THE HUMAN RIGHTS INSTITUTE

University of Connecticut

Economic Rights Working Paper Series

Measuring the Progressive Realization of Economic and Social Human Rights in Brazil: A Disaggregated Economic and Social Rights Fulfillment Index

Patrick Nolan Guyer
The New School

Sakiko Fukuda-Parr
The New School

Susan Randolph
University of Connecticut

Louise Moreira Daniels
The New School

Working Paper 10

August 2009

The Human Rights Institute
University of Connecticut
Thomas J. Dodd Research Center
405 Babbidge Road, U-1205
Storrs, CT, 06269, USA

Email: humanrights@uconn.edu
Tel: 860-486-8739
Fax: 860-486-6332
http://www.humanrights.uconn.edu/

Abstract

This paper summarizes findings and conclusions from our application of the Economic and Social Rights Fulfillment Index developed by Fukuda-Parr, Lawson-Remer and Randolph (2009) to the states of Brazil. The key features of this methodology in assessing economic and human rights fulfillment is the focus on state obligations rather than only on human outcomes, and reference to both level of state resources and the historic achievements of comparator state parties as criteria in assessment. Our results show that none of the states of Brazil are completely meeting their obligations to fulfill economic and social rights although some are far more successful than others, and that fulfillment does not depend on income. States struggle most to meet their obligations to realize the right to decent work and adequate housing, but are somewhat better and meeting their obligations to fulfill the rights to education, the highest attainable standard of health and adequate food. Furthermore, a ranking of the states based on our findings differs significantly from rankings based on GDP per capita or the state-level Human Development Index values alone. This paper summarizes our methodology and findings and also proposes several avenues for further study.

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

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I. Introduction

This paper presents findings and conclusions from an application of the Economic and Social Rights Fulfillment Index (ESRF-I) developed by Fukuda-Parr, Lawson-Remer and Randolph (2009), to the case of the states of the Federative Republic of Brazil. The ESRF-I is a new approach to measuring the extent to which states, as the primary duty-bearers of the human rights of their citizens, fulfill their obligations to realize economic and social human rights relative to the economic resources available to them. This approach provides an advance on the prevailing practice of relying on socio-economic indicators to assess the level of human rights fulfillment; these indicators reflect the enjoyment of a right by the rights bearer but do not reflect the perspective of the duty bearer. Moreover, the ESRF-I methodology takes account of the obligations of progressive realization by assessing achievement based on the historical record of achievements over the last 25 years. While the main ESRF-I methodology was developed to estimate rights fulfillment at the national level, this application disaggregates the level of fulfillment to the state level, providing evidence of human rights disparities within the country. Like the global Index, the Brazil ESRF incorporates core economic and social rights including the rights to decent work, education, adequate food, the highest attainable standard of health and adequate housing. Since national data were used in this exercise, some of the indicators used differ from those used in the global Index.

Although Brazil as a country performs relatively well in the global ESRF rankings, placing 14th out of 101 countries, the results of this disaggregated state level ESRF Index values and rankings show that this is an average that obscures a wide range of performance. Moreover, performance does not depend solely on resources nor on the level of human development. Our findings highlight the strong performance in fulfilling economic and human rights obligations on the part of relatively poorer states such as Paraná and the poor performance of higher income states, notably the Distrito Federal (Federal District)[ii], which was the richest state overall in GDP per capita terms and ranked 1st among all states in terms of the HDI in 2005 yet ranked 10th out of 27 states on our index.

The state level ESRF rankings also differ significantly from rankings based on the disaggregated Human Development Index which has recently been used to measure human development in Brazil at the national, state and even municipal level[iii]. The Brazil ESFR-I shows that no state is fully meeting its obligations for progressive realization, and that the lags are more marked in areas of decent work and housing than food, health and education.

This paper starts with a brief introduction of the development context of Brazil. The second section discusses the conceptual basis of the ESRF-I and the methodology for calculation as applied to Brazil. The third section presents the results of the Brazil ESRF Index. The fourth section discusses the findings. The final section presents conclusions and some questions for further research.

II. Development Context of Brazil

Brazil is an upper-middle income country characterized by a level of human development which has grown steadily over the past three decades. Brazil's score on the HDI in 2005 was .800, giving it a rank of 70th out of 177 countries classified and qualifying Brazil for the first time as a country enjoying "high human development" according to UNDP definitions (UNDP, 2007, p. 235). In the global ESRF rankings of 101 developing and non-OECD countries, Brazil at the national level placed 14th, between 13th place Thailand and 15th place Armenia, with an ESRF value of 90.14. Matching trends that our research identified at the sub-national level, Brazil's final score was most impacted by poor performance on progressively realizing the right to adequate housing despite relatively good performance on realizing other rights, especially the right to education (Randolph et al, forthcoming).

Garnering international attention as a member of the BRIC (Brazil, Russia, India and China) group of developing countries with rapidly growing economies, Brazil saw its overall percentage of households below the national poverty line decline from 34% in 1990 to 19% in 2006 as GDP per capita slowly grew by 1.1% per year over the timeframe (IPEA, 2008; UNDP, 2007, p. 278). While Brazil's recent economic

success and poverty-reduction advances are nothing short of laudable, massive inequalities remain a stark reality for the country. Brazil's score on the Gini index of inequality in national income distribution is .57 (1 representing complete inequality in the distribution of income) and the income share of the richest 20% of the population, at 61.1%, dwarfs that of the poorest 20% whose incomes represent just 2.1% of the national total (UNDP, 2007, p. 282). While these inequalities cut across Brazilian society in a variety of ways, geographical differences between the states offer a striking manifestation of them. The 1996 *Human Development Report* for Brazil for example spoke of "three Brazils" in one country: an area of high human development comprising eight southern states, an area of upper-medium human development in the central and northern states of Goiás, Mato Grosso, Rondônia, Amazonas, Roraima and Amapá and a third area, comprising the poor northeastern states, with even lower average levels of human development (UNDP Brazil / IPEA, 1996). Going beyond the aggregation of the Human Development Index (HDI), inter-state inequalities in a variety of indicators are striking. For example, GDP per capita in 2006 in the richest state, the Distrito Federal, at R$ 22,322 per person[iv] was nearly 9 times higher than that of the poorest state of Piauí, with a GDP per capita of only R$ 2,501. While only 7% of the population of the southern state of Santa Catarina lived below the national poverty line in 2006, only 55% of the inhabitants of the northeastern state of Alagoas lived *above* the poverty line in the same year. 94.07% of the population in the Distrito Federal had access to improved sanitation in 2006 while only 20% of the population of the nearby state of Tocantins had comparable access (IPEA, 2009).

Much of Brazil's recent success in reducing poverty and improving the overall well-being of its citizens has come from a series of national-level programs which have earned the country significant international attention in recent years. Among the most-researched is *Bolsa Família* ('Family Allowance), a conditional cash transfer (CCT) program which now benefits 11 million families, almost ¼ of the population. *Bolsa Familia* is one component of the overarching *Fome Zero* ('Zero Hunger') anti-poverty and anti-hunger program initiated by President Luiz Inácio Lula da Silva at the beginning of his first term

in 2003 (Lindert et al. 2007, p. 13; Ministério do Desenvolvimento Social e Combate à Fome, 2009). *Bolsa Família* provides program beneficiaries, who are overwhelmingly women, with income supplementation conditional on ensuring that school-aged children are enrolled in school and attend regularly, that children aged up to 6 years-old receive all necessary vaccinations and that pregnant women and the mothers of newborns receive pre- and post-natal medical attention (Ministério do Desenvolvimento Social e Combate à Fome, 2009).

