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Growth and Equity in Developing Countries: A Reinterpretation of the Sri Lankan Experience

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In the important debate between the proponents of direct (basic needs) and indirect (economic growth) measures of promoting welfare, Sri Lanka has frequently been cited as one country which has successfully pursued the direct approach—it has raised living standards without much cost in terms of reduced growth. This conclusion, however, is based on analyses which do not account for the initial conditions of the countries being compared. After methodologically incorporating these concerns, neither the improvement in living standards nor the 2.0 percent per capita growth rate during the period of direct policy measures (1960–78) was exceptional. In contrast, during the period of more indirect growth-promoting policies (1977–84), (i) economic growth more than doubled to an average rate of 4.3 percent per capita per annum; (ii) expenditure inequality did not significantly change; (iii) consumption expenditures of the population, and the poor, generally increased; and (iv) several living standard indicators continued to improve.

Growth and equity are two important goals of developing countries. Depending on the fashions of the times, development economists (and policymakers) have variously emphasized the complementarities or trade-offs between these twin objectives of economic development. While there is general agreement that increased equity means an improvement in the living standards of the poor, there is disagreement about the appropriate emphasis to be placed on this goal.

This disagreement can be brought into focus by contrasting two opposing viewpoints. One point of view contends that an attack on poverty requires heavy reliance on direct measures to meet basic needs.[1] An explicit assumption of this approach is that economic growth by itself is too slow to provide substantial

1. Since welfare has several components besides monetary income, economists have tended to look at several nonincome indicators of welfare, such as basic needs (Streeten and Burki 1978), physical quality of life (Grant 1978) and living standards (Isenman 1980, Sen 1981).

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benefits to the poor in a reasonable amount of time. Consequently, governments should provide goods and services directly to the population in order to ensure that the poor receive an equitable share. The other viewpoint (again an extreme version) is that policymakers should reduce government involvement in the provision of goods and services and concentrate instead on increasing long-term economic growth. The explicit assumption here is that such growth will raise the incomes of all people (including the poor) and thus raise their standards of living. The former method, which can be described as the direct approach, emphasizes government intervention and equity, while the latter, which can be called the indirect approach, emphasizes economic growth and less government intervention.[2]

Among developing countries, Sri Lanka is frequently cited as a country which has successfully implemented the direct approach to raising economic welfare while still maintaining a respectable rate of economic growth. In recent years, it has been argued that the large social expenditures of the Sri Lankan government are the chief cause of its high standard of living as indicated by the long life expectancy, low infant mortality, and high level of literacy of the country's population (in particular, see Isenman 1980; Sen 1981, forthcoming). Ironically, however, just as economists began praising Sri Lanka's extensive array of social welfare programs, a new Sri Lankan government was elected in 1977 which began to reduce such expenditures and switch to the indirect strategy of providing for economic welfare, that is, placing a greater weight on the objective of economic growth.

The wealth of data available on Sri Lanka, when combined with the shift in its economic policies, provides a unique opportunity to assess the relative merits of the direct and indirect approaches to improving the economic welfare of low-income groups. Economic development is a complex process, and this article is not intended to provide definitive answers to the difficult policy questions involved. In addition, seven years (1977–84) is a rather short period of time from which to judge the longer-term effects of these changes in economic policies. What this article does seek to provide is a discussion and analysis of some of the methodological issues that are involved in making an assessment of the relative success or failure of policies in different countries or policy regimes. To make this assessment, this article analyzes Sri Lanka's performance both relative to that of other developing countries and with respect to its own initial level of development.[3] Particular attention is given to the living standards of the population and the welfare of the poor.

I. Living Standards: A Comparative Framework

Sri Lanka has become one of the most frequently cited examples of the successful use of the direct approach to the raising of living standards. According to

2. See Bhagwati (1986) for a lucid discussion of these two schools of thought.

3. Much of this analysis reflects our earlier work on this topic, in particular Bhalla and Glewwe (1985), Glewwe (1986a), and Bhalla (forthcoming).

several measures (life expectancy, infant mortality, literacy, absolute levels of expenditures of the poor), Sri Lanka has achieved better standards than most, if not all, of its comparator countries. Given this evidence, two questions need to be answered: Was Sri Lanka indeed an exceptional performer? If it was, what were the determinants, and particularly the policy determinants, of this exceptional performance?

The first question might be answered if a structural model could be estimated for each of the several indicators of living standards. Estimation of the life expectancy model, for example, would require data on female literacy, public health systems, private expenditures on health, and social expenditures (and the effectiveness of such expenditures) on disease eradication (such as malaria). Such data are not easily available for a particular country, let alone for a set of countries. Consequently, a structural model is difficult to estimate.

This same data constraint has affected other attempts at modeling intercountry behavior. As an alternative, researchers have tended to emphasize the establishment of "stylized facts" to interpret cross-country differences. This endeavor has led to analyses of patterns of development (Chenery and Syrquin 1975); of the relationship between income inequality, income levels, and growth rates of income (Ahluwalia 1976); and of the relationship between living standards and income (Isenman 1980; Sen 1981; Streeten 1981).

In this pursuit of stylized facts, a regression of the following form is typically estimated:

$$H_{it} = f(Y_{it}, Z_{it}) \tag{1}$$

where H_{it} represents some measure of living standards (or inequality) for a country i at time period t, Y represents per capita income, and Z represents a vector of nonincome determinants of H.[4] Often, Z_{it} is not included for lack of data, and the estimated equation is of the form

$$H_{it} = f(Y_{it}) + e_{it} \tag{1'}$$

where $f(Y)$ represents a particular functional form and e_{it} is the residual. If for purposes of analysis $f(Y_{it})$ is represented by a linear relationship, one obtains

$$H_{it} = (\alpha_t + \beta_o) + \beta Y_{it} + e_{it} \tag{2}$$

where α_t is a time-effect for time t and β_o is a constant term. Note that equation 2 cannot yield a separate estimate for β_o.

Though equation 2 applies across time, the more usual approach is to estimate it for a single time period. While the residual in equation 2, e_{it}, can inform one about a country's comparative level of living standards given its income level, it cannot, however, indicate anything about what *caused* the particular status to be observed. Additional information is needed to interpret the nature of the residual in equation 2, and the causes of relative achievement. In other words, the

4. It is likely that there is a simultaneous relationship between H and Y; though recognized, this issue is ignored in this paper.

implicit assumption is that e_{it} contains the effects of omitted variables; and in particular the effects of omitted policy variables. The contribution of these omitted variables (for example, social expenditures) may lead to a particular country being observed as an outlier. Formally, if E_{it} represents social expenditures,[5] and δ the average impact of such expenditures, equation 2 becomes

$$H_{it} = (\alpha_t + \beta_o) + \beta Y_{it} + \delta E_{it} + u'_{it} \tag{3}$$

where the estimated residual is

$$e_{it} = \delta E_{it} + u'_{it}$$

and u'_{it} is a random error term.

If the omitted variable E_{it} is observed to be exceptionally large for a particular country, then according to equation 3, an exceptionally large residual e_{it} will also be observed. Hence, large social expenditures for Sri Lanka can lead to its being an outlier in terms of achievement of living standards. This sort of causal connection seems to be implied in the conclusion reached by Isenman and Sen on the basis of an estimate of equation 3.[6] Sen notes: "Regarding the causation of this superior performance, attention has tended to concentrate on Sri Lanka's program of food subsidy and other social services" (1981, p. 301). Similarly, Isenman states: "Sri Lanka's record on social indicators suggests that expenditure over a number of years as a high percentage of the total government budget can lead to striking progress in the underlying social objectives of the economic development process" (1980, p. 251).

One important reason why equation 3 may be an inappropriate basis for deriving conclusions about recent policy-induced performance is that such regressions ignore the effect of "initial conditions."[7] Findings can vary because of country-specific factors like climate or diet. These "fixed effects," which are assumed to be time-invariant, can cause differences in observed living standards and yet have little to do with per capita income or social expenditure. Fixed effects may also arise because of *past* policy. Consider the following example. The time pattern of crude death rates in Sri Lanka is as follows: 1946, 20.2 per thousand; 1947, 14.3; 1953, 10.9; 1960, 8.6; and 1978, 6.6. One interpretation of this sequence of death rates is that a structural or technological change took place in Sri Lanka from 1946 to 1947. Such a change plausibly could be identified with the successful malaria eradication campaign that occurred in Sri Lanka in 1946. If this change did not take place in other countries, and if this technological advantage persists through time, then a six-point (20.2 versus 14.3) advantage in terms of death rates will be observed for Sri Lanka in 1950,

5. Obviously, unless one believes in no lags, E_{it} is a weighted sum of recent expenditures with presumably different weights being given to its investment and maintenance components.

