

**Regional Project To Overcome Poverty in Latin America
and the Caribbean (RLA/86/004)**

**SOCIAL PROGRESS INDEX.
A PROPOSAL**

DE 138

**Meghnad Desai
Amartya Sen
Julio Boltvinik**



2.4. The purpose and alternatives for a social progress index.	35
2.5. The social progress index as a measure of the development process.	37
2.6. The social progress index as a measure of the objective of development.	42
2.7. Social progress index as both a measurement of the development process and its objective.	44
2.8. Available resources and their distribution. Further issues on measurement.	44
2.9. Some preliminary calculations on an index of the development process.	46
References to chapter 2.	52
Statistical appendix to chapter 2	54
3. WELL-BEING AND LIFETIME DEPRIVATION: A PROPOSAL FOR AN INDEX OF SOCIAL PROGRESS.	
<i>By Meghnad Desai.</i>	67
3.1. Introduction.	67
3.2. Measures of development: income and alternatives	68
3.3. Potential lifetime.	73
3.4. Consumption gap/second step towards an index.	76
3.5. Measures of well-being and deprivation/third step.	83
3.6. The poverty debt: an aggregate measure of deprivation.	90
3.7. Addendum	93
References to chapter 3.	94

INTRODUCTION. AN OVERVIEW

Julio Boltvinik

A. THE PREVALENCE OF PER CAPITA GDP AS THE DEVELOPMENT INDICATOR.

More implicitly than explicitly, growth of per capita GDP has, in practice, become the universal evaluation criterion and the sole and exclusive objective of development.

Growth of per capita GDP as the sole objective of development, produces serious distortions in it, such as: the concentrating and excluding character of development oriented towards greater production without regard for what is produced, how, and for whom it is produced.

The predominance of per capita GDP is explained by the following: 1) In economic systems based on the production of exchange values, needs (related to use values) are disregarded or their basic or non-basic nature is ignored. 2) GDP weighs individuals according to their income, and goods and services according to their price, in accordance to the direct and apparently objective way in which the real world values them. The theoretical scale of GDP and the practical real life scale are the same. 3) GDP is not an alien way to measure development for politicians or the average citizen. 4) In addition, GDP is a synthetical expression which forms part of the coherent conceptual scheme of national accounting.

The failure of alternative development indicators may be explained by the absence of the same attributes which make for GDP's success. These indicators emphasize qualitative aspects and basic needs. Their weakness, and potential strength, lies in their denial of the logics of exchange value and their nearness to democratic logic that grants one person one vote. These alternative indicators usually have the following drawbacks: 1) When they arrive at a single figure, it is usually expressed in artificial units (indexes). 2)

With regard to its conceptual framework: i) it is not always explicitly formulated, ii) it doesn't have the internal consistency of national accounting, and iii) it does not generate the same degree of consensus.

B. CHARACTERISTICS OF THE SOCIAL PROGRESS INDEX.

Alternative development indicators may be of two types: Those oriented to stand side by side with GDP, and those which seek to substitute or complement it in an integrated fashion. Indicators of the first type -which include the majority proposed up to now- perpetuate the separation of the economic and social domains, of production and consumption. Its adoption at a national or international level would reinforce the separation of economic and social policies. The struggle to develop indicators of the second type and to substitute the "economicist" GDP for an integrated "societal" development indicator, seeks to overcome the dichotomy between economic and social realms and to guide the development process towards collective welfare.

An indicator of this type should take into account the two basic dimensions of the development process: The man-nature dimension and the man-man dimension. While the first dimension indicates human ability to obtain what it needs or wants from nature, the second pinpoints to how the product is distributed among participants in the production process, according to the rules derived from productive organization and property rights.

In turn, these dimensions are related to individual and social welfare, or human development, the ultimate goal of development.

In what follows we consider the construction of a social progress index (SPI) with the following features: 1) It provides an account of the degree of development socially achieved, as expressed by the goods and services available to satisfy human needs, by equity in their distribution and by the effort required to generate them. 2) It is a synthetic calculation of the quantity and quality of life (QQL), as a basic measure of welfare. 3) It seeks to become a synthetic expression of a social accounting system. 4) It is expressed in measurement units handled by the population in everyday life, thus allowing it to be generally adopted by society.

C. THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE DEVELOPMENT PROCESS. (Opportunity set).

GDP per capita is an approximation to the average amount of welfare means available in a given year. Any development indicator should reveal what GDP -despite its limitations- reveals: how far have we departed from the realm of scarcity into the realm of abundance.

On the other hand, GDP per capita has the following limitations: a) it only records those welfare means which can be transacted in the market, leaving

aside among others, all goods and services produced by domestic work; b) conversely, it records commodities such as weapons, which can hardly be considered as a means of welfare; c) the valuation of goods and services reflects all the biases of its markets, including externalities; d) in referring only to one period, it does not take into account interdependencies over time and, above all, it does not reflect socially accumulated welfare means (social assets); e) it does not take into account the social distribution of available means.

If GDP per capita is corrected along the lines of the first three limitations, we obtain GDP^*c , which would constitute a good indicator in the man-nature dimension: expressing the annual flow of welfare means per person.

Besides, human needs vary with age, sex, type of activity and other personal characteristics. The definition of adult equivalents has given rise to a specialized literature. From the perspective adopted here, not only should needs expressed in mercantile terms be considered for the calculation of equivalents, but also those that are not. We could thus express GDP per equivalent adult (GDP^*e) instead of per capita, thus approaching an expression of the flow of available means in relation to the "unit of needs."

However, inasmuch as human effort is required to produce goods and services, every society, every household and every person has to choose between producing more goods and services or having more free time for resting and for recreation. GDP^* per equivalent unit (GDP^*e) must thus be corrected by labour time required for its generation; alternatively, its complement, free time, constitutes, in addition to available means, an indicator of the degree of development in the man-nature dimension.

In the man-man dimension, the development process should be measured according to equity, which may be expressed with an indicator of the distribution of means of welfare and free time among the population. A commonly used indicator is the Gini coefficient.

In summary, the social progress index as a measure of development, refers to: 1) GDP per equivalent adult corrected by including non-mercantile production, externalities, price biases and by eliminating means of destruction and the like; 2) these available means may be corrected by the relative labour time required to produce them, or else, include an indicator of available free time; 3) elements 1 and 2 together constitute the indicator of the degree of development in the man-nature development dimension; 4) equity in distribution (1-G), where G is the Gini coefficient, constitutes the indicator in the man-man dimension. Both dimensions are combined in a multiplicative format as is shown in table 1.

The development process determines greater opportunities for human development to the extent that: 1) the volume of available goods and services per person is greater; 2) free available time per person is greater; and 3) the distribution of means and free time among the population is more equitable.

Table 1
**COMPONENTS OF THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE DEVELOPMENT PROCESS
(OPPORTUNITY SET)**

DIMENSIONS OF THE DEVELOPMENT PROCESS	COMPONENT	BASIC INDICATOR		OBSERVATIONS	COMPOSITE INDICATOR
		DESCRIPTION	NOTATION		
MAN-NATURE	Available means	Corrected GDP per equivalent adult	GDP^*e	Corrections for: <ul style="list-style-type: none"> • price biases, etc. • inclusion of non-mercantile means. 	$GDP^*e \cdot I_{ft}$
	Free time or Required labour time	Index of average free time in relation to standard Index of required labour time in relation to standard	I_{ft} I_w	I_{ft} and I_w are alternative indicators	
MAN-MAN	Equity with respect to means and free time	Equality index	1-G		$1-G_{ft}$ $1-G_{ft}$
GLOBAL VISION (MAN-NATURE & MAN-MAN)	Opportunity set for social progress	Equalitarian equivalent of available means and: a) free time equalitarian equivalent b) adjustment with free time index c) adjustment with labour time index			a) $[GDP^*e(1-G_{ft})] [I_{ft}(1-G_{ft})]$ b) $GDP^*e(1-G_{ft}) I_{ft}$ c) $GDP^*e(1-G_{ft}) / I_w$

**D. THE SOCIAL PROGRESS INDEX AS A MEASURE OF WELFARE.
(Achievement set).**

Opportunities are not automatically transformed into welfare. Production capacity can be used to produce arms. Free time may be used in passive, non-constructive activities. The private and social allocation of available resources -income and time- is not neutral in terms of human welfare. The qualitative composition of GDP among different use values and, therefore, the degree of relative satisfaction of one need or another is not irrelevant for human development. Those societies which dedicate a higher percentage of their resources to basic goods and services (food, education, health care, housing, basic sanitation, etc.) will have, under equal circumstances, higher levels of welfare. Although this depends on the social distribution of income, -the greater equality is, the higher the concentration on basic goods- it also depends on the role and composition of government consumption and investment, as well as on prevailing life-styles in society. If the social objective is (or should be) welfare, there are societies (and families) more efficient than others in transforming resources into welfare. This efficiency is a function of variables such as the ones we have enumerated above.

Tables 1, 3 and 4 show how the measurement of social welfare has been approached. The first step has been to define two dimensions of welfare: quantity of capable life and quality of life.

A central aspiration of all human societies is the preservation and prolonging of life. The social progress index includes longevity of individuals as a basic element.

The way to measure this is through the concept of proportion of life potential realized in capable conditions. On the one hand, future life expectancy is defined, FLE, the years a person still has left to live, given his age, and future life potential, FLP, the years that, ideally as a social aspiration, he/she should have left to live. The ratio between FLE and FLP (FLE/FLP), expressed as R, is an achievement indicator: how close he/she has come to the ideal of longevity (table 2).

However, mere longevity is not a very precise welfare indicator. A better one would be "capable-longevity": the number of years in which the individual can perform as a full human being using his capabilities. The probability of being a partially or totally useful member of the community is defined as S. When S is equal to one, all years lived count fully. When S is lower than 1, we subtract the years of "total incapacity" from FLE. We thus arrive at Rs, which expresses the proportion of life potential lived in conditions of total or partial capacity (table 2).

Quality of life is conceptually approached by welfare (deprivation) associated with the degree of satisfaction of basic needs, which implies favouring these needs in our conception of standard of living.

Table 2
QUANTITY OF LIFE
THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE OBJECTIVE OF DEVELOPMENT
(ACHIEVEMENT SET)

COMPONENT	BASIC INDICATORS		EXPLANATION AND COMPOSITE INDEX	DEFINITION OF ADDITIONAL NOTATION
	DESCRIPTION	NOTATION		
LONGEVITY: PROPORTION OF LIFE POTENTIAL REALIZED	Future life expectancy as a proportion of future life potential	$R_j = \frac{FLE_j}{FLP_j}$	$FLR_j = E_{a-a}, FLP = T - a$ $R_j = \frac{E_{a-a}}{T - a}$	a, Individual's current age E_a , Age conditional life expectancy T , Standard longevity
CAPABILITY	Probability of being (totally or partially) capable	S_j	$0 \leq S_j \leq 1$	
CAPABLE LONGEVITY	Proportion of life potential realized in capable conditions	R_{sj}	$R_{sj} = \frac{E_{a-a}}{T - a} (S_j)$	

The practical application of this approach is very similar to the one used for the measurement of poverty: the combination of the unsatisfied basic needs (UBN) and of the poverty line (PL) methods. As with poverty, we start off reaffirming that the satisfaction of basic needs in a household depends on: a) **current private consumption** to provide for those goods and services which are attended by such a channel; b) **rights of access** to government services (water, sewerage, medical care, education); c) **property or possession** of assets that provide basic consumption services (housing, household equipment, etc); d) **knowledge and skills**; e) **available time** for leisure, education and recreation.

To take these five dimensions into account we proceed in the following manner: a) We consider current household consumption as an initial variable instead of current income, implicitly considering the existence of other assets which allow the household to dissave (or to increase debts), in order to meet needs. Thus far, similarity is with the poverty line method. b) Rights of access to public services, ownership of basic consumption assets and acquired educational levels shall be dealt with on an ordinal scale. c) Available time for education and recreation may also be dealt with on an ordinal scale, directly verifying the satisfaction-unsatisfaction of educational (school attendance) and recreational needs, or by quantifying free time, expressing it as an index in relation to a standard, and multiplying the result by current consumption. The first option has been adopted here.

Items b) and c) are qualified binarily in poverty studies, scoring 0 to those who comply with or exceed the standard, and 1 to those who do not (basic need is unsatisfied). In the present case, in which we also have to take into account those households and individuals above the standard, we need to widen the scale including, for example, those very much above the standard with values of -1. Likewise, we may include intermediate values such as 0.5 and -0.5. Individual scores in specific needs are termed d_{ij} . (Table 3).

Next step is to build a synthetic indicator of UBN deprivation for every household, D_j , as the weighted mean of scores obtained for each need (d_{ij}). The poorer households will be deprived in one or several needs and their average, D_j , will be positive; the more acute and numerous deprivations are, the closer to 1 will D_j be. A household with D_j equal to 0 may be one that is at level with the standard in every need, or one that has some unmet needs, compensated with situations above the standard in other satisfiers. Non-poor households, which may include households with deprivation in some needs overbalanced by above standards in others, will have a negative D_j (which reflects welfare). (Table 3). Note should be taken that this already establishes a difference with the IPM method where deprivation in any need is regarded as poverty. This is derived from the fact that in IPM no weighted mean of scores is obtained and the minimum score (d_{ij}) is zero.

To combine within a household the scores of various needs we may choose among four weighing criteria: a) the percentage of the population that is not deprived, which expresses the relative importance society grants to each need and also the subjective feeling of relative deprivation; b) the relative costs of achieving satisfaction of each need; c) one that reflects social goals, even if they have not actually been achieved; and d) one that reflects public opinion on the necessary nature of goods and services in question. In order for D_j to range also from -1 to 1, the sum of weights must be 1. (Table 2).

Current private consumption should not only include goods and services purchased but also: a) those produced and consumed within the household (food cooking, child care, upkeep of clothing, self-consumed foodstuffs, etc.) and b) transfers in kind received in areas which have not been considered in the ordinal scale (like food). We need a working definition of standard consumption, C_j^* , or poverty line, as well as information on current private consumption, C_j , of households. The individual situation with respect to private consumption is expressed by the comparison of observed consumption, C_j , in relation to C_j^* . While most observed data is referred to households, it is necessary to transform it to individual data, which constitutes our unit of analysis.

To combine the dimension of current private consumption with that of satisfied-unsatisfied specific needs, we multiply current consumption, C_j , by $1-D_j$, before comparing it to C_j^* . When D_j is positive, $C_j(1-D_j) < C_j$, when D_j is zero, $C_j(1-D_j) = C_j$, and when D_j is negative, $C_j(1-D_j) > C_j$. The value of $C_j(1-D_j)$ shall be called global consumption and denoted as C_j^* . We should note that C_j^* , from now on, is the poverty line plus the fulfillment of each standard for specific basic needs, i.e. when $D_j = 0$. Thus, the global satisfaction indicator is $(C_j - C_j^*)$, denoted S_g .

Welfare (w_j) derived from global consumption takes on negative values (deprivation) for the poor ($C_j^* < C_j$) and positive ones for the non-poor ($C_j^* > C_j$). Among the latter we should bear in mind that one extra unit of consumption does not have the same welfare value at low consumption levels as it does at high levels: this can be seen in figure 1 (the mathematical expression may be found in table 4). Between 0 and C_j^* , welfare is negative and changes proportionally with global consumption; from this point on, welfare is positive, but marginal welfare (the slope of the curve) decreases as consumption becomes greater.

We now have our quantity of life indicator, R_{sj} , and our quality of life indicator, w_j , which results from the comparison of global access to resources by a household, C_j , with the standard minimum resources, C_j^* , and from a specific welfare function applied to each range up to his level of resources. We can now combine both dimensions to obtain our quantity and quality of life index (QQL).

Table 3

THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE OBJECTIVE OF DEVELOPMENT
QUALITY OF LIFE. INDIVIDUAL SATISFACTION OF NEEDS
(PARTIAL ACHIEVEMENT SET)

COMPONENT	STANDARD	BASIC INDICATOR		NOTES
		DESCRIPTION	NOTATION	
1. PL needs	Poverty line, calculated by household, is expressed in per capita terms (C_j^*)	Current private consumption of households, in per capita terms, (C_j) is compared with per capita poverty line (C_j^*)	$S_{pl} = (C_j - C_j^*)$ $C_j = C_j^*$, meets needs $C_j < C_j^*$, poor $C_j > C_j^*$, non poor	Spl. satisfaction of PL needs. Similarity with PL method. In this case, however, C_j and C_j^* are determined for all (poor and non-poor).
2.1 UBN needs. Need by need analysis	For each need, or satisfier, a specific standard is set $d_j = 0$	Scores (d_{ij}) are determined for each household or individual (i) and for each need (j). Standard score is zero, and its range is from -1 to 1. Individuals receive household's scores	d_{ij} , score obtained by individual j in need i $d_{ij} = 0$, at standard $d_{ij} > 0$, below standard $d_{ij} < 0$, above standard Standard is defined as $d_j = 0$	Similarity with UBN method. In this case, however, binary scores are broadened. All households (and individuals) are scored.
2.2 UBN needs aggregation	At standard in every need, or zero overall score: $D_j^* = 0$ $(1-D_j^*) = 1$	Synthetic indicator of deprivation (D_j) is a weighted average of scores in specific needs (d_{ij}). Thus, achievement indicator is $(1-D_j)$	$D_j = \sum_i h_i d_{ij}$; $\sum h_i = 1$ $D_j^* = 0$, standard $-1 \leq D_j < 0$, above standard $0 < D_j \leq 1$, below standard Subn = $(1-D_j)$	h_i , weight for need i For weighing criteria see text. Subn, Satisfaction of UBN needs
3. PL and UBN needs (global satisfaction)	$(1-D_j^*) = 1$ Thus, $C_j^*(1-D_j^*) = C_j^*$	Observed private consumption level, C_j , is modified by multiplying it by achievement indicator $(1-D_j)$	Combined standard = C_j^* (see column 2) Global consumption: $C_j = C_j(1-D_j)$ Global satisfaction indicator: $S_g = C_j - C_j^*$	S_g , global satisfaction of needs (UBN and PL). S_g cannot be aggregated directly. First it has to be transformed into welfare

Table 4

THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE OBJECTIVE OF DEVELOPMENT QUALITY (INDIVIDUAL AND SOCIAL WELFARE) AND QUANTITY OF LIFE. (ACHIEVEMENT SET)

COMPONENT	STANDARD	INDICATOR		NOTES
		DESCRIPTION	NOTATION	
4. Individual Welfare (Quality of life)	Welfare is zero when $S_g=0$ $w_j=0 \mid C_j = C_j^*$	Welfare is a step function of global satisfaction, S_g . Below standards ($C_j < C_j^*$) it is negative (deprivation). Above standards it is positive but increases less than proportionally - by steps - with growing S_g .	$w_j = f(C_j - C_j^*) = f(S_g)$ $w_j = S_g$ $w_j = 2S_g / 3$ $w_j = 3S_g / 3$ $w_j = nS_g / n$ $C_j \leq C_j^*$ $C_j < C_j^* \leq 2C_j^*$ $2C_j^* < C_j \leq 3C_j^*$ $(n-1)C_j < C_j \leq nC_j^*$	Each individual's welfare is calculated applying the corresponding welfare function to each range of his C_j , thus obtaining all w_j
5. Social welfare (Quality of life)	$W \geq 0$	Social aggregated welfare, W is the algebraic sum of (positive and negative) individual's welfare. Per capita welfare is obtained by dividing W by population.	$W = \sum w_j$ $W_c = W/n$	n , population
6. Quality and quantity of life: lifetime welfare (individual and social)	$R_{sj}=1$ $C_j=C_j^*$ $LTD=0$ Social Standards $LTD>0$ Standards $QLL>0$	By integrating quantity of life indicator, R_{sj} , with quality of life indicator, w_j , in a multiplicative format one obtains lifetime welfare or lifetime deprivation. Social LTD and LTW are the sum of individual indicators.	$ltd_j = R_{sj}(C_j - C_j^*) \mid C_j \leq C_j^*$ $LTD = \sum ltd_j$ $LTD_c = LTD/q$ $ltw_j = R_{sj}w_j \mid C_j > C_j^*$ $LTW = \sum ltw_j$ $QQL = LTD + LTW$ $QQL_c = QQL/n$	LTD can be interpreted as lifetime poverty debt. LTD, divided by q , number of poor, gives lifetime poverty debt per poor. Algebraic sum of LTW and LTD gives the final indicator, QQL, expressed in monetary terms.

Figure 1
WELFARE EVOLUTION AS A FUNCTION OF NEEDS SATISFACTION DEGREE

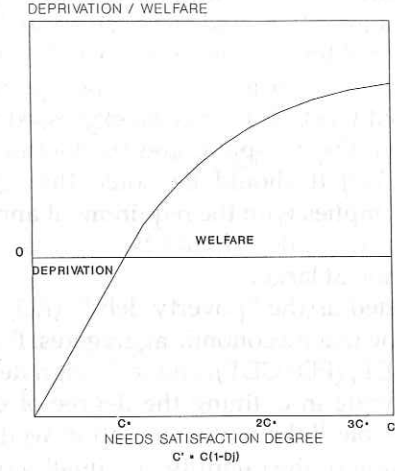
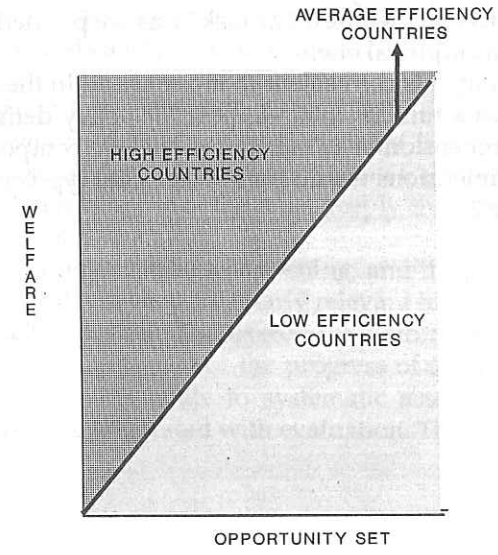


Figure 2
SOCIAL PROGRESS INDEX OPPORTUNITY AND ACHIEVEMENT SETS



The simplest and most obvious way is to multiply w_j by R_{sj} , obtaining $ltw_j = R_{sj}w_j$. In this expression, lifetime welfare (ltw_j) is a modified expression of welfare observed over a given period, according to the proportional achievement in the quantity of life. Since welfare is negative for the poor, it can be denoted as D , deprivation, and the product as ltd_j , lifetime deprivation: $ltd_j = R_{sj}D_j$. Aggregated lifetime deprivation and welfare (LTD and LTW) are obtained by aggregating over all poor and non-poor households respectively. Thus, at the social level, QQL may be expressed as the algebraic sum of lifetime welfare for all the non-poor, and the lifetime deprivations of the poor, ($QQL = LTW + LTD$) It should be noted that QQL is expressed in monetary terms. This complies with the requirement announced at the beginning of this section that the index should be expressed in every day units, handled by the population at large.

LTD can be interpreted as the "poverty debt", (PD), and may be expressed as a proportion of the macroeconomic aggregates. Particularly interesting are its proportions to GDP, (PD/GDP), and to foreign debt, (PD/FD).

Progress has been made in defining the degree of development; we explored some of its possible links with population welfare; and, finally, we advanced in the definition of the quantity and quality of life. Thus, we have an index of the degree of development and an index of quantity/quality of life. A detailed analysis of both components should determine the links between the set of opportunities for social welfare and the actual fulfilment of welfare in the quality/quantity of life index, i.e. the links between the opportunity set and the achievement set. The task is, as we pointed out before, both a theoretical and an empirical one.

