SERF Index Methodology Version 2011.1

Technical Note

Economic and Social Rights Empowerment Initiative

Co-directors:

Sakiko Fukuda-Parr
The New School
FukudaPS@newschool.edu

Terra Lawson-Remer
The New School
lawsonrt@newschool.edu

Susan Randolph
University of Connecticut
Susan.Randolph@Uconn.edu

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SERF Index Methodology: Version 2011.1
Technical Note

The purpose of this technical note is to explain the construction of the Social and Economic Rights Fulfillment (SERF) Index and the methodology used to estimate the 2011 Index scores. As with all measurement indices, the methodology evolves to take account of emerging conceptual and data issues. The SERF Index has been refined twice since it was initially published in 2009, and the 2011 Index scores were estimated on the basis of the latest adjustments. The concept and methodology of the SERF Index are fully elaborated in two peer reviewed publications and two earlier working papers:

Fukuda-Parr, Sakiko, Terra Lawson-Remer and Susan Randolph (2009). 'An Index of Economic and Social Rights Fulfillment: Concept and Methodology.' *Journal of Human Rights*. 8: 195-221. (http://www.informaworld.com/smpp/title~db=all~content=g914018350) Earlier version published as 'Measuring the Progressive Realization of Human Rights Obligations: an Index of Economic and Social Rights Fulfillment.' University of Connecticut Department of Economics Working Paper Series 2008, no. 8 http://ideas.repec.org/s/uct/ecriwp.html

Randolph, Susan, Sakiko Fukuda-Parr, Terra Lawson-Remer (2010). 'Economic and Social Rights Fulfillment Index: Country Scores and Rankings.' *Journal of Human Rights*, 9.3, 230-261. (http://www.informaworld.com/smpp/title~db=all~content=g926038290) Earlier version published as University of Connecticut Department of Economics Working Paper 2009, no. 11 http://www.econ.uconn.edu/working/11.pdf

Introduction

The SERF Index measures the performance of countries and sub-national units on the fulfillment of economic and social rights obligations. The index uses objective, survey-based data published by national and international bodies. A fundamental principal of international law is that countries have a duty to progressively realize economic and social rights to the maximum of available resources. Statistics like school enrollment and infant mortality tell us only the extent to which individuals enjoy economic and social rights, but not whether a state is complying with its obligations to progressively respect, protect, and fulfill human rights. *Measuring economic and social rights fulfillment requires considering the perspectives of both the rights-holding individual and the duty-bearing government.* The composite SERF Index is comprised of separate scores for each core economic and social right, and estimates obligations for progressive realization by using an innovative approach that maps an 'achievement possibilities frontier'. Because of data constraints, a separate SERF Index has been developed for high-income OECD countries.

The International Covenant of Economic, Social, and Cultural Rights (ICESCR)[1] commits governments to achieve realization of economic, social and cultural rights *progressively*. As stated in Article 2.1:

> Each State Party to the present Covenant undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant, by all appropriate means including particularly the adoption of legislative measures.

The '*progressive realization'* provision recognizes that states have very different starting points in their ability to achieve full enjoyment of economic and social rights. Countries across the world face hugely different levels of deprivation and capacity. Inherent in the idea of progressive realization is that a government's ability to achieve realization of rights depends on the level of resources (financial and other) available in the country. The enjoyment of the right to the highest attainable standard of health, for example, cannot be achieved overnight, as facilities need to be built, personnel trained, and policy incentives for businesses and households put in place and so on, so that people have access to healthcare. These arrangements require financial resources which may be beyond what governments and households can mobilize. Consequently, the performance of states with regard to progressively realizing economic and social rights cannot be judged on the basis of outcomes – enjoyment of rights by people -- alone. For example, the performance of the United States and Malawi cannot be compared on the basis of their respective levels of maternal mortality considering the hugely different levels of capacity in these two countries. Thus, a country's performance in fulfilling obligations for economic and social rights depends on both: (i) the actual economic and social rights (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 provision of progressive realization has complicated and frustrated efforts to monitor countries' fulfillment of their economic and social rights obligations, since, as Human Rights measurement scholar Chapman notes: 'it necessitates the development of a multiplicity of performance standards for each right in relationship to the varied… contexts of specific

[1] United Nations (1966). International Covenant on Economic, Social and Cultural Rights (ICESCR). Adopted 16 December 1966, General Assembly Resolution 2200 (XXI), U.N. GAOR, 21st Session, Supp. No. 16, U.N. Document A/6316 (1966), 993 U.N.T.S. 3 (*entered into force* 3 January 1976).

countries'[2]. That is, measures of ESR outcomes must reflect variable local specificities. The monitoring procedure adopted by the Committee on Economic, Social and Cultural Rights assesses performance relative to 'benchmarks'. But this leaves the problem of setting the benchmark. In the absence of a conceptual and evidence-based model for setting benchmarks, States enjoy considerable discretion over where their benchmark is set, thus effectively leaving open an 'escape hatch' for States to avoid meeting their ESR obligations.

The SERF Index overcomes this problem. The innovation of the SERF Index methodology lies in the construction of Achievement Possibilities Frontiers (APFs) that specify each country's level of obligation *for progressive realization* with regard to various aspects of each economic and social right.

The construction of the Index is illustrated in appendix figures A.1 and A.2 and described in the following sections.

Rights Indicators: Defining Core Economic and Social Rights of Individuals and State Obligations

Sources and definitions of rights and obligations

The SERF Index draws on international law -- the Universal Declaration of Human Rights[3] (UDHR), ICESCR[4] and numerous other international human rights legal instruments[5] -- to define rights of individuals and obligations of states. It incorporates the six core rights, the rights to adequate food, education, highest attainable standards of health, adequate housing, decent work, and social security. The substance of these rights is detailed in General Comments of the Committee on Economic, Social, and Cultural Rights (CESCR)[6].

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[2] Chapman, Audrey. 'The Status of Efforts to Monitor Economic, Social, and Cultural Rights.' *Economic Rights: Conceptual, Measurement and Policy Issues, eds.* Shareen Hertel and Lanse Minkler (Cambridge: Cambridge University Press, 2007). Chapter 7, pp 143-164.