6. The actual equation estimated is $\ln H = \alpha + \beta \ln Y$; the nature of the functional form, however, is irrelevant to the present argument.

7. This is in addition to the general criticism that cross-country data analysis is inappropriate per se because of inherent inaccuracies in data, noncomparability of economic systems, and so forth.

1960, 1975, and 1995. Thus, a cross-country regression for 1975 may show Sri Lanka to be an outlier, by six points, but it would be incorrect to attribute this exceptional status to Sri Lankan expenditure policies *after* 1947.[8]

Formally, initial conditions (λ_i) can be incorporated into the analysis thus:

$$H_{it} = \alpha_t + \beta Y_t + \delta E_{it} + \lambda_i + u''_{it} \tag{4}$$

where λ_i is a country-specific and time-invariant fixed effect and u''_{it} is a random error term. Note that β_o is no longer in the equation. This is because it represented equal fixed effects for all countries; equation 4 allows these fixed effects to differ. In all other aspects, equation 4 and its assumptions are identical to the equations which are generally estimated. It is important to emphasize the nature of the variable representing initial conditions or fixed effects λ_i. If equation 4 is estimated for the time period 1940 to 1950, then the malaria eradication campaign of 1946 is not a fixed effect. If, however, the equation is estimated for 1950 to 1970, then the six-point contribution of the malaria campaign becomes a fixed effect for the latter equation.

With fixed effects, the estimated residual of equation 4 is

$$e_{it} = \delta E_{it} + \lambda_i + u''_{it}$$

Thus, cross-country differences in e_{it} can no longer be attributed to differences in social expenditures, E_{it}; they may instead be caused by differences in initial conditions, λ_i.

A second problem with using equation 3 is that ignoring differences in fixed effects implies that such effects are presumed to be identical across countries and equal to β_o. If this is not the case, and if fixed effects are correlated with per capita income, then the estimate β will be biased and will yield incorrect estimates of predicted changes in H_{it} caused by assumed changes in Y_{it}.[9]

Given the importance of controlling for initial conditions, the question remains: How can λ_i be estimated? Alternatively, how can the effect of λ_i be removed from equation 4? One method of "purging" the residual of initial conditions is to estimate a model relating first differences of variables in equation 4 or a *change–change* regression:

$$dH = H_{i,t+1} - H_{it} = \alpha_{t+1} - \alpha_t + \beta(Y_{i,t+1} - Y_{it}) + \lambda_i - \lambda_i + u^* \tag{5}$$

where $u^* = \delta(E_{i,t+1} - E_{it}) + u''_{i,t+1} - u''_{it}$

Note that λ_i drops out so that the residual is composed of just the difference in the omitted variable, social expenditures, and a random error term.

8. The implicit assumption is that the expenditures needed to maintain a particular level of H_{it} (death rate) are much smaller than the initial capital expenditure needed to improve H_{it}. Isenman *does* discuss in detail the initial conditions prevailing in Sri Lanka but fails to incorporate the effects of these initial conditions into his regression estimates.

9. As discussed later, the log–log relationship between life expectancy and income ($\ln H = \alpha + \beta \ln Y$) yields a *negative* estimate for β once initial conditions are incorporated into the regression.

It is the residual of equation 5, and not the residual of 3, that may be useful in assessing country performance over time. Consequently, if a stylized fact methodology is pursued, then at a minimum, equations like 5, rather than 3, need to be estimated and interpreted.

Initial Conditions in Sri Lanka

In the case of Sri Lanka, an examination of initial conditions reveals two often ignored facts: it had exceptional living standards as early as the initial postwar period, if not before; and it was a surprisingly rich developing country (in monetary terms) in 1950 and 1960.

Table 1 documents the historical data for Sri Lanka since 1881. Literacy was already relatively high (21.7 percent) in the late nineteenth century, and "primary education was made nominally (although not in practice) compulsory in 1901" (Isenman 1980, p. 238). As noted earlier, the malaria-eradication policy of 1946 was largely responsible for reducing the death rate from 20 per thousand in 1946 to 14 per thousand in 1947.

Other Sri Lankan social indicators were also exceptional at the time of its independence in 1948. Though comparable data are not easily available, the following three measures stand out. First, life expectancy at birth of a Sri Lankan in 1948 (54 years) was almost identical to that of a Japanese (57.5 years) and higher than an Indian's in *1981* (51 years).[10] Second, the 1950 Sri Lankan unadjusted school enrollment ratio (primary and secondary school enrollments as a percentage of the population aged 5–19 years), 54 percent, was among the highest in the developing world in 1950. In India, the rate was 19 percent; in the Republic of Korea, 43 percent; and in the Philippines, 59 percent. By 1979, Sri Lanka's enrollment rate, 74 percent, had fallen behind Korea's, 94 percent, and had failed to keep pace with that of the Philippines, 85 percent. Third, even in 1950, Sri Lanka had an impressively low level of infant mortality—82 deaths per thousand live births. By contrast, the Philippines had 102 deaths and Malaysia, 91. In 1977, the corresponding numbers were Sri Lanka, 42; the Philippines, 65; and Malaysia, 32.[11] Thus, at the time of its independence in 1948, Sri Lanka enjoyed reasonably high living standards—a life expectancy of 50 years, a literacy rate of 58 percent, and an infant mortality rate of 92 deaths per thousand. These accomplishments are put into a comparative perspective by noting that the above figures for Sri Lanka for *1948* correspond to the following *average* figures for the East Asian countries (the most successful of the developing countries) for *1960:* a life expectancy of 53 years, a literacy rate of 59.5 percent, and an infant mortality rate of 94 per thousand.

It is also important to recognize how relatively well off Sri Lanka was both at

10. Sources of data are various United Nations and World Bank documents.

11. The 1977 figure for Sri Lanka does not match that reported in table 1 because it comes from a different source—table 1 is based on Alailima (1985) for time series Sri Lanka data, whereas comparative cross-country data are from various *World Development Reports*, World Bank.

Table 1. *Social Expenditures and Living Standards in Sri Lanka, 1881–1982*

Year	*Social expenditures per capita (Rs)*[a]	*Social expenditures per capita (Rs)*[a]	*Life expectancy (years)*	*Crude death rate (per thousand)*	*Infant mortality rate (per thousand)*[b]	*Total fertility rate*	*Primary school enrollment (percentage of age group)*	*Literacy rate (percent)*[c]	*Crude birth-rate (per thousand)*
1881								17.4	
1891								21.7	
1901–04					170			26.4	
1920–24			31.7		192			39.9	
1930–34					165				
1940				20.6	149				35.7
1945				21.9	140			57.8	35.9
1950	62[d]	66[d]	56.5	12.6	82				40.2
1955	43	49	59.3	11.0	71			65.4	37.3
1960	85	98	62	8.6	57	5.3	95		36.6
1965	91	97	63.5	8.2	53		93	71.6	33.1
1970	103	103	64	7.5	48			78.5	29.4
1975	128	144		8.5	45	4.2	77		27.8
1978	189	253	69	6.6	37	3.6	94		28.5
1982	84[e]	119[e]	69	5.9	32	3.4	103	86.5	26.3

Sources: Central Bank of Ceylon (1970, 1974, 1983, 1984), IMF (various years [b]), World Bank (various years), and Alailima (1985).

a. Social expenditures include net food subsidies, health, education, housing, community and social welfare services, and nonfood subsidy transfers. The second column is deflated by the gross domestic product (GDP) deflator and the third column by the inaccurate (for the 1970s) consumer price index.

b. Infant mortality rate figures are from Alailima (1985) and are different in some years from the source of cross-country data, World Bank (1983) (for example, the Sri Lanka figure for 1960 in the latter source is reported to be 71 rather than 57).

c. Literacy figures are for 1946, 1953, 1963, 1971 and 1981.

d. Data are for 1951.

e. Data are for 1984.

the time of independence and in the early 1960s. In 1950, Sri Lanka's per capita income according to purchasing-power-adjusted exchange rates—Kravis figures, denoted by $\$K^{12}$—was only 18 percent less than that of Japan ($\$K669$ versus $\$K810$ in 1975 prices). In 1960, its per capita income (1960 prices and exchange rates) of $152 was more than twice that of its neighbor India ($68), 50 percent more than Thailand ($97), and equal to that of Korea ($154). Kravis figures show Sri Lanka ($\$K961$) to have been richer than Brazil ($\$K912$) and Korea ($\$K631$) and about equal to Colombia ($\$K1,070$) and Turkey ($\$K1,044$) in 1960.