For the time being, it is convenient to move ahead in the quantification of both components as a fundamental support for policy definition and to advance in the comprehension of links between the two components. The quantification of both dimensions would permit an initial typology of countries as illustrated in figure 2.

1.

PROGRESS AND SOCIAL DEFICIT: SOME METHODOLOGICAL ISSUES

Amartya Sen *

1.1. INTRODUCTION

"He gave man speech, and speech created thought, /Which is the measure of the universe" (*Prometheus Unbound*, II, iv, 72). That statement of Shelley is not only characteristically poetic, it also gives expression to one of the profound truths about measurement and evaluation and consequently even about indexing. Any exercise of measuring and indexing is ultimately one of thought, analysis and judgement, and not just of observing, recording and chronicling.

A social progress index, if one is to be found, will have to be based on judgments that we can defend – regarding what is important and what is trivial. It cannot but address the nature of human deprivation and predicament, and it must invoke some of the most deeply cherished values about enhancing the quality of human life.

We observe a variety of things happening, and the job of a "measure" or an "index" is to distill what is particularly relevant for our purpose, and then to focus specifically on that. The exercise is nothing short of providing a reasoned basis for the appraisal of the progress of a society. The central issues in devising an index relate to systematic assessment of importance. Measurement has to be integrated with evaluation. This is not an easy task.

* Lamont University Professor. Harvard University. Note written for the Regional Project to Overcome Poverty in Latin America and the Caribbean, UNDP.

1.2. THE NEED FOR INDICATORS

What is the necessity of undertaking such an exacting and ambitious exercise? The basic reason is clear enough. Changes in a society are always judged –both by planners and by critics– by using some explicit or implicit criteria. These yardsticks have a crucial role in deciding how well things are going, what else should be done now, and what demands should be placed on the government and other responsible bodies.

Economic evaluation, planning and policy-making have tended to be tremendously influenced by some simple and rather narrow measures of progress. The growth of GNP per head is the most widely used measure, and it is spectacularly limited in its focus of attention. It concentrates on commodities rather than people, and provides a remarkably misleading indicator of progress. For example, countries like South Africa or Oman could have many times the GNP per head of, say, Sri Lanka or China, and still have much lower longevity, higher morbidity and more widespread human deprivation than the latter countries [on this, see Amartya Sen (1988)] Unless the focus of attention is shifted to those features of human society that are really important –primarily the lives that people can lead– there is constant pressure to direct planning and policy making in less momentous and more inconsequential directions. Misleading indicators lead to mistaken policies.

It is in this context that one can fully understand the demand of the Regional Conference on Poverty in Latin America and the Caribbean, held in 1988 in Cartagena, that the participating countries should “contribute to the initiative of gathering, analyzing, and publishing on a regular basis, a set of basic social development indicators and to issue a periodical report on the social conditions in Latin America and the Caribbean”. The project is not only important for the information and illumination it would provide if successful, but also for the contribution it could make to better policy making and to more productive discussion of what should or should not be done.

1.3. WHY ONE INDEX?

The demand for appropriate indicators is a broad one, and must not in general be confused with searching specifically for some *one* “social progress index”. Indeed, given the breadth of our concerns and values, it should be obvious that no *one* index –composite or otherwise– can possibly do justice to the task of representing all the relevant features.

In this context, it is useful to distinguish between the demands of *comprehension* and those of *emphasis*. If one index is selected among a class of relevant indicators, the intention cannot reasonably be to supplant the entire class altogether by that one index. After all, how much information can one

number give? If it does justice to our concern A, it cannot –except by accident– do justice to our concern B at the same time.

The real issue is one of *emphasis*. A selected, distinguished index of social progress can help to focus attention specifically on what may be thought to be the most crucial aspect of the lives of human beings in the society in question. It cannot possibly represent many things simultaneously –that is not its purpose anyway. The entire exercise is one of complementing a broad comprehension (using a variety of indicators) by a specific and focussed emphasis (using the distinguished index).

As it happens, the GNP per head already plays that focussing role in discussions of economic and social development. Any “social progress index”, if it is to be successfully used, must be involved, to some extent, in a confrontation with the GNP per head. The proposed index must be seen as providing an alternative focus to that presented by the ubiquitous gross national product (and related measures such as real national income and gross domestic product).

1.4. COMPOSITION OR SELECTION?

There are two ways of thinking about choosing a distinguished index as a focal indicator. One is that of “averaging” (in the broad sense), that is, to look for a number of indicators and then get one “composite index” out of it by some device of putting the different indicators together, with specified relative weights. The other approach is that of “discrimination”, that is, selecting some particular indicator –or some variant of one– that is important in itself and that may, indirectly, help to represent a few of the other concerns as well. While the former approach attempts to be broad and inclusive, the latter is geared to choice and discernment.

Various composite indices have indeed been proposed in the literature [See for example J.P. Grant (1978) and M.D. Morris (1979)]. The merits of that approach are clear, to wit, the ability to combine various concerns. On the other hand, in so far as some kind of an average –weighted in some particular way– of the different indicators is taken as the value of the composite index, it need not reflect well *any* of the particular indicators, since all are modified and diluted by the force of the *other* indicators. To preserve the influence of all may be to undermine the influence of each.

The approach of discrimination proceeds by choosing a specific focus and deliberating ignoring other variables (judged to be less important). Its main merit is clear enough, viz, concentration, and it tries to catch the full force of the chosen perspective. Its main defect is no less obvious, to wit, being narrow, possibly even arbitrary. The variables other than the chosen one are not represented at all in the general index – at least not directly.

The choice between the two perspectives need not, however, be as stark as all that. First, it is possible to do some extensive pruning –eliminating many indicators as being of lesser importance-but not ending up with only one variable. The remaining variables –a few at most– may be then combined. In practice, the more successful composite indices have tended to rely on only a few chosen variables.

Second, if different variables correlate well with each other, then it may be possible to treat one variable as doing two jobs simultaneously, viz., (1) *directly* representing itself, and (2) *indirectly* representing the variables that are correlated to it. For example, if life expectancy correlates well –negatively– with morbidity rates, then life expectancy can (1) stand for itself, and (2) serve also as a proxy for the lowness of morbidity.

Third, our different concerns need not necessarily be primarily *competitive* with each other. For example, we may both value longevity *and* equality – both are much championed objectives (rightly so). The two will be in conflict if and only if equality refers to preferring egalitarian distributions of some variable *other than* life expectancy, e.g., incomes. If we are concerned both with (1) raising life expectancy of all, and (2) giving priority to raising the life expectancy of those who are worst off in this respect, then a *distribution-adjusted* indicator of life expectancy can serve both ends with appropriate relative emphases.

In practice a combination of selection and composition would almost certainly prove to be the right approach. But before this exercise is undertaken, it is important to understand the conflicting demands of the two strategies and to choose a combined position taking adequate note of those demands. In particular, we have to resist the presumption, which is often implicitly assumed, that the *more* the number of variables included in a composite index, the better a composite index it would be. A good index may be mainly unitary in focus (as GNP per head also is, in its own limited domain), with other influences brought in to provide some secondary supplementation.

1.5. ACHIEVEMENT OR SHORTFALL?

There are two ways of comparing performance with respect to any indicator, viz: (1) to compare the levels of achievement, and (2) to compare the levels of shortfall from some postulated maximum. The two would generate the same *ordering*, i.e., if A has higher achievement than B, then A also has a lower shortfall than B. In this sense the two are equivalent, and there is, it may be argued, no advantage in introducing the notion of shortfalls. In fact, since the maximal level that is postulated can well be arbitrary, it may even be thought that the shortfall approach is basically more problematic, without having any redeeming advantage.

However, the ordering of levels is not the only way of comparison. Some times we are concerned with percentage improvements, i.e., with proportionate growth. Indeed, that is how progress in GNP per head is standardly compared. In terms of percentage improvements, the level-achievement perspective gives rather different signals from that of shortfall-reduction. In so far as the achievement variable in question has a natural maximum, it may well be the case that as the maximum is approached, further improvement becomes more and more hard. Raising life expectancy at birth from 65 years to 75 years may be much harder in practice than lifting it from 40 years to 50 years, which may result from simple changes like the eradication of malaria or the use of vaccination against tetanus and other easily preventable ailments.

In terms of absolute change, both reflect the same enhancement, viz., an addition of 10 years in life expectancy. However, in the scale of percentage improvements, the *easier* move from 40 to 50 years looks much *bigger* (a 25 per cent rise) than the harder climb from 65 to 75 years (a 15 per cent increase). This surely is the wrong way round. If, on the other hand, we compare *shortfall reduction*, then the harder transformation is shown to be bigger in percentage terms. For example, if 80 years is taken as the maximal national life expectancy, then the change from 40 years to 50 years is an improvement of the shortfall by 25 per cent (a reduction from a gap of 40 years to one of 30 years), whereas that from 65 years to 75 years is an improvement of 67 per cent (from a gap of 15 years to one of 5 years). And that is certainly the right direction of comparison.

1.6. SOCIAL DEFICIT AND POVERTY DEBT

The shortfall perspective has another motivational advantage. Our condemnation of low performance is often related to our belief that a much better state of affairs can, in fact, be achieved, and in that critique the concept of a shortfall from some acceptable level is quite central. Indeed, the very notion of “deprivation”, manifested in various forms (including what are taken to be the basic ingredients of “poverty”), invokes the idea of a shortfall from some designated value (representing either adequacy, or acceptability, or achievability). Thus, the format of shortfall does have some merits both in terms of comprehension and emphasis.

Indeed, the shortfall perspective is a part of seeing social progress as the systematic elimination of social failures. The quality of life that people in a particular society can enjoy is an integral product of the way the society is organized. Social progress can be seen as the effective eradication of the major shortfalls to which the members of that society are subjected. If, for example, modern medicine and public health facilities permit the possibility of people having and expectation of life at birth of 80 years, and if nevertheless because

of the shortage of average income or of medical facilities. or due to inequalities in the distribution of incomes and facilities, members of a particular society end up having a life expectancy of, say 50 years, then there is a shortfall here of 30 years that social progress must deal with. An enhancement of life expectancy from 50 years to 80 years is social progress precisely because it is eliminating the deficit compared with what is *possible*, given modern science and technology and appropriate social arrangements. In this sense, the indexing of social progress may be seen in terms of eliminating social deprivation and shortfall. Use will be made of this deficit-based view of social progress in the chapters that follow.

Sometimes it is possible to express the social deficit in terms of equivalent income loss. This is not always a sensible thing to do, since money is not the measure of everything. However, such income-based indexing has an advantage in terms of focussing attention on the magnitude of the social deficit expressed in units that *communicate* easily (as income units tend to do). Such an approach will be tried in the chapters that follow.

However, it is important in that context to remember that while income may be used as the chosen unit of *expression*, the idea of social progress or social deficit cannot be seen adequately in terms of lowness of incomes only. For example, if the shortness of life expectancy is social deprivation, then that too must be incorporated in the measure of social deficit. While it is true that finding financial "values" of life and death must, in some sense, be wrong and vulgar [on this see John Broome, (1978)], it is possible to take some account of the shortness of human life even in calculating measures of poverty. In the specific context of finding usable indicators that point us in the right direction, getting broadly-focussed assessment of poverty, expressed in units of income, has some pragmatic advantages. The possibilities in this direction have to be explored within the limited context of that exercise*.

The idea of a "poverty debt" can also be raised in this context. Once again, the language of "debts" is not necessarily helpful in dealing with shortfalls in the quality of life, but in the context of modern economic concerns, that language has come to be very widely understood. That easy understanding has also helped to give priority to the goal of debt removal in practical policy discussion. But the magnitude of a country's international debt does not typically tell us very much about the size of the problem it faces in having to deal with other -possibly more important- objectives, such as the elimination of pervasive poverty.

The more palpable advantage of the monetary magnitudes in the figures of international debt has contributed to the visibility and preoccupation with

* These possibilities will be pursued in the next two chapters, written respectively by Julio Boltvinik and Meghnad Desai.

the removal of these debts. There is, thus some advantage, in the context of political and social dialogues, in seeing the commitment to poverty removal as a "poverty debt" - a debt that is "owed" by that society to the poor and the deprived in that society. Even though debts to commercial banks have a legal standing that the concept of "poverty" cannot possibly provide, the idea of poverty debt does still have normative force of a kind that social progress evaluation must not overlook. The moral and political obligations of the society extend beyond what is owed to Chase Manhattan.

1.7. PRINCIPLES AND PRACTICE

If the foregoing analysis is right, the use of a "social progress index" has to be seen:

- (1) as an exercise of *emphasis* that supplements a more comprehensive exploration,
- (2) as being based primarily on *selection*, supplemented by composition, and
- (3) as focussing on *deprivations* and shortfalls, leading to ideas of "social deficit" and "poverty debt".

The variables to be selected must be chosen both in the light of (1) their direct (or *intrinsic*) relevance to good living in a society, and (2) their indirect (or *associative*) relevance in terms of their correlates (i.e., connection with and the importance of other variables with which they correlate).

Since social progress is not a matter of average achievements only, we have to examine the *distribution-adjusted* values of the relevant variables, when that is possible. This makes the examination of inequality a central part of the exercise. Some times we have to go beyond this, and put the primary focus on the avoidance of deprivation or poverty, and perhaps even ignore the overall average levels of achievement.

Another major consideration is practical usability, and this relates particularly to the important issue of data availability. The concern here is not simply about the present situation regarding data availability, but must include an assessment of what data can become available if demanded. In the field of applied statistics, supply is often determined by demand (it is not surprising that this should be the case), and the demands that would be generated by the proposed "social progress index" will no doubt generate its own response. A distinction has, thus, to be made between the data that can be obtained if sought, and those that would be in practice impossible (or much too difficult) to acquire.

1.8. ILLUSTRATIONS

Consider a few examples of possible social progress indices*.

(1) *Distribution-adjusted life expectancy*: The importance of life expectancy rests primarily on the crucial role of longevity in good living. Living long –if the life is not intolerable– is itself a positive achievement. There is also little doubt that the opportunity to live long is one of the freedoms we value most, and as such life expectancy can be seen as valuable even from the point of view of the positive freedom of people. Further, while living long may not be the only objective we have, our other plans and ambitions may also be thoroughly dependent on our ability to have a reasonable span of life in which to carry out our projects. Longevity is an important means to many ends, even if it were not an end in itself. Finally, a number of other important variables correlate closely with life expectancy, e.g., adequate nutrition, good health and low morbidity. If life expectancy is chosen as an index, it can represent not only itself, but indirectly also parts of the force of these other perspectives which are associated with life expectancy. Thus the case for life expectancy lies in its (1) intrinsic importance, (2) its instrumental value, and (3) its associative characteristics.

On the other hand, the usual life expectancy figures are simple averages, and this is misleading. Some kind of distributive adjustment can be very useful in giving us an idea of the dispersion around the mean. The greater the inequality of the distribution of life expectancy, given the average life expectancy, the worse (we may judge) is the social situation. There are various ways of making distributional correction, and some formats will permit a simple multiplicative form involving the average life expectancy (e) and a measure of inequality (i), with the distribution-adjusted life expectancy being $e(1-i)$. [Some of the formal issues are discussed in Amartya Sen (1976a)]

(2) *Life expectancy shortfall*: This takes the difference of the achieved life expectancy from the value of a plausible maximum (m), so that it is given by $(m-e)$. Distributional corrections can also be made in this case.

(3) *Shortfall composition*: Even though life expectancy relates to other important indicators, we may wish to take direct note of other variables also, e.g., literacy and poverty. Suppose we take a poverty measure p (e.g. of the head-count variety, or some distribution-adjusted measure, the percentage of adult literacy t , and life expectancy e . [On poverty measures see Amartya Sen (1976b), James Foster (1984) and Meghnad Desai (1989)]. These can be rescaled to fix the likely ranges of variation, placing 0 and 1 accordingly. The average value of p, t and e will give a composite index. The weighting will be

* These are presented here as illustrations of the kinds of concerns that may be usefully reflected in the index of social progress and social deficit. For more specific development of a particular index, see chapter 3 below.

done in this case indirectly through the rescaling procedure, since the choice of 0 and 1 for each variable will control the impact of that variable on the composite index*.

Each of these variables can have distributional correction as well. The measure of poverty p can be itself distribution adjusted. The life expectancy measure can also be thus corrected to $e(1-i)$. Even the literacy figure may take note of inequalities in the distribution of literacy, e.g., between women and men.

These are only a few suggestions, and more alternatives have to be explored –and explored more fully– before we can really judge the adequacy and robustness of the respective claims to being a good “social progress index”. The task of confronting –and in part replacing– the ubiquitous GNP per head calls for a good deal of internal assessment first. That is the next step in this exercise.

1.9. SOME CAUTIONARY REMARKS

While the possible usefulness of indicators of social progress and of social deficit is not in doubt, it is important to distinguish between what it can be expected to do and what it must *not* be seen as doing. First, no index can supplant the necessity of detailed investigation of objectives and aims of social change and a fuller understanding of the complex values underlying social commitment. An index can help to focus attention on some particularly crucial concerns and can contribute to achieving an appropriate emphasis, but it cannot be taken as a substitute for more featured and more complete assessment of objectives and values. The acceptance of usefulness of an index must not be seen as a denial of the importance of many objectives that are not included in the index.

Second, an index of this kind is concerned with giving a pithy and precise expression to an important formulation of *objectives*. It must not be seen also as an expression –or assessment– of the *means* to achieve those objectives. Questions as to how a social progress indicator is to be promoted, or how a social deficit index is to be minimized, call for careful causal analysis involving economic, social and political investigation. The construction of the index is not aimed at providing guidance as to how best to *pursue* those objectives. For example, problems of incentives in particular systems, or the effectiveness of particular policies, are important exercises that supplement the development of good indicators of social progress and social deficit. An index is not a blueprint of policy, even though having a good index con-

* In UNDP's *Human Development Report, 1990* a similar combined index has, in fact, been used. Meghnad Desai and Amartya Sen had Technical Note 3 of this Report for the details of the procedure.

tributes to developing a good blueprint through better focussing on emphasized objectives.

Third, good indicators of social progress and social deficit can illuminate what a country is achieving and what remains to be done. If an index is used too mechanically, there is the danger that it can discourage rather than promote the pursuit of the underlying objectives. If, for example, international assistance is denied to those countries which do better in terms of social progress (on grounds that they need such assistance less), then that can provide some built-in incentive for the countries to go slow in enhancing those achievements. This is, of course, not a special problem only with indicators of social progress or of social deficit, and applies to any criterion of judging achievement. It is well-known, for example, that many governments have been keen on having their country shown as having a *low* -not high- gross national product per head, since a high figure can compromise their claims for help. This problem of perverse incentives is present with any indicator of accomplishment.

It is true that on grounds of equity, countries with low values of social progress may be entitled to more international assistance, if such assistance can help. On the other hand, on grounds of incentives, good efforts by a government to enhance the quality of life in that country should be appreciated and rewarded, rather than penalized. In particular, a government should not have reasons to feel that if it achieves a lot, then it would be cut off from assistance and international cooperation. This conflict between equity and incentives is, of course a central one in economic and social organization. While it is not unique to social progress indicators, the relevance of this conflict deserves clear-headed recognition, in deciding on national policies and international assistance.

In this context, the indicators of social progress or of social deficit can be usefully supplemented by indicators of "effort" on the part of the government in promoting social progress. This can be done in various ways. For example, one simple consideration may be the proportion of the national income, or of the national budget, that is devoted in particular socially beneficial ways (e.g., in promoting health and education). These and other indicators of governmental effort can be used to identify endeavour for better appreciation and recognition.

In developing good indicators, we must not end up discouraging good performance. This *need not* happen, but there is a danger here to guard against, and one way of preventing it from happening is to have a clear-headed awareness of this danger. Having indicators of effort to supplement indices of achievement can go a long way in removing this danger. The development of good indicators of social progress and of social deficit must be seen as one *part* of a larger exercise of intelligent pursuit of social progress.

To get the most out of a good social progress index we have to recognize its limitations and dangers as well as its contributions and advantages.

REFERENCES TO CHAPTER 1.

- Broom, John (1978). "Trying To Value a Life", *Journal of Public Economics*, 30.
- Desai, Meghnad (1990). "Poverty and Capability: Towards an Empirically Implementable Measure". Unpublished paper written for the Regional Project To Overcome Poverty in Latin America and the Caribbean - UNDP.
- Foster, James (1984). "On Economic Poverty: A Survey of Aggregate Measures", *Advance in Econometrics*, 3.
- Grant, James P. (1978). *Disparity Reduction Rates in Social Indicators*, Overseas Development Council, Washington, D.C.
- Morris, Morris D. (1979). *Measuring the Conditions of the World's Poor*, Oxford, Pergamon.
- Sen, Amartya K. (1976a). "Real National Income", *Review of Economic Studies*, 43, reprinted in Amartya K. Sen (1982).
- _____(1976b). "Poverty: An Ordinal Approach to Measurement", *Econometrica*, 46, reprinted in Amartya K. Sen (1982).
- _____(1982). *Choice, Welfare and Measurement*, Oxford: Blackwell, and Cambridge, MA.: MIT Press.
- _____(1988). "The Concept of Development" Chapter 1 in H. Chenery and T.N. Srinivasan, eds. *Handbook of Development Economics*, Amsterdam, North-Holland.

2.

TOWARDS AN ALTERNATIVE INDICATOR OF DEVELOPMENT

Julio Boltvinik*

2.1. INTRODUCTION

In this chapter I deal with various topics. First of all I start pointing out the reasons and consequences of the prevalence of per capita GDP as the unique indicator of development (section 2). As a contrast, in section 3 I explore some factors behind the failure of alternative indicators of development so far proposed to be generally adopted.

Having discussed these topics, I analyze the purpose and alternatives for a social progress index. This is done in section 4. First of all a distinction is drawn between alternative development indicators oriented to stand side by side with GDP and those oriented to substitute it or complement it in an integrated fashion. Arguments are given for rejecting the first type of alternative indicators and the rest of the chapter tries to develop some ideas on the second type of alternative indicators. To this end, the objective of development (human welfare or human development) is distinguished from the process of development. The position adopted at section 4 is that, ideally, a Social Progress Index should measure both the objective (outcome index) and the process itself.

Following sections (5, 6 and 7) discuss social progress index as a measure of the development process (section 5), as a measure of the objective of

* Technical Coordinator, Regional Project To Overcome Poverty, UNDP. The ideas herein contained are an exclusive responsibility of the author and do not reflect necessarily views of the Regional Project or of UNDP. I am grateful to Amartya Sen and Meghnad Desai for their commentaries and suggestions to the drafts of this chapter. The remaining errors are only my responsibility.

development (section 6) and as measurement of both (section 7). Section 5 is the chore of this chapter. It is complemented in section 9 by some preliminary calculations on the Social Progress Index as a measure of the development process.

This index is regarded as an expression of *social potential well-being* or as the social opportunity set. The specific index proposed defines the opportunity set in terms of: a) available means in relation to population needs (GDP per equivalent adult); b) relative required working time to obtain GDP (or its counterpart: available free time); and c) equity of distribution. These components are combined in a simple multiplicative form.

Section 6 is an anticipation of what is developed in chapter 3: the social progress index as a measure of the objective of development.

Section 7 brings together both measures, expressing well-being (or deprivation) as a function of the opportunity set, giving thus a perspective in which indices advanced in chapters 2 and 3 should be seen as forming an integrated whole.

