the index). This can be interpreted as the proportion of the feasible level achieved. The most recent observations on the various indicators are used for x. Per capita GDP is measured in constant PPP$ to enable valid comparisons across time.

Version 2A:

Once the raw x* values are determined, the country's scores on each of the *k* economic and social rights, z_k, are then determined as shown below, where the subscripts are defined as for Version 1 of the ESRF index.

Low & Middle Income Countries

Right to Food: $z_1 = x_{L1}^*$

Right to Education: $z_2 = (.5x_{L2}^* + .5x_{L3}^*)$

Right to Health: $z_3 = (1/3x_{L4}^* + 1/3x_{L5}^* + 1/3x_{L6}^*)$

Right to Housing: $z_4 = (.5x_{L7}^* + .5x_{L8}^*)$

Right to Work: $z_5 = x_{L9}^*$ *High Income Countries*

Right to Food: $z_1 = x_{H1}^*$

Right to Education: $z_2 = (.5x_{H2}^* + .5x_{H3}^*)$

Right to Health: $z_3 = (.5x_{H4}^* + .5x_{H5}^*)$

Right to Work: $z_5 = (.5x_{H6}^* + .5x_{H7}^*)$

Once the scores on the individual rights, z values, are determined, they are aggregated into an overall ESR Fulfillment index that is decomposable across rights as in Version 1:

Low and Middle Income Countries

Aggregate ESRF Index: ESRF-1 $= [((z_1)^{1/\alpha} + (z_2)^{1/\alpha} + (z_3)^{1/\alpha} + (z_4)^{1/\alpha} + (z_5)^{1/\alpha}) / 5]$

High Income Countries

Aggregate ESRF Index: ESRF-2 $= [((z_1)^{1/\alpha} + (z_2)^{1/\alpha} + (z_3)^{1/\alpha} (z_5)^{1/\alpha}) / 4]^{\alpha}$

To estimate the APF for each rights dimension, for each indicator concerned first a scatter plot was made of the actual value of the indicator achieved against per capita GDP (constant PPP$) for all

countries for all years for which data were available, from 1990 to 2006. The per capita GDP value used was the per capita income level in the year of the observation. Second, observations on the frontier of the scatter plot were identified. Third, the functional relationship, $x_{jimax} = f(y)$, was estimated using the curve fitting algorithms available in SPSS. Three different variants of per capita GDP were considered when fitting the curve: per capita GDP, natural log of per capita GDP, and per capita GDP squared. Linear, logarithmic, inverse, quadratic, power, growth, and exponential functional forms were considered. Fourth, the best fit relationship was used to specify the x_{jimax} value for any given per capita GDP level.

To ensure the achievement frontier reflected what was reasonably achievable and to guard against measurement error, certain additional measures were taken when specifying the achievement possibility frontiers. First, observations from countries where there were major conflicts within the past ten years were excluded from defining the frontier. Data from the Uppsala Data Program and Center for the Study of Civil Wars, International Peace Research Institute, Oslo (UCDP/PRIO) data set were used to identify countries engaged in major conflicts.[31] [32] Second, the 1990s witnessed the transition of many countries from a command to a market system and during the transition, per capita GDPs temporarily plummeted. Yet the physical and human capital infrastructure laid prior to their transitions supporting economic and social rights fulfillment (e.g. schools and hospitals, teachers and doctors) did not deteriorate to the same degree as per capita GDP, and accordingly they were able to fulfill unusually high levels of economic and social rights relative to their per capita GDP levels during their transitions. To ensure that the achievement frontiers reflected a reasonable standard, for purposes of estimating the frontier, transitional countries were assigned their per capita GDP level at the onset of the transition until their per capita GDP levels rebounded. Third, we required observations over time from a minimum of four countries to define the frontier.

The core advantage of the APF approach is the theoretical coherency of assessing a country's fulfillment of its obligation of progressive realization based on the level at which a country with a given per capita GDP *could* perform and a country's score is readily understood relative to this standard—it is simply the percentage of what could be achieved given the country's income. Another advantage is that the APF approach reflects differences across indicators in the feasibility of transforming income into increased achievement. Also, like Version 1, this index is readily comparable across time. A principle drawback is that the calculations are not as simple as for the

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Ratio Approach. The best fit relationships underlying the APFs are different for each indicator, which may make the index more opaque to policy makers and therefore possibly less salient. It should be pointed out that the achievement possibilities approach does not penalize high income countries with complete or near complete fulfillment of particular rights as heavily as does the Ratio Approach (Version 1 of the index).

The crux of this approach lies in the details of how the achievement possibilities frontiers are estimated. This is illustrated by primary school completion rate and the child survival rate per 1000 population, which is equal to 1000 – the child mortality rate per 1000.   Figure 1 shows the scatter plot and associated APF for the primary school completion rate. The best fit was obtained with a quadratic relationship using natural log of per capita GDP. Primary school completion rates greater than 100 are constrained to equal 100. The estimated frontier boundary equation is:

x^*_{L2max} = -3384.641 + 999.403 (y) – 71.599 (y)^2 for GDP per capita (2000 PPP\$)<1074

x^*_{L2max} = 100 for GDP per capita (2000 PPP\$)>1073

Figure 2 shows the scatter plot and associated APF for the child survival rate. The inverse function with per capita GDP as the independent variable provided the best fit. This function asymptotically obtains a value of 1003.6, but was constrained to 1000.

x^*_{L4max} = 1003.628 – 74884.7(1/y), Values>1000 constrained to = 1000

Note that not only do the shapes of the two frontiers differ, but the per capita GDP level at which they reach a plateau, Yp, differs. This reflects the greater ease of transforming resources into increased educational opportunities for children as opposed to increasing child survival rates.