[3] United Nations (1948). *Universal Declaration of Human Rights (UDHR.,* Adopted 10 Dec. 1948, United NationsGeneral Assembly Res. 217 A (III), (1948).

[4] United Nations (1966).

[5] These international legal instruments include the General Comments of the relevant treaty body committees, reports of Special Rapporteurs, and other documents such as reports of seminars, task forces and working groups.

[6] Committee on Economic Social and Cultural Rights.(1991)'General Comment 4: The Right to Adequate Housing', 6th Session, 13 December; (1997) 'General Comment 7: The Right to Adequate Housing—Forced Evictions', 16th Session, 20 May; (1999a) 'General Comment 11: Plans of Action for Primary Education', 20th Session, Geneva, 26 April – 14 May 1999, Document E/C.12/1999/4; (1999b) 'General Comment 12: The Right to Adequate Food', 20th Session, Geneva, 26 Apr – 14 May, Doc. E/C.12/1999/5; (1999c) 'General Comment 13: The Right to Education', 21st Sess. 15 November – 3 December 1999, Document E/C.12/1999/10; (2000) 'General Comment 14: The Right to the Highest Attainable Standard of Health', 22nd Session, 25 April – 12 May 2000, Document E/C.12/2000/4 ; (2005) 'General Comment 18: The Right to Work', 35th Session, 7-25 November 2005, Document E/C.12/GC/18, 6 February 2006; (2008) 'General Comment 19: The Right to Social Security", 39th Session, 5-23 November. Document E/C.12/GC/19, 4 February 2008.

States bear the primary responsibility for the realization of the rights of citizens and individuals residing within their borders. Their obligations are threefold: *to respect, to protect, and to fulfill rights.* These obligations also include the cross-cutting *procedural rights of non-discrimination, participation, and accountability*. General Comments 3[7] and 9[8] along with the Limburg Principles[9] and Maastricht Guidelines[10] elaborate the nature and extent of the obligations accepted by State parties to the Covenant.

The SERF Index measures State parties' compliance with their obligations for progressive realization of economic and social rights, focusing on outcomes reflected in enjoyment of rights by people and adjusted for state capacity. It does not attempt to assess the extent to which States ensured the *procedural rights* of non-discrimination, participation and accountability. The SERF Index complements other measurement tools currently being proposed, such as those suggested by the Office of the High Commissioner for Human Rights[11]. These and other recent proposals focus on different aspects of obligations, such as process (or policy efforts made by government), structure (institutionalized provisions), and outcomes (level of rights enjoyment in the population). However, none attempts to benchmark outcomes according to the obligation of progressive realization as the SERF Index does. The SERF Index is also unique in applying the empirical analysis of development economics to human rights measurement.

Selecting the indicators

A number of criteria govern the selection of the indicators. First, selected indicators must be: (i) based on reliable data; (ii) measured with objective methods; (iii) legitimately comparable across countries and over time; and (iv) publicly accessible. To satisfy these criteria, all data sets used to construct the SERF Index are international series that are maintained by international organizations. Further considerations for indicator selection

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[7] Committee on Economic, Social and Cultural Rights (1990) 'General Comment 3: The Nature of States Parties' Obligations' , 5th Sess., December 14.

[8] Committee on Economic, Social and Cultural Rights (1998) 'General Comment 9: The Domestic Application of the Covenant' 19th Session, 16 November – 4 December, Document E/C.12/1998/24, 3 December 1998.

[9] United Nations (1987). The Limburg Principles on the Implementation of the International Covenant on Economic, Social and Cultural Rights. Guidelines adopted at a workshop sponsored y the International Commission of Jurists, the Faculty of Law of the University of Limburg, and the Urban Morgan Institute for Human Rights, University of Cincinnati, Maastricht, Netherlands, 22-26 January 1997, Document E/CN.4/1987/17.

[10] United Nations (2000). The Maastricht Guidelines on Violations of Economic, Social and Cultural Rights. Guidelines adopted at a workshop sponsored by the International Commission of Jurists, the Urban Morgan Institute for Human Rights and the Center for Human Rights of the Faculty of Law of Maastricht University, Maastricht, Netherlands, 22-26 January, 1997. Document E/C.12/2000/13.

[11] United Nations International Human Rights Instruments (2008). *Report on Indicators for Promoting and Monitoring the Implementation of Human Rights* (HRI/MC/2008/3), 6 June 2008. For comparison of SERF with other proposals, see Randolph et al, *Journal of Human Rights* 2010, and Fukuda-Parr, Sakiko, 'The Metrics of Human Rights: Complementarities of Human Rights and Capabilities Approach', *Journal of Human Development and Capabilities,* Vol. 12:1 pp 73-89.

include: (i) data availability and country coverage; (ii) frequency of data collection; and (iii) the extent of variation amongst countries. Indicator sets are selected to reflect the challenges most relevant to fulfilling a given right, rather than to encompass all aspects of a given right. Indicators signifying the percentage of the population enjoying the right were preferred to those indicating the average level of enjoyment of the right across the population. Further, indicators of flow variables were preferred to indicators of stock variables, and preference was given to bell weather indicators sensitive to a variety of factors related to rights fulfillment.

The limitations of data availability necessitated developing two variants of the International SERF Index: a core index covering all but high income OECD countries, and a supplementary index for high income OECD countries. Furthermore, data limitations currently preclude defining indicator sets for all six rights. The Core SERF Index incorporates five of the six rights; no indicators meeting the above criteria could be identified for the right to social security. The SERF Index for high income OECD countries incorporates four of the six rights; it was not feasible to identify acceptable indicators for either the right to housing or the right to social security.

Table 1 below shows the indicator sets selected. Appendix Table A.1 gives details of sources and definitions for each indicator.

Table 1: Indicators used in the SERF Index

Human Right	Core SERF Index	High Income OECD Country SERF Index
Food	• % children (under 5) not stunted	• % babies not low birth weight
Education	• Primary school completion rate • Combined school enrollment rate (gross)	• Combined school enrollment rate (gross) • Average math & science PISA score
Health	• Contraceptive use rate • Child (under 5) survival rate • Age 65 survival rate	• Child (under 5) survival rate • Age 65 survival rate
Housing	• % rural population with access to improved water source • % population with access to improved sanitation	
Decent Work	• % with income >$2 (2005 PPP$) per day	• % with income > 50% median income • % unemployed not long-term unemployed.