Section 8 discusses some additional measurement topics both for available means and equity of distribution.

Finally, in section 9 some preliminary calculations of the opportunity set are presented. These calculations should be seen, together with those presented at the end of the chapter 3 as both ends of the functional relation discussed in section 7. Nonetheless, both of them are preliminary.

2.2. THE PREVALENCE OF PER CAPITA GDP

Amongst the anecdotes of planning in east european countries, Oskar Lange points to the case of furniture factories in one east european country. Production goals were defined, for furniture, as well as for other products, in tons. As incentives were related to goal-accomplishment, everybody tried to meet the goals. Oskar Lange writes that he had never seen pieces of furniture as heavy as those being produced in this country. Goals were accomplished and incentives were paid, but consumers paid the consequences. This anecdote illustrates the distorting effects on human activities when goals are biased or crude.

In a more implicit than explicit way, growth in GDP (or per capita GDP) has become, in practice, the exclusive, universal and unique objective and evaluation criterion of development. Failure or success of a policy is frequently judged exclusively by its effects on GDP growth.

This happens, paradoxically, in a period in which the need to use other development indicators is stressed more than ever, when a growing number of them is published and analyzed, and when composite indexes of well-being, quality of life, human development and the like are being proposed. Although nobody sustains explicitly the tenet that growth in GDP is the ob-

jective of development, in practice all of us seem to accept this tenet in one way or another.

In the same way in which furniture production goals expressed in tons biased their production towards very heavy pieces of furniture, GDP growth as the objective of development produces serious distortions in the development process. Amongst these

distortions it is worth mentioning the concentrating and excluding nature of development processes directed to produce more with no regard for what is produced and for whom it is produced. As luxury goods and arms contribute to GDP in the same way as food or housing, growth is taken to be as valuable when it takes the form of an expansion of arms production as when it consists of increases in food production. As valuable when income is highly concentrated as when it is spread over the population.

At this point in the argument we should address ourselves to two questions: Why has GDP attained such a predominance? Why have other development indexes failed to be generally adopted?.

Predominance of GDP, or per capita GDP, can be explained by:

- a) Economic systems which are based on the production of *exchange-values* tend to disregard *use values*. The quantitative dimension of value is overemphasized and the qualitative dimension of use values is underemphasized. In the same way, needs (related to use values) are disregarded or their distinctive nature (basic or non-basic) is ignored. GDP is a value sum, a sum of exchange-values. If a gun has a market price of 10 x and a loaf of bread a market price of x, the logic of exchange-values tells us that the gun is worth ten times the loaf of bread. Both commodities are weighted, within this logic, in GDP. One monetary unit in the hands of a millionaire is worth as much as in the hands of a starving peasant. Income of the poor and income of the rich are weighted in GDP taking each monetary unit with the same weight. Thus in great contrast with democracy, where each person has a single vote, in GDP a rich man has many hundreds of times more "votes" than the poor man.
- b) GDP's way of weighting people, goods and services (by their income or prices) corresponds with the practical, and seemingly objective way in which the real world values them. The theoretical scale of GDP and the practical scale of real life are the same.
- c) For the politician, for the businessman, for the common citizen, GDP is not an alien way of expressing development. As they regard their personal situation as better-off the bigger their income is, it is only natural they should regard the country as better-off when national income is bigger.
- d) Besides, GDP is a synthetic expression of the coherent conceptual scheme of national accounting; it is a disaggregable figure—in various

dimensions— which allows for composition and causal analysis; it is a single figure expressed in the same units handled by the population in their daily lives.

2.3. FAILURE OF ALTERNATIVE DEVELOPMENT INDICATORS

Let's now look at our second question. Failure of alternative development indicators reinforce GDP's predominance. Their failure must be attributed to the lack of those same attributes which explain GDP's success.

Alternative indicators of development have, in general, adopted the form of quality of life or human development indexes. In general, their emphasis is on qualitative aspects and on basic needs which, as we have seen, are not entirely in harmony with the nature of exchange-value producing societies, which reduce everything to the quantitative dimension of value, which can be expressed in money terms. On the other hand, these development indexes tend to weight individuals not by their income but in a more egalitarian fashion, as in democratic political systems where each individual has a single vote. Any proposal of this kind denies, in principle, that a gun is ten times as valuable as a loaf of bread and that a monetary unit in the hands of a millionaire is worth as much as the same monetary unit in the hands of a starving peasant. Their weakness lies, thus, in the fact that they deny the exchange-value logic of the economic system and propose a use-value logic in which certain goods and services, which are related to basic needs (or basic capabilities or functionings), are regarded as more important than those contributing to the luxury of the few, or those that are destructive by nature. Their strength lies, potentially, in the fact that they follow the democratic political logic which, everywhere, makes qualitative distinctions amongst goods and services, and weights each human being with the same (or similar) weight. In fact, the aim of evaluating development by an alternative indicator of this type has a greater purpose behind it: that development be guided by political democracy and not by the sole logic of exchange-value production.

Besides, these alternative indicators have the following disadvantages:

- a) When they arrive at a single figure, this is normally expressed in artificial units (index numbers) which do not correspond with the units of daily life.
- b) The conceptual background of these indicators, (1) is not always explicitly stated, (2) is not consistent in the way national accounts are, and (3) does not generate the same degree of consensus.
- c) The disaggregable and analytical properties of these alternatives are not as extended as those of national accounts.

2.4. THE PURPOSE AND ALTERNATIVES FOR A SOCIAL PROGRESS INDEX

Having thus answered the preceding questions, now we should go on and propose an alternative indicator of development that has the possibility of "dethroning" GDP or GDP per capita. Can we overcome the weakness of previously advanced alternative indicators? If we could overcome the use of artificial units of measurement and at the same time weight each individual with similar weights, we may have a viable development indicator.

Although there's a growing consensus that human development constitutes *the* social objective, unable to express this consensus through a "social objective function" we continue to use GDP despite its distortions, because we have not yet come to an agreement on an alternative way of evaluating development.

Alternative development indicators can be of two kinds: those oriented to stand side by side with GDP and those oriented to substitute it or complement it in an integrated fashion. Indicators of the first kind—which include most of the proposals advanced—perpetuate the separation of the economic and social realms, the separation of production and consumption. The adoption, at national or international level, of such an indicator would reinforce the present situation in which we have a general economic indicator of development, viz GDP per capita, and some special social indicators of development. This dualism in measurement exacerbates the existing dualism of economic policy on the one hand and social policy on the other.

The struggle to develop indicators of the second kind, the goal to substitute the "economicist" GDP for an integrated development indicator, a "societal" indicator, aspires to overcome the economic-social dichotomy and guide the development process towards well-being for all. In the rest of this chapter I shall deal with this kind of alternative indicator.

Development has two basic dimensions: The human-nature dimension and the human-human dimension. While the first dimension indicates basically the human ability to obtain from nature what it needs or wants, the second pinpoints to how the proceeds are distributed among participants in the process of production in accordance to rules set by production organization and property rights. The first is related mainly to production, technology and productivity. The second is related to property rights, production and exchange organization, and distribution.

Both dimensions are not independent as, for example, certain types of property rights, of production organization and of distribution, foster technological innovation, productivity and production. An Index of Social Progress, where social should be understood as "societal" (in the sense of integration of the economic and social realms), should take into account, explicitly, both dimensions of development.

The question one should ask now is how these two dimensions of development are related to social welfare or to human development which, as stated above, is (or should be) *the* objective of development. The objective (or the should-be objective) of a process is not the same thing as the process itself. Should the Social Progress Index measure the degree of accomplishment of the objective or should it measure the process of development? There are sound arguments for different possible answers.

Arguments for measuring the objective directly include the following: 1) it is the only way of knowing if a society is improving its standard of living; 2) what we are concerned with is results and not means; 3) we are not concerned with explaining why living standards are improving (worsening) but with assessing them.

Arguments against measuring the objective directly include the following: 1) the purpose of an Index of Social Progress is to arrive at an aggregate measure and the objective of the development process (the standard of living) can only be –conceptually– measured at the individual level (as intrahouse– hold inequalities have to be considered); 2) individual standard of living is empirically unobservable as individual access to means is very difficult to observe and individuals transformation rates of means to achievements (functionings) vary widely and are frequently unknown; 3) measurement of individual living standards –even if it were possible– or of household living standards, if not accompanied by the main macroeconomic variables explaining them, sheds little light on policy requirements, and the overall purpose of an alternative index is to orient policy.

Arguments for measuring the process of development would thus be: 1) the dimensions of the development process are empirically observable; 2) they shed immediate light on policy orientation; 3) they are at the macro level which is the adequate level for a Social Progress Index; 4) although such a measurement does not shed light directly on the living standards of the population, it does give the potential (opportunity sets) for such living standards.

In many respects this option is similar to that confronted when we are measuring poverty. In effect, while the poverty line method (PL) measures the *potential satisfaction* of basic human needs, the dissatisfaction of Basic Needs Method (DBN) measures the *actual satisfaction-dissatisfaction* of specific basic needs. In poverty studies the choice of the DBN method reflects a mainly normative point of view, while choice of the PL method reflects a mainly positive point of view, as PL gives a greater role to consumers preferences than DBN. In a similar way measurement of living standards directly requires “an identification of valuable functionings” and at least some sort of definition of “the *relative* values to be attached to the different functionings” (Amartya Sen, 1988); in other words, an extensive normative exercise. On the other hand, measuring the process of development in terms of (say) means

available and their distribution along households, conceived as an expression of potential living standards, does not require a similar normative exercise.

Trying to conclude what the options are we could say that the Social Progress Index can be constructed as: a) measurement of living standards, which requires an important degree of normative exercise or value definition; b) measurement of the dimensions of the development process which would give an idea of the potential living standards amongst the population, which requires very limited normative definitions.

Of course we could, also, try to measure both the objective and the development process and come out with functional relations between both. This would have not only the advantages of both options but the whole would be more than the sum of the parts.

2.5. THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE DEVELOPMENT PROCESS

Let's start by trying to measure the development process. And first of all by trying to identify what GDP does and does not achieve. As Amartya Sen has pointed out discussing the distinction between growth and development: “First of all, insofar as economic growth is concerned only with GNP per head, it leaves out the question of the *distribution* of that GNP among the population.... A second source of difference between growth and development relates to the question of *externality* and *non-marketability*. The GNP captures only those means of well-being that happen to be transacted in the market, and this leaves out benefits and costs that do not have a price-tag attached to them.... Third the valuation of commodities in the GNP will reflect the *biases* that the markets may have.... Fourth, the real income enjoyed by a person in a given year reflects at best the extent of well-being enjoyed by that person at that period of time.... The issues to be considered include interdependences over time.... as well as the more elementary question of the *length* of that life.... Finally, it must be noted that GNP is, in fact, a measure of the amount of the *means* of well-being that people have, and it does not tell us what the people involved are succeeding in getting out of these means, given their ends”. [Amartya Sen (1988)].

This text by Amartya Sen tells us what GNP does not measure, let's try to state what it does measure. M. Desai has rightly pointed out that “whereas Hicks following Pigou and others.... was defining a measure of *economic welfare*, GDP is a measure of *economic activity*” (M. Desai, 1989 a). Per capita GDP, can be seen as reflecting three things, 1) the average product generated by each occupied person GDP/P_o , 2) the proportion of occupied persons in the working population, i.e. the rate of employment P_o/P_w , and 3) the proportion of working population to total population (P_w/P).

$$\frac{\text{GDP}}{P} = \frac{\text{GDP}}{P_o} \cdot \frac{P_o}{P_w} \cdot \frac{P_w}{P} \quad (1)$$

where P is total population, P_o occupied population and P_w, working population.

The first factor on the right hand side, which might be called the productive factor, is a function of technological development, capital accumulation and hours of work per occupied person. The second factor, the labour-market factor, is determined by the forces acting on that market. The third factor, the demographic factor, depends on age structure of the population, cultural traits (e.g. involvement of women in paid work) and economic opportunities.

GDP per capita is a proxy to the amount of the means of well-being that people have on average. When this average is high, GDP per capita expresses that the material bases of welfare are high. In particular when this average exceeds the cost of a normative per capita basket of basic goods and services, this particular society has the material bases to overcome poverty, to satisfy basic needs. Any development indicator should reveal what GDP (despite its limitations) reveals: how much means of well-being are we capable of producing – or are producing currently; how much have we advanced in extracting from nature the things we need, how far have we departed from the realm of scarcity into the realm of abundance.

Following Amartya Sen we could say that GDP per capita, which is a very useful development indicator, should be complemented first of all with an indicator of the distribution of those means among the population. This is related to what I have termed the human-human dimension of development. This could easily be done with an indicator of distribution (like the Gini coefficient) applied to the most adequate variable or group of variables (as GDP can hardly be distributed among households as it incorporates other institutional agents). Let's look at the other four issues which GDP does not do according to Amartya Sen. The second and third elements enumerated by him are related to imperfections of GDP which nobody would disagree are imperfections, but which, if corrected, would only lead us to a better concept and measurement of the total amount of means available on a sustainable basis. The fourth and last points enumerated by Amartya Sen are more related to the objective of the development process than to the process itself. We will come to this later, when we discuss the measurement of the objective (section 6).

Some additional issues on the definition of an aggregate measure of availability of means and of their distribution are discussed later in this chapter (section 8).

There is another aspect that should be included, somehow, in the measurement of the development process. This is the amount of working time required to produce GDP. Two societies with the same GDP per capita or with the same product per occupied person cannot be considered at the same degree of development if in the first people work 3,600 hours a year, and in the second they only work 1800 hours. Labour productivity is a very important indicator of the development of our ability to transform nature. Besides it has vast consequences on human development. As labour productivity grows the labour day shrinks and nonlabour days grow (weekends, vacations and holidays); the potential for human development increases. Labour productivity is also related to earnings and thus to potential well-being. If from the point of view of potential well-being, GDP per capita tells us the average amount of means of well-being available on average per person, labour productivity tells us the required human effort to produce those means of well-being.

We reach the following conclusions regarding the measurement of the development process: a) we should start with per capita GDP; b) we should correct GDP for all its imperfections regarding the valuation of all means available at the macro level; c) we should take into account the amount of work required to generate GDP; d) we should introduce the distributional dimension in a way consistent with corrections of GDP performed at b). Let's try to formalize these four steps.

Let's call the degree of development DD and write the following expression:

$$DD = f(\text{GDP}^*/P; L; De) \quad (2)$$

Where GDP* stands for corrected GDP (to take account of non-marketability, externalities, price biases and the like); L stands for total working hours required to generate GDP; and De stands for equity of distribution. An alternative way of formulating (2) would be:

$$DD = f(\text{GDP}^*/P; T_F; De) \quad (2)'$$

where T_F stands for average available free time per occupied population, thus emphasizing the importance of free time as a potential for human development.

A specific way of writing (2) could be:

$$DD = \frac{\frac{GDP^*}{P}}{\frac{w}{w^*}} (1-G) = \frac{GDP^* c}{Iw} (1-G) \quad (3)$$

where w is average working yearly hours per occupied population, and w^* is a standard of yearly hours per occupied population (say 2000 hours a year), such that w/w^* is an index (Iw) reflecting "overwork" (when it is more than 1) or "underwork" (when it is less than 1). Thus corrected GDP per capita (GDP^*c) is reduced when working hours by occupied people are above the standard and increased when they are below the standard. The virtue of doing this is that the units of measurement (monetary units per year per capita) are not modified, and labour productivity is taken into account. Ideally, in order to define w^* a distinction should be drawn between creative and not creative labour. For creative work, w^* has a much higher standard, as the human need of creative activity has no clear upper time limit. On the other hand, a drudge is better-off the shortest is his/her journey.

G is a Gini coefficient calculated for the distribution (among households) of an income concept consistent with our corrected GDP; e.g. if we have corrected GDP for non marketability including in it an imputed value for domestic work, we should do the same at the household level, and then calculate the Gini on total household income (see section 8 of this chapter for further discussion on this topic). By multiplying corrected GDP per capita, additionally corrected by labour productivity (GDP^*c/Iw) by $(1-G)$ we take into account the distributional dimension. When G is 1 (absolute concentration) $1-G$ becomes zero and DD also becomes zero. When G is zero (total equality) $DD = GDP^*c/Iw$.

Thus DD is the equalitarian equivalent of the first term. For a Gini of 0.5 the first term would be reduced to a half. Two countries with the same first term but with very different G would be ranked far away from each other.

Note should be taken that the units of measurement are still monetary units per year per capita, thus meeting the requirement set at the beginning of this paper that units of measurement should be those of everyday life. The weights given to each person (or household) are not explicit in the formulation. We do know that by punishing countries (or years) with high concentration, we are counterbalancing the higher weights given to rich people in GDP, but we do not know to what extent. This analysis is required to verify that equation (3) meets the requirement of weighting different people with similar weights. The first term (GDP^*c/Iw) is our indicator of the degree of development in the human-nature dimension. The second term $(1-G)$ is our indicator of the degree of equity in the human-human dimension.

An additional correction is required. GDP^*c represents available means per head. But needs differ with age, sex, type of activity and other personal characteristics. Babies require much less means to meet their needs than adults (e.g. according to WHO/FAO 730 calories are required for children of age less than a year against 2,800 for male adults). A population with a high proportion of children requires, ceteris paribus, less means per head than a population with a small proportion of children. The required concept is thus GDP per equivalent adult and not per head. This is not the place to discuss the equivalence methodology.

Substituting P_e (equivalent population) in (3) for P (population) is enough for our purposes. Additionally decomposing the first term on the right hand side of (3) using equation (1), we obtain:

$$DD = \frac{GDP^*}{P_o \cdot Iw} \cdot \frac{P_o}{P_w} \cdot \frac{P_w}{P} (1-G) = \frac{GDP^*}{P_o^*} \cdot \frac{P_o}{P_w} \cdot \frac{P_w}{P_e} (1-G) \quad (3')$$

where P_o^* is $P_o \cdot Iw$ and can be interpreted as standardized working population, thus DD is the product of four terms: product per yearly standardized working population; rate of employment; proportion of working population with respect to equivalent population; and $(1-G)$ which measures equity.

The conclusions we arrive at are: a) GDP^* per equivalent adult is our indicator of available means; b) these available means are corrected by the relative amount of working time required to produce them, which can be seen also as relative free time available to enjoy life; c) these two together constitute our indicator in the human-nature dimension; d) $(1-G)$ which expresses distributional equity, constitutes our indicator in the human-human dimension; e) the decomposition of GDP^* per equivalent adult presented in equation (3)' constitutes an analytical device which might be useful in intertemporal or across country comparisons.

There are, however, two problems which we have not solved. The first is the corrections required in GDP in order to arrive to GDP^* . The second is on what variable is G to be measured. (See section 8 for some issues on the last topic).

The point we want to emphasize here is that equations (3) and (3)' can be calculated with uncorrected GDP as a first proxy. Regarding G it could be calculated for any appropriate variable obtained from household surveys (like income or consumption) as a first proxy, although it would be desirable to take into account access to public services, access to publically provided goods and services, domestic work and property of consumer assets.

2.6. THE SOCIAL PROGRESS INDEX AS A MEASURE OF THE OBJECTIVE OF DEVELOPMENT

Let's look now at the alternative of measuring the objective directly. We regarded this as human development, social welfare or standard of living. We should add now that we are confronted here with two options. The first option is to measure this dimension throughout the population in which case we have to solve somehow how to weight high standards of living with those with low standards. The second option is to look only at those who are poor and build a poverty index. This option has the implicit value choice of giving zero weight to a further increase in living conditions above some normative level regarded as the poverty threshold.

The second question one should ask is how to measure living standards (or poverty). Should one use result indicators or input indicators? (e.g. should one use food-intake or nutritional status?. Should one use access to health care or life expectancy?). This is related to Desai's discussion of capabilities, functionings, characteristics, and commodities (Desai, 1989 b) following A. Sen's concepts. The adoption of, for example, food in-take is an approach in the commodity-characteristics space, whereas adopting nutritional status as an indicator could be regarded as a functioning-space approach. The first emphasizes the possession or use of commodities, an input approach, and the second is a result approach. A. Sen has argued strongly for the second approach when he says that "the standard of living is not a standard of opulence, even though it is *inter alia* influenced by opulence. It must be directly a matter of the life one leads rather than of the resources and means one has to lead a life" (A. Sen, 1987). That's why he adds later on, comparing indicators like life expectancy and literacy in China and India: "It is this type of comparison that can tell us what has been happening in the achievement of the living standard in China *vis-a-vis* India, and even the fragmented information on the important functionings tells us more than the oddly precise picture of aggregated GNP" (*Ibid*). Although these ideas are very strong, there are various problems in implementing them empirically. No one has succeeded in doing so to a satisfactory degree. Some of the reasons have been previously discussed (section 4, above). This is perhaps the reason why most researchers continue to use an "opulence" approach. As an example, Grootaert summarizes the "thinking that has been ongoing in the living standards measurement study" (LSMS) which the World Bank launched in february 1980" (Grootaert, 1982) by saying "LSMS is concerned with measuring welfare, not utility.... welfare derives from the consumption of goods.... The translation of consumption into welfare units is a function of various physiological characteristics (age, sex) of the recipient and of environmental factors. However, throughout this paper it will be assumed that, *ceteris paribus*, a good bestows the same amount of welfare on an individual regard-

less of personal psychological factors which may result in differences in the pleasure or utility that different individuals derive from the same good" (*Ibid*). In fact, he is assuming that the transformation rate of goods and services into functionings is the same for all individuals, thus coming to the idea that, despite our knowledge that these rates might vary widely, we need to settle with a proxy. This is not far away from Desai's position who, summarizing a diagram which interprets Sen's ideas on capabilities-functionings-commodities says: "The essence of the argument then is to compare the resources required and the resources available" to guarantee capabilities. (Desai, 1989b). Although he is conscious that "given the environment and the available goods, this generates a minimal resource requirement for each individual given his/her personal characteristics", he later adds that "in practical terms, therefore the connection between goods and capabilities is taken from social practice". "It is what it costs "everyone" to have the capability for healthy living that needs to be measured. Personal characteristics of the individual e.g. physical disability or age or gender may put the cost above or below average but the commodity requirements should be computed using the social norms." (*Ibid*). Thus, albeit in a different context, he assumes away, as Grootaert, personal differences. The point I want to stress is that whether one starts with capabilities or basic needs, or not, it is very difficult to avoid ending up with goods and services as the *practical* way of measuring poverty or the living standard. A. Sen himself, discussing basic needs' strategic relevance says: "if it is accepted that the concern is basically with the kind of lives people do lead or can lead, then this must suggest that the "basic needs" should be formulated in line with functionings and capabilities. If they are, for some reason, stated in the form of commodity requirements, the derivative and contingent nature of that formulation must be given adequate recognition." [Amartya Sen, (1987) emphasis added].

If we want to measure only poverty and we want to do it with the input approach, we could construct a poverty index such as the Sen poverty index, which takes into account not only the head-count ratio and the poverty gap, but also the distribution of income among the poor. (On this see Amartya Sen, 1988, specially chapter 3 and appendix C).

Naturally, similar conceptual problems would appear in defining the poverty line as those discussed in the preceding paragraphs. Some of these problems are dealt with in Desai, (1989b) and (1990), in Julio Boltvinik (1989) and (1990), so we don't have to deal with them here.