[Insert Figures 1 and 2 about here]

Version 2B:

The goal here is to capitalize on the best features of both the ratio approach and the simple AFP approach (Version 2A) by overcoming the key weakness of the latter. The APF approach treats countries with very low per capita incomes more appropriately than the ratio approach (Versions 1A and 1B) in that their achieved level on a rights indicator is compared to the best historically achieved by any country with the same per capita income level as identified by the frontier. However, the simple APF version of the index does not make any adjustments in achievement scores when a country's GDP per capita is at or above Yp, the value where the frontier function is first equal to its maximum value, Xp, of the indicator (generally 100) and plateaus. Thus, two countries with the same

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level (but less than 100%) of achievement (x) on an indicator will have no adjustments to their score if both have incomes above Yp, even though one country might have per capita income five times higher than the other. One way to correct this problem is to calculate an adjusted score that subtracts a "penalty" from the observed achievement when countries have resources sufficient to provide 100% fulfillment. Thus, in Version 2B, the x* values are specified as follows.

$$x^*_{ji} = x_{ji}/x_{jimax} \text{ if } x_{jimax} < 100\% \text{ of } Xp$$

$$\text{else, } x^*_{ji} = x_{ji} - penalty$$

The z values and Aggregate Economic and Social Rights Fulfillment Indices (ESRF-1 & ESRF-2) are calculated as for Version 2A of the index. The crux of this approach lies in deciding on the penalty; that is, how to adjust the x_{ji} scores when countries have per capita income levels above Yp but observed achievement on an indicator of less than 100%. There are several criteria that could be used to evaluate possible adjustments. These include:

i. **No Penalty on 100% Fulfillment:** If the observed value of an indicator equals 100 percent of Xp, the adjusted score on the indicator equals 100 percent of the peak value, Xp, of the indicator. This ensures that once a country has completely fulfilled an economic or social right, it is not penalized for per capita income growth.

ii. **Asymptotic equality**: The adjusted score approaches the observed percent achievement as the per capita income approaches the Y_p value for the chosen indicator. This requirement insures that there are no "jumps" in a country's z-score as its per capita income increases from below Y_p to above Y_p.

iii. **Penalty increases with per capita income**: As a country's per capita income increases it has more resources to achieve the economic right under consideration, so the penalty should increase with increasing per capita income. One might argue that ideally, the penalty should increase with higher per capita income, but at a decreasing (or some might argue, increasing) rate.

iv. **Penalty adjusts for difficulty of achieving the right**: Some rights indicators are less costly to improve than others (e.g. increasing primary school completion rates costs less than reducing child malnourishment levels). These differences are related to the different Y_p values for the different indicators.

v. **Penalty declines with increasing achievement**: Providing economic rights to the more "difficult to reach" segments of the population will require more resources per percent

achieved compared to providing rights initially to the easiest to serve segments of the population. Equivalently, this criterion suggests that penalties should increase with diminishing achievement.

     vi.   **Meaningful range**: the adjusted scores should range from 0 to 100%.

    vii.   **Simplicity**: The adjusted score formula should be easy to understand and to calculate, but this may be largely subjective.

    viii.   **Flexibility**: The adjusted score formula includes parameter(s) that can be adjusted to reflect alternative penalty rates for failure to meet human rights obligations as per capita income levels increase. This criterion facilitates sensitivity analysis.

Table 2 shows seven possible adjustment formulas (formulas A-G), while table 3 shows which of the above criteria are met by each of the seven possible adjustment formulas. Three common components of these formulas should be noted. First, (Y/Y_p) is the "income ratio," the ratio of the country's income to the plateau value. It will always be 1.0 or greater in these equations because they are applied only when a country's income is at or above Y_p. Second, $(Y-Y_p)/Y_p$ measures how much a country's income is above Y_p (in Y_p units). It will always be 0 or above and is equal to the income ratio minus one. Third, $(100-x)$ is the "shortfall" of a country on the indicator from 100% enjoyment.

To demonstrate how the penalty rate changes as Y/Y_p increases, we have selected two of the formulas, F and G. Figure 3 shows how a country's observed achievement score, x, would be adjusted using formula F depending on a) the observed achievement level on x, and b) how many times it's per capita income level exceeds Y_p. (In figures 3 and 4 below, we have assumed only a single indicator, x, is used to measure a right, z, so that $z = x*$ and the vertical axis is labeled as the "z-score" rather than the $x*$ value.) The highest curve indicates that if a country's per capita income level exactly equaled Y_p, then $x*$ equals the observed achievement level on x, 95%. However, if a second country had a per capita income level of ten times Y_p and its observed achievement level on x were also 95%, its $x*$ score would be reduced to 60%. Note that with formula F the penalty increases at a decreasing rate and falls more rapidly to zero the lower the observed achievement level. In an analogous manner, figure 4 shows how the penalty changes when formula G is applied instead. In our example, the adjustable parameter for beta is set equal to 1.5 and the adjustable parameter gamma is set equal to .1.