As noted at the outset, States are required to fulfill economic and social rights *progressively,* and to commit the *maximum of available resources* to meet this obligation. The SERF Index uses per capita GDP as the indicator of State resource capacity. While it might be argued that States with larger budgets or better institutions have a greater capacity to fulfill economic and social rights than those with the same per capita income but smaller budgets or poorer institutions, a State's capacity depends on the choices it makes with regard to its taxing policies and institutional structure. Since the obligation to progressively realize economic and social rights requires States to collect and expend resources at the level necessary to meet their rights obligations, it is appropriate to measure resource capacity as reflected by the total resources available to the State, not the portion of those resources the State chooses to tap.

Indicator Indices

Benchmarking a Country's Obligations of Progressive Realization: Achievement Possibility Frontiers

The Achievement Possibility Frontiers (APFs) benchmark each country's obligation with regard to each indicator reflecting the different aspects of each right. They reflect what is feasible to achieve when a country allocates the maximum of available resources to fulfilling economic and social rights and uses those resources effectively. The frontiers are constructed so as to be stable over the medium term thus enabling inter-temporal comparison.[12] Specifically, the APF for a given indicator is constructed by plotting the observed value of the indicator against per capita GDP (2005 PPP$) for each country over the 1990 to 2006 period.[13] The frontier itself is defined as the outer envelope of the scatter plot, and the equation specifying the frontier is estimated by fitting a curve to the observations that define the outer envelope of the scatter.[14] Table A.2 in the Appendix identifies the country/year observations defining the outer envelope of the scatter for each indicator. The fact that the observations defining the frontier do not cluster in the 2005-6 period but rather come from throughout the 1990-2006 period provides assurance that the frontiers are stable over the medium term. Table A.3 in the Appendix shows the equations specifying the frontier for each indicator.[15] Figure 1 below shows the curve fitted

[12] Although knowledge of how to transform resources into rights enjoyment will change over time, rapid and abrupt changes in best practice technology are unlikely.

[13] The APFs were constructed in 2008 using all data available at that time since 1990.

[14] Two papers, Fukuda-Parr, Lawson-Remer, and Randolph (2009), and Randolph, Fukuda-Parr and Lawson-Remer (2010) further detail the basic methodology, although the current version of the index incorporates some additional refinements as detailed in footnote 16.

[15] To guard against measurement error and ensure that the frontiers reflect what is reasonably achievable, observations from a minimum of four countries were required to define the frontier, and potential outliers were eliminated. In particular, observations from countries engaged in civil war at the time of the observation were eliminated, and for purposes of estimating the frontier, the per capita income corresponding to observations occurring in the wake of the Post USSR transition when per capita income levels in many of the former Soviet Republics and Eastern European countries briefly and temporarily plummeted were reset to the per capita income

to the scatter plot for the child survival rate. Each black dot is the observed value of the under 5 survival rate in a specific country for a particular year plotted against the country's per capita GDP (2005 PPP$) for the same year. The solid curve is the fitted Achievement Possibility Frontier, APF. The APF defines the level of a State's obligation for any given per capita GDP level (2005 PPP$).

Assessing State Performance: The Adjusted Performance Indicator Score

Two things should be noted about Figure 1 below. First, the observed child survival rate never reaches a value approaching zero. In fact, Niger's child survival rate of 68% in 1990 is the lowest child survival rate observed since 1990. The observed minimum score differs widely across indicators. In order to standardize the range across indicators, the indicator scores are rescaled using the following formula:

S = 100 [(actual value – minimum value) / (frontier value – minimum value)]

Here **S is the rescaled performance indicator score**. The numerator of the ratio in brackets reflects the extent to which a given right aspect is enjoyed, while the denominator of the ratio reflects the level of the State's obligation to ensure that right aspect. After multiplying by 100, the rescaled indicator scores can be interpreted as the percentage of obligation met. The minimum values are set to approximate the indicator value one would expect to observe in a country with a subsistence per capita income level that places no priority on ensuring economic and social rights. This is approximated as zero for those indicators for which the score significantly depends on state provision of goods and services (e.g. the primary school completion rate); otherwise it is approximated as the minimum value observed in any country in any year since 1990.

The second thing to note is that the frontier reaches a peak and then plateaus. In the case of the child survival rate, the frontier reaches a peak at $6,350 per capita (2005 PPP$). With the exception of the contraceptive use rate which peaks asymptotically, all of the frontiers reach a peak at a per capita income level well below the highest observed per capita income level, and there is some difference across indicators in the peak indicator value, Xp. The peak per capita income level, call it Yp, is the minimum per capita GDP level required to ensure enjoyment of the aspect of the right concerned by everyone in the population given current knowledge of the measures (legislation, policies, programs, etc.) that promote that goal. Countries with income levels exceeding Yp have more than sufficient income to ensure everyone enjoys the aspect of the right concerned. The Yp values differ substantially across indicators and are also shown in Table A.3 of the appendix. The rate at which resources can be transformed into enjoyment of the right aspect concerned is shown by the shape of the frontier