If we want to measure overall living standards, we could do it by a combination of the input and output approach, (say life expectancy and consumption). Otherwise we could take only achievement indicators (functionings). Unfortunately there are very few of which one can think of for which there are data available and, besides, there's the problem of combining them. Anyhow, life expectancy, literacy and nutritional status are

three of them which are quite important and obvious enough. Housing and its services (which are inputs) pose a serious problem for we cannot easily express a result for such varied functionings (related to adequate housing) as being able to "protect oneself from the weather" "being able to prepare food" and so on, which are related to housing, its services and its facilities. This is a big limitation if we want to stick to result indicators.

Meghnad Desai has developed both a deprivation (poverty) index and an overall well-being (living standards) index (see chapter 3).

2.7. SOCIAL PROGRESS INDEX AS BOTH A MEASUREMENT OF THE DEVELOPMENT PROCESS AND ITS OBJECTIVE

Going back to the possibility announced at the end of section 4, we could try and put together the measurement of the process and the measurement of the objective. Select for this last the overall well-being index developed by M. Desai in chapter 3 and we would have:

$$SDI = \sum_{j=q+1}^N LTW_j - \sum_{j=1}^q LTD_j = f [GDP^*e / I_w (1 - G)] \quad (4)$$

where SDI is the Social Development Index. LTW is Life Time Well-being, LTD is Life Time Deprivation, q is the number of poor and N is the population. On the right hand side GDP^*e is corrected GDP per equivalent person and f denotes an implicit-function. The SDI is a function of the characteristics of the development process as depicted by GDP^*e , I_w , and G. The functional specific form of association could be calculated empirically. We would be able to analyze the partial effects on SDI, on LTW and on LTD, of changes in all three right-hand variables, thus making an important contribution to economic and social policy.

2.8. AVAILABLE MEANS AND THEIR DISTRIBUTION. FURTHER ISSUES ON MEASUREMENT

There are two possible approaches to the measurement of available means and their distribution. The first would be to stick to GDP^* or GNP^* per equivalent person. The second would be to devise a personal (or household) appropriate income or consumption concept. An argument for the first approach would be that income agents other than households (or persons) are also part of the economy and the income that accrues to governments and enterprises has to be considered also in a measurement of the nation's capacity to produce. The appropriate yardstick would be net of depreciation (NDP^* or NNP^*).

The adequate indicator for capability to produce would be NNP^*e or NDP^*e , adequately corrected for non-marketability, externalities, price biases and the like. For international comparisons, where national currencies are converted into dollars, real acquisitive power of local currencies (purchasing power parities) would be required. Market exchange rates do not reflect them.

The arguments for using a household or personal concept are more applicable to the distributional dimension. As it is very difficult to attribute to households the income of all enterprises and government, the practical way of analyzing distribution has come to be the distribution of personal disposable income. As private enterprise's income is, in the last analysis, income of somebody (mainly the rich), this procedure underestimates inequality. Government income is mostly somebody's income—in kind through services and goods provided by government, but a wholesome part of it are public goods, the distribution of benefits of which is impossible to measure. Publically provided private goods can, and should be estimated as personal income and consumption.

Thus, regarding the distributive dimension of the development process, I would suggest that the Gini coefficient—or any other chosen inequality coefficient—be measured against the concept of *total household income* (with percentiles constructed with income per adult equivalent units). Ideally, total household income would contain:

- a) current monetary income.
- b) current in-kind income, which would be the sum of: value added to production not sold and consumed (or stored) by the household; in kind services and goods received free from any source (specially publically provided goods and services); and imputed value added by domestic work, which is usually excluded from the concept of production.
- c) Consumption services received from asset holdings.
- d) Increases (decreases) in wealth during the period not computed in current monetary income (e.g. increases in the value of share's holdings or real estate). Increases in "human capital" could also be included here, valued at present value of future expected earnings.
- e) Free time available (for education, leisure and recreation) is an additional dimension that has been brought—equation (2)' above—into the degree of development index. It can be measured directly or indirectly (measuring working time) as in equation (3). It should be included, as well, in the equity measure. It seems best not to transform it into money terms—even if that were possible—and leave the distributional dimension to be computed combining money and time units.

Although available resources are to be measured on NDP^* per equivalent adult, with the additional corrections suggested in the preceding

sections, (one of which refers to working or to free time) and equity is to be measured on total household income (as defined) and free time available, there is no inconsistency as each indicator refers to a different dimension of the development process.

2.9. SOME PRELIMINARY CALCULATIONS ON AN INDEX OF THE DEVELOPMENT PROCESS*

We present here some preliminary calculations for equation (3), i.e. of both dimensions of the development process. Some preliminary calculations on a specific index of the development objective are presented in chapter 3.

We start with the transformation of GDPc into GDPe proposed on preceding sections. Table A.1. column 1 (statistical appendix) shows for 35 countries the relative importance of taking into account the age structure of the population and expressing GDP not in per capita terms but in per equivalent adult terms. While the low opportunity set countries (LOS'c) have, on average, 16% more inhabitants than equivalent adults, the high opportunity set countries (HOS'c) have only 9% more. The range of this indicator varies from 20% in Kenya to 8.1% in Holland and Denmark*. The tendency of this relation to be smaller for richer countries can be seen in figure A.1. The effect of this modification is, in general, to reduce the difference between underdeveloped and developed countries. Thus, whereas GDPc in Denmark is 31.7 times that of Kenya, GDPe is 28.5 times larger. The ratio of HOS'c average GDP'c to LOS'c average GDPc, is 14.8 whereas the same ratio for GDPe is 13.9.

The next step is the use of purchasing power parities (ppp) to express GDP in dollars. Unfortunately I was unable to combine GDP in ppp dollars with the Gini coefficients for all countries in table A.1. as I only had GDP in ppp dollars for 1987 and the available Gini coefficients were around 1980. Nonetheless, in order to show the importance of the use of ppp we show, in table 1, data for five countries.

Whereas Japan's GDPc is around 48 times bigger than Kenya's in exchange rate dollars, it is "only" 16.5 times bigger in ppp dollars, and this is further reduced to 15.2 times when GDP per equivalent adult in ppp dollars is considered. The differences look more dramatic when comparing Japan to Mexico, as they reduce from 8.6 to 2.8, to 2.68. Thus, from the two corrections so far done, the ppp conversion is quantitatively more important. This has to

* This calculation is preliminary, as it was based only on WHO/FAO caloric requirements for different age groups. The specific coefficients used to transform age groups into adults were: 0.49 for children 0-4 years of age; 0.76 for the age groups 5 to 9 years, 0.88 for the age groups 10-14 and for old people (60 and more). The group age 15-59 was taken as 1.00. Whatever the biases of these coefficients, they tend to overestimate Pe, as caloric needs vary much less than other needs between children and adults. No correction for gender was made.

Table 1.
TRANSFORMING GDPc IN EXCHANGE RATE DOLLARS TO GDPe
IN PURCHASING POWER PARITY DOLLARS. 1987.
(Five Countries)

Country	Indices (Kenya =100)			
	Exchange rate \$		PPP \$	
	GDP	GDP	GDPc	GDPe
Kenya	100.0	100.0	100.0	100.0
Guatemala	287.9	281.8	246.5	245.6
Mexico	4524.2	4075.5	1904.2	1746.2
Denmark	4775.7	4314.4	1654.3	1521.2
Japon	554.5	531.1	582.4	567.6

be borne in mind in the following calculations where GDPc is used in exchange rate dollars for lack of data.

Our next steps should have been: 1) using NDP instead of GDP; 2) correcting NDP for externalities, non-marketability and market biases, to arrive at NDP^{*}; 3) introduce our index Iw of relative hours of work per occupied person. None of these corrections are attempted in the following preliminary calculations. So we have to settle with a simplified version of the righthand side of equation (8): GDPe (1-G) instead of NDP^{*} e/Iw (I-G).

In table A.1 GDPe (1-G) has been calculated in exchange rate dollars for 35 countries around 1980, where countries are ordered by the value of the opportunity set. The Gini coefficients were calculated by Juan Luis Londoño (1989) using a United Nations survey data bank referred by F. Campano and D. Salvatore (1988).

These Gini coefficients do not include the corrections suggested in the preceding section of this chapter. They should, thus, be regarded as preliminary.

Table A.1 shows the variables that determine the opportunity set: P-Pe/Pe; 1-G; GDPc and GDPe. Figures A.1. to A.3. show the relative stand of each country for the first, second and fourth variables. Figure A.4. brings together the first three variables and the resulting GDPe (1-G).

Countries have been classified in three groups: low, medium, and high opportunity sets (LOS'c, MOS'c and HOS'c), with somewhat arbitrary thresholds for the equalitarian equivalent GDPe: less than 1,000 dollars, from 1,000 to less than 4,000 dollars and more than 4,000 dollars. The simple averages in the opportunity set are: 385 dollars for LOS'c, 2537 for MOS'c and 7163 for HOS'c. In index numbers (making simple average of all countries = 100) the opportunity sets are 10.8, 70.9 and 200 (Table 2 sum-

marizes the average figures and the relations amongst them). These relative distances are much greater than the distances in GDP per equivalent adult, whose average indices are 14.5, 77 and 201.9. This is due to the fact that the equity coefficient (1-G) is also smaller in LOS'c.

Table 2.
OPPORTUNITY SET AND DETERMINANT VARIABLES
INDICES BY GROUPS OF COUNTRIES (Average = 100).

Groups of countries	P-Pe/Pe	1-G	GDPc	GDPe	GDPe (1-G)
LOS'c	135.4	87.2	13.2	14.5	10.8
MOS'c	90.8	100.7	73.6	77.0	70.9
HOS'c	76.8	110.4	195.7	201.9	200.1
HOS'c/LOS'c	0.57	1.27	14.8	13.9	18.5
MOS'c/LOS'c	0.67	1.15	5.58	5.3	6.6
HOS'c/MOS'c	0.85	1.10	2.66	2.62	2.82

Countries with low GDPe have, on average, also low equity coefficients. This means that both indicators of the development process are low in poor countries and high in rich countries. Figure A.2. shows that, with the exception of Nepal, LOS'c are below average in the 1-G coefficient. On the other hand, the HOS'c are all above average (with the exception of Australia). The MOS'c show a mixed situation. On average its equity indicator lies in between the other two groups. Thus, the development gap as depicted by the indicator of availability of means in relation to needs (GDPe) is widened when the equity indicator is brought into the picture: while average GDPe in HOS'c was 13.9 times the corresponding average in LOS'c, the average index of the development process becomes 18.5 times larger, due to equity being 1.27 times higher in HOS'c as compared with LOS'c.

Our first conclusion is that countries, assembled in groups, show a consistent pattern of growing equity as GDPe is larger.

But individual countries, when ranked by GDPe and GDPe (1-G) show some important changes in rank. This is clearly depicted in figure A.3. If rank by both indicators were the same, the bars in the chart would grow smoothly. But GDPe—shown on the y axis— fails to grow 13 times, showing that 13 countries are not ranked equally with both variables.

Some outstanding cases are: a) Brazil and Korea (rank 11 and 14 in the opportunity set: Table A.1 and figures A.1 to A.3). Brazil has a higher GDPc and GDPe than Korea: indices of 37.9 and 40.7 for Brazil against 34 and 35.8 for Korea. (Note that their distance is enlarged when equivalent adult population is considered). Nonetheless, Korea is the third country (from the bottom up) amongst the MOS'c, while Brazil is last amongst the LOS'c. While Brazil's development index is only 916 dollars, Korea's is 1328. The relative

index being 37.1 for Korea and 25.6 for Brazil. The whole difference is explained by their respective equity indicators: 0.696 in Korea, 0.422 in Brazil, an amazing difference which can be seen in figure A.2 clearly. b) Another interesting case is Hong Kong (rank 19). Hong Kong, classified as a MOS country has a GDPc of 5798 dollars, higher than any other MOS country and higher than Spain and Israel (ranks 23 and 24), which have been classified as HOS'c. Hong Kong is moved a bit down when ranked by GDPe due to its predominantly adult population. Israel and Ireland (rank 22), which were in a lower rank than Hong Kong move now above it. But it would still be above Spain which is a HOS'c. It is because of its equity coefficient (well below average: .546) that it moves back to the MOS'c. c) Australia, amongst the high opportunity set countries moves back two places in rank due to its relatively low equity indicator (below average of all countries and very much below the average of the group). The G.D.R., which has the highest equity indicator amongst all 35 countries (a relative index of 136) shows an index of development of 5312 dollars with only 5910 GDPc and 6424 GDPe. If it had the average equity indicator of the HOS'c, it would require a GDPe of 7916 to be at the same opportunity set. If it had the average (1-G) of the 35 countries, the GDPe required would be 8736. If it had the average (1-G) of the LOS'c, the required GDPe would be 10022 dollars. If it had Brazil's income distribution, the required GDPe would be 12587 (almost twice its actual GDPe).

This type of analysis can be seen more clearly drawing the family of equilateral hyperboles which describes the equation $GDPe(1-G)=k$. In these curves, the slope describes the rate of marginal substitution between equity and GDPe. This rate goes down as one moves along the curve from higher GDPe to lower ones and from low to high values of 1-G. This can be interpreted as the dollar value of equity in terms of potential satisfaction of human needs.

Looking at figure A.4. we can see all the variables determining the opportunity set together. While (1-G) has a slight U-shaped behaviour, going down first and then raising, P-Pe/Pe has a downward trend as we move from LOS'c TO HOS'c. The opportunity set follows, as a general trend, the behaviour of GDPc but, as noted earlier, has fluctuations which reflect countries ranking differently in both indicators.

At this stage, an empirical point on the influence of the equity dimension should be raised. Whereas the range of variation of GDPc and GDPe is very large (from 150 to 14887 in the first case and from 174 to 16,116 in the second), the equity indicator's range goes from 0.42 to 0.827. While one variable ranges from 1 to 100, the other ranges from 1 to 2. This is one reason for the somewhat diminished importance of the equity dimension in the calculations. If 1-G is rescaled, making 0.40=0 and 0.85=1, its range of variation would be from 1 to 21.5, still smaller than GDPe's. Nonetheless, the enormous difference brought by such a change is illustrated in table 3. As can be seen, Brazil's and Reunion's (1-G) drops dramatically as they are close to the

lower range chosen. This would lower their development index from 916 to 106 in Brazil and from 1567 to 164 in Reunion.

Whereas this is the adequate way to go or not, remains to be further explored. In the remainder of this chapter we proceed with (1-G) non re-normalized.

Table 3.
CALCULATING THE OPPORTUNITY SET WITH RESCALED (1-G)

Countries	Non-normalized	Rescaled (1-G) calculations		
	GDPe (1-G)	1-G	1-G rescaled*	GDPE (1-G)
GDR	5312	0.827	0.950	6102
Japan	6908	0.726	0.724	6889
Mexico	1302	0.500	0.222	578
Brazil	916	0.422	0.049	106
Reunion	1567	0.420	0.044	164
Tanzania	134	0.539	0.309	77
Nepal	106	0.610	0.467	81

* Obtained from $(1-G) - \min(1-G) / \max(1-G) - \min(1-G)$, where (1-G) is the data on the 2nd column, $\min(1-G)$ is 0.4 and $\max(1-G)$ is 0.85.

Additional information, this time on 94 countries and 142 observations is presented in Table A.2 and figures A.5 to A.8. These data, from the same sources previously referred, go from the end of the fifties to the eighties and are expressed in 1980 exchange-rate dollars. No conversion of GDPc to GDPe has been performed. The figures allow us to show two things: a) changes in rank when the equity dimension is brought into the development indicator; and b) the growing importance of the equity dimension when countries are grouped in smaller GDPc ranges.

With regard to changes in rank, Table 4 singles out the countries (and years) with the highest (positive or negative) change in rank, when GDPc rank is compared with the rank in GDPc (1-G).

Positive changes in rank take place in countries having higher equity indicators than some countries above them in GDPc rank. Negative changes take place in countries having lower equity indicators than some countries below them in GDPc rank. As an example, Iran has a rank of 98 on GDPc, but has a Gini of .59, (1-G) of .41, an equity indicator well below those of countries with similar GDPc and one of the lowest in all 142 observations. Thus its abrupt change in rank.

In figures A.5. to A.8. the effect of the equity dimension is depicted when countries are grouped by smaller ranges of GDPc. In the lowest and highest income groups there's an evident concentration around a straight line, which

Table 4
COUNTRIES WITH HIGHEST
CHANGES IN RANK.
[GDPc (1-G) rank minus GDPc rank]

Positive change		Negative change	
Pakistan (64):	+5	Senegal (60):	-5
Pakistan (71):	+5	Brazil (72):	-6
Sudan (68):	+5	Sierra Leone (69):	-6
Surinam (62):	+5	Zimbabwe (68):	-6
Korea (81):	+6	Mexico (77):	-7
GDR (80):	+6	France (75):	-7
Czechos. (75):	+7	Hong Kong (81):	-7
Poland (83):	+7	Hong Kong (68):	-8
GDR (75):	+7	Irak (76):	-8
Bulgaria (82):	+7	Gabon (68):	-8
Czechos. (70):	+8	Brazil (82):	-8
Finland (77):	+8	South Africa (82):	-8
Taiwan (72):	+9	Venezuela (71):	-8
Hungary (75):	+9	Ecuador (70):	-11
Japan (77):	+10	Reunion (77):	-12
Ghana (69):	+11	Iran (75):	-15
Cyprus (66):	+11		

shows that most countries in these groups have similar Gini coefficients. But on the intermediate income groups, specially on the 2,000-3,000 and 3,000-5,000 group, the scatter of points show no clear tendency, giving the equity dimension a greater role in the definition of the development index.

So far we have dealt with cross section analysis. Now we turn to an example of analysis overtime. We chose Colombia for which Juan Luis Londoño (1989), has assembled a series of Gini coefficients in the period 1965-1988. The results are shown on Table A.3. and figures A.9 and A.10. In this case we calculated GDP per equivalent adult (in exchange rate dollars).

Growth of equivalent population is faster than that of population as a result of the demographic transition which made population older during this period. This is shown in Table A.3 (columns 1 and 2) and in figure A.9. During the period 1965-1988 Colombia showed both a growing economy and growing equity. As a consequence, the opportunity set grew much faster than both GDPc and GDPe. The equity indicator grew from 100.0 to 127.5, while GDPe grew from 100.0 to 165.5. As a consequence, the opportunity set shows an index of 211 in 1988. But changes in the period were not smooth. The equity indicator decreased two years in a row (71-72 and 72-73). As a consequence, the opportunity set declined in years 71-73, despite accelerated growth in GDPe. This is reflected in the kinks of GDPe (1-G) and GDPc (1-G)

lines in figure A.10. The distance between these lines and those of GDPe and GDPc in the figure, is explained by the upward trend in (1-G). This example shows how availability of means and equity can reinforce or counter balance their role in the development process. Recent tendencies in Latin America, where GDPe has stagnated or diminished and equity diminished as well, would be examples of negative reinforcements. Unfortunately we don't have the data to perform such calculations.

We end this rather large section presenting some empirical results on the decomposition of GDP proposed in equation (3)'. These results, using GDPc and GDPe in ppp dollars for 1987 are presented in Table A.4. for Latin American countries.

Uruguay has the largest GDPe and GDPc in ppp dollars in Latin America. Decomposition in our three terms show that Uruguay reaches this position despite ranking fourth in productivity per occupied person (behind Chile, Mexico and Venezuela) due to a very high proportion of working people in its population (the demographic factor). On the contrary, on the lower end of the scale ranking is determined mainly by productivity.

REFERENCES TO CHAPTER 2

Julio Boltvinik (1989). "Hacia una Estrategia para la Superación de la Pobreza", Paper presented at *Seminario Necesidades Básicas y Desarrollo*, La Paz, Bolivia.

Julio Boltvinik (1990). *Pobreza y Necesidades Básicas. Conceptos y Medición*, CRESALC, UNESCO, CARACAS (in press).

F. Campano and D. Salvatore (1988). "Economic Development, Income inequality and Kuznets' U- Shaped Hypothesis". *Journal of Policy Modelling*, No. 10.

Meghnad Desai (1989). "Methodological Problems in the Measurement of Poverty in Latin America". Unpublished paper prepared for the Regional Project to Overcome Poverty in Latin America and the Caribbean, UNDP.

____ (1990). "Poverty and Capability: Towards and Empirically Implementable Measure". Unpublished paper prepared for the Regional Project to Overcome Poverty in Latin America and the Caribbean, UNDP.

C. Grootaert (1982). "The Conceptual Basis of Measures of Household Welfare and their Implied Survey Data Requirements", *Living Standards Measurement Study*, Working Paper No. 19, The World Bank.

Juan Luis Londoño (1989). "Distribución Nacional del Ingreso en 1988: Una Mirada en Perspectiva" in *Coyuntura Social*, N° 1, December 1989, Fedesarrollo, Bogotá.

Amartya Sen (1987). *The Standard of Living*. The Tanner Lectures. Cambridge University Press.

Amartya Sen (1988). "The Concept of Development" in *Handbook of Development Economics*, vol. I, edited by H. Chenery. and T.N. Srinivasan, Elsevier Science Publishers.