[Insert Figures 3 & 4 about here]

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Comparing the 2 Approaches and Alternatives

We also tried measuring the relationship between rights enjoyment and resource capacity by regressing each outcome indicator on the natural log of per capita GDP, and then using the difference between actual and predicted values (the residuals) for each outcome indicator as the raw index z scores in each human rights dimension. Thus, we estimated the equation $x_i = \alpha + \beta(y_i)$, where y is the natural log of GDP per capita, x = actual value for enjoyment indicator (e.g., primary school completion rate) and i indexes country. The index score in each dimension, z, was then computed as $z = (x_i - \hat{x}_i)$, where $\hat{x}_i$ = predicted value for enjoyment indicator, based on the β coefficient. This approach, which is quite similar to that used by Cingranelli and Richards (2007)[33], incorporated consideration of the resource capacity of each country, because the predicted indicator values, $\hat{x}_i$, depended on per capita GDP (measured as ln GDP per capita).

The advantage of the residuals approach is that the resulting total z score was relatively easy to understand: since the underlying indicator values were percentages, the component z scores $(x_i - \hat{x}_i)$ were also expressed in percentage terms. The component z scores reflect how far above (for a positive number) or below (for a negative number) the country is performing compared to what would be predicted based on its ln of GDP per capita. A z score near zero implies that enjoyment of a given ESR is at the level that would be predicted, given the country's resource capacity. This method avoided the problem created by the S-score methodology, which implied that the top relative performer is a top absolute performer.

However, as a concept, the residuals approach would imply that the predicted values for each outcome indicator were performance targets, based on per capita GDP. However, the fundamental premise of progressive realization is that States must strive to realize rights to the maximum extent possible, NOT to achieve minimum goals based on per capita GDP levels. We therefore did not pursue this approach.

Of the two primary methodologies, we prefer the achievement possibilities approach both because of its conceptual strength, and because its value is intuitively related to the extent to which obligations are being met. The achievement possibilities frontier method reflects the concept of progressive realization more accurately since it empirically estimates the possibilities of human outcome achievements at different income levels on the basis of historical achievements. The adjustment for

level of income rewards countries that achieve high levels of rights enjoyment with lower resources. Among the two variants of the achievement possibilities approach, we prefer Variant B, because it penalizes countries that fail to fulfill rights despite adequate resources and ties the penalty to the resources required to fulfill given rights. In a future paper we will present the achievement possibility frontiers for all indicators reflecting each right for both low and middle income countries (ESRF1) and high income countries (ESRF2) and the full ranking of countries according to Variant B of the frontier approach.

V. Discrimination and Inequality

It is important to note that this index currently does not incorporate a measure of discrimination. From a conceptual standpoint this might be viewed as a serious failing; because the principle of non-discrimination is at the core of the human rights framework, it is questionable how accurately an index can measure ESR fulfillment when discrimination is not taken into account. Concretely, a country in which the population as a whole enjoys high levels of ESRs – but a small minority is systematically denied basic Social and Economic Rights enjoyment – could still receive a high ESRF index score. The primary reason for excluding measures of discrimination is methodological, as incorporating discrimination is difficult given the conceptual and data issues already explained. However, it would be valuable to create such an index of discrimination in ESR Fulfillment, to be used in conjunction with the present index.

Discrimination may be reflected in inequality of outcomes, so outcome disparities could be used as a proxy indicator for discrimination. Outcome inequality is conventionally used in human rights assessment as *prima facie* evidence of discrimination, or, at the minimum, unequal treatment and inequality of opportunity for rights enjoyment. And insofar as states are obligated to eliminate discrimination in the enjoyment of human rights, inequality in outcomes is an appropriate measure of success (or lack thereof) in this regard. However, as discussed previously, outcome inequality is not a perfect proxy for discrimination because differences may be the result of historical circumstances that the current state government is taking proactive steps to address.

A discrimination score could either be incorporated into the existing ESR fulfillment index, in order to reward countries with non-discriminatory ESR outcome metrics and penalize countries where ESR enjoyment levels differ significantly along racial/ethnic/gender/religious lines, or it could serve as a

complementary ranking system. In either scenario it would be necessary to define 'marginalized' and 'privileged' groups within each country, and to collect disaggregated socio-economic data that reflects outcomes for these groups as compared to the population as a whole. Currently only very limited inequality data is available, including: income distribution; rural-urban distributions for some socio-economic outcomes; and gender distributions for some indicators. However, it is possible to generate some disaggregated data, which could provide differentiated outcome levels for a limited number of subgroups within a given country, based on some existing data sets such as the Demographic and Health Surveys[34].