Sri Lanka's high living standards, both in 1948 and in 1960, should caution one against causally linking social expenditures (post-1948 or post-1960) with the "exceptional" status of Sri Lanka in the late 1970s. That judgment requires an examination of whether Sri Lanka's post-1948 *performance* was exceptional and whether social expenditures played an important role in that performance.

Cross-Country Analysis of Living Standards

In a comparative analysis of country performance, the more widely used indicators of living standards are the following: life expectancy, death rate, infant mortality, fertility, primary schooling, and adult literacy. These six indicators, which provide reasonable (though imperfect) information about the effects of direct social welfare policies, are analyzed below. Before this can be done, however, four issues need to be addressed: the time period of analysis; the countries to be considered; the specification of the functional relationships between living-standard indicators and income; and statistical procedures to be used to assess whether a country is exceptional according to a particular criterion.

Time Period of Analysis

Estimation of change–change regressions (equation 5) requires comparative data for at least two points in time. If these points are chosen sufficiently far apart, then a meaningful relationship can be estimated. Since comparative data on a number of variables are required, the choice of a period of analysis was dictated by data constraints and chosen to be 1960 and 1978.[13]

If the data for 1960 to 1978 are used, the differences in country performance prior to 1960 are ignored. This is unfortunate but unavoidable. Ideally, one would like data for as long a period as possible, perhaps since the 1930s—a time

12. Kravis dollar figures are in 1975 international prices and are as reported in Summers and Heston (1984). Because purchasing power parity (Kravis 1982) and conventional income figures often differ substantially, all analyses reported in this article were conducted for both definitions of income.

13. Comparative data are available for 1960 in World Bank (various years). The sample of developing countries for which consistent data are available prior to 1960 is small and not sufficient for econometric analysis. To correspond with the switch from direct to indirect Sri Lankan economic policies, 1978 is the end point chosen.

period prior to the expansionary Sri Lankan social welfare policies of the 1940s. Even this might not be enough, for it would leave unexplained the relatively high literacy rate (greater than 40 percent) and low death rate (20.6 per thousand) that was observed in Sri Lanka in 1940.[14]

Given that an ideal data set is unavailable, the choice of a period for a meaningful analysis of cross-country performance should satisfy two important conditions: the time period must be long enough for expenditure policies to have an effect, and the period should include episodes of policy change in order to analyze the effects of policy shifts.

In the case of Sri Lanka, it is likely that eighteen years (1960 to 1978) is a sufficiently long time for social expenditure policies to have an impact and for differences in achievement to be observed. Furthermore, 1960 is coincidentally a good cutoff point for marking a "beginning" or a shift in Sri Lankan policies. As Fields notes, "It happens that the early 1960s mark a turning point in economic and social policy: Sri Lanka moved from an open to a closed economy and then approached welfare statism" (1980, p. 195). Social expenditures started accelerating in the late 1950s. Yearly data suggest that average real per capita expenditures on social programs from 1960 to 1969 were 65 percent higher than those from 1951 to 1959.[15] And although the rate of growth in expenditures decreased, the average 1970–78 level was still 39 percent higher than in the 1960s. Thus, Sri Lanka's commitment to the maintenance and improvement of living standards—whether measured relative to its own gross national product (GNP) or relative to those of other countries—remained high. Such cross-country data are, unfortunately, only available for the period 1973 onward. Of the countries reported on in table 2, Sri Lanka's share of GNP devoted to social expenditures—11 percent in 1973—was exceeded only by that of Egypt (International Monetary Fund, various years [a]).

The end year, 1978, corresponds with the shift in policies which occurred with the advent of the new government in November 1977. Thus, it seems that the period from 1960 to 1978 is a particularly appropriate reference period for analysis of Sri Lankan performance. As noted in tables 1 and 2, living standards, social expenditures, and per capita income increased during this period. Whether the changes in living standards were exceptional relative to those of other countries will be examined below.

14. What these statistics emphasize is that a complete understanding of the comparative Sri Lankan experience vis-à-vis living standards is unlikely to emerge from cross-country data on living standards, or income, or social expenditures over the last twenty or forty years. And these figures reiterate the importance of allowing for different fixed effects (initial conditions).

15. The GDP deflator is used to deflate nominal expenditures. Social welfare programs in Sri Lanka include food subsidies, and a weighted index (GDP and consumer price index) may be preferable. However, as discussed later, the official consumer price index is extremely unreliable for the 1970s and shows unrealistically low inflation rates. For consistency, therefore, the approximate GDP deflator is used.

Table 2. *Levels of Income and Growth Rate Per Capita, 1960–78*

Economy	GDP per capita		Kravis dollars per capita		Growth rate, 1960–78	
	1960	1978	1960	1978	GDP	Kravis
Afghanistan	121	128	366	405	0.4	0.6
Algeria	254	353	1,209	1,989	2.3	2.8
Angola	149	100	934	767	1.2	−1.1
Bangladesh	59	66	355	432	−0.4	1.1
Benin	84	89	437	419	0.4	−0.2
Bolivia	134	204	684	1,151	2.2	2.9
Brazil	243	550	912	1,982	4.9	4.4
Burma	59	75	248	340	1.0	1.8
Burundi	67	97	482	374	2.2	−1.4
Cameroon	103	152	546	903	2.9	2.8
Central African Rep.	69	76	528	531	0.7	0.0
Chad	59	52	493	403	−1.0	−1.1
Colombia	256	434	1,070	1,803	3.0	2.9
Congo	138	176	653	1,030	1.0	2.6
Côte d'Ivoire	165	275	762	1,376	2.5	3.3
Dominican Rep.	238	409	926	1,487	3.5	2.7
Egypt	160	286	541	1,019	3.3	3.6
El Salvador	221	321	756	1,130	1.8	2.3
Ethiopia	47	60	278	331	1.5	1.0
Ghana	179	158	1,009	946	−0.5	−0.4
Guatemala	263	416	919	1,419	2.9	2.4
Haiti	75	76	363	436	0.2	1.0
Honduras	173	220	736	1,001	1.1	1.7
India	73	96	428	514	1.4	1.0
Indonesia	92	177	370	636	4.1	3.1
Kenya	97	152	378	481	2.2	1.3
Korea	153	488	631	2,053	6.9	6.8
Malaysia	280	588	888	1,856	3.9	4.2
Morocco	175	265	596	1,264	2.5	4.3
Nepal	41	44	345	402	0.8	0.9
Nicaragua	238	434	897	1,290	2.3	2.0
Pakistan	81	134	404	629	2.8	2.5
Paraguay	167	296	828	1,508	2.6	3.4
Peru	249	315	1,200	1,704	2.0	2.0
Philippines	254	409	644	983	2.6	2.4
Senegal	174	177	922	720	−0.4	−1.4
Sri Lanka	152	226	961	778	2.0	−1.2
Sudan	102	128	753	865	0.1	0.8
Taiwan	149	505	733	2,246	6.6	6.4
Tanzania	59	86	285	493	2.7	3.1
Thailand	95	219	446	1,121	4.6	5.3
Uganda	78	73	569	582	0.7	0.1
Zambia	213	227	657	703	1.2	0.4
Zimbabwe	232	253	880	883	1.2	0.0

Source: GDP figures are World Bank data. Kravis income numbers were obtained from Summers and Heston (1984).

Note: GDP figures are in 1960 prices and exchange rates, and Kravis numbers are in 1975 international prices.

Selection of Comparator Economies

What economies should be chosen to provide a perspective on Sri Lankan performance? Since a maintained hypothesis is that through time Sri Lanka performed better than its comparators, a useful criterion for selection might be those economies that were at broadly similar income levels in some selected base year. Since the base year is to be 1960, economies were chosen if their per capita income level was no more than double that of Sri Lanka ($153) at prevailing exchange rates and prices in 1960 (table 2).[16] Constraining the selection of economies by a predetermined income level should not introduce a bias, since in all the regressions, income is an exogenous variable.[17]

Functional Relationships between Indicators and Income

The models being considered (equations 3 and 5) are formulated in terms of stylized facts and are ones in which income is a proxy for several variables. Theory does not provide an a priori relationship between living standards (H) and income (Y).