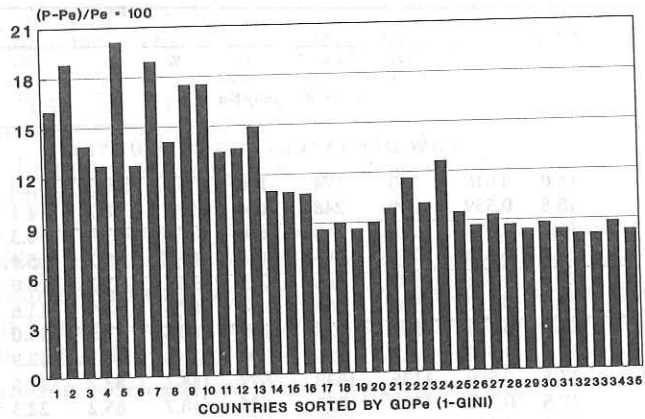
STATISTICAL APPENDIX TO CHAPTER 2

Table A.1

VARIABLES OF THE OPPORTUNITY SET DIFFERENT COUNTRIES - CIRCA 1980

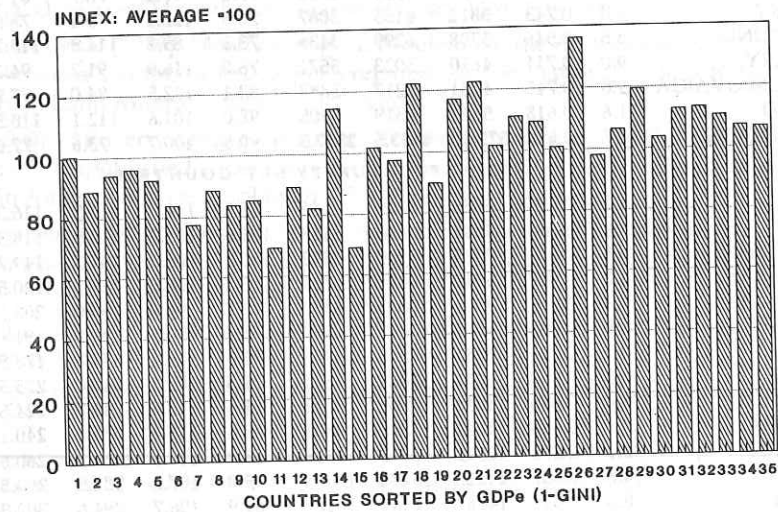
COUNTRY	(P-Pe)/Pe %	1-GINI	GDP Per Capita	GDPe Per Equi- valent Adult	GDPe (1-G) Opport- unity Set	INDICES SIMPLE AVERAGE = 100				
						(P-Pe)/Pe %	1-GINI	GDP Per Capita	GDPe Per Equi- valent Adult	GDPe(1-G) Opport- unity Set
LOW OPPORTUNITY SET COUNTRIES										
1 NEPAL	16.0	0.610	150	174	106	135.9	100.3	3.0	3.3	3.0
2 TANZANIA	18.8	0.539	209	248	134	159.4	88.7	4.1	4.7	3.7
3 INDIA	13.9	0.571	215	245	140	117.9	93.9	4.3	4.6	3.9
4 SRI LANKA	12.7	0.582	271	305	178	107.7	95.7	5.4	5.7	5.0
5 KENYA	20.1	0.561	405	486	273	170.4	92.3	8.0	9.1	7.6
6 THAILAND	12.7	0.510	585	659	336	107.4	83.9	11.6	12.4	9.4
7 BOSTWANA	18.9	0.471	705	839	395	160.5	77.5	14.0	15.7	11.0
8 PHILIPPINES	14.1	0.538	645	736	396	119.6	88.5	12.8	13.8	11.1
9 DOMINICAN REP.	17.5	0.509	1135	1333	679	148.1	83.7	22.5	25.0	19.0
10 GUATEMALA	17.5	0.518	1125	1322	685	148.7	85.2	22.3	24.8	19.1
11 BRAZIL	13.4	0.422	1914	2170	916	113.5	69.4	37.9	40.7	25.6
GROUP AVERAGE	16.0	0.530	669.0	774.4	385.2	135.4	87.2	13.2	14.5	10.8
MEDIUM OPPORTUNITY SET COUNTRIES										
12 SKYCHELLES	13.6	0.543	2006	2279	1237	115.2	89.3	39.7	42.7	34.6
13 MEXICO	14.9	0.500	2267	2604	1302	126.2	82.2	44.9	48.9	36.4
14 KOREA	11.0	0.696	1719	1908	1328	93.3	114.5	34.0	35.8	37.1
15 REUNION	10.9	0.420	3363	3731	1567	92.8	69.1	66.6	70.0	43.8
16 URUGUAY	10.8	0.618	2960	3281	2028	91.9	101.6	58.6	61.6	56.7
17 SINGAPUR	8.6	0.592	3978	4321	2558	73.0	97.4	78.7	81.1	71.5
18 BULGARY	9.0	0.743	3812	4155	3087	76.3	122.2	75.4	78.0	86.3
19 HONG KONG	8.6	0.546	5798	6299	3439	73.3	89.8	114.8	118.2	96.1
20 HUNGARY	9.0	0.711	4610	5023	3572	76.0	116.9	91.2	94.2	99.8
21 CZECHOSLOVAKIA	9.8	0.745	4751	5217	3887	83.1	122.5	94.0	97.9	108.6
22 IRELAND	11.6	0.618	5664	6319	3905	98.0	101.6	112.1	118.5	109.1
GROUP AVERAGE	10.7	0.612	3720.7	4103.5	2537.3	90.8	100.7	73.6	77.0	70.9
HIGH OPPORTUNITY SET COUNTRIES										
23 SPAIN	10.1	0.675	5633	6201	4186	85.5	111.0	111.5	116.3	117.0
24 ISRAEL	12.6	0.664	5601	6306	4187	106.6	109.2	110.9	118.3	117.0
25 NEW ZELAND	9.5	0.613	7285	7980	4892	80.9	100.8	144.2	149.7	136.7
26 GERMAN D.R.	8.7	0.827	5910	6424	5312	73.7	136.0	117.0	120.5	148.4
27 AUSTRALIA	9.3	0.596	9901	10826	6452	79.2	98.0	196.0	203.1	180.3
28 ENGLAND	8.7	0.646	9537	10363	6695	73.4	106.3	188.8	194.4	187.0
29 JAPAN	8.4	0.726	8781	9515	6908	70.8	119.4	173.8	178.5	193.0
30 CANADA	8.8	0.630	11053	12022	7574	74.3	103.6	218.8	225.5	211.6
1 FINLAND	8.4	0.686	11048	11981	8219	71.6	112.8	218.7	224.8	129.6
32 HOLLAND	8.1	0.688	11844	12800	8806	68.4	113.2	234.4	240.1	246.0
33 DENMARK	8.1	0.672	12850	13893	9336	68.8	110.5	254.3	260.6	260.8
34 NORWAY	8.8	0.652	14225	15483	10095	75.0	107.2	281.5	290.5	282.1
35 SWEDEN	8.3	0.649	14887	16116	10459	69.9	106.7	294.6	302.3	292.2
GROUP AVERAGE	9.1	0.671	9888.8	10762.3	7163.2	76.8	110.4	195.7	201.9	200.1
TOTAL AVERAGE	11.8	0.608	5052.6	5330.5	3579.1	100.0	100.0	100.0	100.0	100.0

Figure A.1
PROPORTION OF (P-Pe) WITH RESPECT TO Pe
DIFFERENT COUNTRIES CIRCA - 1980



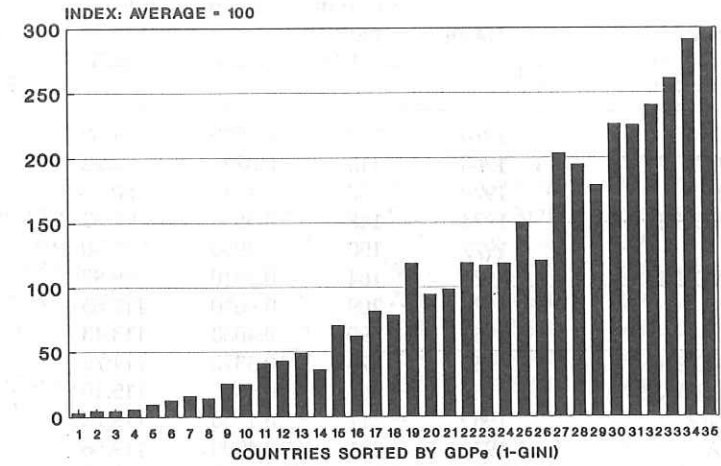
Source: Table A.1

Figure A.2
INDEX OF 1-GINI
DIFFERENT COUNTRIES CIRCA - 1980



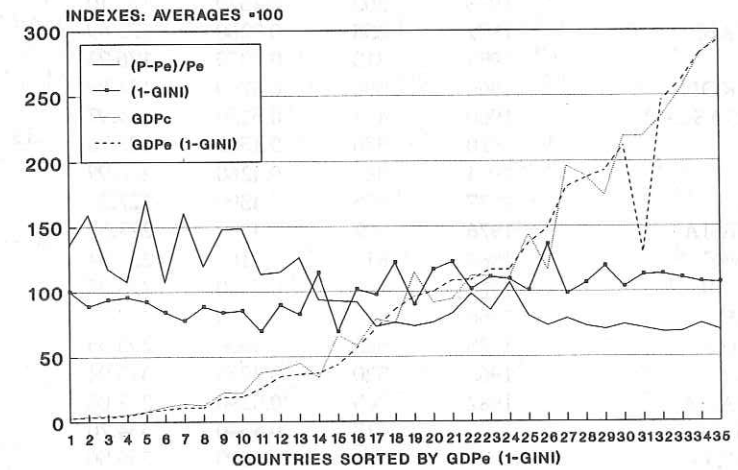
Source: Table A.1

Figure A.3
GDP/Pe - INDEX
DIFFERENT COUNTRIES CIRCA - 1980



Source: Table A.1

Figure A.4
EXPLANATORY VARIABLES OF OPPORTUNITY SET
DIFFERENT COUNTRIES CIRCA- 1980



Source: Table A.1

Table A.2
SOCIAL PROGRESS INDEX
(SIMPLIFIED)
COUNTRIES ORDERED BY OPPORTUNITY SET

COUNTRY	DATE	INCOME PER CAPITA	GINI COEFLI- CIENT	OPORTU- NITY SET	OPORTU- NITY SET RANK
ETHIOPIA	1970	107	0.4010	64.09	1
MALAWI	1967	115	0.3720	72.22	2
MYANMAR	1970	137	0.4140	80.28	3
BANGLADESH	1974	148	0.3830	91.32	4
NEPAL	1977	150	0.3900	91.50	5
BANGLADESH	1974	164	0.3910	99.88	6
TANZANIA	1975	209	0.4610	112.65	7
INDIA	1964	190	0.4030	113.43	8
BANGLADESH	1967	173	0.3370	114.70	9
SIERRA LEONE	1969	264	0.5640	115.10	10
TANZANIA	1969	211	0.4350	119.22	11
UGANDA	1970	221	0.4590	119.56	12
INDIA	1976	215	0.4290	122.77	13
PAKISTAN	1964	200	0.3770	124.60	14
SRI LANKA	1973	226	0.4080	133.79	15
THAILAND	1962	300	0.4920	152.40	16
SRI LANKA	1981	271	0.4180	157.72	17
INDONESIA	1971	291	0.4250	167.33	18
NIGER	1973	303	0.4320	172.10	19
PAKISTAN	1971	258	0.3260	173.89	20
BENIN	1959	313	0.4370	176.22	21
HONG-KONG	1968	596	0.6730	194.89	22
MADAGASCAR	1960	402	0.5150	194.97	23
ZAIRE	1970	370	0.4500	203.50	24
EGYPT	1964	385	0.4260	220.99	25
KENYA	1977	405	0.4390	227.21	26
INDONESIA	1976	402	0.4340	227.53	27
ZIMBAWE	1968	616	0.6160	236.54	28
ECUADOR	1970	802	0.6570	275.09	29
SENEGAL	1960	644	0.5610	282.72	30
THAILAND	1975	585	0.4900	298.35	31
SUDAN	1968	520	0.3980	313.04	32
BOSTWANA	1982	705	0.5290	332.06	33
PHILIPPINES	1975	613	0.4540	334.70	34
MOROCCO	1971	673	0.5000	336.50	35
ZAMBIA	1968	615	0.4480	339.48	36
PHILIPPINES	1985	645	0.4620	347.01	37

Table A.2
SOCIAL PROGRESS INDEX
(SIMPLIFIED)
COUNTRIES ORDERED BY OPPORTUNITY SET

COUNTRY	DATE	INCOME PER CAPITA	GINI COEFLI- CIENT	OPORTU- NITY SET	OPORTU- NITY SET RANK
GUYANA	1956	612	0.4110	360.47	38
GHANA	1969	541	0.3110	372.75	39
DOMINICAN REP.	1969	729	0.4790	379.81	40
ZIMBABWE	1975	845	0.5320	395.46	41
EL SALVADOR	1969	730	0.4560	397.12	42
JAMAICA	1958	918	0.5610	403.00	43
GUATEMALA	1970	855	0.4990	428.36	44
COLOMBIA	1970	937	0.5370	433.83	45
PERU	1972	1019	0.5690	439.19	46
MALAYSIA	1970	893	0.5020	444.71	47
BOSTWANA	1982	964	0.5030	479.11	48
EL SALVADOR	1977	811	0.4070	480.92	49
COTE D'IVOIRE	1970	1031	0.5210	493.85	50
TURKEY	1973	1026	0.5050	507.87	51
BRAZIL	1972	1358	0.6060	535.05	52
IRAQ	1976	1426	0.6110	554.71	53
TUNISIA	1975	1141	0.4940	577.35	54
DOMINICAN REP.	1977	1135	0.4910	577.72	55
MAURITANIA	1981	1236	0.5290	582.16	56
GUATEMALA	1981	1125	0.4820	582.75	57
NIGERIA	1970	1115	0.4530	609.91	58
ALGERIA	1968	1512	0.5330	706.10	59
GABON	1968	1807	0.6020	719.19	60
SURINAME	1962	1175	0.3200	799.00	61
BRAZIL	1982	1914	0.5780	807.71	62
GREECE	1958	1387	0.3740	868.26	63
SOUTH AFRICA	1968	2039	0.5740	868.61	64
PANAMA	1972	1489	0.4130	874.04	65
FIJI	1972	1587	0.4150	928.40	66
COSTA RICA	1971	1676	0.4380	941.91	67
TAIWAN	1972	1374	0.2820	986.53	68
SEYCHELLES	1978	2006	0.4570	1089.26	69
MEXICO	1977	2267	0.5000	1133.50	70
YUGOSLAVIA	1968	1744	0.3430	1145.81	71
KOREA	1981	1719	0.3040	1196.42	72
CHILE	1968	2210	0.4520	1211.08	73

Continuation

Table A.2
SOCIAL PROGRESS INDEX
(SIMPLIFIED)
COUNTRIES ORDERED BY OPPORTUNITY SET

Continuation

COUNTRY	DATE	INCOME PER CAPITA	GINI COEFFICIENT	OPORTU-NITY SET	OPORTU-NITY SET RANK
PORTUGAL	1974	2200	0.4020	1315.60	74
BARBADOS	1970	2391	0.4140	1401.13	75
REUNION	1977	3363	0.5800	1412.46	76
URUGUAY	1967	2466	0.4200	1430.28	77
KOREA	1985	2129	0.3180	1451.98	78
PUERTO RICO	1963	2667	0.4420	1488.19	79
CYPRUS	1966	1903	0.1940	1533.82	80
HONG-KONG	1971	2723	0.4180	1584.79	81
HUNGARY	1975	2125	0.2420	1610.75	82
IRAN	1975	4379	0.5900	1795.39	83
URUGAY	1983	2960	0.3820	1829.28	84
POLAND	1976	2586	0.2630	1905.88	85
LIBYA	1962	2642	0.2660	1939.23	86
CZECHOSLOAVAKIA	1970	2401	0.1910	1942.41	87
SPAIN	1965	3215	0.3860	1974.01	88
YUGOSLAVIA	1978	3027	0.3350	2012.96	89
GREECE	1974	3293	0.3540	2127.28	90
HONG-KONG	1976	3903	0.4310	2220.81	91
CZECHOSLOVAKIA	1975	2780	0.1960	2235.12	92
ALGERIA	1961	4172	0.4620	2244.54	93
SINGAPORE	1978	3978	0.4080	2354.98	94
POLAND	1983	3199	0.2450	2415.25	95
GERMANY	1975	3200	0.2050	2544.00	96
ISRAEL	1960	4122	0.3770	2568.01	97
TRINIDAD	1975	5007	0.4670	2668.73	98
ARGENTINA	1970	4983	0.4420	2780.51	99
BULGARIA	1982	3812	0.2570	2832.32	100
HONG-KONG	1981	5798	0.4540	3165.71	101
VENEZUELA	1971	6021	0.4610	3245.32	102
SPAIN	1974	5097	0.3570	3277.37	103
HUNGARY	1982	4610	0.2890	3277.71	104
IRELAND	1980	5664	0.3820	3500.35	105
CZECHOSLOVAKIA	1981	4751	0.2550	3539.50	106
ISRAEL	1976	5365	0.3350	3567.73	107
ISRAEL	1980	5601	0.3360	3719.06	108
SPAIN	1981	5633	0.3250	3802.28	109

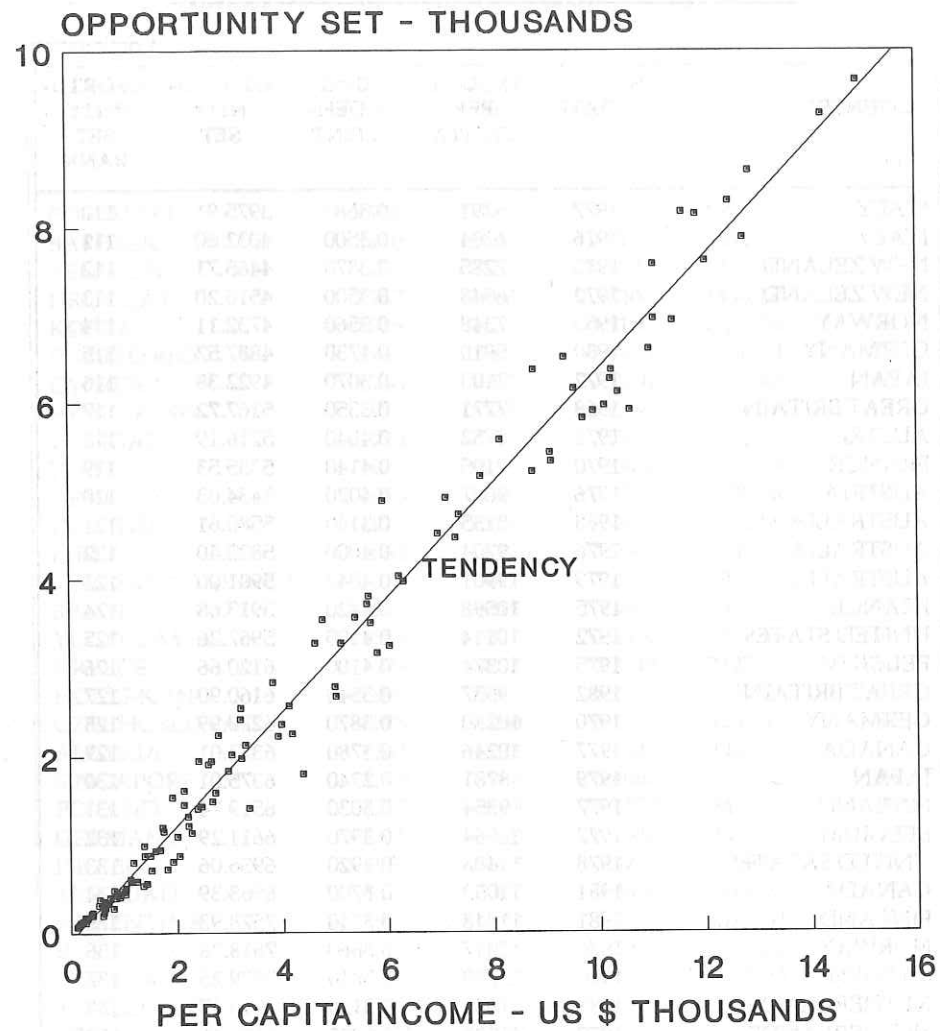
Table A.2
SOCIAL PROGRESS INDEX
(SIMPLIFIED)
COUNTRIES ORDERED BY OPPORTUNITY SET

Continuation

COUNTRY	DATE	INCOME PER CAPITA	GINI COEFFICIENT	OPORTU-NITY SET	OPORTU-NITY SET RANK
ITALY	1977	6291	0.3680	3975.91	110
ITALY	1976	6204	0.3500	4032.60	111
NEW ZELAND	1982	7285	0.3870	4465.71	112
NEW ZELAND	1972	6948	0.3500	4516.20	113
NORWAY	1963	7348	0.3560	4732.11	114
GERMANY	1980	5910	0.1730	4887.57	115
JAPAN	1972	7103	0.3070	4922.38	116
GREAT BRITAIN	1968	7771	0.3350	5167.72	117
AUSTRIA	1974	8752	0.4040	5216.19	118
FRANCE	1970	9105	0.4140	5335.53	119
AUSTRIA	1976	9087	0.4020	5434.03	120
AUSTRALIA	1968	8135	0.3140	5580.61	121
AUSTRALIA	1976	9704	0.4000	5822.40	122
AUSTRALIA	1979	9901	0.4040	5901.00	123
FRANCE	1975	10598	0.4420	5913.68	124
UNITED STATES	1972	10114	0.4100	5967.26	125
BELGIUM	1975	10374	0.4100	6120.66	126
GREAT BRITAIN	1982	9537	0.3540	6160.90	127
GERMANY	1970	10230	0.3870	6270.99	128
CANADA	1977	10246	0.3780	6373.01	129
JAPAN	1979	8781	0.2740	6375.01	130
FINLAND	1977	9354	0.3030	6519.74	131
BELGIUM	1977	10964	0.3970	6611.29	132
UNITED STATES	1978	11408	0.3920	6936.06	133
CANADA	1981	11053	0.3700	6963.39	134
FINLAND	1981	11048	0.3140	7578.93	135
NORWAY	1976	12017	0.3660	7618.78	136
SWEDEN	1970	12729	0.3810	7879.25	137
NETHERLANDS	1981	11844	0.3120	8148.67	138
NETHERLANDS	1977	11591	0.2950	8171.66	139
GERMANY	1978	12467	0.3350	8290.56	140
DENMARK	1981	12850	0.3280	8635.20	141
NORWAY	1982	14225	0.3480	9274.70	142
SWEDEN	1981	14887	0.3510	9661.66	143

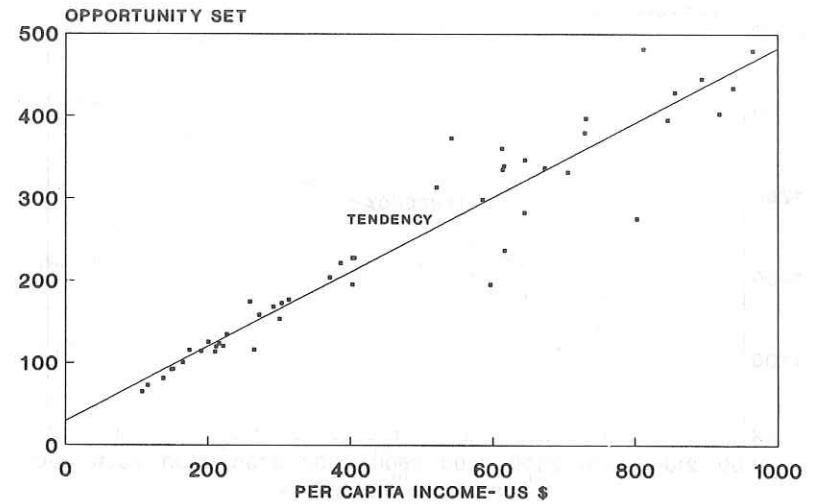
Source: Campano y Salvatore (1988)