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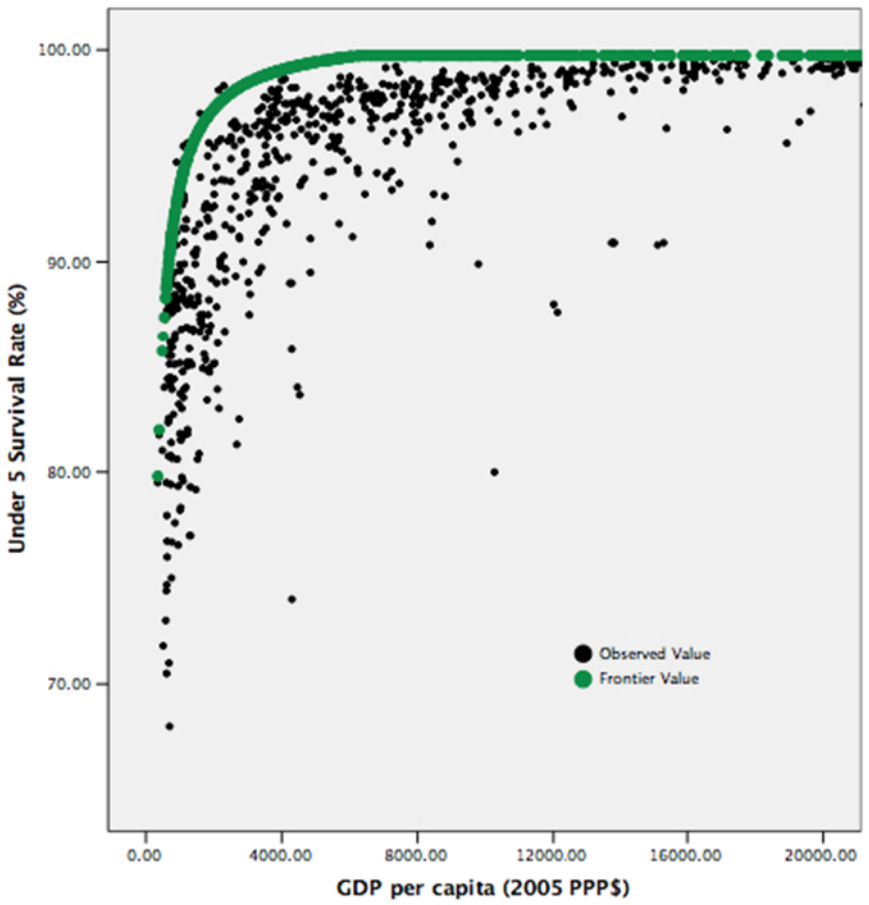
level just prior to the start of the transition until per capita income levels recovered. See Fukuda-Parr, Lawson-Remer, and Randolph (2009), and Randolph, Fukuda-Parr and Lawson-Remer (2010) for further details.

as it rises to its peak value and is implicit in the estimated frontier equations; those rising more steeply imply greater ease in transforming income into enjoyment of the right aspect concerned. In addition to showing the frontier equations for each indicator, Table A.3 of the appendix shows the minimum indicator values and the peak indicator values (Yp) for each indicator.[16]

Figure 1: Achievement Possibility Frontier for the Child Survival Rate



The frontier value of the indicator will be the same for countries with per capita income levels above Yp whether their per capita income level is exactly Yp or two times Yp, or even 10 times Yp, and thus their rescaled performance indicator score will be the same. It makes little

[16] In response to feedback from a wide range of scholars and practitioners, some of the indicators used to construct the SERF Index as well as some of the values used to rescale the index have been refined in the current version of the SERF Index and differ from those reported in Randolph, Fukuda-Parr and Lawson-Remer (2010). In particular, the gross combined school enrollment rate replaces the gross secondary school enrollment rate, the percentage of the rural population with access to improved water replaces the percentage of total population with improved water access, the contraceptive use rate replaces births attended by skilled health workers, the percentage of the population surviving to age 65 replaces life expectancy, and the $2 a day poverty rate replaces the $1.25 poverty rate. With regard to the minimum values used to rescale indicators, the distinction between those indicator scores that substantially depend on public provision of goods and services (with a consequent 0 minimum) and those that do not is a refinement incorporated into the current version of the SERF Index.

sense to evaluate two countries with the same indicator score as performing equally well if one has twice as much income as another. The final step in calculating the performance indicator score is to deduct a penalty from the rescaled indicator score when a country has income that is more than sufficient to ensure everyone in the country enjoys the right aspect concerned but fails to ensure that everyone does so. Thus, the final **adjusted performance indicator score, A,** is:

A = S if Y <= Yp

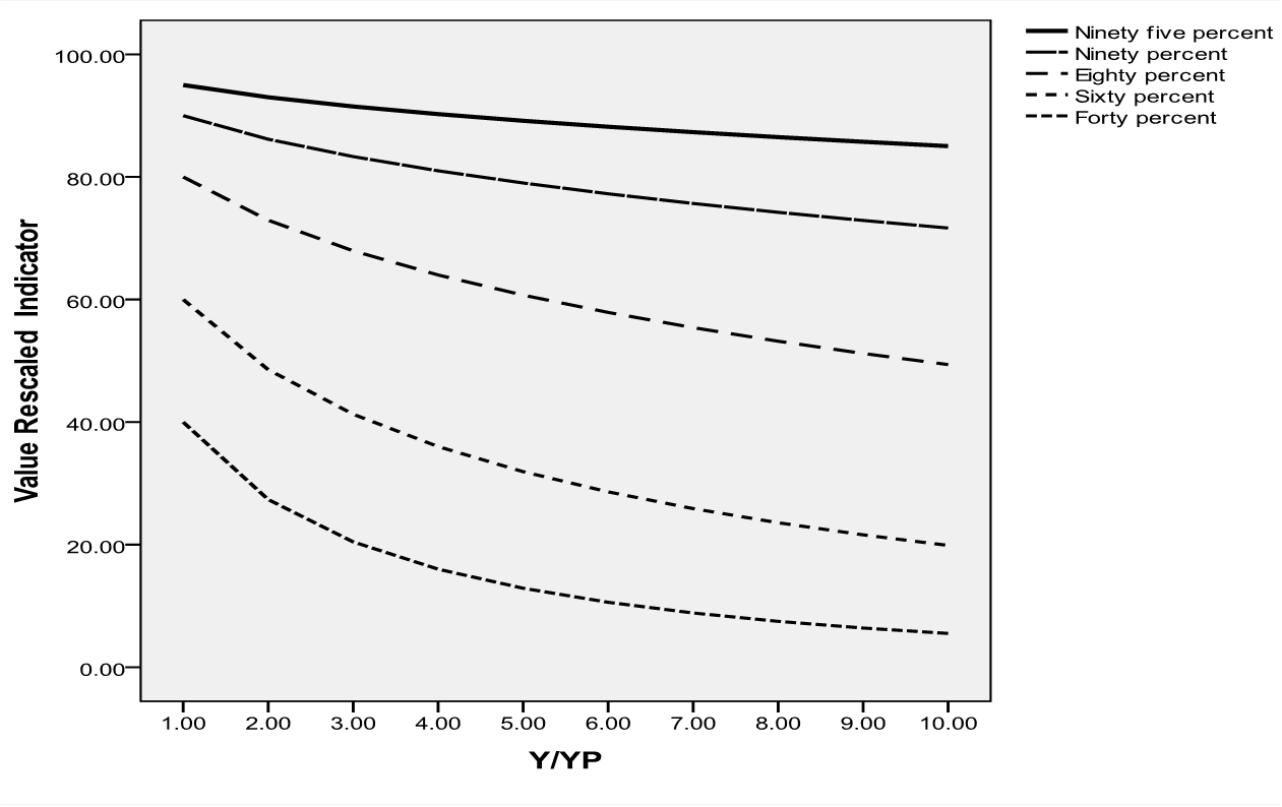
A = S – penalty if Y > Yp

A number of alternative penalty formulas were considered in Fukuda-Parr, Lawson-Remer, and Randolph (2009) along with a set of axioms defining the characteristics one would like such a penalty formula to have. On the basis of the axioms, penalty formula F was identified as meeting all but the flexibility criterion. A refinement of penalty formula F offered in Randolph, Fukuda-Parr, Lawson-Remer (2010) ensures it meets the flexibility criterion as well. The resultant **adjusted indicator score, A, when Y>Yp is**:

$$\mathbf{A} = \mathbf{100}[\left(\frac{\boldsymbol{S}}{\mathbf{100}}\right)^{\left(\frac{\boldsymbol{Y}}{\boldsymbol{Yp}}\right)^{\boldsymbol{\beta}}}]$$

The value of β determines the severity of the penalty and for purposes of calculating the SERF Index, β is set equal to .5. Figure 2 plots the adjusted performance indicator score against the ratio of a country's per capita GDP to the Yp value for rescaled performance indicator scores, S scores, of 95%, 90%, 80%, 60%, and 40%. For example, the figure indicates that if a country has

Figure 2: Penalty for Different Scaled Indicator Values



an S score of 95%, the penalty reduces the adjusted performance indicator score to 85% as its income rises to ten times the minimum amount necessary to fulfill the right aspect concerned.

Rights Indices

Each substantive right index is computed as the simple average of the underlying adjusted performance indicator scores for the different aspects of the right assessed. So for example, the Core Right to Education Index is the average of the adjusted performance indicator scores for the primary school completion rate and the combined school enrollment rate. In the event that only a single aspect of a substantive right is assessed, the substantive right index is simply the adjusted performance indicator score on the corresponding indicator. So for example, the Core Right to Food Index is the adjusted performance indicator score for the percentage of children that are not low height for age (not stunted). Thus, differentiating between the different adjusted performance indicator scores with i, and denoting n as the number of adjusted indicator scores relevant to right k, the formula for a given **substantive right index, R_k**, is:

$$R_k = \Sigma A_i / n$$

Composite Index – Social and Economic Rights Fulfillment Index

The SERF Index itself is a weighted average of the substantive rights indices. Denoting m as the number of substantive rights incorporated in the SERF Index (5 in the current version of the Core SERF Index, and 4 in the case of the current version of the SERF Index for High Income OECD countries), the **SERF Index is defined as**:

$$SERF = [\Sigma R_k^{1/\alpha} / m]^{\alpha}$$

The current version of the SERF Index sets α equal to 1 and thus is the simple average of the substantive rights indices. Higher values of α place more weight on those rights where fulfillment falls shortest.[17]

[17] Users preferring a higher value of α can construct their preferred version of the SERF index from the substantive rights indices provided using the above weighting formula.