One possible methodology to incorporate discrimination when data are available by relevant population subgroups is to adjust the score on each of the indicators in a manner that reflects the extent of inequality or discrimination. For example, the following formula could be used to "correct" the value of any or all indicators:

$$x^D = (1 - \omega) \Sigma P_i x_i + \omega x_1$$

Here x^D is the indicator value corrected for discrimination, x_i is the value of the indicator for sub-group i with i=1 assigned to the sub-group with the lowest score on the index, Pi is the proportion of the population in sub-group i, and ω is a weight between 0 and 1. The value selected for ω reflects the emphasis placed on non-discrimination (or inequality). If ω=0 then the "corrected" value of the indicator is the weighted average of the value of the indicator for the subgroups where the weights are the subgroup's shares in the population. That is, the "corrected" value equals the raw value of the indicator, so no penalty is imposed for inequality/discrimination. If ω=1, then the maximum penalty is imposed and the "corrected" value of the indicator equals the value of the indicator for the sub-group with the lowest score on the indicator. Thus, as the value of ω is increased from 0 to 1, the emphasis placed on inequality or discrimination increases. One interesting option is to set ω=P . In this case, the penalty for inequality is greater the larger (proportionately) is the sub-group with the lowest achievement on the indicator.

An alternative, and significantly less time intensive, strategy is to utilize the existing Minorities at risk (MAR) database to "flag" countries with discriminatory policies and practices vis-à-vis fulfillment of ESR obligations. The MAR database assesses the political and economic exclusion of ethno-cultural minorities in every country with a population of at least 500,000 (MAR 2008). Numeric codes indicating existence and severity of discrimination, social exclusion, and inequality are assigned for approximately two dozen variables, including higher education and public health conditions. The

MAR database explicitly evaluates group discrimination and bias *relative* to other groups within the country. In our analysis, each country was flagged as: "Green", indicating little or no discrimination; "Yellow", for caution, indicating moderate discrimination; or "Red", indicating severe and systemic discrimination.

VI. Conclusions and Agenda for Further Research and Data Development

The purpose of the ESRF Index is to create a rigorous measurement tool that human rights advocates and researchers could use to assess the extent to which countries are meeting their obligations to respect, protect and fulfill core economic and social rights. The ESRF Index demonstrates the feasibility of a measure that is methodologically rigorous, conceptually rooted in international human rights principles, replicable, transparent, based on survey data, and that makes possible inter-country and inter-temporal comparisons. The ESRF Index also demonstrates the limits of a composite measure; this index focuses on the obligations of fulfillment subject to progressive realization and does not capture the negative obligations of respect and protect, nor the obligations for participation and non-discrimination. Further work is needed to develop the index to overcome some of these limitations which are due in part to conceptual obstacles but also to data gaps – a point that we will elaborate further. Nonetheless, the Index is an advance on the current practice of ad hoc indicator use. It takes a step further than the current use of socio-economic indicators and composite development indices such as the HDI as proxies for human rights fulfillment by reflecting the obligation of progressive realization.

The Index is a tool that could be utilized by advocacy groups to hold governments accountable and to press for policy reforms. The ESRF Index highlights successes and failures in States' realization of their international human rights obligations, both in aggregate and along the five dimensions of food, health, education, housing, and work. Moreover, the component index rankings for each of the five human rights dimensions help identify those areas where the States are failing to meet their obligations to fulfill economic and social rights. The Index can be estimated for disaggregated units within a country such as provinces or municipalities to demonstrate disparities in state performance for different population groups. As a tool of advocacy for policy reform, an important aspect of the index is its transparency and ease of disaggregation, which makes it accessible to a wide range of users. Unlike many of the governance indicators that use complex methodologies and subjective data that can only be generated by resource-rich organizations, the ESRF Index can easily be estimated, by a wider group of users such as a small NGO in a developing country.

The ESRF Index draws attention to the fact that some countries with apparently high human development achievements do not actually do as much as they could in view of their income levels.

For example, Costa Rica, South Africa and Mexico have roughly similar per capita incomes: 2005 per capita incomes in 2000 prices were $9067 PPP, $9952 PPP and $9618 PPP, respectively (at the high end within our sample). However, Mexico had an under 5 malnutrition rate of 17.1% when last measured in 1999, and South Africa had an under 5 malnutrition rate of 24.9% when last measured (also in 1999), while Costa Rica's under 5 malnutrition rate was only 6.1% when last measured (1996). Equatorial Guinea and Oman – the top two countries in terms of per capita GDP among the low and middle income countries in our sample – have roughly equivalent per capita income levels ($15385 PPP and $13887 PPP, respectively). However, Equatorial Guinea had a primary completion rate of only 54.3%, an under 5 malnutrition rate of 45.3%, and an under 5 mortality rate of 205 per 1000 live births. In contrast, Oman had a primary completion rate of 91.3%, an under 5 malnutrition rate of 8.7%, and an under 5 mortality rate of 14.5 per 1000 live births. Botswana, with a slightly lower per capita income ($10,812 PPP) likewise significantly outperforms Equatorial Guinea, achieving a primary completion rate of 93.3%, an under 5 malnutrition rate of 23.1%, and an under 5 mortality rate of 120. However, Botswana and Oman both fell short in terms of under 5 malnutrition rates when compared with other countries at similar income levels, such as Croatia, whose malnutrition rate was less than 1%. The ESRF Index, particularly the component right indices ranking countries on each of the five human rights dimensions, highlights instances where States are falling short of what they could and should be able to achieve given their resource capacities.