There is evidence that *Bolsa Família* has contributed to reductions in both poverty and inequality in Brazil. A study by the ministry which oversees the program found that by 2006, 31.1% of families living in extreme poverty that participated in the *Bolsa Família* moved out of extreme poverty into the income range of non-extreme poverty,[v] and that 4.9% of families living in this income bracket successfully elevated their incomes to a level at which they were no longer considered poor (de Souza, 2006). Furthermore, a study by Soares et al attributed 21% of the reduction in income inequality in Brazil between 1995 and 2004 to the redistributive effects of *Bolsa Família* and its predecessor CCT program *Bolsa Escola* (2009, p. 219).[vi] However, these programs are not without their critics. Local governments have at times struggled to fulfill their role of effectively monitoring compliance with program conditionalities and the program has been criticized for perceived irregularities in the inclusion and exclusion of beneficiary families. Critics have also claimed that programs like *Bolsa Família* could end up creating dependence of poor families upon government transfers and creating the conditions for corruption to take root and for political elites to abuse it as a mechanism for dispensing political patronage (de Britto, 2008, p. 189). Others have argued that the popularity of *Bolsa Família* and the increasing share of social spending which is allocated to it may be cutting the flow of resources to other important sectors such as housing, education and sanitation infrastructure (Hall, 2009, p. 816). Indeed, data used in this research points to deteriorating conditions in access to improved sanitation and improved water sources in certain states over the 1990-2006 timeframe.[vii]

Since key aspects of the implementation of *Bolsa Família* fall upon municipal governments, quality local governance then would seem to be a key factor in helping to explain the differences in the extent to which the program contributes to the meeting of economic and social rights obligations in different states. The well-documented example of social budgeting pioneered in the city of Porto Alegre in the southern state of Rio Grande do Sul offers one potential entry point for further exploration. Brazil's 1988 constitution awarded municipal governments unprecedented powers and authorities in Rio Grande do Sul initiated an experiment with citizen participation in budgeting in 1989 which has since been adopted at the state-level and incorporated in other municipalities elsewhere in Brazil and abroad (Serageldin et al. 2003, p. 8-9). A 2003 study by the Inter-American Development Bank and researchers from Harvard University found that participatory budget processes in Rio Grande do Sul have resulted in the consistent prioritization of resource allocation to key sectors such as urban infrastructure (roadways and water and sanitation), education and housing and to rural needs such as agriculture and transportation (Serageldin et al. 2003, p. 11). A more recent World Bank study concluded that participatory budgeting in Brazil showed promise as a mechanism for redistribution and poverty reduction (World Bank, 2008, p. 6). Rio Grande do Sul had the 8th highest HDI value in Brazil in the 2005 rankings but ranked only 11th in terms of GDP per capita. However, the state ranks 5th on our index although the difference in the aggregate ESRF scores between it and 4th place Minas Gerais and 3rd place Paraná, at less than 3 tenths of a percentage point, is almost negligible. Quality governance and strong citizen involvement in budgeting may well be a large part of the strong showing of this state on our index.

II. Conceptual Background to the ESRF-I[viii]

Material deprivations of the basic necessities of a dignified life which persist in Brazil are human rights issues and the Brazilian government, at all levels, is obligated to act to ameliorate them. Brazil has been a state party to the International Covenant on Economic, Social and Cultural Rights (ICESCR) since 1992 (UNDP, 2007, p. 348). Brazil's ratification of the Covenant marks the legal recognition of the Brazilian state of its obligation to realize the economic and social rights of its citizens enumerated in the ICESCR

as well as in the Universal Declaration of Human Rights and other international human rights instruments. Among these rights are the right to decent work (Art. 6 & 7), the right to adequate food and adequate housing (Art. 11), the right to the highest attainable standard of health (Art. 12) and the right to education (Art. 13). Recognizing that the realization of these rights is in part a matter of resources, states parties are obligated to "progressively realize" economic and social rights to the greatest extent possible given existing resources so long as advances in rights fulfillment are never regressive (ICESCR, 1966, Art. 3, Para 1).

These international commitments to economic and social rights are further reinforced by domestic guarantees. The current constitution, which came into force in 1988 following the transition from military to civilian rule, guarantees the rights to education, social welfare, work, housing and health in Article 6 of the document. The rights of workers, including the right to a minimum wage and to unemployment insurance, are detailed in Article 7 (Brazil, 1988).

III. Methodology

The basic premise of the ESRF-I is that existing socio-economic indicators are not suitable as measures of human rights fulfillment because they do not take into account the obligations of states to ensure that these rights are fulfilled (Fukuda-Parr et al, 2009, p. 1). Existing socio-economic indicators speak to the extent to which certain economic and social human rights are being enjoyed generally but are unable to capture the extent to which states are fulfilling their obligations to progressively realize the economic and social rights of their citizens. In response, the ESRF-I incorporates a variety of socio-economic indicators as well as an indicator of the economic resources of the state into its calculation. When the ESRF-I was first calculated at the global level by Fukuda-Parr, Lawson-Remer and Randolph (2009), GDP per capita in constant-dollar PPP terms was used as a proxy for state resources since this broadly represents the pool of resources upon which the state can draw depending on its taxation policies. In order to reflect the shared responsibility of both the federal and state-level governments to fulfill the economic and social

rights of all Brazilians, we used the average of state-level GDP per capita and national-level GDP per capita for each state for each year from 1990 to 2006 as the resource indicator in this analysis.

We selected a variety of socio-economic indicators to represent the five groups of economic and social rights that the ESRF-I includes. These indicators are proxies and clearly cannot capture the entire breadth of the rights in question. However, they are the best representative indicators available. These data came primarily from institutions of the Brazilian government such as the *Instituto Brasileiro de Geografia e Estatística* ('The Brazilian Institute of Geography and Statistics' - IBGE) and the *Instituto de Pesquisa Econômica Aplicada* ('The Institute for Applied Economic Research' - IPEA). Figure 1 below summarizes the indicators included in our calculations for each of the five economic and social rights in question. More detailed information on the definitions and sources for each indicator are presented in Annex I.

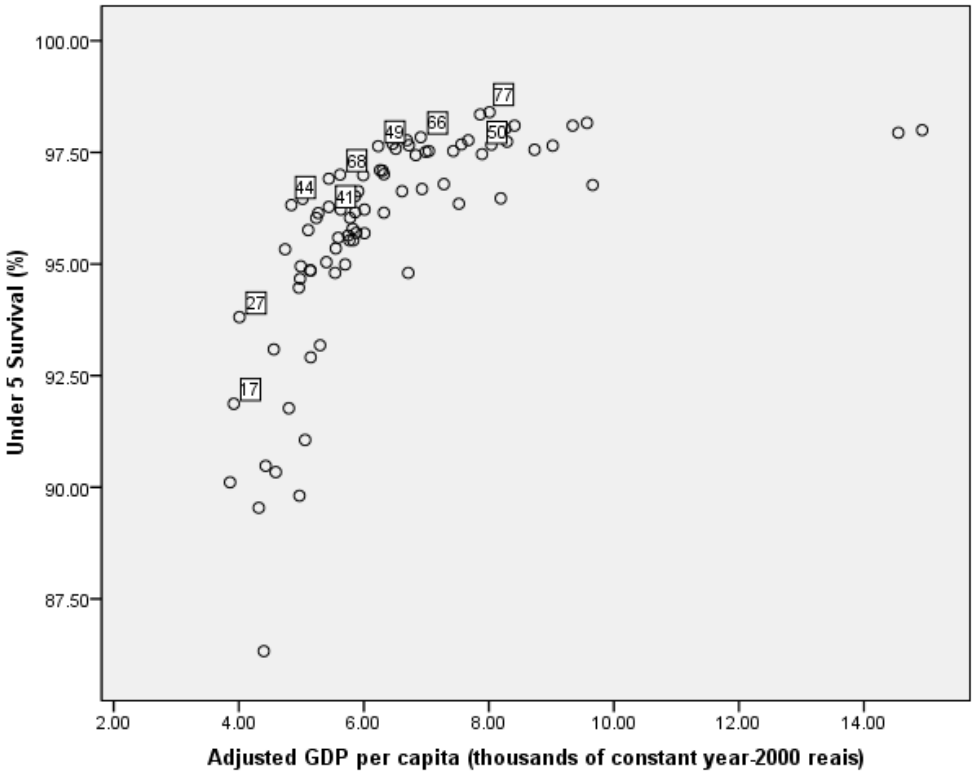
Figure 1: Indicators Used

Economic and Social Right	Indicators Used
Right to Decent Work	Percent of the population living below national poverty line
	Percent of the population working in vulnerable employment situations
Right to Education	Net enrollment of 7 to 14 year-olds
Right to Adequate Food	Percent of new-borns with low birth weights
Right to the Highest Attainable Standard of Health	Life expectancy at birth
	Maternal mortality per 100,000 live births
	Under-five mortality per 1,000 live births
Right to Adequate Housing	Percent of the population with access to improved sanitation
	Percent of the population with access to improved water source
	Percent of the population living in housing constructed out of durable materials