Appendix

Figure A.1

Core Economic and Social Rights Fulfillment Index—SERF Index

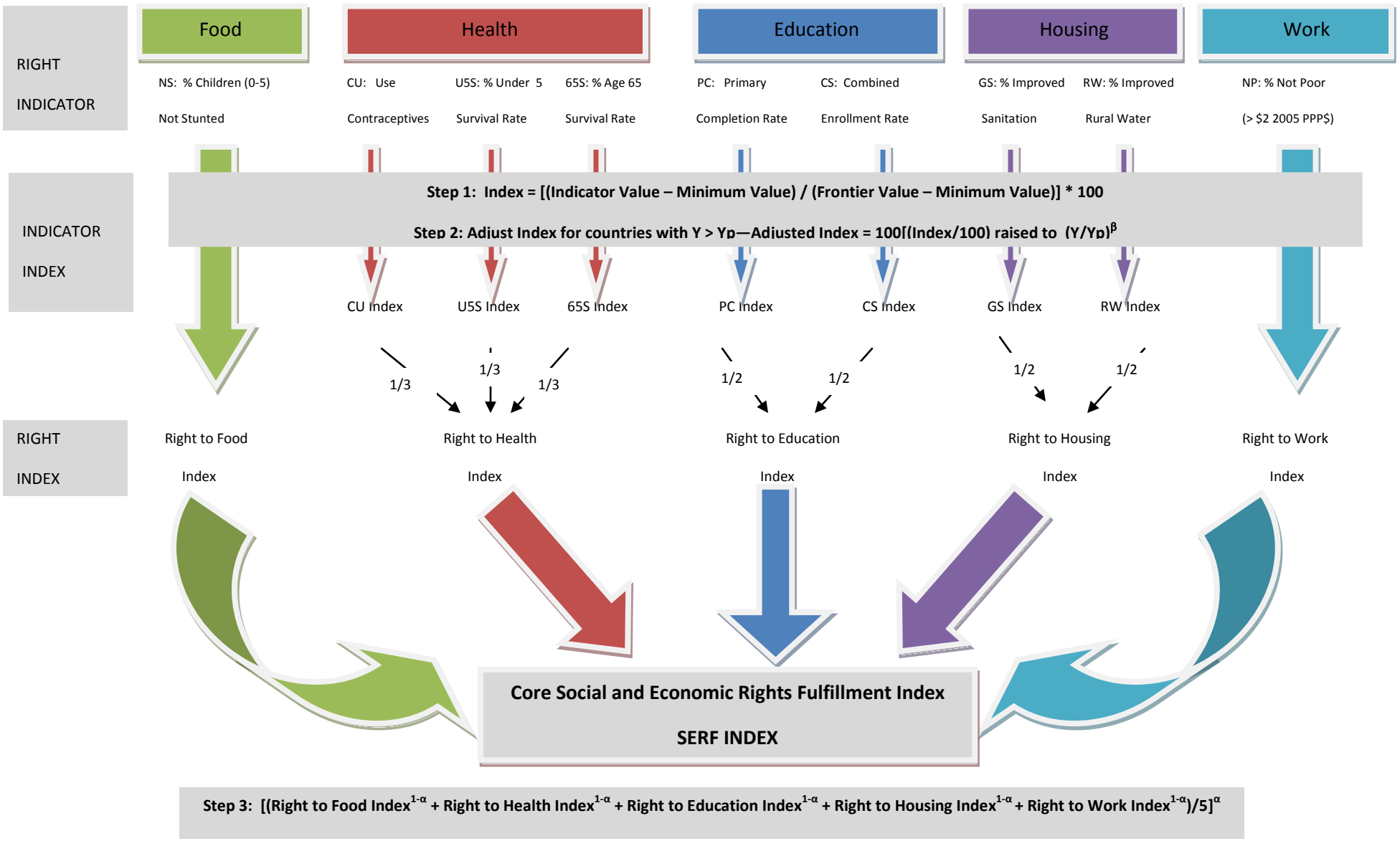


Figure A.2

Social and Economic Rights Fulfillment Index for High Income OECD Countries

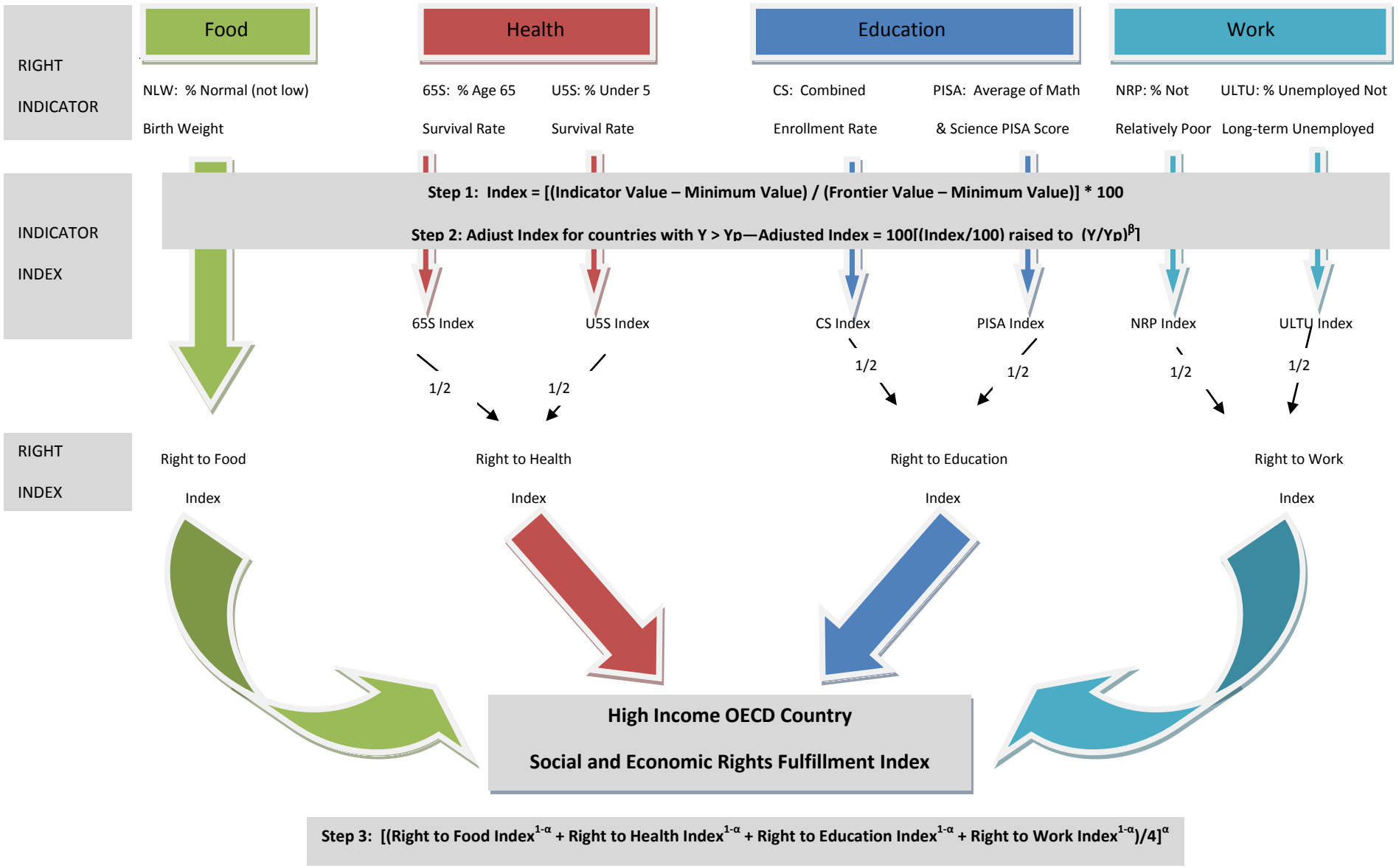


Table A.1
SERF Index Indicator Definitions

Aspect Country Group	**Indicator**	**Primary Source**	**Indicator Definition**
Available Resources			
Both	GDP per capita (2005 PPP$)	World Bank, International Comparison Program database. Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 international dollars.
Right to Food			
Core	Malnutrition Prevalence—Height for Age (% children under 5) (→% not stunted)	World Health Organization, Global Database on Child Growth and Malnutrition. Extracted from WDI online via University of Connecticut library, WHO (http://apps.who.int/ghodata) and UNICEF (www.childinfo.org)	Prevalence of child malnutrition is the percentage of children under age 5 whose height for age (stunting) is more than two standard deviations below the median for the international reference population ages 0-59 months. For children up to two years old height is measured by recumbent length. For older children height is measured by stature while standing. The data are based on the WHO's new child growth standards released in 2006.
High Income OECD	Low Birth Weight babies (→ % not low birth weight)	UNICEF, State of the World's Children, Childinfo, and Demographic and Health Surveys by Macro International. Extracted from WDI online via University of Connecticut library.	Low birth weight babies are newborns weighing less than 2,500 grams, with the measurement taken within the first hours of life, before significant postnatal weight loss has occurred.
Right to Education			
Core	Primary School Completion Rate	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics. Extracted from WDI Online via University of Connecticut library.	Primary completion rate is the percentage of students completing the last year of primary school. It is calculated by taking the total number of students in the last grade of primary school, minus the number of repeaters in that grade, divided by the total number of children of official graduation age. [Capped at 100% for our purposes.]
Both	Gross Combined School Enrollment Rate	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics. Extracted from http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=143&IF_Language=eng	Gross enrollment ratio. All levels combined (except pre-primary). All students. [Capped at 100% or our purposes.]
High Income OECD	Average Math & Science PISA Score	Organization for Economic Cooperation and Development (OECD) Programme for International Student Assessment (PISA). Extracted from: http://pisacountry.acer.edu.au/	Average of country mean quality of learning outcome scores on mathematics and science subject tests.
Right to Health			
Core	Contraceptive Prevalence Rate (% women 15-49)	Household surveys, including Demographic and Health Surveys by Macro International and Multiple Indicator Cluster Surveys by UNICEF. Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	Contraceptive prevalence rate is the percentage of women who are practicing, or whose sexual partners are practicing, any form of contraception. It is usually measured for married women ages 15-49 only.
Both	Survival to age 65 (% cohort)	United Nations Population Division. 2009. World Population Prospects: The 2008 Revision. Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	Survival to 65 (% of cohort): Survival to age 65 refers to the percentage of a cohort of newborn infants that would survive to age 65, if subject to current age specific mortality rates.