The choice of functional form relating H and Y therefore is bound to be somewhat arbitrary. One functional form is the log–log relationship:[18]

$$(6) \qquad \ln H_{it} = \alpha_t + \beta \ln Y_{it}$$

Also plausible is a semi-log relationship ($H = \alpha + \beta \ln Y$). An intuitively appealing functional form, however, is a logistic relationship between H and Y:

$$(7) \qquad H_{it} = \frac{K}{1 + e^{-[\alpha_t + f(Y_{it})]}}$$

The logistic relationship is particularly useful for those indicators that have a physical limit, for example, life expectancy. (The physical limit is reflected by K in equation 7). In contrast, the log–log relationship assumes that the same income growth is associated with the same percentage increase in life expectancy regardless of whether it is from 50 to 60 years or from 70 to 80 years—obviously an untenable assumption. Conversely, the logistic form has the drawback that knowledge of the ceiling (or floor in the case of a variable like infant mortality) is needed for its estimation.

Once a level–level functional form is decided upon, a change–change relationship can easily be derived. For example, the corresponding difference equations for equations 6 and 7 are

$$(6') \qquad d\ln H = \ln H_{iT} - \ln H_{it} = (\alpha_T - \alpha_t) + \beta (\ln Y_{iT} - \ln Y_{it})$$

16. Since a major part of the analysis is to evaluate the performance of countries over time, the major oil exporters (for example, Iran, Iraq, and Nigeria) were excluded from the analysis.

17. In other words, the assumption is made that a piecewise linear relationship exists between living standards and income. And if income is an exogenous variable, then exclusion of a country from analysis may affect the efficiency of estimation but does not affect the unbiasedness of the coefficients.

18. Indeed, this functional relationship is the one used by Isenman and Sen.

and [assuming $f(Y)$ takes the form βY]

$$(7') \qquad 1n\left(\frac{K - H_{iT}}{H_{iT}}\right) - 1n\left(\frac{K - H_{it}}{H_{it}}\right) = -(\alpha_T - \alpha_t) - \beta_T Y_T + \beta_t Y_t$$

Note that in these difference equations, the estimate of the constant term $(\alpha_T - \alpha_t)$ represents an exogenous effect (time, technology) common to all countries. Furthermore, the residual in these equations, as noted earlier, will not be influenced by initial conditions, λ_i.

These difference equations can be refined to include one additional hypothesis—namely, that the exogenous element $(\alpha_T - \alpha_t)$ is not the same for all countries but is rather a function of initial conditions. For example, cheaper methods to eradicate malaria may have no impact on a country that has already eradicated malaria. Thus $(\alpha_T - \alpha_t)$ need not be a constant. How the impact of technology is conditioned by time is a matter of specification. One equation which reflects a diminishing impact of time for countries with better initial conditions is

$$(8) \qquad d1nH = (\alpha_T - \alpha_t) \cdot \frac{1}{1nH_{it}} + \beta(1nY_{iT} - 1nY_{it})$$

Statistical Procedures for Assessing Outliers

For each nonincome indicator, "level" regressions (such as equation 3) and change–change regressions (such as equation 5) can be estimated for the selected group of countries. If it is assumed that residuals represent permanent differences among countries, then level regressions can be used to test whether Sri Lanka was an exception relative to its income level *at that point in time,* while the change–change regression can be used to test whether Sri Lanka's performance was exceptional *during a given period of time.* Since being an exception is measured by the residual—the difference between the actual value of the left-hand side variable and its predicted value—relevant statistical techniques have to be used for determining whether the residual of a particular equation is an outlier. Since the residual is a random variable and not a parametric constant, the appropriate statistical technique is the use of a tolerance interval for an observation (forecast error and/or noncentral t tests) rather than a confidence interval for a parameter (conventional t tests). These statistical tests have been applied to the results reported in this paper (see Srinivasan 1979 and Bhalla 1984 for details).

Estimation and Results

Several models of both the level–level and change–change form were estimated for 1960, 1978, and the time period from 1960 to 1978.[19] The level–level

19. For the logistic model, the following ceiling (floor) levels, K, were assumed: life expectancy, 76 years; death rate, 6 per thousand; infant mortality, 20; fertility, 2; primary school, 115 percent; and literacy, 100 percent. The results incidentally, are not sensitive to plausible variations in K. All models were estimated for both the conventional and the Kravis definition of income. Since results do not differ, only the results for the conventional definition of income are reported.

regressions for 1960 and 1978 yield similar results. They indicate that in 1960, Sri Lanka was an outlier for three of the six indicators—life expectancy, death rate, and infant mortality.[20] This conclusion was not dependent on functional form, but the outlier status was modified somewhat by the use of the more stringent noncentral t statistic. A 99 percent tolerance interval suggested Sri Lanka was not, but a 95 percent tolerance interval suggested that Sri Lanka was an outlier. In the case of fertility, the outlier status for Sri Lanka is dependent on the functional form—the log–log form suggested it was not, the logistic form indicated that it was. Regarding the related education indicators—adult literacy and primary schooling—Sri Lanka was not an outlier according to any criterion.[21]

It appears that in 1960 Sri Lanka was a positive outlier among the sample countries for fertility and mortality but not for education. What was Sri Lanka's relative position in terms of these indicators eighteen years later? Did it improve its relative position?

Results according to the change–change regressions are reported in table 3. Strikingly different results are now obtained. In the case of the log–log functional form and weighting for initial conditions (equation 8), Sri Lanka is not an outlier for any of the six indicators chosen. Though not significant, Sri Lanka does worse than expected for life expectancy, death rate, primary schooling, and literacy, and better than expected for infant mortality and fertility. In *none* of these cases, though, is Sri Lanka's performance significantly different. If the logistic form is used (but one which does not weight initial conditions as the log–log form can), then Sri Lanka's performance in terms of life expectancy and death rate appears more favorable. However, though forecast error calculations suggest that Sri Lanka is an exception in terms of life expectancy, the tolerance interval calculations suggest that it is not (see table 3 and Bhalla 1984). Fertility and infant mortality were observed to be better than average, and regardless of the functional form or statistical tests, Sri Lanka performs worse than average for the education variables.

These results highlight both the importance of functional forms and the importance of initial conditions. For example, implausible results are generated by the log–log functional form. When a change–change regression is estimated (that is, the correlation between fixed effects and per capita income is removed), the results indicate that income change has a *negative* impact on changes in life expectancy and primary schooling.[22]

20. See Bhalla (1984) for details.

21. The importance of functional forms was indicated by the difference in the result for these two indicators according to the log–log and logistic form. Sri Lanka was observed to be worse than average according to the log–log form; the preferred logistic form indicated that Sri Lanka was a positive deviant but not significantly so.

22. This result is also obtained if the constant term is not weighted for initial conditions and if the regressions are run with per capita income replaced by Kravis income.

Table 3. *First Differences of Models Relating Indicators and Income*

Indicator and model[a]	*Coefficient on time* $(\alpha_T - \alpha_t)$	*Coefficient on income change (model I) or 1978 income (model II)*	*Coefficient on 1960 income (model II)*	*Sri Lanka error*[b]	*(SEE) Standard error of estimate*	*Forecast error*[c]
Life expectancy						
Model I	0.695	−0.032		−0.0487	0.0315	
	(27.143)	(−2.198)				
Model II	−0.397	−0.00112	0.00093	−0.291	0.138	0.1396
	(−8.265)	(−4.369)	(1.780)			
Death Rate						
Model I	−1.121	−0.0159		0.111	0.119	
	(−12.887)	(−0.252)				
Model II	−0.0727	−0.00118	0.00124	−0.359	0.0906	0.0916
	(−2.308)	(−7.017)	(3.602)			
Infant mortality						
Model I	−1.710	−0.316		−0.0228	0.134	
	(−11.048)	(−4.703)				
Model II	−0.0419	−0.00114	0.00136	−0.1258	0.0704	
	(−1.713)	(−8.677)	(5.083)			
Fertility rate						
Model I	0.0211	−0.424		−0.231	0.157	
	(0.292)	(−5.300)				
Model II	−0.0300	−0.00216	0.00282	−0.248	0.145	
	(−0.522)	(−7.591)	(4.890)			
Primary school						
Model I	2.375	−0.523		−0.206	0.287	
	(11.040)	(−4.080)				
Model II	−1.237	0.00217	−0.00156	0.525	0.739	
	(−4.740)	(1.524)	(−0.543)			
Literacy						
Model I	1.696	−0.0415		−0.337	0.354	
	(8.275)	(−0.270)				
Model II	−0.974	−0.00153	0.00301	0.695	0.570	
	(−4.656)	(−1.387)	(1.325)			

Note: For all variables, 1960 and 1978 data are taken, except infant mortality (1960 and 1982) and primary schooling (1960 and 1977). Figures in parentheses are t statistics for the parameter estimates.

a. Model I represents equation 8 and model II represents equation 7′.

b. Sri Lanka error represents the difference between the actual and predicted value for Sri Lanka.

c. Only for death rate is Sri Lanka an outlier according to both forecast error and the noncentral t statistic. Forecast errors (and noncentral t statistics) are not calculated for models for which Sri Lanka is clearly not an exception.