The crux of this methodology is to use historical data to determine what Fukuda-Parr et al. term the "achievement possibilities frontier" (APF). Creating an APF for each indicator involves using historical data about the levels of achievement attained by all the states at different levels of income from 1990 to

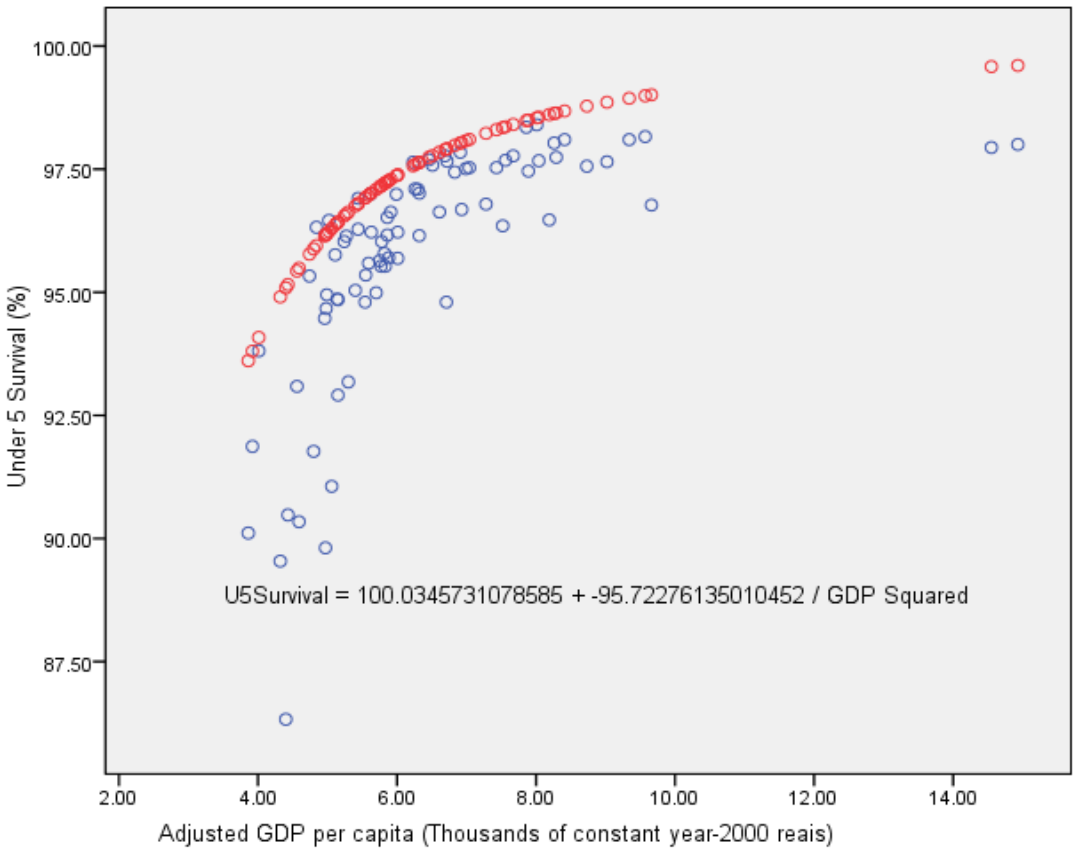
2006 to determine the best possible levels of achievement at any given income level. These values then become the standard against which the performance of all states in all years are compared (Fukuda-Parr et al., 2009, p. 16-17). To begin, separate datasets were assembled for each indicator using the statistical modeling software package SPSS with outcome indicators for each state and each year matched with a corresponding adjusted GDP per capita value. A scatter-plot was then generated with adjusted GDP per capita as the independent variable and the outcome indicator as the dependent variable.[ix] States which exhibited the highest levels of achievement for their level of income were identified as being on the "frontier" and thus representing the greatest level of achievement possible for that level of income. Figure 2 below shows an example of one such scatter-plot with the frontier observations identified.

Figure 2: Sample Scatter-Plot with Frontier Observations Identified



Using the curve-setting algorithm within SPSS, a curve was then set to the frontier observations. In order to get the best-fitting curve, we considered not only adjusted GDP per capita but also the natural log and square of GDP per capita as well. Figure 3 below shows the same scatter-plot shown in Figure 2 above with the APF curve superimposed. This function represents the best level of achievement for that particular indicator that we could expect for any given level of income, based on the historical experiences of the states of Brazil. In the case of the plot shown in Figure 3 below, the best-fitting curve for the data on under-five survival is an inverse function using the square of GDP per capita. This function was then used to calculate a "Frontier Value" for each state and each year that we had data for. These values represent the precise levels of achievement that we could expect that state to achieve in that year based on its income at the time. Please see Annex II for a list of functions set to each indicator.

Figure 3 : Sample Scatter-Plot with Achievement Possibilities Frontier Applied



Next we calculated the "rights fulfillment score" (X*) of each state for each year, using the following calculation in which the minimum value is the lowest observed value for that particular indicator for any of the states of Brazil:

$$X* = (100 \times (\frac{Observed\ Value - Minimum\ Value}{Frontier\ Value - Minimum\ Value})$$

Finally, in the case of states which had a level of income which should have enabled them to achieve full realization of the right in question yet still fell short of that level of achievement, a penalty was applied to their X* values. The calculation of the penalty was as follows, in which Xp represents the greatest possible X* value and Yp represents the level of income at which achievement should reach the highest attainable level according to the APF: [x]

$$X*\ With\ Penalty = 100[\left(\frac{X*}{100}\right)^{\left(\frac{GDP\ \ per\ \ capita}{Yp}\right)^{.5}}]$$

Calculating the final ESRF-I scores incorporates the X* values for all states which were not subject to the penalty and the outcome of the penalty calculation for all states which received it. First, rights sub-scores were calculated for each state for the last year data was available as follows:

$$Right\ to\ Decent\ Work\ Sub - Score = \frac{Population\ \ Not\ Poor\ X* + Workers\ \ Not\ Vulnerable\ \ X*}{2}$$

$$Right\ to\ Education\ Sub - Score = Net\ Enrollment\ of\ 7\ to\ 14\ Year - Olds\ X*$$

$$Right\ to\ Food\ Sub - Score = Percent\ New - Borns\ with\ Normal\ Birth\ Weight\ X*$$

$$Right\ to\ Health\ SubScore = \frac{Life\ \ Expectancy\ \ X* + Maternal\ \ Survival\ \ X* + U5\ Survival\ \ X*}{3}$$

$$Right\ to\ Housing\ Sub-Score = \frac{Sanitation\ \ Access\ X* + Water\ \ Access\ X* + Durable\ Housing\ \ X*}{3}$$

Finally, the ESRF values for each state were calculated by finding the average of the five rights sub-scores as follows:

$$Aggregate\ ESRF - I = \frac{Work + Education + Food + Health + Housing\ Subscores}{5}$$

III. Findings

The findings of our application of the ESRF-I methodology to the states of Brazil are summarized in Figure 4 below which lists the states of Brazil in order from highest to lowest score on our index with data for each on per capita income, HDI score, and percentage of the population living above the poverty line to offer some context.