Both	Child Mortality Rate (→% under age 5 survival rate)	Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UNPD, universities and research institutions). Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	Under-five mortality rate is the probability per 1,000 that a newborn baby will die before reaching age five, if subject to current age-specific mortality rates.

(continued on next page)

Table A.1 (continued)
SERF Index Indicator Definitions

Aspect Country Group	**Indicator**	**Primary Source**	**Indicator Definition**
Right to Housing			
Core	Improved Sanitation (% population with access)	World Health Organization and United Nations Children's Fund, Joint Measurement Programme (JMP) (http://www.wssinfo.org/). Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	Access to improved sanitation facilities refers to the percentage of the population with at least adequate access to excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta. Improved facilities range from simple but protected pit latrines to flush toilets with a sewerage connection. To be effective, facilities must be correctly constructed and properly maintained.
Core	Rural Improved Water (% rural population with access)	World Health Organization and United Nations Children's Fund, Joint Measurement Programme (JMP) (http://www.wssinfo.org/). Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	Access to an improved water source refers to the percentage of the population with reasonable access to an adequate amount of water from an improved source, such as a household connection, public standpipe, borehole, protected well or spring, and rainwater collection. Unimproved sources include vendors, tanker trucks, and unprotected wells and springs. Reasonable access is defined as the availability of at least 20 liters a person a day from a source within one kilometer of the dwelling.
Right to Work			
Core	Poverty Headcount (<$2 per day) (→% population not poor)	World Bank, Development Research Group. Data are based on primary household survey data obtained from government statistical agencies and World Bank country departments. Extracted from "PovcalNet: the on-line tool for poverty measurement developed by the Development Research Group of the World Bank" http://web.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTPROGRAMS/EXTPOVRES/EXTPOVCALNET/0,,contentMDK:22716987~menuPK:5280448~pagePK:64168445~piPK:64168309~theSitePK:5280443,00.html For more information and methodology, please see PovcalNet (http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp)	Population below $2 a day is the percentage of the population living on less than $2.00 a day at 2005 international prices. As a result of revisions in PPP exchange rates, poverty rates for individual countries cannot be compared with poverty rates reported in earlier editions.
High Income OECD	Long-term unemployment rate (% of unemployed) (→% unemployed not long-term unemployed.	International Labour Organization's Key Indicators of the Labor Market http://kilm.ilo.org/KILMnetBeta/default2.asp . Extracted from World Bank's (WB) World Development Indicators online (WDI online) via University of Connecticut Library	Long-term unemployment refers to the number of people with continuous periods of unemployment extending for a year or longer, expressed as a percentage of the total unemployed.
High Income OECD	Relative Poverty Rate (→ % not relatively poor)	Luxembourg Income Study (LIS). Extracted from LIS Key Figures on Poverty and Inequality on-line data tool. http://www.lisproject.org/php/kf/kf.php	Percentage of population with less than 50% of the median income.

