CHAPTER THREE

CLASSIFYING COUNTRIES AND MEASURING DEVELOPMENT

"GNP only indicates the national potential for improving the welfare of the majority of the population – not the extent to which the society delivers on the potential." Irma Adelman, 2001

3.1 Introduction

The bare-bones model of the previous Chapter used GDP and GDP per capita as the central indicators of "development". This Chapter adds further to our common platform of concepts and facts by:

- Explaining these concepts and explores their analytical strengths and weaknesses
- Providing an initial classification of countries based on the GDP (income) measure.
- Showing and explaining the significant contrasts that can arise when an alternative "purchasing power parity" (PPP) approach is used to compare incomes.
- Introducing the most authoritative alternative to a GDP measure of development namely the Human Development Index (HDI).

The factual materials presented in this Chapter are static in the sense that they describe the situation of income and income differentials as these look today. Chapter 4 continues the build-up of the factual basis of the book by analysing some major trends that have emerged in the past 50 years.

Let us start by acknowledging *that development cannot be uniquely and definitively measured*. It is just too complex and multi-dimensional a process. Among other things that process involves rising material prosperity, improving health and social conditions, a reduced incidence of poverty, cultural shifts, the emergence of new laws, institutions, traditions and social conventions, greater political maturity, more diverse and complex economic and political links with the international community and, yes some downsides such as urban congestion, moral decay and rising crime.

We could sit 100 wise men in a room for several months and never get them to agree how to balance off these multifarious features into a consensus definition of "development."

3.2 Gross Domestic Product as the Baseline Measure

So let's be pragmatic economists for the time being. We need some sort of metric to position countries relative to each other for some descriptive and analytical purposes. We already saw one example in the previous chapter when we examined how economic structure was changing with "development" in China and other countries. If we refrain from measuring "development" we can never conduct such analysis. Whatever metric we choose can never be regarded as a precise means to authoritatively differentiate between countries. But it should be good enough to proxy *large* differences in "development" in a manner that is helpful for descriptive and analytical purposes. In practice the Gross Domestic Product (GDP) of a

country (or some variant of this such as Gross National Income – GNI) has become the economist's standard for this purpose[1]. As long as we remain alert to its basic weaknesses, it can play that role perfectly well.

The general opinion is that for relatively large differences in GDP levels (between countries or over time) the measurement and conceptual weaknesses of the GDP measure will not prove too misleading. For example, World Bank data show that the measured GNI per person in Tanzania in 2014 was $ 920 or only 2% of that of France whose income was $42,960 in the same year[2]: i.e. the ratio of Tanzanian to French per capita incomes was 1: 46. Technical arguments about the appropriate exchange rate to use in converting these GNI measures into a common currency ($US dollar) – as discussed below – reduce this differential substantially for reasons also explained below. This is because Tanzania's adjusted income using a *purchasing power parity* exchange-rate was $2,510 in 2014 as compared to the unadjusted total of $920 shown above. The corresponding French figure for 2014 was $39,160. So the ration of income per capita reduces to 1: 16. Considerations of other adjustments to GDP (as also considered below) might further reduce or even widen this gap. But when all the possible adjustments are done, there will still be little dispute that France is a substantially richer and more developed country than is Tanzania. But note that if we were to compare two countries of broadly similar per capita incomes using the Atlas method (see footnote) - for example Kenya and Ghana - then the existence of the apparent income differential in favour of Ghana would be more suspect.

The health warning is that GDP differences that are small cannot necessarily provide us with robust conclusions about which of the two countries being compared is richer or more developed.

As pragmatic economists we start with a base-line concept that is narrow in its scope but which can reasonably be measured for *all* countries. This is GDP or GDP per capita – an aggregate employed in a large proportion of the economic development literature whenever some metric of progress towards development is called for. It has two main manifestations.

- *GDP in total* is a measure of the total productive power of a country. It is an aggregate measure of an economy's *total production of all goods and services*. But because the "value-added" concept of production is the one used to compute GDP, the total GDP is easily decomposed into the main components of income (wages, profits, rent). Hence total GDP also indicates the *total income* of an economy. This dual interpretation of the aggregate is one of its great analytical strengths.