Our index highlights the achievements of medium and low-income states which manage to achieve significant results in realizing economic and social rights while also exposing the failure of higher-income states to achieve more given the level of resources available to them. For example, the southern state of Santa Catarina which tops the rankings based on our index is the 4th richest state in GDP per capita terms. Three states that rank in the top third of the ESRF-I rankings, Minas Gerais (4th), Goiás (7th) and Mato Grosso do Sul (8th) place in the middle third of states ranked by GDP per capita. Two states from the bottom third of the income-distribution, Rio Grande do Norte (14th) and Paraíba (17th) manage to finish in the middle-third of the ESRF-I rankings. On the other hand, while the Distrito Federal lead the country in terms of GDP per capita and the HDI, the District comes in only 10th on our index. Similarly, the state of Mato Grosso, which is the 9th richest state in GDP per capita terms, finishes in the middle-third of our ESRF-I rankings in 13th place.

Figure 4: States of Brazil by ESRF-I Rank

	ESRF Rank	ESRF Value	Per Capita Income (constant 2000 thousands of reais)	State HDI Value	Percentage of Population Above Poverty Line
Santa Catarina	1st	95.601	9,283	0.840	92.96%
São Paulo	2nd	92.743	11,605	0.833	86.65%
Paraná	3rd	91.688	6,547	0.800	85.18%
Minas Gerais	4th	91.687	7,812	0.820	83.21%
Rio Grande do Sul	5th	91.441	8,495	0.832	83.12%
Espírito Santo	6th	90.674	9,045	0.802	86.25%
Goiás	7th	90.028	5,914	0.800	85.53%
Mato Grosso do Sul	8th	89.955	6,292	0.802	86.78%
Rio de Janeiro	9th	89.610	10,505	0.832	83.78%
Distrito Federal	10th	89.468	22,322	0.874	84.34%
Rondônia	11th	88.175	4,981	0.776	71%
Sergipe	12th	86.023	4,488	0.742	58.52%
Mato Grosso	13th	85.972	7,332	0.796	83.52%
Rio Grande do Norte	14th	85.537	4,009	0.738	60.73%
Amapá	15th	85.372	5,072	0.780	69.97%
Roraima	16th	84.460	5,387	0.750	61.37%
Paraíba	17th	83.732	3,269	0.718	57.92%
Amazonas	18th	83.542	7,022	0.780	64.10%
Pará	19th	83.016	3,705	0.755	61.78%
Ceará	20th	82.266	3,346	0.723	55.29%
Acre	21st	82.130	4,180	0.751	58.62%
Tocantins	22nd	81.990	4,280	0.756	64.82%
Bahia	23rd	81.949	4,109	0.742	55.76%
Piauí	24th	81.621	2,501	0.703	50.43%
Pernambuco	25th	80.848	3,875	0.718	51.52%
Alagoas	26th	78.125	3,066	0.677	45.06%
Maranhão	27th	74.265	2,747	0.683	46.71%

Sources: GDP per capita and poverty data from IPEA, 2009. HDI data from UNDP Brazil, 2005.

What this fundamentally reveals is that none of the states of Brazil are fully meeting their obligations to fulfill economic and social human rights. However, states generally had more success meeting their obligations to fulfill the rights to food, health and education than they had with the right to decent work and the right to adequate housing. Figure 5 below shows the rights sub-scores for all the states as well as their final ESRF-I values, with minimum and maximum values for each column in bold. The ranges in

values for each column demonstrate which rights obligations have proven most difficult to meet. Sub-scores for the right to decent work ranged from 39.73 in Maranhão to 97.18 in Santa Catarina and sub-scores for the right to adequate housing range from 61.06 in Acre to 97.87 in São Paulo. In contrast, sub-scores for the rights to education, adequate food and health vary only from about 80 to near 100.

Figure 5 : Rights Sub-Scores for All States and Final ESRF-I Values

	Decent Work	Education	Adequate Food	Health	Adequate Housing	ESRF Values
Acre	70.42	91.46	93.44	94.28	**61.05**	82.13
Alagoas	55.59	93.37	92.58	**80.99**	68.10	78.13
Amapá	76.17	98.02	91.20	90.61	70.86	85.37
Amazonas	65.75	91.24	92.86	91.19	76.67	83.54
Bahia	53.41	92.81	91.09	94.58	77.85	81.95
Ceará	53.22	97.80	92.85	92.11	75.35	82.27
Distrito Federal	85.45	87.51	82.95	94.79	96.63	89.47
Espírito Santo	83.42	92.69	90.91	95.06	91.29	90.67
Goiás	84.07	96.51	91.58	98.15	79.82	90.03
Maranhão	**39.73**	91.03	93.16	84.68	62.72	**74.27**
Mato Grosso	78.47	93.18	92.56	93.57	72.08	85.97
Mato Grosso do Sul	87.93	97.67	92.35	97.87	73.95	89.96
Minas Gerais	87.38	91.70	86.44	**99.11**	93.80	91.687
Pará	61.26	92.30	90.48	97.27	73.77	83.02
Paraíba	56.41	95.75	94.16	89.60	82.73	83.73
Paraná	86.14	96.41	88.87	96.38	90.63	91.688
Pernambuco	57.53	93.68	91.91	85.69	75.42	80.85
Piauí	44.45	**100.00**	93.79	90.36	79.51	81.62
Rio de Janeiro	84.45	**87.42**	86.21	92.15	97.81	89.61
Rio Grande do Norte	67.22	96.22	92.60	91.19	80.46	85.54
Rio Grande do Sul	83.12	95.37	86.55	98.51	93.66	91.44
Rondônia	80.49	92.48	**95.01**	93.15	79.74	88.18
Roraima	59.48	94.11	91.10	90.26	87.35	84.46
Santa Catarina	**97.18**	96.87	89.64	99.01	95.31	**95.60**
São Paulo	89.17	94.93	**85.77**	95.97	**97.87**	92.74
Sergipe	60.10	94.16	90.98	91.76	93.11	86.02
Tocantins	60.07	98.04	93.70	93.32	64.82	81.99

In interpreting these results, it is imperative to bear in mind that the X* scores and the subsequently calculated rights sub-scores measure the extent to which obligations are being met *relative* both to the range of historical attainment in Brazil itself and to the level of resources available to each state. Our findings with the education indicator for net enrollment of 7 to 14 year-olds present an illustrative example. This indicator was the sole educational indicator in our study and our analysis of historical trends showed that states of Brazil have historically been able to achieve high levels of enrollment at relatively low levels of income. The best-fitting APF for these data was an inverse function[xi] which predicted that enrollment should hit a peak of 100% at an adjusted GDP per capita level of about R$ 8,391.29. In 2006, both Piauí, the poorest state overall, and the Distrito Federal, the richest, had about 96% of their 7 to 14 year-olds enrolled in school. However, Piauí ended up with a score of 100 while the Distrito Federal received only 87.51 on this indicator. Given Piauí's meager resources, the frontier value for the state was 95.1%, slightly lower than 95.68% enrollment rate that Piauí actually achieved in 2006. Since the actual value exceeded expectations, Piauí's X* rights fulfillment score for this right is 100.