Figure A.5
**PER CAPITA INCOME AND OPPORTUNITY SET
 ALL COUNTRIES**

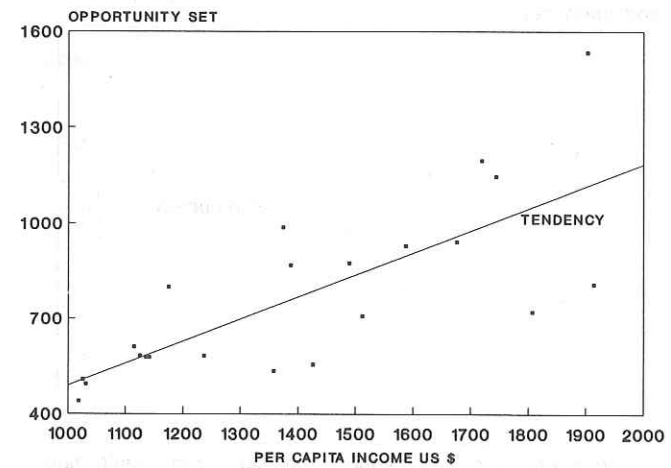


Source: Table A.2

Figure A.6
**PER CAPITA INCOME AND OPPORTUNITY SET
 COUNTRIES WITH LESS THAN US\$ 1000 PCI**

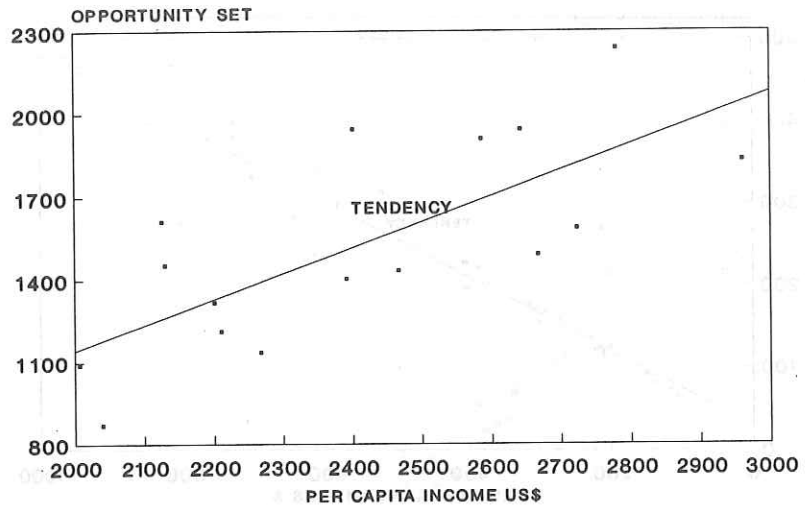


COUNTRIES WITH US\$ 1000-2000 PCI
 COUNTRIES WITH US \$ 1000-2000 PCI

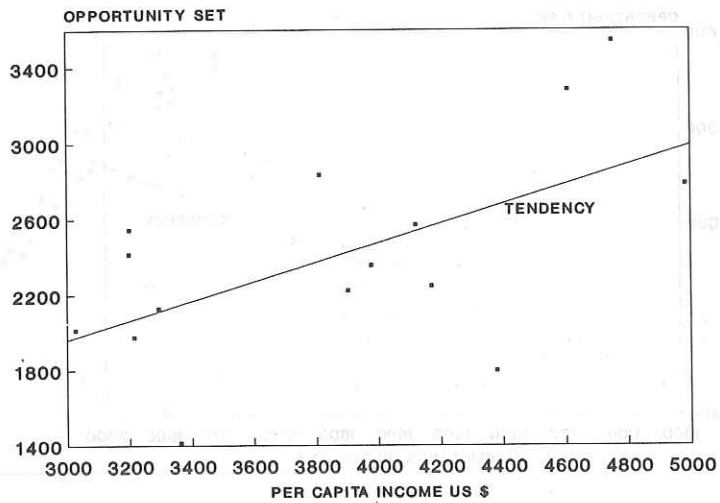


Source: Table A.2

Figure A.7
PER CAPITA INCOME AND OPPORTUNITY SET
COUNTRIES WITH US\$ 2000-3000 PCI

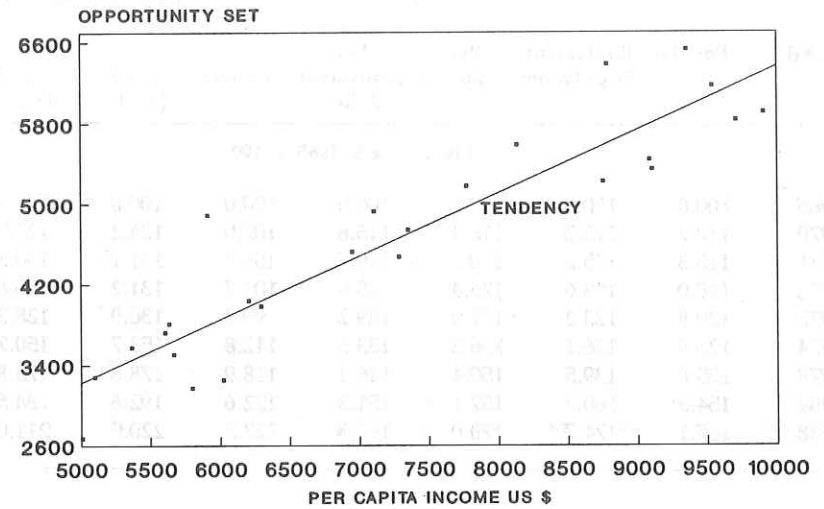


COUNTRIES WITH US\$ 3000-5000 PCI

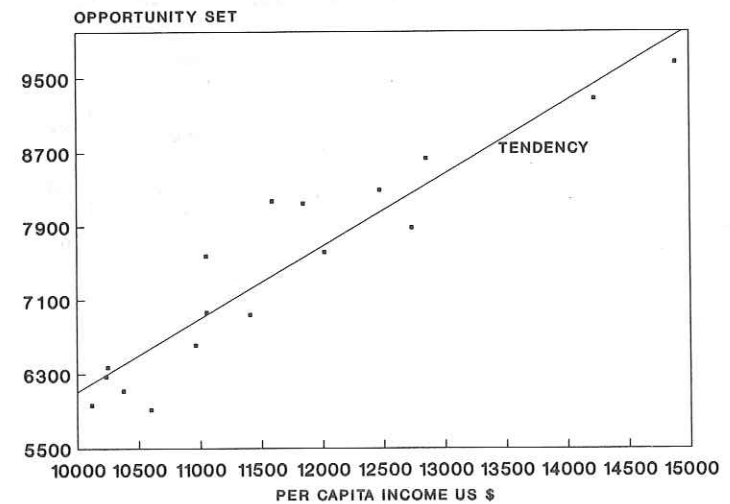


Source: Table A.2

Figure A.8
PER CAPITA INCOME AND OPPORTUNITY SET
COUNTRIES WITH US\$ 5000-10000 PCI



COUNTRIES WITH MORE THAN US\$ 10000 PCI

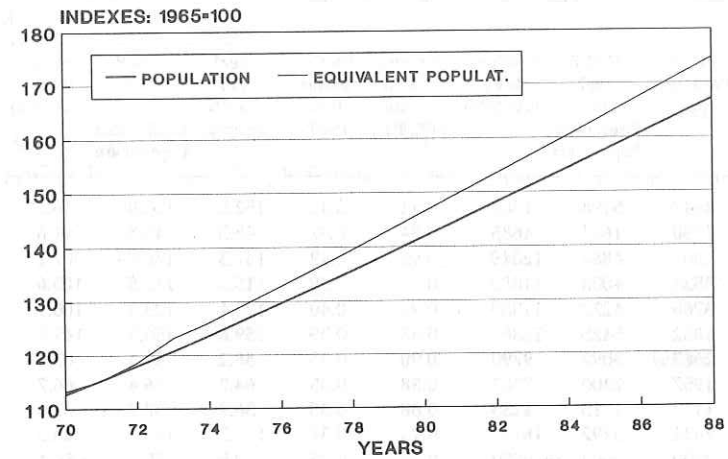


Source: Table A.2

Table A.3
EVOLUTION OF VARIABLES OF THE OPPORTUNITY SET COLOMBIA

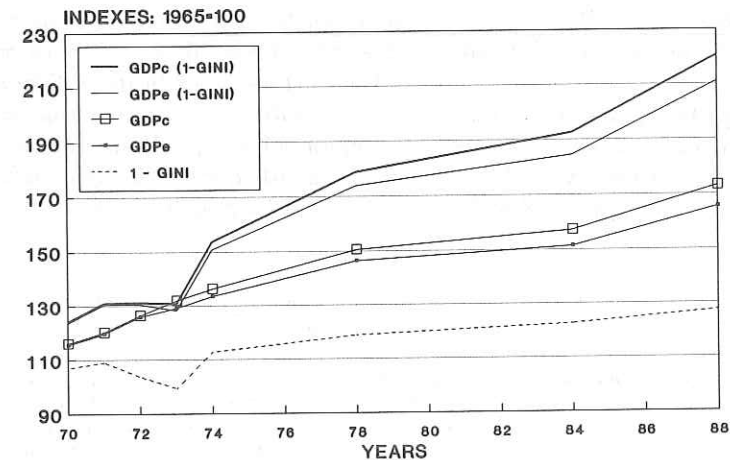
YEAR	G D P				OPPORTUNITY SET		
	Popula- tion	Equivalent Population	Per Capita	Per Equivalent Adult	1-GINI	GDPc (1-GINI)	GDPe (1-GINI)
INDICES 1965 = 100							
1965	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1970	112.7	113.2	116.1	115.6	107.0	124.2	123.7
1971	115.3	115.2	120.2	119.7	109.1	131.1	130.5
1972	118.0	118.6	126.4	125.9	103.7	131.2	130.6
1973	120.8	123.2	131.9	129.2	99.3	130.9	128.3
1974	123.6	126.1	136.2	133.5	112.8	153.7	150.7
1978	135.6	139.5	150.4	146.2	118.9	178.8	173.8
1984	154.3	160.3	157.1	151.3	122.6	192.6	184.5
1988	167.1	174.7	173.0	165.5	127.5	220.5	211.0

Figure A.9
EVOLUTION OF THE COLOMBIAN POPULATION
1970 - 1988



Source: Table A.3

Figure A.10
EVOLUTION OF EXPLANATORY VARIABLES
OF THE OPPORTUNITY SET - COLOMBIA 70-88



Source: Table A.3

Table A.4
DECOMPOSITION OF REAL G.D.P. PER CAPITA (ppp \$)
LATINAMERICAN COUNTRIES - 1987

Country	INDICES: AVERAGE=100									
	Real Per Capita (ppp \$)	G.D.P. 1987 Per Equivalent Population	Productivity (GDP/Po)	Employment Rate (Po/Pw)	Participation Rate (Pw/Pe)	Real Per Capita (ppp \$)	G.D.P. 1987 Per Equivalent Population	Productivity (GDP/Po)	Employment Rate (Po/Pw)	Participation Rate (Pw/Pe)
ARGENTINA	4647	5198	1307	0.94	0.42	152.5	150.0	116.5	105.5	107.2
BOLIVIA	1380	1611	4685	0.94	0.37	45.3	46.5	41.6	105.8	92.6
BRASIL	4307	4884	12049	0.95	0.43	141.3	140.9	107.1	106.4	108.6
COLOMBIA	3524	4003	11880	0.86	0.39	115.6	115.5	105.6	96.6	99.4
COSTA RICA	3760	4272	11359	0.93	0.40	123.4	123.3	100.9	104.8	102.3
CHILE	4862	5425	16862	0.83	0.39	159.6	156.5	149.8	93.2	98.4
ECUADOR	2687	3097	9790	0.90	0.35	88.2	89.3	87.0	100.7	89.6
GUATEMALA	1957	2300	7503	0.88	0.35	64.2	66.4	66.7	98.9	88.4
HONDURAS	1119	1315	4233	0.88	0.35	36.7	37.9	37.6	99.2	89.3
MEXICO	4624	5292	16197	0.96	0.34	151.7	152.7	143.9	107.4	86.7
NICARAGUA	2209	2603	9950	0.76	0.35	72.5	75.1	88.4	85.2	87.6
PANAMA	4009	4546	14179	0.84	0.38	131.6	131.2	126.0	94.8	96.4
PARAGUAY	2603	3008	7612	0.95	0.42	85.4	86.8	67.6	106.6	105.6
PERU	3129	3581	10287	0.90	0.39	102.7	103.3	91.4	101.0	98.2
URUGUAY	5063	5602	14728	0.87	0.44	166.2	161.6	130.9	97.6	111.0
VENEZUELA	4306	4933	15629	0.86	0.37	141.3	142.3	138.9	96.3	93.4
SIMPLE AVERAGE	3047.2	3465.9	11253	0.89	0.39	100.0	100.0	100.0	100.0	100.0

3.

WELL-BEING AND LIFETIME DEPRIVATION: A PROPOSAL FOR AN INDEX OF SOCIAL PROGRESS

Meghnad Desai*

3.1. INTRODUCTION

It is widely felt that the process of development, once thought to be as simple as taking off the runway has got stymied in the last few years. The normal flows of capital have been reversed during the debt repayment crisis of the 1980's, the upward march of per capita income has been halted and again reversed for Africa and for Latin America, the slow improvement in the position of the poorest by the never reliable process of "trickling down" has given way, with official international approval to a flow upwards from the poor to the rich. In some areas, even the gains made on the mortality/morbidity front have been eroded.

At the same time, our understating of what the development process should consist of is changing. No longer can we be satisfied by the numerical march of income statistics at the aggregate level. We are conscious that the improvement in the quality of life, of human development, is more impor-

* Professor, London School of Economics. This is a much revised version of my earlier paper "Potential Life Time: A Proposal for a Index of Social Progress", written (as this new version) for the Regional Project to Overcome Poverty, UNDP/Latin America, in September 1989. Parts of that paper appeared in the proceedings of the South Commission Conference on Social Indicators for Development, edited by Frank Bracho, [Desai (1989a)]. I am grateful to Amartya Sen and Julio Boltvinik for earlier discussions. Jaime Ross, Chris Longford, Francois Bourignon, Luis Ordoñez and Anup Shah said things at various times which helped shape the final product. Luis Thais always had the confidence that something like the present project could be accomplished even though he did not know the shape it would take. All these are exonerated of any responsibility for any errors remaining but have earned my thanks.

tant. We are therefore as aware of the gender dimensions of economic life as we are of the environmental ones. In general we are aware that the true aim of all economic life is the greater opportunity for people to pursue what they consider their own lifestyles; that people are the ends, not the means of economics. [UNDP (1990) HDR1].

Such considerations call for new ways of thinking about development. They also call for a reexamination of the available tools and techniques used in evaluating development. In this essay, we concentrate on a critical discussion of the concept of income, the most frequently and universally used measure of economic activity as well as of well-being. As a measure of the outcome of the development process, income leaves much to be desired. This however does not mean that development programmes can be formulated without reference to the constraint that available resources represent. Income is, if broadly interpreted as resources, an indicator of the opportunity set within which better outcomes can be pursued.

A parallel task must then be to pose against income as opportunity a better measure of the outcome of development. We need devices to gauge the social outcomes of the economic processes on which hitherto, much attention has been focussed. In proposing such a measure, it must be always borne in mind that measures of development are not just technical devices; they must be meaningful to people as well as to those who motivate development. As will be argued more fully below, despite all its shortcomings, income is a concept that is meaningful to each person no matter how low or high in the economic and political spectrum. Any alternative proposed should have the same simplicity.

3.2. MEASURES OF DEVELOPMENT: INCOME AND ALTERNATIVES

Our search for an alternative measure of development is not a new one. Periodically, people have discovered that rapid though progress has been it has not been spread far enough down. Thus it was towards the end of the Victorian era that Charles Booth embarked on his systematic study of the London poor and Rowntree enquired into the same phenomenon in York. Almost contemporaneously, in India, Dadabhai Naoroji challenged the notion that the British Empire had been a benevolent experience; he used a pioneering national income accounting to size up the poverty then extant in India. Thus it was that these pioneers taught us that overall prosperity can lead for large groups of people to adverse living conditions. [Booth (1889-1902), Rowntree (1901), Naoroji (1901)].

After a decade and more of full employment and economic growth, a similar search resumed at the end of the 1950's. In the USA and the UK, poverty was rediscovered in the midst of plenty. In India, at the other end of

the income scale, the government became aware of the fact that ten years of economic growth had led to a very uneven record of improvement for different sections of the population. Much work was carried out by the World Bank on the interrelationship between economic growth and income distribution. At the same time in the early seventies we also became aware of the environmental consequences of economic growth and how income as then measured was too gross a concept because it did not account properly for the use of exhaustible resources.

Thus at the microeconomic level the prevalence of poverty and at the macroeconomic level, the neglect of the global ecological considerations taught us that the much used concept of GNP/GDP was an unreliable guide to many important facets of economic life. At the present, we resume the search in a very different context; growth, even in terms of the imperfect GDP measure, has stopped. This stoppage has neither improved income distribution nor has it slowed down the environmental deterioration. At the same time nearly two decades of the women's movement have made us aware of another dimension of deprivation – the intrahousehold deprivation that women suffer in addition to the discrimination in the outside world in matters of incomes, educational opportunities, access to jobs, etc. Unlike the concern for the poor in the Victorian times, the gender issue touches a large part if not the majority of the population. No index of human development or of social progress can afford to neglect this large group. [Brannen and Wilson (1987), Wilson (1987)].

The work of the last two decades has led to some alternative measures being proposed; on the one hand we have had a vigorous literature on the measurement of poverty. In this area, debate has concentrated around the choice between an absolute and a relative measure of poverty. As with all these debates, much can be clarified by laying down the conceptual foundations of the measure properly. When this has been done, as in this case by Amartya Sen [see his Geary lecture *Poor, Relatively Speaking*, Sen (1983)], we see that we need a combination of an absolute measure in the space of capabilities [to be further explained below] and a relative measure in the space of commodities. In our subsequent analysis we shall use and extend this powerful insight. For the time being let us note that both the absolute and the relative measures have the properties that (a) they relate to individual households, (b) they tell us that food, some basic needs such as shelter, health and education or social approbation form a hierarchy of needs which is more similar than not in diverse societies.

The poverty literature has also on another hand tackled the task of producing a scalar summary statistic of the aggregate amount of poverty in any economy. [See for instance the survey in Atkinson (1987)]. This is the macroeconomic side of the poverty measure. Unlike the household poverty measure which is defined (usually) in terms of income, the aggregate

measure proposed, elegant as they are, lack the simplicity required for communicability in public life. They remain the playthings of economists.

Other measures proposed have been far too summary and related to economies rather than households. Thus, the measure PQLI has meaning only for intercountry comparison. [For PQLI, see M.D. Morris (1979)]. A similar criticism can be made of the valiant efforts made by MacGranahan and his associates who at UNRISD tried to create measures of socioeconomic development. These too are solely macro and do not relate to the individual or the household.

The contrast with income cannot be greater. At the macro level, income is measured as GDP or GNP. This measure has many defects and even now it is being improved, as for instance in the recent monumental efforts by Kravis-Heston-Summers. [1978]. But at that level, it has now permeated national and international policy making. One reason for this is that at an individual level, income makes sense to everyone. This is despite the fact that individual incomes do not sum to GDP and that per capita income is an even less useful indicator of individual welfare. But income is a concept that people understand, or think they do. Policy makers can formulate national programmes in terms of income targets. Politicians can write election platforms in its terms.

These are virtues of the income concept. As such, income is a simple measure of a very complex phenomenon; it is a price weighted sum of quantities. Prices as weights are not ideal; they frequently distort. Many non market activities are ignored, most notably the value of time spent by women in housework. Many non marketed, but in principle marketable commodities – home produce for example – are underestimated. All these defects are well known and some are being remedied. But the fact remains that income still captures a lot of economic life in a deceptively simple way.

One reason is that income is measured in money terms, terms that are easily understood; even real income is in constant "dollars". The money metric is part of everyday life. Prices which are the weights, imperfect though they be, are also part of everyone's daily experience. At individual as at the macro level the units of income are the same – "dollars". This is not the case in poverty measures, for instance.

Where income fails is in the fact that it is used for two very different purposes and can only adequately do one of the two jobs. Throughout the history of modern economics from Petty onwards, one use of income has been to measure output or surplus. This is an ex post account of what has already happened. It is as such a measure of activity. So it remained through the period of classical economics. It was with Pigou and neoclassical economics that income was proposed as a measure of individual economic welfare. Pigou, to do him justice, did try and relate this personal welfare measure to the "national dividend" i.e. aggregate income. This is not however straightforward. On the one hand, net output or net real income was found

too difficult to measure even ex post at the aggregate level [hence the debate about "keeping capital intact" between Pigou, Hayek and others in the mid 1930's. [See Parker and Harcourt (1969)]. This is what led Keynes to reject any use of real income or output in his *General Theory*. [See the little read chapter 4 of the *General Theory*, Keynes (1936)]. The compromise proposed in the 1940's and later when some measure of productive activity was needed for war planning was to use gross national product and ignore the net concepts.

The other use of income as a welfare measure required an ex ante concept. As Hicks showed in his *Value and Capital* fifty and more years ago, this measure of income is almost impossible to implement in any practical way. [Hicks (1939)]. Income in this definition is *the maximum flow of consumption that an individual can expect to maintain given his/her expectations about prices and interest rates, keeping the initial level of wealth intact*.

Consumption is the primary concept here for measuring welfare; but it is the prospective path of consumption rather than the past or actual path that is of interest. But once we gaze into the future, expectations are important, as are stocks of durable assets inherited from the past. Finally it is what the individual can do, the maximum sustainable flow, rather than what s/he actually does that counts. Individuals may actually save or dissave ex post. That is none of the concern of the welfare theorist. It is what they can potentially at their best do, without ruining their capacity for going on doing so which matters.

Such difficulty of definition or measurement has not daunted economists who blithely use per capita GDP as a welfare measure. On all counts this is illegitimate and unsatisfactory. Even for measuring economic welfare narrowly defined such an ex post measure is useless. It measures what has already happened, be it income, output or expenditure. To call it a measure of welfare invokes many unstated but inadmissible assumptions. It is here that dissatisfaction with the income measure in popular debates surfaces; those who object to GDP may not put it the way we have put it. But they have a legitimate reason to feel suspicious.

[There are additional difficulties from a theoretical angle in interpreting movements in aggregate real income (assuming that it can be adequately measured) as telling us anything about improvements in individual welfare. This raises some formidable issues of aggregation and/or of income distribution. Paul Samuelson took this issue up in his "Evaluation of Real Income" [Samuelson (1950)]. The issue was by no means resolved satisfactorily since the utilitarian calculus encounters difficulties in this exercise. Amartya Sen has returned to this problem in his article on "Real National Income", Sen (1976)].

One useful insight of the Hicks definition can however be of value in our attempt to construct an alternative definition of development/progress. This is that the measure must be prospective. In its subsequent development the

Hicks definition has been adopted in the notion of life cycle income. This is a weaker version of the Hicks definition but an operational one. Originally proposed to explain the saving/income relationship over long periods of data, the life cycle income notion is microeconomic as well as dynamic. It takes a lifetime perspective of individual behaviour. We hope to adapt it for our purpose.

In the lifecycle hypothesis, at the outset, the horizon of lifetime over which decisions are made was taken as fixed. Later work was done on adapting this to uncertain lifetime. The important thing for our purpose is that it is both the length of this uncertain life as well as the level of consumption which should enter any index of the quality of life. The poor suffer from at least two dimensions of deprivation; they consume less than the amount adequate by certain definitions of the poverty line and they live shorter lives than the better off. This positive relationship between longevity and income is obvious in international comparisons of life expectancy and per capita income. But this crude relationship reflects an equally strong one at the level of individuals and households within a country. The poor experience a higher level of infant mortality, of post natal maternal mortality and higher levels of age specific mortality and morbidity rates. It is true that the positive relationship between income and longevity is concave; the inequalities in longevity are much less than those in income levels. But the fact remains that inequalities of consumption/income are compounded by the inequalities in length of life expected or lived.

In this chapter, I proceed to build up an index of social progress as a measure of human development. The aim is to supplement rather than supplant GDP. An index of progress marks positive gain; by contrast, an index of deprivation will register shortfalls. Deprivation like welfare is a basic measure expressed in terms of levels.

Progress is by definition a change in the levels of the basic measure. A drop in deprivation or an increase in well-being are alternative measures of progress. [Sen, chapter 1 in this volume]. So alternately I shall refer to deprivation measures, such as poverty measures and achievement measures such as social welfare functions.

The view taken in this chapter is that it is *the quantity and quality of life* (QQL) which is the basic measure of well-being. An improvement in the quantity and quality of life is a sign of progress. Relative to some minimum threshold, any shortfall in QQL is a sign of deprivation.

Apart from levels and changes, another issue is whether the index should be defined in positive or negative units. Sen's index of poverty is measured in positive units and progress is defined as a decline in the index. Atkinson, on the other hand, has defined poverty in terms of negative welfare; progress is an increase in this index from a negative number towards zero. [Sen (1976), Atkinson (1987)].