At the same time, the ESRF Index rewards countries that have managed to achieve high levels of human development in spite of severe resource constraints. For example, Tanzania, with a per capita GDP of $650 PPP, has a primary completion rate of 71.6% and an under 5 mortality rate of 122 per 1000 live births, while Niger, with a similar per capita GDP of $700 PPP, has a primary completion rate of only 28.1% and the much higher under 5 mortality rate of 256. The performance of Tanzania in terms of primary completion is similar to that of Guatemala (which has a 74% completion rate), a country with significantly more resources (per capita GDP $4064 PPP). Tanzania's under 5 mortality rate is comparable to Zimbabwe's (132 per 1000 live births), although Zimbabwe's GDP per capita is almost three times that of Tanzania ($1837 PPP in the year under 5 mortality data was collected). In the same vein, Senegal's under 5 malnutrition rate is identical to Peru's (25.4%), although Peru has nearly 4 times more income per capita.

Gaps and Priorities for further methodology development

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As already noted, while the Index represents a clear advance over existing methods, it is nonetheless far from an ideal measure of ESR Fulfillment. It goes as far as the current state of conceptualization and data availability would permit but further work is needed to strengthen it. It would be desirable to use a single universal index that could be applied to countries at low, middle and high income levels. Using GDP per capita as a proxy measure for state capacity and resources is problematic not only because of the well known limitations of national accounts data, but also because it is endogenous; national economic performance depends on state capacity to design effective policies as much as factors such as history, geography, resource endowment and the external economic policy environment. A number of important elements are missing from the index: (i) discrimination and inequality; (ii) participatory decision making; and (iii) important aspects of core rights including decent work, food, housing and social security.

These limitations in the ESRF Index indicate some pressing priorities for future research and data collection. Conceptual work on clarifying the concept of non-discrimination is needed, especially concerning identifying the difference between institutionalized discrimination and unequal human outcomes. Data collection in decent work and adequate housing is already underway and new data sets are expected to become available in the medium term. The issue of the right to food in high-income countries requires research on identifying the leading indicators of food deprivation, especially the extent to which obesity reflects loss of entitlement to nutritious food, and whether this is universal or a phenomenon for only high income countries.

The limitations of the index also reflect the weaknesses that are inherent in quantitative measures that aim to capture complex concepts. It is important to remember that such quantitative tools should be part of a human rights assessment that would draw on multiple tools. The index is a tool of empowerment for human rights advocacy which should be used in combination with qualitative and contextual assessments.

The resulting index rankings will be published in a companion paper which is forthcoming in a subsequent issue of this journal.

Table 1: Indicators Selected

Social/Economic Right	Indicator for ESRF-1	Indicator for ESRF-2
Right to Food	Malnutrition (height for age)	Infants with low birth weight
Right to Education	Primary school completion rates; Gross secondary school enrollment rates Educational achievement when data coverage improves	Gross secondary school enrollment rate; Average math and science PISA score
Right to Health	Under 5 mortality rate; Life expectancy; Assisted birth rates	Under 5 mortality rate; Life expectancy
Right to Adequate Housing	Access to improved water source; Access to improved sanitation	Data not available.
Right to decent work	$1.25 a day PPP poverty rate; Vulnerable employment when data coverage improves	Relative poverty; Long term unemployment; Vulnerable employment when data coverage improves
Right to social security	Data not available	Data not available
Right to equality and non-discrimination	Flag using MAR data; Use disaggregated data	Flag using MAR data; Use disaggregated data

Table 2. **Possible Adjustment Formulas**

Formula A: $x^* = x - (Y/Yp)^\beta$ for x<100%. $x^*=x$ for x=100%.   This simply subtracts from the achieved percentage some power function of the income ratio. The power function is used to minimize discontinuity at the Yp value, but it still has a 1% discontinuity there. This formula subtracts a penalty that increases with the income ratio in an increasing manner, but it is the same penalty for all levels of enjoyment. The adjustment parameter β controls the magnitude of the penalty.
Formula B: $x^* = x - [(Y-Yp)/Yp]^\beta$ for x<100%. $x^*=x$ for x=100%.   This is similar to formula A, but without its discontinuity.
Formula C: $x^* = x - [(Y-Yp)/Yp]\beta$ for x<100%. $x^*=x$ for x=100%.   Instead of the power parameter, this formula uses a simple multiplier, so the increase in the penalty is a simple proportion of the income ratio. The larger is β, the greater is the penalty.
Formula D: $x^* = x - [(Y - Yp)/Yp](100-x)\beta$ or, equivalently, $x^* = 100 - (100-x)(Y/Yp)\beta$ This formula allows different penalties for different levels of enjoyment and for different income ratios. It subtracts from the observed percent the product of the income ratio minus one, the shortfall, and an adjustable parameter, β.
Formula E : $x^* = x (Yp/Y)^\beta$ for x<100%. $x^*=x$ for x=100%.   This formula simply weights the observed achievement by a power function of the **inverse** of the income ratio. Thus, a country with per capita income five times higher than Yp will have its observed score weighted by $(1/5)^\beta$. When β is less than 1.0, it increases the value of proportions, e.g., $(1/5)^{.2}$ is 0.72.
Formula F: $x^* = 100 (x/100)^{(Y/Yp)}$ This formula uses the fact that multiples of a proportion diminish faster the smaller the proportion. The percent achieved is converted to a proportion and the income ratio specifies the power function. The 100 multiplier converts the proportion back to a percent. No adjusting parameters can be added.
Formula G : $x^* = x - [(Y - Yp)/Yp]^\beta (100 - x)\gamma$ This complex formula weighs the shortfall by a power function of the income ratio -1. The power function allows the penalty to increase at an increasing rate with increasing income. The adjustable parameters β is the power for the income ratio -1. It controls how fast the penalty increases with increasing income ratios. The parameter γ controls the size of the penalty increase as a linear function of the shortfall.