The role of the penalty in determining the final X* scores for the more affluent states comes to bear in this example. The premise of the penalty is to reduce the fulfillment scores of states that have the resources necessary to fully meet their rights obligations but which still fail to do so. The adjusted GDP per capita level for Piauí was far below Yp, so no penalty was applied to its X* score. However, in the Distrito Federal, that state's high income gave it a frontier value of 100%. Its actual achievement in 2006 however was only 95.81%, giving it an X* score of 90.48. Since the adjusted GDP per capita level in the District in 2006 was well above the level at which full enrollment should have been achieved (Yp), the penalty was applied here. Therefore, the actual final X* score for the Distrito Federal for education was 87.51, calculated as follows:

$$X * With\ Penalty = 100[\left(\frac{X *}{X * p}\right)^{\left(\frac{GDP\ per\ capita}{Yp}\right)^{.5}}]$$

In the above calculation, X* is the initial X* score, X*p is the highest X* value achieved (Piauí's 100 in this case), GDP per capita is the value for 2006 and Yp is the income level at which full achievement of the right in question should be reached which was R$ 8,391.29 in this case.

Our findings also show that the ESRF-I produces results which differ significantly from comparing states on the basis of their GDP per capita or HDI scores alone. Figure 6 below shows a scatter-plot of the ESRF scores compared to adjusted GDP per capita income for the states of Brazil. There is a positive correlation but it is a moderate one, with a Pearson's Correlation of .602 (significant to .01). ESRF scores and HDI correlate positively but even more weakly, as shown in Figure 7 below.

Figure 6: The Relationship between ESRF Values and State Per Capita Income

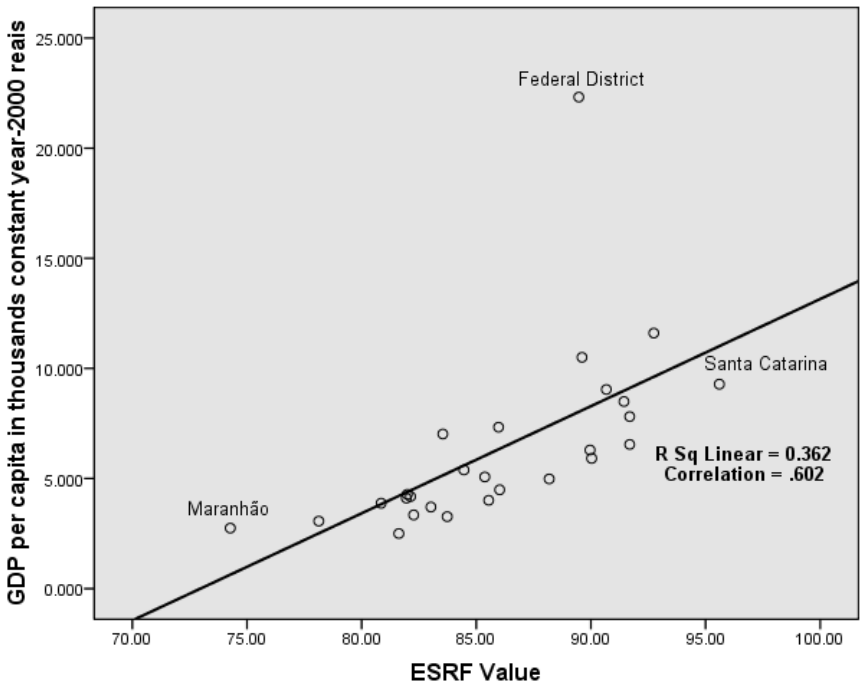
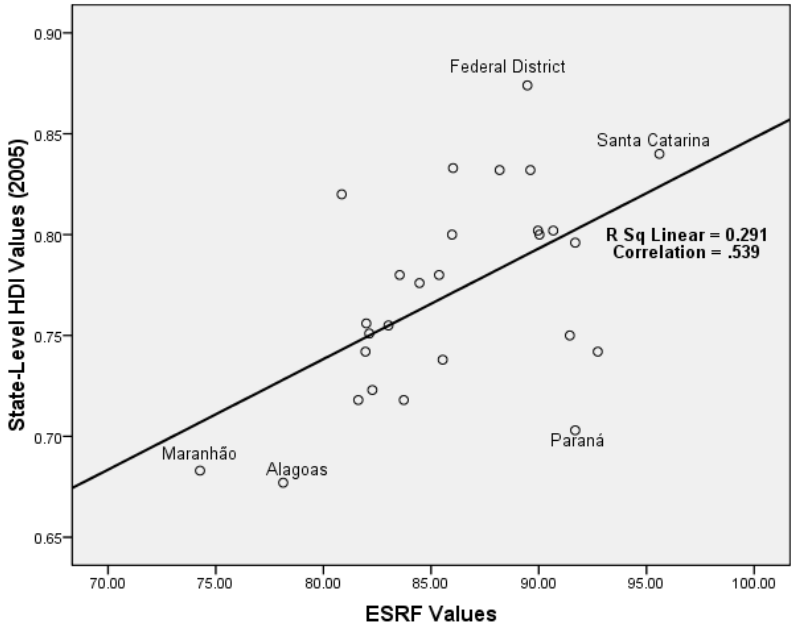
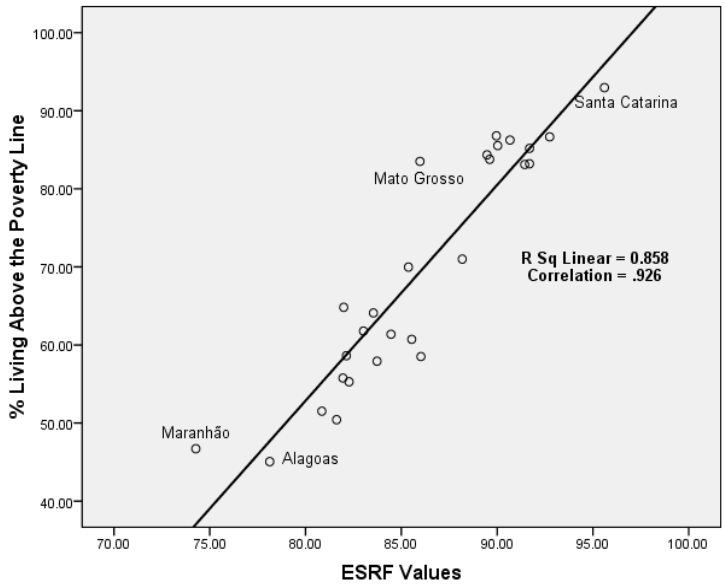


Figure 7: The Relationship between ESRF Values and State-Level HDI Values



One relationship which stands out is a very strong and positive correlation between ESRF values and the percentage of the population that lives above the national poverty line. This relationship, shown below in Figure 8, has a Pearson's Correlation of .926 and is significant to the .01 level.

Figure 8: **The Relationship between ESRF Values and Population Above the Poverty Line**



IV. Discussion and Questions for Further Research

After completing the calculations for the ESRF values for each state, we compared the values with several other indicators to explore possible linkages with other economic and social trends. Figure 9 below summarizes four of the most intriguing findings. As mentioned above, there was a very strong relationship between poverty rates and ESRF values. Urbanization was also shown to have a moderate and positive relationship with ESRF values. However, it should be noted that Brazil is a highly urbanized country overall. The population of even the least-urbanized state, Maranhão is still almost 60% urban and the most populous state, São Paulo, is 93.41% urbanized. Another interesting relationship is that between ESRF values and income inequality. At the national level, Brazil's Gini coefficient of inequality in the income distribution of .57 is among the highest in the world. However, among the states of Brazil, state-level Gini coefficients range from .462 in Santa Catarina (1st in our ranking) to .6236 in Alagoas (26th in our ranking). The correlation between ESRF values and Gini coefficients is a negative one of moderate strength with a Peareson's Correlation of -.601. This means that states which score more highly on our index also tend to have a more equitable distribution of income, suggesting that states which make the most effort to realize the rights of their citizens relative to their available resources are also making efforts to see that income is distributed more equally. However, for the sake of perspective even Santa Catarina, the most egalitarian state in terms of distribution of income, still has a higher Gini coefficient than that of neighboring Uruguay (.449) or even the United States (.408) (UNDP, 2007, p. 281-282).