The two dimensions of QQL are treated in the following two sections. In Section 3, the quantity of lifetime to be lived is analysed as a measure of welfare. In Section 4, consumption defined broadly to include many non-market activities, is the basic measure of quality of life. In Section 5, these two are combined to generate the measure of QQL at the individual level. Section 6 then takes up the alternative ways of aggregating the QQL measure for individuals. This is the macroeconomic index. Some illustrative calculations are offered using Latin America data.

3.3. POTENTIAL LIFETIME

A central concern of all human societies is the preservation and prolongation of life. The shortness of lived life has been the primary constraint felt by all societies until recently; even today only a few very rich economies are burdened by the worry of a large part of its population living long. Even then, societies wish to prolong rather than cut off life, and, except for the suicidal, so do individuals.

The length of life one leads has a connotation both for its own sake – few wish to die – but also because it represents the opportunity to do other things that one longs to do but has not had the time so far to do. Time on earth represents opportunity to have new encounters, to deepen existing relationships, to look forward to new generations, new developments, etc. No one is willing to trade off their life for any amount of money *ex ante*; indeed, economic theory is not equipped to deal with the problem of valuing life as such. It can only deal in the marginal issue of increasing or decreasing probability of survival and its valuation. [See the debate between John Broome and others, *Journal of Public Economics*, 1979/1980].

The index of social progress/development thus takes as a basic building block the longevity of individual life. This is to be measured in terms of the expected length of life remaining to be lived by an individual. It is thus an *ex ante* or prospective measure. For any individual of age *a*, his/her age conditional life expectancy can be denoted as E_a ; then his expected future lifetime [FLT] is:

$$FLT_j = [E_a - a_j] \quad (1)$$

In equation (1), for the *j*th individual of age *a*, the future lifetime [FLT] is equal to his/her expected length of life less their current age. Thus a 40 year old person may have an age conditional life expectancy of 75; then their future lifetime is 35 years. E_a , the age conditional life expectancy is to be distinguished from the life expectancy concept usually cited. Life expectancy in the normal sense, denoted E_0 , is attached to a newly born cohort, and is merely a way of summarising the existing age specific survival probabilities into a

scalar form. If the mortality rate was independent of age and constant then $E_a = E_0$ for all a . But this is rarely the case. In actual fact the age conditional life expectancy is also influenced by income and other personal characteristics. But it is age which is the principal conditioning variable in (1). It is convenient to assume that no one is living beyond his/her expected life i.e. E_{aj} a_j for all j .

The units in which FLT is defined is years, a metric easily understood. It is also possible to aggregate FLT over all individuals of all ages. Doing this we get

$$FLT = [E - A] N \quad (2)$$

In equation (2), E is the average expected life in years and A is the average age of the population, N .

It may be helpful to contrast E , the average (age weighted) life expectancy with the life expectancy figure (E_0) usually cited in the development literature. E_0 , as we have explained, is the average life expectancy of a newly born cohort; it summarizes the age specific mortality rates existing at the time the cohort is born. Thus it is supposed to convey the length of life a representative newly born is expected to live if age specific mortality rates stay constant through its future life. Our measure E incorporates the longevity of each individual conditional on their current age and conveys the length of life of a representative individual among all those currently alive on the assumption that the age conditional mortality rates remain unchanged until the last of the currently alive persons has passed away. In a sense E is by itself a measure of achieved welfare but it is not the one we use. It is the future life remaining to be lived that we are focussing on.

FLT has an obvious virtue of simplicity at the individual level. Of course, years of expected future life are undiscounted nor are they adjusted for quality. But it is "agist" at the individual level; as a measure of well-being it rewards the young much better than the elderly. It is quite possible to argue that it is not the value of the *level* of FLT; but its relation to how long people would like to live or in some normative sense should live that is a better measure free of "agist" bias.

At the macroeconomic level, the "agist" bias shows up as favouring countries with growing population and hence low average age. This is called the "natalist" bias of FLT. Take for example two populations of 1000 people each. One has everyone of 6 years of age expected to live 6 more years. Making per capita FLT equal to 6. Another has 60 year olds expected also to live another 6 years. Again the per capita FLT is 6, but somehow our intuition tells us that we ought to rank the second population higher than the

first. This is because achieved longevity is also important, not just future lifetime.

These considerations lead to a modification of FLT in the following way. It is true that a certain age has been the common high aspiration of all civilizations. In Biblical times four score years is mentioned as a venerable age; in India 100 was looked upon as such an age. We can thus define a maximum age that everyone aspires to in all countries. Let this age be denoted T ; T can be, say, 80. The maximum life expectancy (E_0) over all countries in 1985 was 78, so we are not very far away.

The choice of T is arbitrary and could even be decided after a survey of the population, since T is a welfare objective of individuals: it is the age everyone would like to live to if they had a choice. But in any society T must exceed the age of the oldest living individual i.e. $T > \max_j a_j$.

Now we can see that for a person of age a , $[T-a]$ is his/her potential lifetime [PLT]. By the same argument as before the economy's PLT can be also derived:

$$PLT_j = (T - a_j) \quad (3)$$

$$PLT = (T - A) N \quad (4)$$

PLT is thus the maximum stock of years left for the population to live, clearly the gap between FLT and PLT is an indicator of deprivation. The way to modify FLT in order to reduce its agist/natalist bias is to express it as a proportion of a maximum or a potential life time.

Thus

$$R_j = (E_{aj} - a_j) / (T - a_j) \quad (5)$$

Now R_j can be as high for an old person as for a young person; the favourable treatment of low a is mitigated. Now R_j is a measure of achievement, of well-being just as $(1 - R_j)$ is a measure of deprivation. Factors such as poverty which lower the life expectancy of children will show up as low R_j since T is independent of all personal characteristics, including income.

Thus R_j is a relative measure of the quantity of life. It can also be thought of as the probability of living up to T , since it takes values between 0 and 1. Being a ratio, it is not a straightforward task to interpret an aggregate R . It can be written as a weighted sum of R_j , the weights t_j being relative PLT _{j} .

$$R = \frac{1}{N} \sum_j \frac{[E_{aj} - a_j] (T - a_j)}{(T - a_j) (T - A)} = \sum R_j t_j = \frac{[E - A]}{[T - A]} \quad (6)$$

We now turn to the second dimension of deprivation -the consumption gap. In one sense this is a well known measure and has been much discussed. We wish however to extend and modify it before it is appropriate for our purpose. This is what is discussed in the next section.

3.4. CONSUMPTION GAP/SECOND STEP TOWARDS AN INDEX

In the poverty literature a frequently used measure is the poverty line, denoted Z . Given the poverty line an individual's poverty gap is decided as the difference between Z and actual income Y ($g_j = Z - Y_j$). It is necessary for our purpose to reexamine the notion of the poverty line before it can form the second block of our measure.

There are two principal approaches to the measurement of poverty -absolute and relative. Within the absolute approach, there are two variants. One is to use some notion of subsistence to derive a poverty line. The other approach, used extensively in Latin America studies, is concerned with the dissatisfaction of basic needs (DBN). While the poverty line (PL) approach reduces the complexity of poverty to a scalar measure in money terms the DBN approach avoids any monetary evaluation of the different needs and hence also avoids any aggregation over the needs [see Desai (1989b) for a discussion]. The relative approach uses a broader notion of poverty than subsistence, emphasising especially the ability to participate in community life. In Peter Townsend's study of UK poverty, the methodology is similar to that of DBN but Townsend aggregates over the several dimensions which define deprivation. From the aggregate deprivation index for each household, Townsend derives a scalar measure of the income similar to the poverty line. There is much to be gained from examining the approaches in detail and hopefully synthesize their best points, avoiding their defects. [Townsend (1979). See Desai and Shah (1988) for a critical look at Townsend's procedure].

In the absolute approach to the measurement of poverty, a first step is to specify a level of calorie intake that is said to constitute subsistence. Of course, we need not have calories alone; in general, other characteristics of food intake can be specified -protein, other nutrients, variety of foods, their freshness, their desirability in terms of tastes, etc. But usually a standard in terms of calories is specified. In India, Bangladesh, Pakistan as in the pioneering studies of Rowntree an identical level is specified for everyone. This is neither scientifically sound nor desirable. Ideally the calorific requirement differs by age, gender, health status, type of work done and the rate of activity in general. In his pioneering study of poverty in Latin America, Oscar Altimir adopted a variable standard specified in terms of the variables such as age, gender, etc. [Altimir (1979)].

Once we have the calorific requirements, preferably variable by individual and over time [or, albeit, a general vector of characteristics of food intake], then we can convert that into food baskets and via prices into food expenditure required. This is an adequate level, not a level below which life is insupportable. Now given this level of calorific requirement and the implied level of expenditure we derive the poverty line by multiplying the food expenditure by the reciprocal of the share of food in total income [called the Engel coefficient]. The poverty level thus derived would be individual and time varying. This is not normally the case with the poverty line which is derived for households and which is based on constant intakes of calories more often than not.

An individually and time varying poverty level is several steps beyond existing practice but it still leaves a lot to be desired. The desirable feature is that it is individual based rather than household based. Recent studies of intrahousehold inequalities in consumption tell us that much deprivation is gender based; thus taking the household as a unit glosses over the difficult problems of poverty. [Brannen and Wilson (1987), Wilson (1987), Sen (1984)]. There is no readymade information available on such a poverty line, but it is still necessary to clarify the conceptual basis of the measure. But the defect of the measure is that it is foodbased as well as the rarely mentioned fact that the time spent in preparation of the food after its purchase, time spent mainly by women, is not at all costed. Thus if anything the poverty line is downward biased.

It may be argued that the use of the Engel coefficient overcomes the exclusive emphasis on foodstuffs as the criterion for the poverty line. It does mitigate it somewhat but not entirely. First, PL neglects the consumption of public goods - healthcare in particular but also education and the infrastructure. Since much of this is publicly provided it is also subsidised; individual budgets thus underestimate the money equivalent of this part of consumption. (It is also this portion of public expenditure which has been cut in recent attempts at structural adjustments with predictable consequences for health outcomes). Second reason for emphasising this neglect is of course the externalities of expenditure on public goods. In measuring the poverty line, we are eventually aiming at a measure of the well-being, the quality of life. It is in enhancing the quality of life that expenditure on eradication of disease, or prevention of crime, or more frequent or rapid transport has its justification. An exclusive attention to private expenditure mainly on marketed commodities misses out this dimension. But even more important is the objection that the emphasis on current consumption focusses exclusive attention on income support as the only way of overcoming poverty. Such an emphasis, although made from the best of motives, may miss the fact that it will be by accumulation of assets especially skills and other human capital items that in the long run families move out of poverty. Income support spent entirely and

exclusively on current consumption leaves the longer run problem untouched.

All this is to say that the measurement of the poverty line frequently though unconsciously embodies theories of causes of poverty. The emphasis on expenditure on purchased goods for current consumption neglects unpaid labour as it does underpriced public goods and also asset formation. It is a short run measure of deprivation which quickly translates into support needed in terms of published data on GDP but leaves all the distortions of that GDP measure untouched. Thus the poverty measure chosen has to remedy these defects.

A further insight into the contents of the poverty line can be obtained by looking at the approach of Dissatisfaction of Basic Needs adopted in some Latin American studies. [See Desai (1989b) "Methodological Problems of the Measurement of Poverty in Latin America" for bibliography and further discussion]. In this approach the questions relate to the quality of housing – overcrowding, availability of running water and sanitary facilities – as well as access to schools for children, level of education of the head of household, etc. Thus private and public goods are taken together although the coverage is neither systematic nor exhaustive.

For each item, households are scored 1 for shortfall and 0 for meeting or exceeding the norm. But these 0,1 scores are not added up. A household's deprivation score is the maximum of these scores. Let DB_j be the deprivation score (as measured by DBN) for the j th household.

$$DB_j = \max_i [d_{ij}] \quad (7)$$

Where d_{ij} is the score for the i th item –overcrowding for instance. It is possible to convert d_{ij} scores into money scores by the approach of hedonic prices. It is also possible to aggregate d_{ij} without using prices. This can be seen in context of Townsend's approach.

Townsend's approach to the measurement of poverty is a relative one.

It is data demanding as it relies on a detailed questionnaire survey of a large sample of poor as well as nonpoor households. The questions relate to consumption of food items as well as availability of certain consumer durables, quality of housing as well as of the neighbourhood, etc. The distinctive feature of this measure is that the adequacy of the resource level is determined not in terms of calories but in terms of being able to participate fully in the life of the community. The sense of being free of shame, cited by Adam Smith as one way of thinking of the quality of daily life is embodied in this measure. Thus activities which involve social reciprocity –inviting friends for dinner and being invited back– activities that indicate absence of

isolation are as much part of an adequate living standard as is the consumption of enough food. [Townsend, (1979)].

For each question, Townsend scores 1 for deprivation and 0 for non-deprivation. But he aggregated up the scores with equal weights. Thus let DT_j be (Townsend's measure of) the deprivation index for the j th household

$$DT_j = 1/I \sum_{i=1}^I d_{ij} \quad (8)$$

Townsend then tried to relate DT_j to household income Y_j to locate a poverty line. But as we have said elsewhere, this is not the best way of treating the problem. [See Desai and Shah (1988)]. The probability of being deprived, of being sufficiently below the community norm is influenced as much by education and health status as by income and wealth. This tells us that while the relative approach is correct in expanding the contents of the basket of goods it is not so in hastening back to translate everything in terms of a scalar level of income.

A way of aggregating the several deprivation scores proposed in the Desai-Shah paper is to use the reciprocal of the proportion of the deprived ($1/h_i$) for any item as a measure of the subjective feeling of isolation for the deprived. An alternative is to take $(1-h_i)$ as weights. Call this D_j

$$D_j = 1/I \sum_{i=1}^I (1 - h_i) d_{ij} \quad (9)$$

Now D_j is between 0 and 1 and is a non monetary analog of the proportional poverty gap $(Z - Y_j)/Z$.

The discussion so far tell us that in the poverty measure we should have:

- (1) individual and time varying measure of consumption.
- (2) such consumption should include at proper prices unpaid and underpriced goods and services – housework and public goods.
- (3) the inclusion of goods which relate to future income – human capital items such as education and health as well as productive assets where relevant [land, for instance].
- (4) participation in social life is as much a constituting element of a poverty line as is private consumption.
- (5) monetary as well as nonmonetary aggregates of the many dimensions of deprivation, as alternative measures of poverty.

[The multiplicity of considerations lacks so far a unifying theory. Such a theory is provided by Amartya Sen's notion of capabilities. The set of capabilities constitute a basis for defining a poverty standard. See Amartya

Sen: *The Standard of Living* (Tanner Lectures/Cambridge, 1987), *Commodities and Capabilities* (Hennipman Lectures/North Holland, 1985). Much work has to be done to produce an operationally viable measure of poverty based on the notion of capabilities. (See M. Desai "Poverty and Capability: Towards an Empirically Implementable Measure (LSE; unpublished). In the presentation here, I have drawn on this paper, but this is not the place for the full theoretical argument.]

The considerations above concern measurement of poverty level consumption (C^*) but they are also relevant for accurate measure of actual consumption (C). The proper empirical implementation of this measure will have to draw on the extensive experience of ECLAC as well as work done in other countries and by other agencies. Survey methods will have to be used and new techniques of measuring intrahouseholds consumption and the value of housework will have to be deployed. Pending these details, a rough sketch of the steps involved in incorporating the considerations (1) to (4) above can be given here.

(A) The value of food purchased plus any home grown food; value of fuel purchased or collected; amount of time spent in food preparation and its appropriate shadow wage: these items together comprise a better estimate of food expenditure than hitherto used. This has to be done for the modal, non-poor family in a society.

(B) The calorific, etc. requirements per individual given the health, age, gender, type of activity have to be calculated and the appropriate amounts of food stuffs to be purchased to meet such requirements have to be specified and the value of the food purchase plus items listed in (A) above added up to give us the primary food expenditure desired per person. [Much of this except for the evaluation of housework time spent in cooking and fuel required is already done in ECLAC studies].

(C) The actual consumption obtained by each member of the household in the sample needs to be calculated. This is a relatively new area of research and methods have to be perfected for accurate measurement. The need to measure this goes beyond merely food consumption but is probably the trickiest here. [The references here are to Sen (1984a), Brannen and Wilson (1987), Wilson (1987)].

(A), (B) and (C) together give us a first approximation to the consumption gap for each individual. This will be measured as desired consumption [from (B) above] less actual consumption [from (C) above]. A shortcut from here on would be to apply the Engel coefficient to this desired level to obtain desired total consumption, but that should be only done if the remaining steps are too data demanding.

(D) The DBN methodology of measuring the availability of decent housing can be used for the next step. Stability of structure, lack of overcrowding, access to running water and to WC/sanitary facilities are the four core items

which could be converted in terms of rent for adequate shelter, as I have indicated in my paper on the methodology of Latin American poverty studies cited above. Alternatively we could leave the deprivation measure in each dimension as a 0/1 variable. Housing is to some extent a choice variable and different societies make do with immensely different amount of housing [e.g. housing in Tokyo as compared to any other big city in a similar income urban area in other countries]. Here survey methods may tell us what is regarded as adequate housing by the population. Housing is consumed collectively by the household and individual shares are only notional; the determination of individual consumption flow can only be done arbitrarily here. Running costs of keeping the house habitable, especially again the housework input, are important here. Thus ideally it is the rent of the "adequate" accommodation plus the imputed value of housework plus any other running cost borne by the occupier add up to housing expenditure. Or we could add up the 0/1 deprivation measure in these various dimensions as in D_j formula in (9) above.

(E) The question of running water and sanitary facilities points to public municipal expenditure on the infrastructure as a component of poverty line; the poor frequently live in those parts of the urban area where the old established drainage and water systems have not reached. They frequently live beyond where roads reach and have ill lit and badly drained streets. Slums impose public as well as private costs but in any delineation of the poverty level the appropriate amount of public expenditure to extend the minimal sanitary and safety conditions ought to be included. Given the difficulty of obtaining a money measure of these things, a quantitative 0/1 deprivation measure is the best bet here.

(D) and (E) together add the second layer of essential consumption. This is a better way of measuring the required expenditure on housing than to apply the Engel coefficient. This is especially the case in view of the public expenditure dimension. As already said above this item is collectively consumed by the household so estimates of individual levels will be arbitrary. Thus if we only had two items, food and housing, one measured in money terms (food) and the other in qualitative terms one way to combine the two would be to multiply the two together i.e. $C_{fj}(1-D_{hj})$ is a measure of actual consumption. Here C_f is expenditure on food, and D_{hj} is the aggregate deprivation in the various housing variables. We can then measure the poverty gap as $[C_{fj}^* - C_{fj}(1-D_{hj})]$. It is this idea that will be extended further below.

(F) Health is the next item in which both the private and the public expenditures are important for the quality of life. It is also an item where the externalities of good health benefit the whole population present and future. Indicators such as infant mortality, low birth weight, perinatal mortality, maternal mortality all tell us the importance of assuring the capability for

biological reproduction adequately. Much of this involves public medical facilities to which easy access has to be assured; there is no way of costing this in private expenditure terms. The same is true of health care at other ages. Some of this involves public consumption – children's school milk, and the rest involves access to medical care at affordable prices. Cuts in public expenditures quickly translate into deteriorating health. Morbidity standards have to be specified as trigger mechanisms for alerting the public authority about the threshold below which health expenditure cannot fall. This also involves even more than for earlier items the labour time of the woman who has the responsibility for health care of children as well as adults.

(G) Education is the next item which is a "merit good" and public provision is the usual mode especially at the primary and the secondary levels. The DBN method asks about access to primary school for children of appropriate age. This must be extended to children of up to 15 years of age. Access to education must be seen to be an essential part of the standard of living as much as food and shelter. There is a similar deprivation for adult illiterates. Lack of adequate education along with health is a determinant of the probability of being poor in developed country data and there is no reason to doubt that this is true of other countries as well. [For evidence on UK, see Desai and Shah (1988)]. Female literacy has consequences for reducing infant mortality as well as for family planning. The estimate of minimum desirable expenditure for assuring primary and secondary education and for eradicating illiteracy should be put into any poverty estimate. It can only be estimated at the public level but it should be part of any deprivation calculation.

(F) and (G) cover the two most important public goods which have not been specified adequately in poverty estimates. They are causes of poverty if inadequately provided; income support to meet a poverty line based on food expenditure alone cannot guarantee that these causes will be removed. Thus income support strategies while no doubt meeting a genuine need fail to tackle the task of getting families out of poverty. These items being part of the public budget compete to some extent with income support, as well as of course other items of public budget [arms expenditure, for example]. But their consideration is too frequently neglected or at least separated from the poverty policy as such. The deprivation measure D_j can be extended to take in information on these dimensions where money sums only inadequately represent value of the service.

Throughout the specification of items in (A) to (G), there has to be a constant reference to the norms of the community regarding what is thought to be adequate. Poverty level is as much a matter of what is regarded as enough by the community as it is a matter for "experts" to lay down. Above all expenditure on poverty eradication is as much an investment in the material development of an economy as in human development. It cannot after all be

in the interest of any economy to have people badly educated, unhealthy, underfed, shortlived, badly housed in crime infested areas. Poverty is a waste of resources, human and material; a world of scarcity should ill afford such a wastage.

The actual poverty line which we arrive at as a result of these considerations is difficult to estimate. Private and public expenditure are its determinants; it will be equally tricky to determine the shortfall that any individual suffers. But this is an area in which some work has been done and given sufficient commitment more can be done. Our present purpose is however to arrive at an index of deprivation/achievement for individuals and for the economy. It is to this task that I now turn.

3.5. MEASURES OF WELL-BEING AND DEPRIVATION/THIRD STEP

In economic literature there are two approaches to measuring individual well-being. The neoclassical approach is to take the expected present value of the utility of life-time consumption as a measure of the welfare of the individual. Future consumption is discounted at the subjective rate of discount appropriate for each time period and the probability of being alive at that period, conditional upon having survived until then is also used to multiply the utility of consumption. As far as the form of the utility function is concerned it is common practice to incorporate a parameter of risk aversion which gives the elasticity of the marginal utility of consumption with respect to consumption.

There are several problems with this approach. Philosophical objections to the utilitarian calculus have been articulated by, among others, Amartya Sen. [Sen (1987)]. For our purposes it should also be emphasised that the emphasis on individualistic behaviour does not tally with the concept of membership of a community that the relativistic approach as well as the capabilities approach take to be the basis for defining desired consumption. Indeed the utilitarian approach has no room for normative considerations [see Desai (1989/1990) on this]. Another problem is that by and large the utilitarian approach has dealt with private consumption. In principle, public goods can be included but then both the budget constraint and the discount rate raise difficult issues of specification.

Thus what we seek is a well-being function W . At its most general we would like to measure W for a society. The difficulties here are well-known even if we only take a Bergson-Samuelson approach. At an individual or household level we wish to specify consumption of "private" goods, consumption of public goods and longevity as three dimensions of human well-being. Some of these issues are dealt with in my paper "Poverty and Capability". [See specially pp. 36-40, Desai (1989/1990)]. My requirements of these variables are influenced by other people's needs. If many people are

deprived, it may not be safe to walk on the streets for me as a rich person and the government may need to spend a lot on policing as a public good.

A well-being function can therefore be specified for an individual j living in community K .

$$W_j = W_j(C_{jk}, E_{jk}, G_k, C'_{jk}, E'_{jk}) \quad (10)$$

In equation (10), the j th individual's well-being is made a function of his/her consumption of private goods C , public goods G and life expectancy E . In these three variables, both C and E carry the subscript j as well as k since they are privatisable but G is common for all. Hence G carries only the subscript k . I have added the consumption of others C'_{jk} and the longevity of others E'_{jk} where $j' \neq j$. This is left vague since it is difficult to say exactly who my welfare may depend upon. Even if I may act altruistic, externalities force me to concern myself with the well-being of other people.