Table A.2
Observations Defining Frontiers

Right Country Group	**Indicator**	**Country/Year observation Defining Frontier**
Right to Food		
Core	% not stunted	Togo 2006; The Gambia 2000, Senegal 2005, Jordan 1997, Dominican Republic 2000, Macedonia, FYR 2004.
High Income OECD	% not low birth weight	Sweden 2004, Iceland 1992, Korea, Rep. 2000, Finland 1992.
Right to Education		
Core	Primary School Completion Rate	Congo, Dem. Rep. 1992, 1994, Burundi 1993; Malawi 2002, Myanmar 2005; China 1990.
Both	Gross Combined School Enrollment Rate	Zimbabwe 1999-2001; Malawi 1999-2002; Timor-Leste 2001-2002; Kiribati 2000; Guyana 2005; Micronesia 2007; Bolivia 2002-2004; Tonga 2003; Cuba 2005-2007; Ukraine 2008; Brasil 2000; Argentina2002; Kazakhstan 2005-2006; Libya 2002-2003; Slovenia 2003; New Zealand 1999; Korean Republic 2004; New Zealand 2000, 2003
High Income OECD	Average Math & Science PISA Score	Indonesia 2003, 2006; Jordan 2006; Thailand 2000, Latvia 2000, 2003; Poland 2003; Korea, Rep. 2000, 2003; Japan 2000; Finland 2006.
Right to Health		
Core	Contraceptive Prevalence Rate (% women 15-49)	Zimbabwe 1994, 1999; Vietnam 1997, 2000, 2002, 2005, 2006; Paraguay 2008; Thailand 2000; Bulgaria 1995; Ukraine 2002; Uruguay 1997; United Kingdom 1993, 2001, 2002; Hong Kong SAR, China 1992.
Both	Survival to age 65 (% cohort)	Liberia 2003-2008; Togo 2006-2008; Nepal 2007-2008; Vietnam 1998-2008; Kirbati 2006; Cuba 1998-2007; Albania 2001-2003, 2005-2008; Costa Rica 2007-2008; Malta 2003-2007; Cyprus 2000, 2004, 2006-2008; Israel 2005-2006, 2008; Japan 2004, 2008; Iceland 2004,2006-2008.
Both	% Child (under 5) survival rate	Vietnam 1990, 1995, 2000, 2005, 2006; China 1990; Syrian Arab Republic 2005, 2006; Ethiopia 2005, 2006; Burundi 1995; Thailand 2005, 2006; Croatia 2006.
Right to Housing		
Core	% Access Improved Sanitation (% population)	Malawi 2000, 2004; Djibouti 1995, 2000, 2004; Samoa 1990, 1995, 2000; Jordan 1990.
Core	% Rural Access Improved Water (% rural population)	Bangladesh 1990, 1995; Belarus 1990, 1995, 2000; Burundi 1990, 1995; Comoros 1990, 1995, 2000, 2006; Mauritius 1990, 1995; Nepal 1990, 2000; Thailand 1990; tonga 1990, 1995, 2006; Uruguay 1990, 1995; Zimbabwe 1990, 1995, 2000; Egypt, Arab Rep. 1995, 2000, 2006; Lebanon 1995, 2000; Maldives 1995; The Gambia 2006; Malawi 2006; Micronesia, Fed. Sts. 2006; Sao Tome & Principe 2006; Vietnam 2006.
Right to Work		
Core	% Not Absolutely Poor (<$2 per day, 2005 PPP$)	Kenya 1997, 2005; Lao PDR 2006; Guyana 1993; Djibouti 1996; Moldova 2007; Albania 1997; Azerbaijan 2005; Bosnia & Herzegovina 2004.
High Income OECD	% unemployed not long-term unemployed.	Norway 2000, Korean Republic 1991-93, 1995-2008; Iceland 2008; New Zealand 2008.
High Income OECD	% Not Relatively Poor (>50% median income)	Finland 1995, Luxembourg 1994, Czech Republic 1992, Slovak Republic, 1992.

Table A.3

Frontier Equations, Peak Values, and Minimum Values

Right Country Group	**Indicator**	**Frontier Equation**	**Peak Value, Xp**	**Income level of Xp 2005 PPP$**	**Minimum Value 2005 PPP$**
Right to Food					
Developing	% not stunted, NS	%NS = -2.158 + 11.175(Ln GDP per capita) Capped at 98%	98%	$7806	36% (Burundi 2000)
High Income OECD	% not low birth weight, NLW	%NLW = 95.8 (value achieved by 4th best performing High Income OECD Country since 1990: Sweden in 2004)	95.8	$16,000	40% (Lao, PDR 1991, 1994)
Right to Education					
Developing	Primary School Completion, PC	%PC = -7.2382+.16414(GDPpercap) - .0000599159(GDPpercap_SQ); 100% for GDP per cap >$1076	100%	$1076	0%
Both	Combined School Enrollment, CS	%CS = -56.591 + 67.622LN(LN_GDPpercap); 100% for GDP per cap >$25,112	100%	$25112	0%
High Income OECD	Average math & science PISA Score, PISA	PISA=332.345 + .017203(GDPpercap) - .000000323068(GDPpercap_squared); 555 for GDP per cap > $22,190	555	$22,190	310 (Peru 2000 = 312.5→310)[a]
Right to Health					
Developing	% prime-aged couples using contraceptives, CU	%CU = 82.753 – 8507.686/GDP per capita	82.753	Peaks asymptotically	0%
Both	Child (under 5) survival rate, U5S	%U5S = 100.895 – 7334.1/(GDP per capita); constrained to 99.74 for GDP per capita >$6350	99.74%	$6350	68% (Niger 1990)
Both	% Surviving to Age 65, 65S	%65S = -90.820 + 35.481(LN_GDPpercap) – 1.742(LN_GDPpercap_squared); 89.85 for GDP per capita levels >=$26,450	89.85%	$26,450	20%

(continued on next page)

Table A.3 (continued)
Frontier Equations, Peak Values, and Minimum Values

Right Country Group	**Indicator**	**Frontier Equation**	**Peak Value, Xp**	**Income level of Xp 2005 PPP$**	**Minimum Value 2005 PPP$**
Right to Housing					
Developing	% rural population with access to improved water, RW	%RW = -22.905 + 19.634(LN_GDP per cap) - .641(LN_GDPpercap_squared); 100% for GDP per capita levels >=$6453	100%	$6453	0%
Developing	% access improved (good) sanitation, GS	%GS= 9.04405(GDPpercapita)**.289997; 100% for per capita GDP>$3970	100%	$3970	0%
Right to Work					
Developing	% Not Poor (NP) = % with income>$2 (2005PPP) per day	%NP = -1869.552 + 471.876 (LN_GDPpercap) – 28.289 (LN_GDPpercap_squared); 98% for per capita GDP>=$3824; 0 if per capita GDP<= $730	98%	$3824	0%
High Income OECD	%unemployed not long-term unemployed, ULTU	ULTU= 94.7 (Norway 2000; highest value achieved by 4th best performing High Income OECD country since 1990)	94.7	$16000	26 (Slovak Republic 2006=26.9→26.)
High Income OECD	% Not Relatively Poor (NRP) = % with > 50% median income	NRP = 95.8 (Finland 1995; highest value achieved by 4th best performing High Income OECD country since 1990).	95.8	$16,000	72 (Peru 2004 72.76→72)