Figure 9: Relationships Between ESRF Values and Other Variables

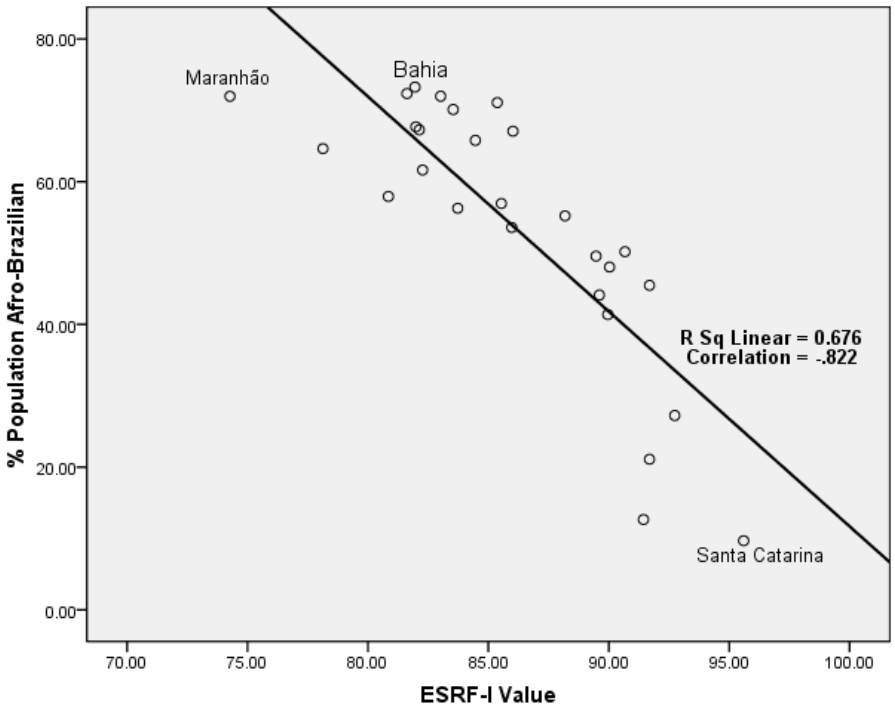
Variable	Percent of Population NOT Poor	Percent of Population in Urban Areas	State-Level Gini Coefficient	Percent of Population Afro-Brazilian
Pearson's Correlation	.926**	.694**	-.610**	-.822**

** Significant to the .01 level

Finally, state scores on our ESRF-I also correlate both strongly and negatively with the percentage of the population which is Afro-Brazilian. This hints at the importance that race continues to play in Brazil today. For example, a 2005 report by researchers with UNDP Brazil presented separate HDI values for whites and for Afro-Brazilians. Their results revealed that, although there were large disparities in human development within both groups across income levels and geographic lines, the HDI for whites was .814, comparable to the national HDI scores of countries like Costa Rica and Kuwait while the HDI for Afro-Brazilians was only .703, close to the HDI score for the entire country in the mid-1980's and comparable to the HDI score of Uzbekistan today (UNDP, 2007, p. 235-236; UNDP Brazil, 2005, p. 58).

Non-discrimination is a key human rights principle and one that should be a part of any measure of the realization of economic and social rights. Our attempts to take race into account in our application of this methodology to Brazil were hampered by a lack of data disaggregated by race for the indicators we used. Indeed, as the 2005 UNDP Brazil report noted, Brazilian race policies have historically paid little formal attention to race in legislation and record-keeping, stressing a race-neutral image of a multi-cultural Brazilian national identity instead (UNDP Brazil, 2005, p. 36, 46-47). However, as the disaggregated HDI suggests, Brazilians of African descent enjoy a far lower level of human development than their white counterparts. While our calculations were not able to incorporate this explicitly, it is noteworthy that our ESRF values for the states of Brazil correlate negatively and strongly with the percentage of state population that is Afro-Brazilian. Put another way, states which scored highly on our index tended to be those states which had the smallest percentage of Afro-Brazilian citizens. This relationship had a Pearson Correlation of -.822 which was statistically significant to the .01 level and is shown in the scatter-plot below.

Figure 10 : The Relationship between ESRF-I Values and Percent of Population which is Afro-Brazilian



Indeed, Bahia, a state which is overwhelmingly Afro-Brazilian, came in 22nd out of 27 states in our index while Santa Catarina, the state with the smallest proportion of Afro-Brazilians, came in 1st. Brazil's long historical experience with slavery as well as more recent rural-to-urban internal migrations have no doubt played a role in shaping the contemporary geographical distribution of populations of different races across the country and have doubtlessly played a role in shaping and calcifying some of the economic, political and social inequalities that persist along racial lines as well (UNDP Brazil, 2005, p. 19-25). However, it is nevertheless of note that states which are making the most of their available resources to realize the economic and social rights of their citizens are those in which Afro-Brazilians are least-likely to live.

While disaggregated raw data was not available for most indicators in our study, we did have income poverty data disaggregated by race for two years, 1991 and 2000. We applied the nationally-determined

poverty APF to these data and compared the resulting disaggregated X* scores for all states. In no state did the extent of fulfillment of the obligation to eliminate poverty among blacks match efforts to eliminate poverty among whites. In some states, such as Alagoas and Maranhão, X* scores for poverty for whites were almost twice what they were for Afro-Brazilians. This suggests that states are coming much closer to fulfilling their obligations to realize the economic and social rights of whites than they are for Afro-Brazilians and that there is indeed a precarious gap in rights fulfillment between the two groups on at least this indicator.

Although this index adds an important new dimension to the monitoring of the fulfillment of human rights obligations, it needs to be complemented with other indicators to make a fuller assessment of the human rights situation. It is particularly important to consider factors such as participation, equality and non-discrimination (Fukuda-Parr et al. 2009, p. 22, 24), and structural and process aspects of human rights obligations. However, as our experiment with racially disaggregated income poverty data shows, better data disaggregated by race and also gender can enable the researcher to undertake ESRF analyses which can expose inequality and discrimination. For other aspects of human rights, the ESRF-I supplements other existing human rights measures and reporting mechanisms[xii] which tend to focus on legislative and institutional protections, processes for human rights protection and redress and data on the negative obligations to respect and protect human rights by permitting insight into the positive obligation to progressively realize economic and social human rights in a way that permits cross-state comparisons.[xiii]

V. Conclusions

Over the last decade, the Brazilian state has taken important measures to act on its economic and social rights obligations. Policies such as *Fome Zero* and its flagship CCT program *Bolsa Família* were initially introduced as policies to help speed the progressive realization of these basic rights by making assistance available to all who needed it (de Britto, 2008, p. 188). Various other policy initiatives have been

implemented to help advance the realization of economic and social rights including the National Qualification Plan to improve employment opportunities for Afro-Brazilians, indigenous people and women, the National School Fund Program which distributes free daily meals to 37 million public school students, and the launch of the National Housing of Social Interest System which is responsible for upgrading the quality of housing and urbanizing informal slum developments across the country (Committee on Economic, Social and Cultural Rights, 2009, para 3).

Our application of the ESRF-I methodology to the states of Brazil exposes considerable inter-state variation in the efforts that have been made. Although no state is fully meeting its obligations in this regard, states such as Santa Catarina, São Paulo, Paraná, Minas Gerais and Rio Grande do Sul, among other high-scoring states, are coming closer to meeting their economic and social human rights obligations than other states, including much higher-income states such as the Distrito Federal and Rio de Janeiro. Overall, states struggle the most to meet their obligations to progressively realize the right to decent work and the right to adequate housing while achievements towards realizing the rights to education, to adequate food and to the highest attainable standard of health were generally more promising. This may reflect the effectiveness of the state programs such as *Bolsa Família* which prioritize reducing poverty and realizing the rights to education and health.