To summarize the regression results, the use of one time-period level–level regression suggests that Sri Lanka had higher living standards than its comparators. This result holds for 1960 (Bhalla 1984) and 1975 (Isenman 1980; Sen 1981). However, this result tells us little about when and why this higher level was achieved. Historical data suggest that even prior to the expansion of social expenditures (and the introduction of food subsidies) in the early 1940s, Sri Lanka had exceptionally high living standards. Consequently, one-period regressions for 1960 or 1975 may be capturing the effects of early achievement (initial conditions) and not entirely those of social expenditures.

If, however, interest is in the comparative nature of *improvement* in living standards, then the results suggest that Sri Lanka's performance for the time period from 1960 to 1978 was, statistically speaking, not better than average. Indeed, in some cases, it has done worse (though never significantly so) than a typical country since 1960. This performance is somewhat surprising, especially given the large increases in social expenditures in Sri Lanka in the post-1950s time period. Of course, in a cross-country regression, it is Sri Lanka's *comparative* expenditure pattern that is relevant in interpreting the residuals. Unfortunately, social expenditure data of the form presented for Sri Lanka (table 1) are not available for most developing countries for most of the 1960s and the early 1970s. However, given the percentage increase in real expenditures observed for Sri Lanka during the post-1950s time period, it is likely that such expenditure changes were greater than average.

It should be emphasized that this conclusion of nonexceptional performance is *not* dependent on functional forms. As noted above, different functional forms make some difference to the estimates of particular equations but not to the general result. Furthermore, the choice of income variable also does not affect the conclusion—results are similar when income is measured in Kravis dollars. Finally, noneconometric tests (for example, the shortfall criterion, as used by Sen 1981) yield similar results (see Bhalla 1984). It appears that the results are quite robust; Sri Lanka was not a comparatively exceptional performer in terms of improvement in living standards during the time period from 1960 to 1978.

In principle, the same methodology for assessing comparative performance could be conducted for the shorter time period from 1977 to 1984. The Sri Lankan policies of this period have generally emphasized economic growth and a reduction in social expenditures; it would, therefore, be useful to examine Sri Lanka's comparative performance under the new policy regime. Though statistical tests are not conducted, the following characteristics of performance are observed: primary school enrollment in Sri Lanka actually *declined* from a level of 95 percent in 1960 to 86 percent in 1977 and *increased* from this level to 103 percent in 1984; infant mortality declined at a faster rate *after* 1977, dropping from 42 per thousand in 1977 to 32 in 1982, compared with the decline from 57 in 1960 to 42 in 1977.[23] This improved performance is noteworthy, for it is likely that is represents improvements in the living standards of the poor. Thus, though not conclusive, the evidence does suggest that the growth orientation of the economy from 1977 to 1984 was accompanied by improvement in the living standards of the population and of the poor.

Effect of Initial Conditions—a Numerical Example

The importance of controlling for initial conditions can be illustrated by the following numerical example. Sen (1981) discusses in detail Sri Lanka's exceptional performance in terms of life expectancy, as measured by its large residual

23. Data are from Alailima (1985), which are based on *Statistical Abstracts,* published by the Sri Lanka Department of Census and Statistics. Also see note b, table 1.

Table 4. *Years Needed to Match Social Welfare Achievements of Sri Lanka through the Growth of Income*

Growth assumption[a]	*Growth rate of per capita GNP per year*[a]	*Sen's income-based longevity increases (power fit)* without *initial conditions (years)*[a]	*"New" income-based longevity increases (logistic fit)* with *initial conditions (years)*[b]
No change in growth rate	2.00	152	46
Full transfer at 1970–76 capital output ratio	4.01	77	16
Full transfer at 1961–70 capital output ratio	5.37	58	6

a. The title, growth assumption, and the first and second columns are identical to Sen (1981, table 4, p. 305).

b. The third column is based on a change–change regression reported in table 4, model II for life expectancy. The years of lead are as of the terminal date of analysis 1975 (second column) and 1978 (third column).

for a cross-country level–level regression for 1975. He then states: "The question has been frequently asked whether a poor country like Sri Lanka can afford to have such a high volume of social welfare expenditure, and it has also been argued that its growth rate may have been negatively influenced by the allocation of resources to these programs. . . . But the question is whether the growth rate would have been much higher in the absence of these programs" (p. 302).

Thus, a clear trade-off between social expenditures and growth is recognized. Table 4 reproduces portions of Sen's calculations which suggest that the high life expectancy enjoyed in Sri Lanka is a result of its welfare-oriented (direct) strategies. For example, Sen's results as given in the second column of the table suggest that if Sri Lanka's GDP grew at a 2 percent annual rate, it would take 152 years to achieve income levels corresponding to its life expectancy level of 69 years in 1975. Hence, Sen's conclusion, "The overall impression is one of a long haul in matching social welfare achievements of Sri Lanka with income growth" (1981, p. 305).

The third column represents the calculations according to the methodology that incorporates the influence of initial conditions.[24] In other words, the third column reports the number of years it would take Sri Lanka to reach a life expectancy of 69 years (1978 level) *given* its income level ($152 per capita) and its life expectancy (62 years) in 1960. Since time is measured from 1960, the "lead" that Sri Lanka enjoys in *1978* is net of eighteen years progress.

24. These calculations are for the logistic form (equation 5). Unfortunately, a direct comparison with Sen's log–log model cannot be conducted, since, as reported in table 3, a *negative* relationship is observed between changes in life expectancy and changes in per capita income.

These results highlight the dangers of ignoring initial conditions. Instead of a lead of 152 years, Sri Lanka enjoys a lead of only 46 years if it continues to grow at only 2 percent a year. At the alternative growth rate of 4.01 percent (somewhat less than Sri Lanka's growth rate since 1978), Sri Lanka's lead in 1978 is reduced to only 16 years. In contrast, Sen's estimate of the lead according to a level–level regression and a growth rate of 4.01 percent is 77 years. Thus, a conclusion of a "long haul" based on a regression which excluded initial conditions is reduced to a "short haul" of only sixteen years when such conditions (fixed effects) are incorporated into the analysis.

II. Economic Growth in Sri Lanka, 1960–84

The new government which came to power in Sri Lanka in late 1977 implemented a comprehensive set of economic policies which marked a distinct shift from the direct to the indirect approach to raising welfare. This shift requires a review of the policies in place before and after 1977 and the performance of the Sri Lankan economy during both periods.

During the 1950s and 1960s, Sri Lanka's economic policies were characterized by increasing government intervention in the economy and high and increasing social welfare expenditures (see table 1). Active government involvement in the economy intensified in 1970 when a new government was elected. The prior weekly ration of rice (two pounds free per person per week) was supplemented by another two pounds per week at a subsidized price. Other goods were distributed at low prices, and rationing of wheat flour and sugar was introduced. Land reform effectively transferred much of the estate sector from private ownership to the government. Several private enterprises were nationalized, and a number of government-owned "business undertakings" were established. In general, government enterprises were heavily subsidized and protected from competing foreign imports by means of a dual exchange rate system and import licenses. These "direct measure" policies were continued until a new government won the popular mandate in late 1977.

The policy regime adopted since 1977 has significantly reduced government intervention in the economy, although there have been fluctuations in the government's commitment to the new set of policies. The exchange rate was unified and devalued, and controls on foreign exchange and the financial sector were reduced. Both foreign investment and foreign aid were successfully solicited. Import restrictions were reduced, and new exports (that is, other than tea and rubber) were promoted. These measures, aimed at increasing growth, were coupled with a reduction in social expenditures. The rice ration system was altered so that only the poorest half of the population was eligible for rations, and many other subsidies were reduced or eliminated.

There is substantial evidence that the *growth* objectives of the government were achieved. The average per capita growth rate of 1.3 percent from 1970 to

Table 5. *Average Rates of Real Economic Growth, 1960–84*

Sector, product, or growth measure	*1960–65*	*1965–70*	*1970–77*	*1977–84*
Agriculture	2.7	4.2	2.2	3.8
Industry	5.2	7.3	1.6	5.6
Services (including construction)	4.6	7.3	3.2	6.1
Total GDP	4.0	5.4	2.9	6.0
GDP per capita	1.5	3.0	1.3	4.3
GDP per capita, Kravis	−3.8	0.2	−1.1	3.5[a]

Sources: Central Bank of Ceylon (1970, 1974, 1983, 1984), Peebles (1984), and Summers and Heston (1984).