Table 3. Features of the Alternative Formulas

Criteria	Formula A	Formula B	Formula C	Formula D	Formula E	Formula F	Formula G
No Penalty on 100% Fulfillment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asymptotic equality	Almost, 1% change at Yp	Yes	Yes	Yes	Yes	Yes	Yes
Penalty increases with GNP/capita	Yes, at increasing rate	Yes, at increasing rate	Yes, at decreasing rate	Yes, at decreasing rate	Yes, at decreasing rate	Yes, at decreasing rate	Yes, at increasing rate
Penalty adjusts for difficulty of achieving the right	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Penalty declines with increasing achievement	No	No	No	Yes	No	Yes	Yes
Meaningful range	Can be < 0	Can be < 0	Can be < 0	Can be < 0	Always >0	Always >0	Can be < 0
Simplicity	Good	Good	Very good	So so	Good	Good	Poor
Flexibility	Some	Some	Some	Some	Some	None	More

Figure 1: PPF for Primary Completion Rate (Max=100)
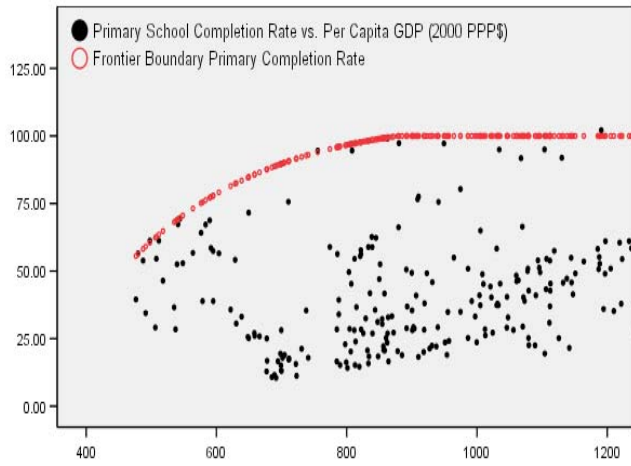Best Fit Obtained for Quadratic Relationship Using Ln Per Capita GDP (2000 PPP$)
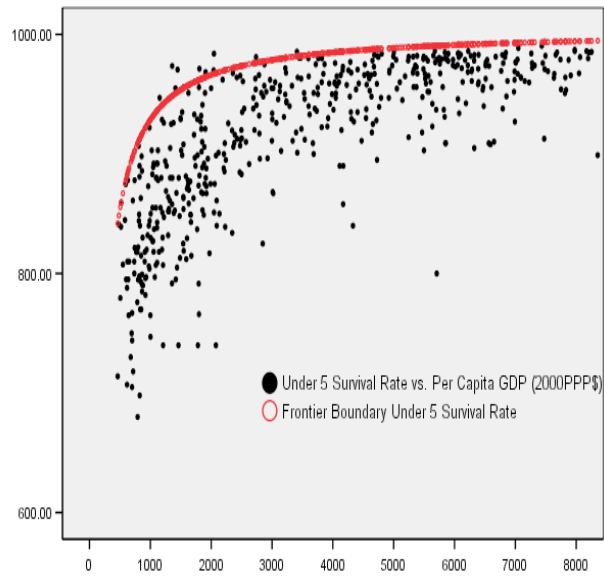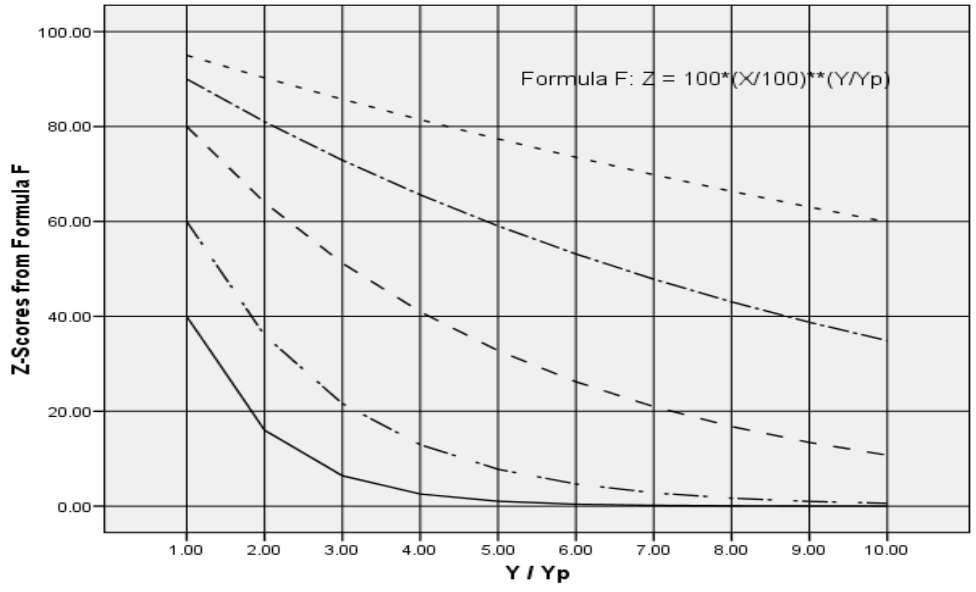
Figure 2: PPF for Under 5 Survival Rate. Best Fit Obtained with an Inverse Function