Our analysis suggests that states which make the most effort to meet their economic and social human rights obligations are also the most effective at keeping the number of people living below the poverty line low and at reducing income inequality. They also tend to be more heavily urbanized and to have smaller minority populations. In addition to these correlations, our research suggests that the quality of local governance, citizen participation in setting budgetary priorities being one component of this, may also contribute to higher ESRF scores. Our results differ significantly from rankings based on GDP per capita alone or the HDI, demonstrating the utility of the ESRF-I as a measure of the progressive

realization of economic and social human rights. However, other qualitative and quantitative measures are necessary to paint a more complete picture of economic and social human rights fulfillment in Brazil.

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Annex I:

Indicators Used in the ESRF-I Calculations

Right	General Indicator	Time Frame	Definition	Source	Minimums and Maxaimums
Decent Work	Poverty rate	1990 - 2007 (skips 91, 94 and 2000)	Proportion of people with household incomes below the national poverty line	IPEA*	15% not poor (Piauí, 1983) 93% not poor (Santa Catarina, 2006)
	Vulnerability in employment (III)	1992 – 2007 (skips 94 and 2000)	One of the three different definitions of the level of informality offered by Ipeadata based on IBGE's National Household Survey (PNAD). This rate corresponds to the result of the following division: (informal workers + own-account workers) / (formal workers + informal workers + own-account workers + employers).	IBGE*	17% employed formally (Maranhão 1995, 1998) 64% employed formally (Distrito Federal 1996, 1998, 2004, 2005, 2006)
Education	Net enrollment of 7 – 14 year-olds	1990 – 2007 (skips 91, 94 and 2000)	Ratio of the number of young people aged 7 to 14 attending school to the total number of youths of those ages	IPEA*	56.1% enrollment = 56%(Alagoas, 1981) 98.62% enrollment (Santa Catarina, 2006)
Food	Low birth weight	1994 – 2005	% of babies born from pregnancies 36+ weeks who weighed below 2.5Kg over the total birth rate (live births only)	MS/SVS - SINASC†	51.62% = 51% normal birth weight (Sergipe, 1994) 95.9% (Rondônia, 2000)
Health	Life Expectancy	1991 – 2006	Life expectancy at birth	IBGE†	59.7 years = 59 years(Alagoas, 1991) 75.11 years (Distrito Federal, 2006)
	MMRa	2000, 2005 (2 years only)	MMR (per 100,000 live births)	CBCD via Unicef Brasil‡	99.9015% survival (Piauí, 2005) 99.973% survival (Paraíba, 2000)
	U5MRa	1991, 2005,	U5MR (per 1,000 live	IBGE via	86.33% survival

		2006 (3 years only)	births)	Unicef Brasil‡	(Alagoas, 1991) 98.4% (Rio Grande do Sul, 2006)
Housing	Access to improved sanitation	1990 – 2007 (skips 91, 94 and 2000)	% of people living in permanent private housing with access to a sewerage or drainage network or septic system	IPEA*	1% with access (actually .538 but rounded up in this instance) (Tocantins, 1996) 95% (Distrito Federal, 2004)
	Access to improved water source	1990 – 2007 (skips 91, 94 and 2000)	% of people in households with piped water connections to the general network or to a well or spring	IPEA*	16% with access (Maranhão, 1982) 98% (Roraima, 1996)
	Durable housing materials	1990 – 2007 (skips 91, 94 and 2000)	% people who live in durable housing. Durable housing is defined as those in which the roof and walls are made of durable materials.	IPEA*	33% in durable housing (Maranhão, 1983) 100% (Roraima, 1990)
Income Measure	GDP per capita	1990 - 2006	Per capita state-level GDP in thousands of constant 2000 Reais, deflated with the "Deflator Implicito do PIB Nacional"	IBGE*	
Additional Variables	State-Level HDI	2005		UNDP Brazil §	
	Total Population, Urban Population and Total Afro-Brazilian Population	2000		IPEA*	
	State-level Gini coefficients	2006		IBGE*	

*Retrieved from the databases of IPEA, 1 February, 2009 available at http://www.ipeadata.gov.br

† Retrieved from the databases of the Ministério da Saúde, 1 February, 2009 available at http:// tabnet.datasus.gov.br

‡ Obtained by special arrangement from UNICEF Brazil

§ Retrieved from the website of UNDP Brazil, 20 July, 2009 available at http://www.pnud.org.br/home

Annex II:

Functions and Y(p) Values for All Indicators

Indicator	Function	Penalty Applied when GDP per capita is > or =
% Not Poor	$y = (107.7736821883518 + \left(\frac{-866.0685110336664}{GDP\ per\ capita^2}\right))$	R$ 10,678.82
% Workforce in Formal Employment	$y = (69.72513339931665 + \left(\frac{-434.503891172549}{GDP\ per\ capita^2}\right))$	n/a
Net Primary Enrollment	$y = (102.728593 + \left(\frac{-192.130501}{GDP\ per\ capita^2}\right))$	R$ 8,391.29
% New-Borns with Normal Birth Weight*	$y = 95.9$	R$ 5,160
Life Expectancy	$y = (76.73422911171755 + \left(\frac{-141.2617114474047}{GDP\ per\ capita^2}\right))$	n/a
Maternal Survival*	$y = 99.9739$	R$ 4,550
Under-5 Survival	$y = (100.0345731078585 + \left(\frac{-95.72276135010452}{GDP\ per\ capita^2}\right))$	R$ 7,652.54
% with Access to Improved Sanitation	$y = (103.1866803694899 + \left(\frac{-802.7568408264116}{GDP\ per\ capita^2}\right))$	R$ 15,871.67
% with Access to Improved Water Source	$y = (113.2520999294585 + \left(\frac{-714.5404709377362}{GDP\ per\ capita^2}\right))$	R$ 7,342.96
% Living in Housing Constructed with Durable Materials	$y = -686.2434056733126 + (984.5662565377468 \times GDP\ per\ capita) + (-307.2834525264886 \times GDP\ per\ capita^2)$	R$ 4,540.33

* Income was found to matter little in the realization of high levels of normal birth-weight babies and maternal survival. Frontiers for these indicators are therefore linear, equal to the highest level of achievement for any state in any year. Penalties were applied to all states and all years with incomes equal to or higher than that of the best-performer.

Annex III:

Rights Sub-Scores for All States and Final ESRF-I Values

	Decent Work	Education	Adequate Food	Health	Adequate Housing	ESRF Values
Acre	70.42	91.46	93.44	94.28	**61.06**	82.13
Alagoas	55.59	93.37	92.58	**80.99**	68.10	78.13
Amapá	76.17	98.02	91.20	90.61	70.86	85.37
Amazonas	65.75	91.24	92.86	91.19	76.67	83.54
Bahia	53.41	92.81	91.09	94.58	77.85	81.95
Ceará	53.22	97.80	92.85	92.11	75.35	82.27
Distrito Federal	85.45	87.51	82.95	94.79	96.64	89.47
Espírito Santo	83.42	92.69	90.91	95.06	91.29	90.67
Goiás	84.07	96.51	91.58	98.15	79.82	90.03
Maranhão	**39.73**	91.03	93.16	84.68	62.73	**74.27**
Mato Grosso	78.47	93.18	92.56	93.57	72.09	85.97
Mato Grosso do Sul	87.93	97.67	92.35	97.87	73.95	89.96
Minas Gerais	87.38	91.70	86.44	**99.11**	93.80	91.687
Pará	61.26	92.30	90.48	97.27	73.77	83.02
Paraíba	56.41	95.75	94.16	89.60	82.73	83.73
Paraná	86.14	96.41	88.87	96.38	90.64	91.688
Pernambuco	57.53	93.68	91.91	85.69	75.42	80.85
Piauí	44.45	**100.00**	93.79	90.36	79.52	81.62
Rio de Janeiro	84.45	**87.42**	86.21	92.15	97.81	89.61
Rio Grande do Norte	67.22	96.22	92.60	91.19	80.46	85.54
Rio Grande do Sul	83.12	95.37	86.55	98.51	93.66	91.44
Rondônia	80.49	92.48	**95.01**	93.15	79.75	88.18
Roraima	59.48	94.11	91.10	90.26	87.35	84.46
Santa Catarina	**97.18**	96.87	89.64	99.01	95.31	**95.60**
São Paulo	89.17	94.93	**85.77**	95.97	**97.87**	92.74
Sergipe	60.10	94.16	90.98	91.76	93.11	86.02
Tocantins	60.07	98.04	93.70	93.32	64.82	81.99