Note: Prior to 1979, data are from Peebles (1984), and the deflator is based on 1959 factor cost prices. Data after 1970 are from Central Bank of Ceylon (1970, 1974, 1983, 1984) and the deflator is based on 1970 factor cost prices.

a. 1977–80.

1977 reached 4.3 percent from 1977 to 1984.[25] It is interesting to note that the poor economic performance in the early 1970s began before the oil price hikes in late 1973 and that the high rates of economic growth since 1977 continued even during the second dramatic rise in oil prices in 1979. Furthermore, the growth since 1977 seems to have been shared by all major sectors of the economy (table 5). It also appears that the growth strategy was relatively equity-oriented, to the extent that it was of a labor-intensive variety. Agriculture (particularly paddy cultivation), construction, services, and textile manufacturing are all relatively labor-intensive, and all have enjoyed high rates of growth since 1977.

That the pre-1977 period was characterized by economic stagnation and/or slow growth is also revealed by figures for Kravis's adjusted purchasing-power parity figures (data are from Summers and Heston 1984). The average GDP growth rate for the 1960–78 period was −1.2 percent—a surprisingly large decline. Only 6 other countries (of the 44 countries reported in table 2) show a negative growth rate for the 1960–78 period. A recovery since 1977 is also captured by the Kravis data; the annual rate of per capita economic growth from 1977 to 1980 was 3.5 percent (in Kravis 1975 dollars).

As part of the post-1977 growth strategy, Sri Lanka has successfully focused on promoting production of paddy, tea, and industrial exports and on increases in employment. Paddy production grew by 84 percent from 1976 to 1984, and rice imports, which had been a major drain on foreign exchange, fell from 43 percent of production in 1970–77 to 13 percent in 1978–82 and to only 2 percent in 1984. In addition, this increased production has led to a large decline in the relative price of rice; an occurrence which disproportionately benefits the major rice consumers—the poor.[26] Recently, some increase in the production of Sri Lanka's major traditional export crop—tea—has occurred. Production, which had stagnated since 1960, reached 208,000 tons in 1984, up from an

25. There is some evidence that the rate of growth might be overstated during the period from 1970 to 1977 (see Bhalla and Glewwe 1985).

26. For example, the consumer price of rice rose by 91 percent from 1978 to 1984, while the increase for the food price index during the same period was 170 percent (Bhalla and Glewwe 1985).

Table 6. *Employment Data from Household Surveys, 1963 to 1981–82*

Year and survey	*Labor force (percentage of population)*	*Employment (percentage of population)*	*Unemployment (percentage of labor force)*
1963 CFS	52.1	27.4	13.8
1969–70 SES	55.6	29.4	14.0
1973 CFS	53.2	25.8	24.0
1978–79 CFS	56.9	31.6	15.0
1980–81 SES	58.1	30.4	13.6
1981–82 CFS	57.1	30.3	11.7

Sources: Central Bank of Ceylon (various years), Sri Lankan Department of Census and Statistics (various years).

Note: CFS, Consumer Finance Survey; SES, Socio-Economic Survey. The labor force is defined as the proportion of the total population between the ages of 14 and 55 years.

average level of 192,000 tons in 1980–83 and 197,000 in 1959–61. This may, in part, have been caused by the 27 percent real price increase enjoyed by tea producers from 1975–77 to 1982–84. Promotion of export-oriented manufactures also led to growth in that sector, and combined with a decline in traditional agricultural exports, this created a rise in the share of manufactured goods in total exports from 11.8 percent in 1975 to 34.1 percent in 1984 (Central Bank of Ceylon 1983, 1984).

Statistics on employment in developing countries are generally weak, yet available data indicate that employment has been higher and unemployment lower in the post-1977 period (see table 6). Since 1977, employment (as a share of population) has remained above 30 percent, compared with a range of 25.8 percent to 29.4 percent from 1963 to 1973. Unemployment rates, which were 24 percent in early 1973 and 22 percent in 1975,[27] dropped to 13.6 percent by 1980–81 and were only 11.7 percent in 1981–82.

This section has presented a broad picture of the Sri Lankan economy from 1960 to 1984. The next section will focus on the effects of the post-1977 policies on the poor and on the overall level of economic inequality.

III. Changes in Inequality and Poverty

The labor-intensive orientation of the post-1977 growth led to substantial employment gains from which the poor were likely to gain. As part of the economic reforms instituted since 1977, however, direct provisions of food to the population were reduced. The elaborate food-rationing scheme was replaced by a food stamp system, and universal eligibility for food rations was replaced by an income criterion so that only households earning less than Rs300 per month in 1979 were eligible. Since incomes were based on self-declaration, some leakage to wealthier households was inevitable. The targeting of the program

27. Full survey data for 1975 were not available to the authors and thus are not cited in table 6 (Government of Sri Lanka 1975).

Table 7. *Receipt of Food Stamps by Expenditure Quintiles, 1981–82*

Per capita expenditure quintile	*Percentage receiving food stamps*
1	79.6
2	65.8
3	50.7
4	36.7
5	15.0
All	49.6

Source: Estimated from the 1981–82 Consumer Finance Survey by Edirisinghe (1985).

Note: Quintile 1 is poorest.

was generally effective in reaching the poor—almost 70 percent of the bottom half of the population received food stamps (table 7).[28] Effective targeting has also meant a reduction in net food subsidies; these have declined from a level of 14 percent of government expenditures in 1970 to 11 percent in 1979 and to less than 4 percent in 1984.

As part of the policy of reducing food subsidies, the government kept constant the *nominal* value of food stamps. The real value of these transfers deteriorated, and by 1982 the value of the subsidy received by eligible households was about half its 1979 value (see price index in table 8). However, if the comparison is made with the earlier rice rations, this is an exaggeration of the real decline in purchasing power. The relative price of rice has declined since 1979—while overall food prices have increased by 130 percent, rice prices have only increased by 76 percent. The average recipient of food stamps in 1982 could purchase only six pounds of rice per month, which compares with nine pounds in 1979—a decline of 33 percent.

It is clear that the change from general food subsidies to targeted food stamps was a major one. Given that the value of food stamps was fixed in nominal terms and that only 50 percent of the population received these transfers, there is a real possibility that the welfare level of the population declined. Conversely, the economy did grow at a faster rate, and employment gains were evident. The question remains—what did the poor and the overall population gain to compensate them for their loss of government transfers?

To answer this question, a detailed analysis of the available data is required, and particular attention must be paid to the reliability of the data.

28. An important and most unfortunate exception to this targeting are the estate workers, who comprise about 6 percent of the total population and are among the poorest workers in Sri Lanka (Sahn 1985; Bhalla and Glewwe 1985). Only 13 percent of such households received food stamps, compared with 57 percent in the rural areas and 33 percent in the urban areas (Edirisinghe 1985). Since they are subject to minimum wages, and thus their incomes are known, self-declaration of income was not an option available to the estate workers.

Intertemporal Welfare Comparisons: Is 1969–70 an Appropriate Comparator?

National-accounts data do not contain information on the *distribution* of income (or consumption), and (as discussed in Bhalla and Glewwe 1985) estimates of nominal expenditures from these data and the official price index are inconsistent with the information given by household survey data. Fortunately, detailed household survey data are available for the years 1963, 1969–70, 1973, 1978–79, 1980–81, and 1981–82.[29] These data, which contain a wealth of information on the levels and distribution of consumer expenditures and income, are analyzed below.

Since 1969–70 was the first year for which survey data were available on computer tape, it necessarily became a benchmark for comparison. Consequently, most analyses report on changes *since* 1970. This would be appropriate if 1969–70 were a typical or trend year for expenditures and income.

As it turns out, 1969–70 is an *unfortunate* base year for comparison of consumer welfare and of food expenditures. Because food purchases account for almost 60 percent of total expenditures and a third of food expenditures are devoted to rice, short-term changes in rice availability and prices can have an appreciable effect on welfare. The weather was favorable in 1969–70, and rice yields in that year were 6 percent above the peak 1968–69 averages and were the highest level achieved in Sri Lanka until 1979. (In terms of production, 1970 levels were 17 percent above the record crop of the previous year.)