The various considerations outlined above in paragraphs (A) to (G) and in the discussion of DBN methodology and the D measure are ways of filling in the generality of (10) with specifics. Later on we shall arrive at a specific simplified form for (10) where these considerations will be taken into account. For our present purposes it is useful however to construct our argument in terms of the neoclassical approach. This is to bring out the precise point of departure from it. The public goods and externality dimensions have already been mentioned. But even confining ourselves to private consumption goods and individualistic behaviour, we have some differences. These are brought out sharply by doing the neoclassical calculus of lifetime utility maximisation. To keep the contrast in mind, I shall use a specialised version of (10).

$$V_j = W_j(C_{jk}) \quad (10a)$$

Thus V_j is very close to the neoclassical utility function but comes from a truncated version of our well-being function W .

We now proceed to define the present value of expected lifetime well-being of consumption in the standard way:

$$PV_j = \int_a^T \beta_j(t) p_j(t) V[C_j(t)] dt \quad (11a)$$

where β_j is the subjective time varying discount factor, $p_j(t)$ is the conditional probability of survival beyond t and $V[C_j(t)]$ is the instantaneous well-

being derived from private consumption. Note that we are summing from a , current age, to T the maximal age.

In the standard model, the individual maximises (11a) subject to a private wealth constraint (11b). Let wealth be denoted M and additions to wealth m . Let r be the rate of interest and Y income. The j subscript will be dropped in what follows and $\beta_j(t)$ will be approximated by $\exp(-\beta t)$ i.e. a constant discount rate). We have as the wealth constraint:

$$m(t) = rM(t) + [Y(t) - C(t)] \quad (11b)$$

In general there are three results that we may note:

(1) If the individual cannot get into debt [$M(t) > 0$] and therefore there are restrictions on borrowing, consumption will equal income until the individual can save up to finance future consumption. For poor people in most countries indeed for the majority of the world's population this is the realistic case (perhaps over their entire lifetime).

$$C(t) = Y(t) \text{ for } t < t_0 \text{ where } M(t_0) > 0 \quad (12a)$$

(2) Once the individual can save and invest to consume in future, s/he can smooth out consumption. The rule is that the expected marginal well-being of consumption should be constant over the lifetime, the constant being the marginal value of wealth in the initial period.

$$p(t) V'[C(t)] = \lambda_0 \quad (12b)$$

λ_0 being the shadow price of the wealth constraint. For those who save up enough to borrow λ_0 will be high and so will therefore be $V'[c(t)]$ i.e. they will have low levels of consumption.

(3) If capital markets are perfect and borrowing is possible at all times the individual will smooth out consumption over the entire lifetime to equal the average expected income over lifetime.

$$\bar{C} = EPV(Y(t))/E_a \quad (12c)$$

$EPV(Y(t))$ is the expected present value of income and E_a is life expectancy at age a as before.

My purpose in developing this piece of textbook economics is to contrast the approach taken here from the neoclassical ones but also to make the difference precise rather than leaving it at some general vague level. It is clear from eqn. (12a) above that for the poor in every country, indeed for the bulk

of the population, current income is the effective limit on consumption. But even beyond that point we may question the relevance or realism of assuming as one does in the neoclassical approach that the marginal utility of consumption is positive but declines immediately no matter how low the level of consumption. In the poverty literature, a simple measure of deprivation is the income gap.

$$g_j = (Z - Y_j) \quad (13)$$

where Z is the (normative) poverty line and Y is actual income. In light of (12a) above $Y_j = C_j$ and so Z corresponds to C_j^* our

normative consumption level. But to take the simple difference $[C_j - C_j^*]$ as the shortfall in well-being (utility) is to ignore the neoclassical assumption of diminishing marginal utility everywhere.

Implicit in (13) is the perfectly plausible and realistic assumption that we should be able to define the individual as having "well-being" or even deriving "utility" until his/her consumption level has reached $Z(C^*)$. As consumption goes from zero to C^* , the individual is merely surviving, not enjoying himself/herself. This can be formalised in the following way:

$$V[C] = \frac{1}{1-e} [C - C^*]^{1-e} \quad (14)$$

Eqn. (14) is a well-known form where e is the elasticity of the marginal well-being with respect to consumption: the higher e the more rapidly the marginal utility declines as consumption increases. Our argument above is that e should be zero for the poor for whom $C < C^*$. After that perhaps e should increase gradually as C rises above C^* .

$$V[C] = (C - C^*) + \frac{1}{1-e} [C - C^*]^{1-e} \quad (14a)$$

For the poor while $C < C^*$, they get negative well-being. But it is arguable that e should not be the same for all people whose consumption exceeds C^* . Thus for the not so poor but not rich individuals whose consumption is less than twice C^* , e should be small, say $1/2$. While this is arbitrary we could say that e should change in proportion of C/C^* . Thus

$$V[C] = (C - C^*) + 2[C - C^*]^{1/2} \quad | \quad (C \leq 2C^*) \\ + 3[C - C^*]^{1/3} \quad | \quad (C \leq 3C^*) + \dots \quad (14b)$$

we thus allow that well-being rises faster for the less well off than for the rich.

Thus $V(C=C^*)$ defines a zero level of well-being. Those who are poor are "enjoying" negative well-being (deprivation) and those above have a well-being increasing less than proportionately as their consumption goes up. Thus take the typically poor person. S/he has consumption below C^* but also a probability of survival to T which is considerably less than one. The level of well-being achieved by this person will be

$$PV(C < C^*) = \int_a^T \beta(t) p(t) V[C - C^*] dt = \int_a^T \beta(t) p(t) [C - C^*] dt \quad (15)$$

This expression is the present value of the well-being of an individual over his/her lifetime. It is a complicated expression but some simplification can be made. We want to measure at the present time how much the deprivation is. Now a person just at poverty line consumption level C^* and living complete potential lifetime can be thought of as neither deprived nor enjoying a well-being. This is because $V(C=C^*)$ is zero. An individual at $C < C^*$ suffers from consumption deprivation but also his/her expectancy is E_{aj} not T . Combining these two we define lifetime deprivation (LTD) as

$$LTD_j = (T - a_j) C_j^* - (E - a_j) C_j \quad (16)$$

This can be compactly rewritten as

$$LTD_j = (T - a_j) [C_j^* - R_j C_j] \quad (17)$$

In (16) we improve upon the income gap measure such as (13) by incorporating the deprivation due to a shorter than maximal future lifetime. But even so in light of our discussion above, measures such as C^* or Z miss out the dimension of public goods which are typically subsidised out of public funds or difficult to allocate by individual charges. These are variables such as lack of sanitation, bad street lighting, access to schools, danger to safety of life and property. They are measured in terms of 0/1 variables saying whether the access to them is adequate or not. One way to summarise these various dimensions is to use our measure D_j in eqn. (9) above. Combining deprivation in the access to public goods with the other two dimensions of deprivation we have

$$LTD_j = (T - a_j) [C_j^* - R_j C_j (1 - D_j)] \quad (17a)$$

In (17a) we incorporate the public goods deprivation in the same multiplicative way as we have done with the other two dimensions of deprivation. If the access to public goods is adequate in all the relevant variables i.e. $d_{ij}=0$ for all i [see eqn. (9) above], then $D_j=0$ and C_j is taken at its full value. But once there is shortfall in any one dimension $D_j>0$ and this modifies the "value" of consumption by the factor $(1-D_j)$.

There are thus three dimensions to deprivation – insufficient longevity ($R<1$), inadequate access to public goods ($D_j>0$) and inadequate level of consumption [$(C/C^*) < 1$]. These deprivations are multiplied by potential lifetime $(T-a)$ taking into account C . Together these elements give us LTD_j in (17a).

Although LTD_j is written as a positive number, it is a measure of deprivation or deficit. It is expressed in terms of money – "dollar years" i.e. so many "dollars" times the potential lifetime $(T-a)$. Those for whom $RC(1-D) > C$ enjoy well-being. Here again taking our equation (14b) as a starting point, some one whose consumption is less than twice C can have:

$$PV(C < 2C^*) = \int_a^T \beta(t) p(t) 2 [C - C^*]^{1/2} dt \quad (15a)$$

Once again we simplify to get a tractable expression without losing the sense of (14b). The lifetime well-being (LTW) of such a person is approximated as

$$\begin{aligned} LTW(C \leq 2C^*) &= 2[(E-a)C(1-D) - (T-a)C^*]^{1/2} \\ &= 2(T-a)^{1/2} [RC(1-D) - C^*]^{1/2} \end{aligned} \quad (17b)$$

Although (17b) looks complicated it will also be in terms of "dollar-years". But it does deflate the well-being of the non poor since the notion is that extra consumption is not worth the same amount the higher it occurs. This logic is extended to the potential lifetime of the non poor as well so it is the square root of PLT which enters the well-being sum. The extension to those with higher consumption levels can be done in the same way

$$LTW(C \leq KC^*) = K(T-a)^{1/k} [RC(1-D) - C^*]^{1/k} \quad (17c)$$

We have now seen that well-being can be defined consistently across all members of a society. A value of lifetime well-being is computed as negative (deprivation) for the poor and as positive for the non poor. Among the latter

we allow for distribution sensitivity. Although we have had to simplify, the analytical basis of the derivation is clear.

We can now define measures at the level of the society by adding up these well-beings and deprivations. Thus take all those who are deprived. We define poverty debt (PD) as the sum of all the LTD_j i.e. all deprivations.

$$\begin{aligned} PD &= \sum LTD_j \quad (18) \\ &= \sum_{j=1}^q (T-a_j) [C^*_j - R_j C_j (1-D_j)] \end{aligned}$$

In (18), we take q as the number of poor people. Below a macroeconomic measure of PD will be derived.

We can take as the Social Development Index (SDI) the sum total of well-beings (positive and negative).

$$SDI = \sum_{j=q+1}^N LTW_j - \sum_{j=1}^q LTD_j \quad (19)$$

It is clear that the social development index is a money expression as is the poverty debt. The latter reduces the SDI. There are $(N-q)$ non poor people and q poor people but our weighting of the well-being function by $(1-e)$ makes it easier for us to bring out the equity issues in social development.

A social progress index then should be defined as an increase in the SDI. Thus social progress is defined here as a reduction in poverty debt or increase in well-being sufficient to register an increase in the SDI. Our weighting scheme puts a premium on reducing poverty debt as a better strategy for increasing SDI rather than increasing the well-being of the rich. Thus

$$SPI = \Delta SDI \quad (20)$$

The Social Progress Index is the change in the Social Development Index.

We can now understand the basis on which GNP is a welfare measure. Corresponding to the SDI, if we take

- (a) $C_j=0$ no poverty line.
- (b) $e=0$ no diminishing marginal utility at any level of consumption.
- (c) $D_j=0$ no public goods deprivation.
- (d) $R_j=1$ no deprivation due to a short life.

We get as

$$SDI = \sum C_j (T - a_j) \quad (21)$$

The sum of individual consumption times their potential lifetime or the sum of life cycle consumption over all individuals. The GNP is a close approximation to C_j . We see thus the restricted view that GNP takes of the significant aspects of the development process.

3.6. THE POVERTY DEBT: AN AGGREGATE MEASURE OF DEPRIVATION.

The poverty debt (PD) is the sum of the lifetime deprivation (LTD) of the poor people. To get a proper estimate we have to weight the terms R_j or C_j by PLT. This makes the final formula easier to express in a compact form. [In this section, D_j is taken to be zero. This simplifies the algebra but understates the deprivation].

$$\begin{aligned} PD &= \sum_{j=1}^q (T - a_j) [C^*_j - R_j (T - a_j) C_j] \\ &= (T - A_q) q [\bar{C}^*_q - R_q \bar{C}_q] \end{aligned} \quad (22)$$

All the three terms \bar{C}^*_q , R_q and \bar{C}_q are averages over the poor population as is A_q . The weighting of C_j by $(T - a_j)$ makes the final expression tractable. In principle, we can sum up the individual LTD without any problem.

Let us now express the debt as a proportion of GNP. We have

$$\frac{PD}{GNP} = \frac{(T - A_q) q [\bar{C}^*_q - R_q \bar{C}_q]}{NY} \quad (23)$$

where I is the average income gap and M is the income gap as a proportion of GNP, i.e.,

$$I = (1 - \bar{C}_q / C^*_q) \quad (24a)$$

$$M = H [C^*_q - C_q] / Y \quad (24b)$$

The expression in (23) is our basic index of deprivation. $H = q/N$ is the headcount ratio. Progress should be measured as a decline in the index, keeping C^*_j unchanged in the individual level LTD. Note that if $R = 1$ then

$$\frac{PD}{GNP} = (T - A_q) M \quad (25)$$

This formula shows the difference that R makes to the calculation of poverty debt. The fact that $R < 1$ makes PD/GNP higher than $(T - A_q)M$.

In table 1 we provide some tentative calculation using available data. We of course do not have \bar{C}_q or \bar{C}^*_q as we would wish to measure it. Nor do we have A_q or R_q but only A and R i.e. averages for the whole population. We do have estimates of \bar{C}_q (Z) and \bar{C}^*_q (Y_q) from the recent ECLAC study of poverty in Latin America [ECLAC (1990)]. Comparing column 5 and column 6 we see the difference that $R < 1$ makes. In most cases the expression $[1 - R(1 - I)]M/I$ is 1.5 times M . For Peru it is nearly two and half times.

We also see that there are some countries - Guatemala, Peru and Brazil, where the ratio is so high that it is not realistic to expect an elimination of poverty in the near future. But for countries such as Venezuela, Uruguay, Argentina, Costa Rica, there is no reason why a small amount of GNP cannot be redirected towards eliminating the poverty debt. The poverty deficit as a proportion of GNP, the annual expression of poverty debt $[1 - R(1 - I)]M/I$ is very small indeed in these countries. Of course it is likely that Z and Y as currently used in poverty calculations underestimate the true extent of poverty.

Our calculation of the poverty debt is thus both conceptually well grounded and statistically sensible. It shows the contrast between the rich and the poor countries of Latin America clearly.

In columns 8 and 9 we express the poverty debt in absolute terms rather than as proportion of GNP. Thus column 8 gives us the per capita poverty debt (PD/N) expressed in terms of thousands of US dollars. The next column gives total poverty debt PD in billions of US dollars. In Venezuela the per capita poverty is \$1,098 while in Guatemala at the other end it is \$61,387. Note that the range in the PD/GNP ratio is larger than 90:1 whereas in the PD/N it is 60:1. Thus while the absolute form is more easily communicable, the ratio form brings out the difficulties poor countries face. The total poverty debt figures are given to indicate that crude as they are they are a magnitude above the much more frequently quoted figures of foreign indebtedness.

Since our totals for PD neglect the deprivation in public goods they are biased downwards. As a consequence of recent macroeconomic trends, specially with respect to cuts in non-defence public spending, this element has if anything increased in importance. The same can be said about the lack of interpersonal variation in our illustrative macroeconomic calculation. Thus if we had LTD for individuals with appropriate measures of C^*_j , D_j , R_j , we may even have noticed a worsening of the incidence of poverty in recent years. Our basic measure is computed at individual level and it incorporates the

three dimensions of deprivation – longevity, private consumption, public consumption. When estimated for a set of households over time, it will enable us to consider the inequalities in the incidence of deprivation among

Table 1
POVERTY DEBT IN SELECTED LATIN AMERICA COUNTRIES

Data for 1986	POVERTY DEBT								
	1	2	3	4	5	6	7	8	9
COUNTRY	(T-A)	R	H	I	M	[1-R(1-I) M/I]	PD/ GNP	'000\$ Per Capita	Billions\$ Total
Guatemala	58	0.49	0.68	0.55	0.38	0.54	31.32	61.387	488.64
Colombi	56	0.58	0.38	0.45	0.07	0.105	5.88	7.291	209.32
Peru	57	0.48	0.52	0.24	0.16	0.42	23.94	38.132	751.20
Costa Rica	56	0.72	0.25	0.38	0.04	0.044	2.46	3.864	10.20
Mexico	57	0.63	0.30	0.39	0.045	0.046	2.62	4.795	380.63
Brazil	55	0.57	0.40	0.19	0.065	0.191	0.45	21.10	2861.54
Uruguay	47	0.74	0.15	0.30	0.02	0.033	1.56	3.416	10.28
Panama	50	0.70	0.34	0.46	0.06	0.08	4.00	8.960	19.53
Argentina	50	0.70	0.13	0.39	0.01	0.015	0.75	1.792	54.35
Venezuela	57	0.68	0.27	0.38	0.04	0.006	0.34	1.098	19.02

Source: H, I, M, from CEPAL (1990) "Magnitud de la Pobreza America Latina en los años Ochenta".
Definitions: H: Head count ratio, I: Income gap as proportion of poverty line, M: Income gap as proportion of per capita income, T: Maximum Life 80 years, A: Average age of the population, R: Ratio of future life time to potential life time.

individuals. We could thus compute a Sen type index given the LTD as analogue of g_j , the income gap. A movement in this index will tell us about the deterioration over time in the quality of life of the poor people.

Our measure also allows us to look at the respective contribution of the different dimensions to deprivation. Thus a policy of tax cuts matched by cuts in public spending will result in uneven movements of D_j as against C_j/C_j^* across individuals. Alternatively a policy of improving public health may, by improving R_j , reduce the $[C_j - R_j C_j (1 - D_j)]$ element and also the (T-A) by increasing average age of the population. In this manner once we have the measure, questions of the efficacy of alternative policy measures in reducing the poverty debt can be addressed.

It would be the next task to go beyond PD and aspire to measure SDI itself. If SDI can be measured over time then we can obtain an index of social progress. Our explicit formulation also allows us to test the sensitivity of our measure to changes in the parameters such as e.

3.7. ADDENDUM

An alternative way of aggregating the measures of lifetime deprivation and lifetime well-being is to keep the utility (well-being) function linear in consumption (i.e. $e=0$, both above and below the poverty line) but weight the gap unequally. The analogy is with Amartya Sen's construction of the Poverty Index [Sen (1976)].

Our basic measure is

$$(T - a_j) [R_j C_j (1 - D_j) - C_j^*] = l_j \quad (A.1)$$

when l_j is negative we call it lifetime deprivation, when it is positive lifetime well-being.

It is possible therefore to order l_j from its lowest (negative) value to its higher positive value. l_j is our analogy to the income gap used in Sen's index as the basic measure.

Consider now a normalisation of l_j in the same way as we do for g_j but with C_j^* instead of Z. Thus

$$l_j / C_j^* = (T - a_j) [R_j (1 - D_j) C_j / C_j^* - 1] \quad (A.2)$$

It would now be possible to look at the Cumulative Distribution Function $F(C_j/C_j^*)$ as well as the probability density function $f(C_j/C_j^*)$. For any consumption level C_j the ratio of the portion of CDF above it i.e. $1 - F(C_j/C_j^*)$ to the portion below $F(C_j/C_j^*)$ is a decreasing function of (C_j/C_j^*) .

Let this ratio be

$$\mu_j = \frac{1 - F(C_j/C_j^*)}{F(C_j/C_j^*)} \quad (A.3)$$

μ_j is very large for low consumption and very small for high consumption. An alternative measure for SDI is therefore

$$SDI 2 = \sum \mu_j (T - a_j) [R_j (1 - D_j) C_j / C_j^* - 1] \quad (A.4)$$

SDI 2 like SDI 1 can be broken down into positive and negative parts

$$SDI2 = \sum_j \mu_j (T - a_j) [R_j (1 - D_j) C_j / C^*_j - 1] \quad (A.5)$$

$$- \sum_j \mu_j (T - a_j) [1 - R_j (1 - D_j) C_j / C^*_j]$$

The first expression covers the positive well-being and the second the deprivations. The second expression is a weighted form of the poverty debt.

Equation (A.5) is thus alternative to eqn. (19).

A simple way of approximating μ_j and of bringing $\$SDI2$ closer to eqn. (19) is to say that the weights should be proportional to C^*_j . Thus for $0 < C < C^*$, let the weight $\mu_j = 1$, for $C^* < C < 2C^*$ let the weight $\mu_j = 1/2$ and so on: $\mu_j = 1/k$ for $0 < C < kC^*$. Then we can have

$$SDI3 = \sum_j 1/k_j (l_j / C^*_j) \quad (A.6)$$

$1/k_j$ is the weight attached to l_j , given the range in which C_j falls. This would be perhaps computationally the simplest but less theoretically elegant than (A.5) or eqn. (19).

REFERENCES TO CHAPTER 3

- Atkinson, A.B. (1987) On the Measurement of Poverty: *Econometrica* Vol. 55, No. 4, July.
- Boltvinik, J. (1989) "Towards and Alternative Indicator of Development". (UNDP/Bogotá, Colombia; chapter 1 of this document).
- Bracho, F. (Ed) (1989) "Towards a New Way to Measure Development". Caracas - Venezuela; South Commission.
- Branne, J. and G. Wilson (1987) "Give and Take". (London, Unwin Hayman).
- Broome, J. (1978) Trying to Value a Life. *Journal of Public Economics*, Vol 9, PP 91-100.
- _____(1979) Trying to Value a Life. A reply. *Journal of Public Economics*, Vol 12, pp 259-262.
- Desai, M. (1989a) Potential Life Time (PLT): "A Proposal for an Index of Social Welfare" in Bracho, F. (1989).
- _____(1989b) Methodological Problems of Measuring Poverty in Latin America. (LSE; unpublished).
- _____(1989/1990) Poverty and Capability: Towards and Empirically Implementable Measure. (LSE; unpublished).
- Desai, M. and A. Shah (1988) An Econometric Approach to the Measurement of Poverty. *Oxford Economic Papers*, October.

Hawthorne, G. (Ed) (1987) *The Standard of Living*. (Cambridge; CUP).

Keynes, J.M. (1936) *The General Theory of Employment, Interest and Money*. (London; Macmillan).

Kravis, I, Heston, A. and R. Summers (1978). *International Comparisons of Real Product and Purchasing Power*, UN International Comparisons Project, Baltimore, World Bank.

Morris, M.D. (1979) *Measuring the Condition of the World's Poor*. (Oxford; Pergamon Press).

Parker, R.H. and G.C. Harcourt (1969) *Readings in Concept and Measurement of Income*. (Cambridge; CUP).

Samuelson, P.A. (1950) Evaluation of Real National Income. *Oxford Economic Papers*, January.

Sen, A.K. (1976) Real National Income: *Review of Economic Studies*, 43, pp 19-39, also in Sen (1982).

_____(1981a) *Poverty and Famines*, (Oxford, Clarendon Press).

_____(1982) *Choice, Welfare and Measurement*, (Oxford, Basil Blackwell).

_____(1983) Poor, Relatively Speaking. *Oxford Economic Papers*, Vol 35, pp 153-169.

_____(1984a) Family and Food: Sex Bias in Poverty. Chapter 15 in *Resources, Values and Development*, (Oxford, Basil Blackwell).

_____(1985) Commodities and Capabilities. (*Hennipman Lectures*). (Amsterdam, North Holland).

_____(1987) *The Standard of Living, Tanner Lectures* in Hawthorne (1987).

_____(1989) *Social Progress Index: Some Methodological Issues*, Harvard, chapter 2. of this document.

Townsend, P. (1979) *Poverty in the U.K.*, (Hammondsdworth; Penguin).

UNDP (1990) *Human Development Report*, (New York, UNDP).

Wilson, G. (1987) *Money in the Family*, (London; Gower Press).