Annex IV:

ESRF-I Brazil Results and Most Recent-Year Indicators, Table 1

	ESRF Values	GDP per capita in thousands of constant year-2000 reais	Not Poor (% population above national poverty line)	Formal Employment (% population not working in vulnerable employment)	Net Enrollment of 7 to 14 year-olds
Acre	82.13	4.180	58.62	47.34	93.62
Alagoas	78.13	3.066	45.06	40.13	93.24
Amapá	85.37	5.072	69.97	48.05	97.06
Amazonas	83.54	7.022	64.10	46.81	95.33
Bahia	81.95	4.109	55.76	35.21	94.11
Ceará	82.27	3.346	55.29	33.10	95.35
Distrito Federal	89.47	22.322	84.34	63.86	95.81
Espírito Santo	90.67	9.045	86.25	53.03	96.72
Goiás	90.03	5.914	85.53	47.92	96.99
Maranhao	74.27	2.747	46.71	26.40	91.92
Mato Grosso	85.97	7.332	83.52	47.34	96.30
Mato Grosso do Sul	89.96	6.292	86.78	51.52	97.71
Minas Gerais	91.687	6.547	85.18	52.64	95.29
Pará	83.02	3.705	61.78	36.58	93.52
Paraiba	83.73	3.269	57.92	33.65	94.44
Paraná	91.688	7.812	83.21	55.32	97.90
Pernambuco	80.85	3.875	51.52	40.34	94.24
Piauí	81.62	2.501	50.43	26.73	95.68
Rio de Janeiro	89.61	10.505	83.78	57.24	94.65
Rio Grande do Norte	85.54	4.009	60.73	42.92	95.41
Rio Grande do Sul	91.44	8.495	83.12	53.75	97.71
Rondônia	88.18	4.981	71.00	50.80	94.68
Roraima	84.46	5.387	61.37	39.91	95.64
Santa Catarina	95.60	9.283	92.96	62.28	98.62
São Paulo	92.74	11.605	86.65	61.20	97.91
Sergipe	86.02	4.488	58.52	39.97	94.99
Tocantins	81.99	4.280	64.82	35.62	96.42

ESRF-I Brazil Results and Most Recent-Year Indicators, Table 2

	Normal Birth Weight (%)	Life Expectancy at Birth	Maternal Survival	Under-Five Survival (%)	Sanitation Access (%)	Water Access (%)	Durable Housing (%)
Acre	93.11	71.1	99.9542	96.16	38.44	54.29	91.41
Alagoas	92.57	66.36	99.9472	93.18	27.83	68.96	96.33
Amapá	92.22	70.06	99.9366	97.09	28.23	81.84	97.87
Amazonas	93.12	71.32	99.9469	96.79	56.55	82.26	93.07
Bahia	92.1	71.72	99.929	95.79	49.50	75.38	96.30
Ceará	92.72	69.93	99.9179	96.28	40.54	76.18	94.50
Distrito Federal	91.17	75.11	99.9586	98	94.07	99.07	98.91
Espírito Santo	92.6	73.42	99.9466	97.74	73.79	97.09	98.56
Goiás	92.52	73.1	99.964	97.66	35.72	97.64	99.09
Maranhão	92.83	67.24	99.9086	94.86	49.18	60.73	72.73
Mato Grosso	93.18	72.85	99.9141	97.53	33.85	89.68	95.31
Mato Grosso do Sul	92.87	73.47	99.9443	97.84	22.05	98.17	98.55
Minas Gerais	90.56	74.37	99.9679	97.53	75.27	95.46	99.51
Pará	91.73	71.67	99.9409	97	52.84	64.71	93.05
Paraiba	93.28	68.64	99.9736	95.04	48.28	80.40	97.75
Paraná	91.73	73.8	99.9339	97.77	69.00	98.89	98.17
Pernambuco	92.39	67.91	99.954	94.99	39.35	77.95	96.67
Piauí	93.11	68.55	99.9015	96.46	61.20	63.31	89.94
Rio de Janeiro	91.06	72.75	99.9368	97.65	90.15	98.36	99.54
Rio Grande do Norte	92.69	70.1	99.9465	95.53	44.98	83.15	97.88
Rio Grande do Sul	90.94	74.75	99.9443	98.4	78.57	98.13	98.38
Rondônia	93.87	70.93	99.9466	97.1	47.06	88.90	94.60
Roraima	92.25	69.62	99.9484	97.69	70.90	85.14	95.19
Santa Catarina	92.18	75.03	99.9669	98.1	83.74	98.34	98.50
São Paulo	91.06	73.94	99.9646	98.16	91.05	99.14	99.26
Sergipe	92.08	70.6	99.9492	95.69	72.23	89.04	97.65
Tocantins	93.23	70.99	99.9279	96.63	20.54	81.23	91.01

All figures are for 2006 except Maternal Survival (2005) and Normal Birth Weight (2005 except data for Tocantins which are from 2004)

[i] The authors wish to thank Boris Diechtiareff at UNICEF Brasil's Fortaleza office for his assistance in obtaining data used in this research and Marc Mousky for his assistance with Portuguese translation.

[ii] Brazil has 26 states and one "autonomous sub-national entity", the Distrito Federal, which includes the capital Brasília and its outskirts. However, Brazilian record-keeping accords the Distrito Federal the same status as a state.

[iii] See for example the Atlas of Human Development developed by UNDP Brazil, available for download at < http://www.pnud.org.br/atlas/>

[iv] All income figures given in constant year-2000 Brazilian reais.

[v] The Brazilian government classifies extreme poverty as per capita monthly income below R$ 60 and poverty as a monthly per capita income between R$ 60 and R$ 120.

[vi] Income inequality, as measured by the Gini coefficient, fell from almost .6 in 1995 to .5711 in 2004.

[vii] Data on improved sanitation access from IPEA show a drop in the percentage of the population with access from a peak of 79% in 1998 to 45% in 2001 and only 27% in 2006 in the state of Rondônia for example.

[viii] Please see the original paper by Fukuda-Parr, Lawson-Remer and Randolph (2009) for a more detailed explanation of the origins and evolution of the ESRF-I methodology.

[ix] Indicators were inverted so that ascending values represented greater achievement. For example, poverty rates were expressed as 'Percent of the population not poor' by subtracting the poverty rate from 100%.

[x] This is a slight variation on Penalty F suggested by Fukuda-Parr et all in their initial methodology. This penalty raises the income exponent to a power of .5, thereby making the penalty on higher-income states which fail to achieve high results somewhat less severe than the original Penalty F.

[xi] The precise function was $Net\ Enrollment = 102.728593 + (\frac{-192.130501}{GDP\ per\ capita\ ^{2}})$

[xii] See, for example, country and civil society reports submitted to the UN Committee on Economic and Social Rights or the human rights indicators being developed by OHCHR.

[xiii] Although this analysis is specific only to the states of Brazil, the ESRF-I was initially designed for application to international cross-country analysis.