Figure 3. Formula F Adjustments for Observed Achievements of 40, 60, 80, 90, and 95% at Income Ratios Up to 10 (with Beta =1.5

Formula F: Z = 100*(X/100)**(Y/Yp)

Figure 4. Formula G Adjustments for Observed Achievements of 40, 60, 80, 90, and 95% at Income Ratios Up to 10.

Formula G: Z = X- (((Y-Yp)/Yp)**1.5)*(100-X)*.1

Y / Yp

Z-Scores from Formula G, Beta=1.5, Gamma=.1
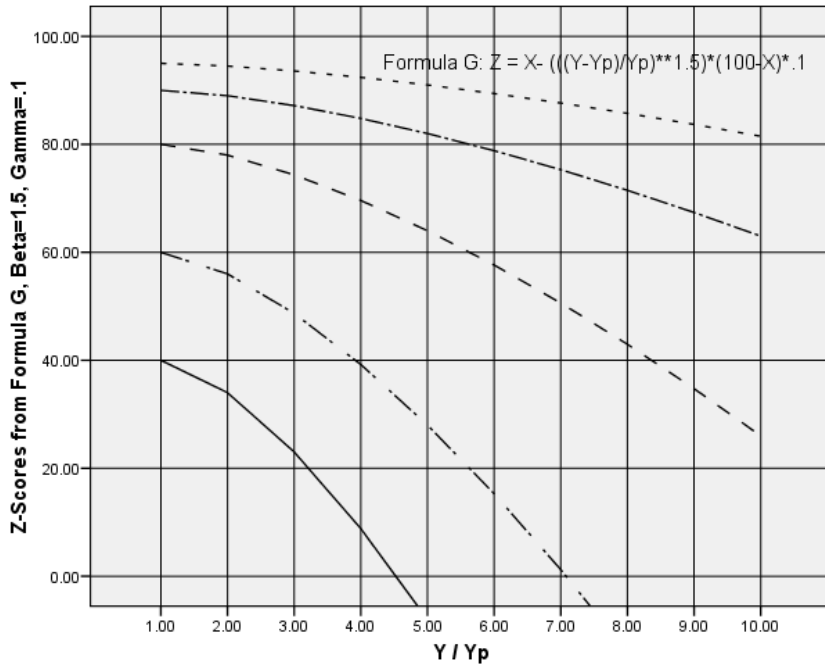
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[1] It was in the early 1990s that literature began to emerge evaluating states on their compliance with human rights obligations. Notable were the works of Charles Humana (1992) on identifying indicators on all sets of human rights, of Herbert and Louise Spirer (1993) on the use of data analysis to establish empirical evidence on human rights violations, of Cignarelli and Richards (CIRI) on political and civil rights data, and of scholars such as Audrey Chapman (1996), Hunt (2003), and Landman (2002) on conceptual issues. The 2003 annual conference of the International Association of Official Statisticians organized by the Swiss Statistical Office was devoted to this issue and included many papers on innovations in methodology for use of measures and use of statistics in event based indicators. By now there is a rich literature on the conceptual and methodological approaches to measuring human rights. See overviews of the literature in Hertel and Minkler 2007 for economic and social rights, Landman 2004 for civil and political rights.

[2] See Rosga and Satterthwaite, 2008 for a detailed analysis of the proposals.

[3] This is the methodology used for example by Freedom House.

[4] See CESCR, General Comment 3, *The Nature of States Parties Obligations* (Art. 2, para. 1) (Fifth Session, 1990), UN Doc. E/1991/23, Annex III; Charter of the United Nations (San Francisco, 26 June 1945), 3 Bevans 1153, 59 Stat. 1031, T.S. No. 993, *entered into force* 24 Oct. 1945, Art. 1, para. 3; CCPR, General Comment 31, *The Nature of the General Legal Obligation Imposed on States Parties to the Covenant* (Art. 2) (2187th meeting, 21 March 2004), CCPR/C/74/CRP.4/Rev.6.

[5] An example of this is the Metagora project, based at OECD, which was a major international effort to develop the use of indicators in human rights assessment.