- More useful for some analytical purposes is *GDP per person* (or *per capita* to use the Latin – the practice from hereon). This is a measure of the situation of the *average* person in the economy and is computed merely by dividing total GDP by population. It is an explicitly *individual-based* measure of development although the individual in question is the average person in a country. This is a major problem given that there is often chronic inequality within both high and low-income countries that are our greatest concern! Subject to that limitation, GDP per capita measures both the

[1] The differences as between GDP and GNI are set out in Box 3.1 below.

[2] This uses the so-called Atlas method of conversion that is adopted by the World Bank to smooth fluctuations in prices and exchange rates. Specifically this method applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation between the country, and through 2000, the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States), with more countries added after 2000.

production generated by the average person and also the income accruing to that person.[3]

3.2.1 Advantages of that Measure

It is Simple

The most significant advantage of the GDP concept as just described (and the family of national income aggregates linked to it – see Figure 3.1 below) is its overwhelming simplicity. It manages to distil all the mind-boggling complexity of modern economies (rich as well as poor) into a single number or limited set of numbers. Such simplicity is crucial whenever politicians, pundits, charity workers, journalists or academics need a simple way to discuss how well or badly any particular economy is doing. Yet because the GDP total is constructed by adding together the ***outputs*** from a wide variety of disparate activities, we can always explore the detail to see, for example, from which sectors the growth of GDP in any particular year mainly originated.

The widespread appeal and usage of the concept is enhanced further by the dual interpretation that can be put upon the GDP aggregate. That same measure can signal something about both the *productive power* of an economy, and also about the *income and welfare* of its average citizen.

The economist's trick that makes this simplification possible is the use of *money* as a common unit of measurement. Without it we would need to add tonnes of rice, numbers of cars, hours of doctor's care etc. to achieve a measure of the total national production of any economy. For more than two centuries economists have been prepared (with various degrees of confidence) to allow the **prices** that people pay for goods and services to be used as a measure of the value or utility that people attach to those goods and services. It is this willingness that allows us to add together disparate goods and services in order to calculate a convenient single aggregate of a country's income/production.

But the trick in question only works so long as everything has a "price" that is defined without too much ambiguity. It works well for all goods and services produced in an economy that are sold to individuals who thereby signal *directly* the utility that they derive from the purchases. In reality in all modern economies – rich as well as poor - a significant part of output is provided by the *public sector* (the government) as various types of public service and often free of charge (public roads, education, police services, many medical services etc.). The exact amount of free public provision of goods and services will vary from country to country but is typically in the range of 35-60% of total production. For this part of national output, an alternative valuation convention has *force majeure* to be employed to compute the GDP aggregate. This alternative is that the value or utility conferred by public goods and services is indicated by the amount that they ***cost*** to produce. Again money is a unifying concept that enables us to add up disparate types of service (e.g. education and roads) but now the value used is a *cost-based* one rather than one based on the selling price.

It Links Production to Income

The second major advantage for the study of development economics, is the relative ease with which the GDP concepts enable us to move between ***production*** (the source of any economy's prosperity) to the ***specific types of income*** that are made possible by that production. The concepts used in national income accounting require that the following statements are true *by definition.*

[3] the concept of Gross National Income (GNI) as now used in the World Bank classification of countries is an adjustment of GDP. This adjustment is explained in Box 3.5 below.

GDP = (*Gross Domestic PRODUCTION)*	*GDI* = *(Gross Domestic INCOMES)*	*GDE (Gross Domestic EXPENDITURE*)	[1]

The equality between the first two terms in Equation [1] arises because all production involves costs and those costs will all show up as ***income*** in the hands of some agent in the economy. For a representative firm or farm this relationship schematically (and with some made-up numbers in the currency we here label "din") will be as shown in Table 3.1.

Table 3.1: The Equivalence between Production and Incomes: An Example for a Typical Firm or Farm