In addition, 1970 was an election year, and there does seem to be an increase in food availability during electoral periods in Sri Lanka. This hypothesis was tested by relating rice availability per capita and election years (1960, 1965, 1970, and 1977). An econometric investigation gives the following results:[30]

$$\begin{aligned} \ln Rice = {} & -25.8 + 0.017 \cdot Time + 0.08 \cdot 1960 + 0.096 \cdot 1965 \\ & \quad (5.8)(7.4) \qquad\quad (1.03) \qquad (1.23) \\ & + 0.148 \cdot 1970 + 0.13 \cdot 1977 \\ & \quad (1.90) \qquad\quad (1.62) \\ & \bar{R}^2 = 0.74 \end{aligned}$$

This equation confirms, in a striking fashion, the electoral rice cycle. The coefficients for election years are positive and are significant for the 1970 and 1977 election years. The unusual nature of 1970 is further underlined by the large coefficient observed (0.148), which indicates that rice availability was 15 percent above trend. It should be noted that the above equation was estimated for *net* availability of rice. Thus, the effects of changes in stocks caused by good weather have already been removed from the data. In that sense, any excesses in availability that are observed point to the existence of an electoral food cycle.

The above trend rice availability levels for 1970 are confirmed by the analysis of import data. Annual rice imports from 1968 to 1972 were successively 349, 264, 534, 339, and 266 metric tons. The average for these years is 350 metric

29. The 1963 survey results, however, are not available on computer tapes.

30. A full presentation of the electoral food cycle is given in Bhalla and Glewwe (1985).

tons, which suggests an import level of 184 metric tons above the trend in 1970. This is strikingly close to the excess availability derived from the estimated equation reported above—196 metric tons.

Wheat imports and availability also rose sharply in 1970. A conservative estimate (of deviation from a simple four-year average for 1969–72) suggests an increase of 8 kilograms per capita per year or almost 25 percent above trend.

According to conservative estimates by Bhalla and Glewwe (1985), the transitory monetary gains accruing to the population from the additional availability of wheat and rice in 1970 amounted to Rs2.34 per capita per month. The average food expenditure in the 1969–70 Socio-Economic Survey was Rs 34.7. Thus this estimate of transitory welfare gain in 1969–70 (which is a lower-bound estimate since the prices of rice and wheat are assumed to stay constant) represents approximately 7 percent of average food expenditures. In terms of the lowest quintile, the transitory welfare effects are 12 percent for food and 8.5 percent for total expenditures, respectively. Thus the transitory effect turns out to be quite large in 1970. For example, the implications of transitory food expenditures for calculations of absolute poverty turn out to be strikingly large—a food expenditure poverty line of Rs23.34 (given the additional Rs2.34 monetary gain) rather than Rs21 in 1969–70 implies an increase in the rate of absolute poverty (head count method) from 11 to 19 percent.

Table 8. *Expenditures and Price Index, Sri Lanka, 1963 to 1981–82*

	Survey data						*National accounts data, total expenditures*[b,d]	
	Price index[a]		*Food expenditures*[b,c]		*Total expenditures*[b]			
Year	*Food*	*Total*	*Nominal*	*Real*	*Nominal*	*Real*	*Nominal*	*Real*
1963	77.1	79.4	23.9	31.0	39.6	49.8	42	53
1969–70	100.0	100.0	34.7	34.7	59.7	59.7	66	66
1973	127.2	127.3	35.5	27.9	61.4	48.2	90	59
1978–79	334.2	311.5	92.5	27.7	171.6	55.1	233	72
1980–81	487.7	458.6	156.9	32.2	240.8	52.5	383	73
1981–82	584.9	564.7	168.4	28.8	299.6	53.1	434	76

Source: Based on data from Bhalla and Glewwe (1985).

a. Food and total price indexes are from Bhalla and Glewwe (1985), which presents rates of inflation on an annual basis. Adjustments, however, had to be made to these rates in order to conform with the period of the survey. For the January–February 1973 survey, special tabulations done by the Department of Census and Statistics were used. For the annual surveys, the price index corresponding to the survey months has been computed under the assumption that within each survey year monthly price increases occur at a constant rate.

b. Expenditure data are written as rupees per capita per month.

c. Food expenditure data are exclusive of alcohol, liquor, and tobacco. Expenditures prior to 1978–79 have been adjusted to reflect market prices of subsidized items.

d. National accounts data are for calendar years. The price index for these years is as follows: 1970 = 100, 1973 = 151.5, 1979 = 323.6, 1981 = 524.4, 1982 = 570.9.

Table 9. *Food and Total Expenditures, Poorest 40 percent of Population*
(rupees per capita per month)

	Food		*Total*	
Year	*Nominal*	*Real*	*Nominal*	*Real*
1969–70	23.2	23.2	35.3	35.3
1973	24.0	18.9	35.5	27.9
1978–79	59.0	17.7	95.9	30.8
1980–81	97.4	20.0	136.4	29.7
1981–82	107.7	18.4	164.4	29.1

Source: Based on data from Bhalla and Glewwe (1985).

Note: In each survey, individuals were ranked according to per capita food expenditure. The price deflator is as reported in table 8.

Food and Total Expenditures from 1963 to 1981–82

Having cautioned against inferring trends from the 1969–70 data, one can now analyze the equity performance of the Sri Lankan economy. Tables 8 and 9 contain data from the six surveys conducted from 1963 to 1981–82.[31] Nominal and real levels of both food and total expenditures are presented for the population as a whole and for the poorest 40 percent of the population. This poorest 40 percent is determined on the basis of per capita food expenditures.

The national accounts data in table 8 show a peak in total expenditures per capita in 1970, with a decline of 10 percent in 1973 (and probably an even more severe decline in 1974 and 1975) and a recovery from 1978 onward.[32] The 1978 consumption level is 18 percent above its 1973 level, and the 1982 consumption level is about 7 percent above the 1978 level and 15 percent above the 1970 level. The survey data in table 8 show similar trends. As before, 1969–70 is observed to be a peak year in terms of food consumption.[33] If the transitory elements are excluded from the 1970 survey, however, then 1963 and 1970 represent almost equal food expenditures. As an alternative to adjusting for the bumper nature of 1969–70, there is some justification for using the 1973 survey as a basis for comparison. This survey was conducted in January and February 1973, before the oil and commodity price increases of 1973–74. Given the advent of a new government in 1970, the 1973 data might be more representative of trends under that government. With 1973 as the base year, no increase in

31. All nominal expenditures are deflated by the Bhalla and Glewwe (1985) DCS price index, which has been constructed with the help of the Department of Census and Statistics (DCS), Sri Lanka. The official Colombo Consumer Price Index shows unrealistically low inflation rates for 1970 to 1978. It registers an increase of only 65 percent in contrast to one of 170 percent given by the DCS index.

32. Unfortunately, the Bhalla and Glewwe DCS price index contains very rough estimates of price levels for 1971, 1972, and 1974–77.

33. Food balance sheet data support this conclusion. Sri Lanka's rice availability and total caloric intake in 1970 were higher than that of any year until 1983.

food consumption of the population as a whole is evident in 1978–79, although some increase is evident thereafter. Total expenditure figures suggest a 9–10 percent increase between 1973 and the early 1980s.

The results for the poorest 40 percent of the population given in table 9 follow the general pattern noted above. Total consumption in the early 1980s registers a 4 percent increase over 1973, while food expenditure increases by 6 percent from 1973 to 1980–81 but then declines by 8 percent in 1981–82.[34]

Thus, a general picture that emerges from tables 8 and 9 is that growth in national income has *not* been accompanied by a decline in the consumption of the overall population or of the bottom 40 percent.[35] Even the wealthiest 60 percent of the population, who lost the most with the introduction of the food stamp scheme, did not suffer a loss in food consumption; in real terms, their food consumption was Rs34 in 1973 and Rs36 in 1981–82 (using 1969–70 prices). As emphasized earlier, year-to-year fluctuations contain transitory elements which need to be removed before firm conclusions about trends can be drawn. The general pattern suggests that food consumption held steady during the years immediately following economic reforms and, more importantly, following the reduction or withdrawal of food subsidies. If national accounts data are utilized (and if the magnitude of measurement errors are similar for the bottom 40 percent and the rest of the population), then one finds that consumption levels for the poorest members of the population have increased since 1977.

One final point regarding trends in consumption in the pre-1977 and post-1977 phases: food expenditures, based on adjusted 1963 survey data, averaged Rs23.9 per capita per month.[36] This translates into Rs31 in 1969–70 prices, which is almost 11 percent higher than food expenditures observed in 1973 and higher than every subsequent year except 1969–70 and 1980–81. Although a detailed analysis cannot be conducted with the 1963 data, it does appear as if the 1963 to 1977 period did not witness any "trend" increase in consumer welfare as measured by food (or total) expenditures. Indeed, if anything, a decline is observed.