[6] For example, in 2000, the *Human Development Report* on Human Rights (UNDP 2000) argued a composite index would not be appropriate because of: lack of reliable data on many essential human rights such as political freedom and dimensions such as participation and transparency; and dangers of misuse, overuse and abuse for purposes other than building human rights accountability. In 2005, a 3 day workshop held at the Harvard Carr Center that brought together nearly 50 leading members of the human rights community recommended against pursuing a composite index approach (Carr Center 2005). They argued that Both the *Human Development Report 2000* and the Carr Center Workshop were concerned that human rights advocacy should focus on specific issues at the country level and that country rankings could be 'fundamentally dangerous'; such rankings could be politically explosive and could only be taken up to oversimplify human rights challenges.

[7] The right to food is guaranteed in the UDHR, Art. 25; CESCR, Art. 11; and CRC, Art. 24 and 27; and is discussed and clarified in CESCR, General Comment 12, *The Right to Adequate Food* (Art. 11) (Twentieth Session, 26 April - 14 May 1999), E/C.12/1999/5.

[8] UDHR, Art. 26; CESCR, Art. 13; and CRC, Art. 28.

[9] UDHR, Art. 25; CESCR, Art. 12; CESCR, General Comment 14, *Right to the Highest Attainable Standard of Health* (Art. 12) (Twenty-second Session 25 April-12 May 2000), E/C.12/2000/4.

[10] UDHR, Art 21; CESR Art 11; General Comment 4; CERD Art 5e.

[11] UDHR Art 23; CESR Art 6.

[12] UDHR Art 22; CESR; Art 9.

[13] *Supra,* note 4.

[14] *See, e.g.,* Human Rights Council Resolution 5/1, "UN Human Rights Council: Institution Building" (18 June 2007), establishing the *Human Rights Council Complaint Procedure* in compliance with General Assembly Resolution 60/251, "Human Rights Council" (Sixtieth Session, 3 April 2006).

[15] See *Supra,* note 4.

[16] See CESCR, Art. 3, para 2; UDHR, Art. 1 and 2.

[17] In particular: Universal Declaration of Human Rights (10 Dec. 1948), U.N.G.A. Res. 217 A (III) (1948) [hereinafter UDHR]; International Covenant on Economic, Social and Cultural Rights (New York, 16 Dec. 1966) 993 U.N.T.S. 3, *entered into force* 3 Jan. 1976 [hereinafter CESCR]; International Convention on the Elimination of All Forms of Racial Discrimination (New York, 7 Mar. 1966) 660 U.N.T.S. 195, 5 I.L.M. 352 (1966), *entered into force* 4 Jan. 1969 [hereinafter CERD]; International Covenant on Civil and Political Rights (New York, 16 Dec. 1966) 999 U.N.T.S. 171 and 1057 U.N.T.S. 407, *entered into force* 23 Mar. 1976 [the provisions of article 41 (Human Rights Committee) entered into force 28 Mar. 1979] [hereinafter CCPR]; Convention on the Elimination of All Forms of Discrimination against Women (New York, 18 Dec. 1979) 1249 U.N.T.S. 13, 19 I.L.M. 33 (1980), *entered into force* 3 Sept. 1981 [hereinafter CEDAW]; Convention on the Rights of the Child (New York, 20 Nov. 1989) 1577 U.N.T.S. 3, 28 I.L.M. 1448 (1989), *entered into force* 2 Sept. 1990 [hereinafter CRC].

[18] See CESCR, Art. 3, para 1.

[19] *Id.*

[20] Dani Rodrik. (2008) *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*. Princeton: Princeton University Press.

[21] Data Source: OECD Program for International Student Assessment.

[22] Clarified by CESCR and General Comment 15 (November 2002).

[23] % children under 5 well nourished = 100 – child stunting rate.

[24] Child survival rate = (1000 – under 5 mortality rate)/10

[25] Assisted birth rate = % of birth attended by skilled health personnel

[26] Non-poor rate = 100 - $1 poverty rate

[27] Normal birth weight rate = 100 - % infants with low birth weight

[28] Av. % PISA score = (.5 PISA science score + .5 PISA math score)/10

[29] % not long-term unemployed = 100 – long-term unemployment rate

[30] % not relatively poor = 100 - % below 50% median income

[31] See Uppsala Conflict Data Program and the International Peace Research Institute, Oslo. (2007). UCDP/PRIO Armed Conflict Dataset Codebook: Version 4-2008, and Gleditsch, Nils Petter, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg and Havard Strand. (2002). Armed conflict 1946-2001: A New Dataset. *Journal of Peace Research. 39*(5):615-637. This data base defines a major military conflict as a country in which there are at least 1,000 battle related deaths in a given year.

[32] Specifically, those countries with a code of 2 on the variable "Int" in the "UCDP/PRIO Armed Conflict Dataset: Version 4-2008".

[33] Cingranelli, D. and Richards. D. (2007) "Measuring Government Effort to Respect Economic and Social Human Rights: A Peer Benchmark", in Hertel and Minkler (eds.), *Economic Rights: Conceptual, Measurement, and Policy Issues*. New York: Cambridge University Press.

[34] Demographic and Health Surveys (DHS) is a project funded by USAID and other donors implemented by ORC Macro. See website: http://www.measuredhs.com/.