In summary, tables 8 and 9 indicate an *absence* of a decline in food consumption following the reduction of food subsidies and the implementation of the food stamp program in 1979. Employment gains, better targeting of food transfers, and the large expansion in rice output (and the corresponding decline in its relative price) are important contributors to the maintenance (if not an increase) of consumption levels.

34. Ideally, separate price deflators would be calculated for the bottom 40 percent and the total population. It is likely that the above changes in consumption for the poor are lower-bound estimates since the relative price of rice has been declining since 1979.

35. Different population groups within the bottom 40 percent (for example, estate workers) may show different trends.

36. The reported figure is Rs20.27 per capita. This figure, however, is adjusted upward to reflect market prices for subsidized rice.

Inequality in Sri Lanka since 1969–70: The Findings

Economists have often been concerned about the impact of economic growth on inequality *independent* of the impact of such growth on the absolute levels of living. The concern with inequality usually entails an evaluation of the distribution of incomes (for example, UNICEF 1985). Unfortunately, in most survey data, there is likely to be a larger variance and a greater bias (understatement) in reported incomes than in reported expenditures. Furthermore, permanent-income considerations would suggest that consumption is a better indicator of welfare than income. For both these reasons, consumption levels and consumption distributions are preferable indicators of equity.

The level of equity attributed to a particular distribution of income or expenditures is commonly measured by indicators which take the value of zero if the distribution is completely egalitarian and register larger positive values as the distribution becomes less equal. As measures differ in sensitivity to different types of inequality (for example, extreme wealth or extreme poverty), three measures of inequality were used. They are Theil's measure of inequality (T), Theil's second measure of inequality (L), and the variance of the logarithm of income or expenditures (LV).[37] They are defined as follows:

$$T = \sum_i \frac{Y_i}{Y} \ln\left(\frac{Y_i N}{Y}\right)$$

$$L = \sum_i \frac{1}{N} \ln\left(\frac{Y}{Y_i N}\right)$$

$$LV = \frac{1}{N} \sum_i [\ln(Y_i) - \frac{1}{N} \sum_i \ln(Y_i)]^2$$

where Y_i is the income of individual i, Y is total income, and N is the total population.

The use of expenditure data gives strikingly different results about inequality than those given by income data (table 10). Between 1969–70 and 1973, all income measures register a decline in the level of inequality. In contrast, two expenditure inequality measures (T and L) increase while the log-variance measure shows a slight decline. Between 1973 and 1978–79, all inequality measures for both income and expenditures show a worsening situation. However, after 1979, measures of income and expenditure inequality diverge. The three income measures show a continued deterioration of equity in 1980–81, and the T and L income measures indicate that this decline continued in 1981–82. The expenditure measures, however, show a marked improvement in equity between 1978–79 and 1980–81, with some reversal of this improvement in 1981–82.

37. For a detailed discussion of these measures and of the measurement of inequality, see Glewwe (forthcoming).

Table 10. *Income and Expenditure Inequality, 1969–70 to 1981–82*

Inequality measure	*1969–70*	*1973*	*1978–79*	*1980–81*	*1981–82*
Income					
T	0.2128	0.2029	0.3153	0.3211	0.4091
L	0.1774	0.1685	0.2410	0.2744	0.2888
LV	0.3028	0.2832	0.3818	0.4796	0.4362
Expenditure					
T	0.1811	0.2705	0.2888	0.1754	0.2249
L	0.1518	0.1718	0.2004	0.1517	0.1820
LV	0.2593	0.2463	0.3006	0.2674	0.3065

Sources: Consumer Finance Surveys, Central Bank, 1973, 1978–79, 1981–82. Socio-Economic Surveys, Sri Lankan Department of Census and Statistics, 1969–70, 1980–81.

Note: Larger values indicate a greater degree of inequality.

These results on expenditure inequality, together with those on absolute expenditure levels noted above, suggest that most sectors of the economy have shared in the economic growth that has occurred since the economic reforms of 1978. Clearly, too much should not be read into the figures on expenditure inequality. It is plausible that in recent years there has been a greater underreporting of expenditures (such as on durables) on the part of the rich than the poor. Allowance for this would increase the levels of inequality. According to a rough average of the 1969–70, 1973, 1980–81, and 1981–82 data, the survey figures (which are generally reliable) reveal a level of expenditure inequality in a targeted food stamp scheme which is not much different than that in a regime of universal subsidies. If the data on levels (tables 8 and 9) and inequality (table 10) are substantially correct, then they imply that growth has indeed trickled down; that is, food subsidies have been replaced by labor income.

IV. Conclusion

In this article, alternative methodologies of analyzing cross-country performance in terms of living standards were discussed. The methodology offered emphasized the inclusion of the role of initial conditions in evaluating country performances over time. Furthermore, the paper emphasized the importance of using consumer expenditure data, rather than the conventionally used income data, for analyzing changes in inequality.

The discussion in the paper was largely based on the Sri Lankan experience since 1960. Sri Lanka has had contrasting policies during the two time periods; direct equity-oriented policies were emphasized before 1977, while the post-1977 period has generally emphasized economic growth. It is of considerable interest, therefore, to evaluate the impact on living standards and equity of these policy changes.

In a cross-country comparison, Sri Lanka emerges as a country with relatively

high living standards in the late 1970s. This result, however, cannot be used to support the conclusion that Sri Lankan policies since 1960 (or even since independence in 1948) were responsible for this success. Comparison with other countries shows Sri Lanka to be relatively exceptional in 1960, 1948, and perhaps even earlier.

The results regarding the comparative part of this study are as follows. It was demonstrated that the conclusion pertaining to Sri Lanka's "exceptional" status in the mid-1970s may have resulted from a methodology which ignored the important effect of initial conditions. When such initial conditions are incorporated into the analysis, a different result emerges—Sri Lankan performance in terms of achievement of living standards is observed to be comparatively nonexceptional for the time period from 1960 to 1973. Since large increases (and levels) in social welfare expenditures are observed in Sri Lanka during the post-1950s period, the results suggest that the direct approach for increasing welfare was not particularly effective from 1960 to 1978. Indeed, it was noted that since 1977, living standards of the poor and the population in terms of two important indicators—primary school enrollment and infant mortality—have increased at a *faster* rate than was the case from 1960 to 1977.

While it is beyond the scope of this article to study the causes of growth (or lack thereof) in the pre- and post-1977 time periods, it is apparent that the two policy regimes—1960–77 and 1977–84—show different results regarding economic growth. In the latter period, economic growth more than doubled, and all the major sectors (agriculture, industry, and services) participated. Further, employment gains from 1977 to 1984 were large, and in 1981–82 the unemployment rate was at a historic low.

Available data on household expenditures suggest that expenditure levels of the population have also increased from those observed in the pre-1977 years. Furthermore, inequality in expenditures in the early 1980s was not much different than that observed during the large government expenditures and food subsidy regime of the early 1970s. In addition, the poor (defined as the bottom 40 percent of the population) have not lost with the introduction of economic reforms. Food and total expenditures of the poor are above those observed in early 1973. This result is encouraging, for it suggests that the poor may have been somewhat compensated for their loss in government transfers through increases in jobs and income.

In the introduction, two contrasting approaches to raising economic welfare were noted—the direct or basic needs approach and the indirect or economic growth approach. While it is unlikely that a government can (or should) take either of the extreme alternatives, the nature of the appropriate mix is also unknown. At the risk of exaggeration, the pre-1977 Sri Lankan economic regime may be characterized as an extreme version of the direct approach. This study shows that the results are not very encouraging; the period is characterized by little per capita growth, nonexceptional improvement in living standards, and little (if not negative) change in food and total expenditures.

The time period subsequent to 1977 may be labeled (again in an exaggerated manner) as a "growth only" phase. Food subsidies were administered through a more efficient, targeted food stamp program and were only gradually decreased over the years. Furthermore, the growth was of a labor-intensive kind. Thus, this phase was not as onerous as it could have been. The analysis suggests that it also produced positive results. Food consumption was maintained, per capita consumption expenditures increased, strong economic growth was initiated and maintained, and there are indications that living standards have improved. Much more can, and will, be learned from the interesting Sri Lankan experience; the evidence examined in this paper, however, suggests that the post-1977 policies have not been detrimental to equity objectives and may offer more promise than those which they replaced.

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