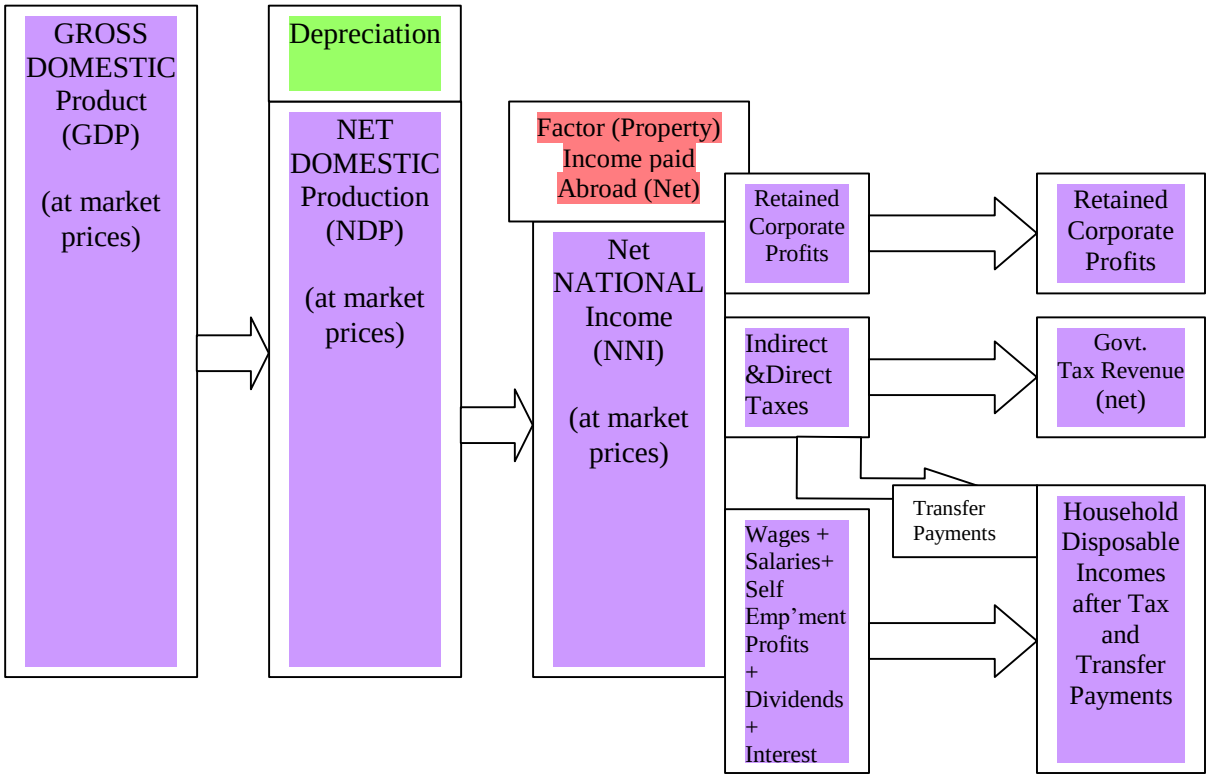
Outputs	*din*	***Incomes Generated***	*din*
Gross Production	1,800	Wages and Salaries	650
Less paid to Suppliers for Intermediate Inputs	800		
= Net Output or Value-Added	1,000	Rent Payments	50
		Interest Payments	100
		Residual – Corporate or Self-Employed Profits (before tax)	200
TOTAL OUTPUT (Net)	1,000	TOTAL INCOMES	1,000

Note that total production or value-added (1,000) on the left hand side of the table has an analogy in one or other sources of income on the right hand side – wages, rents, interest and profits. The two sides of the table must always add up to the same total because any surplus of output over costs generates PROFITS that also represent incomes in someone's hands. Furthermore all these incomes need to go either directly or indirectly to individuals/ households in the economy.

The various income flows (using data now for the sum of all firms and farms in an economy) is as shown in Figure 3.1 below which also shows the family of national income aggregates and how they are related. Figure 3.1 shows that individuals and households *directly* receive much of the total income generated through the economy's production (i.e. as wages, salaries or profits from self-employment). They *indirectly* receive income also when corporate profits are distributed as dividends to individuals who own shares in companies.

A more complete statement of the links between the main GDP aggregates and their main components is shown in Box 3.1.

Figure 3.1: How Production Becomes Income



Individuals/households also receive income *indirectly* insofar as a part of the taxes received by government are used to make transfer payments back to particular groups of households (e.g. for pensions, food subsidies, unemployment benefits etc). But other income benefits also accrue to individuals/households in less obvious ways. For example, retained corporate profits (profits not distributed as dividends) are correctly seen as building the value of companies and so these corporate savings provide higher potential future income to shareholders – all of whom are ultimately individuals.

In short, all current *production* provides either current, or implicit income (in the form of retained earnings) to individuals/households in society. The one important exception to this is the part of corporate profits and interest payments that is paid to *foreign* owners of the share capital and loan capital used by *domestic* companies. This possibility is accommodated in national income accounting conventions by using a variant of the GDP aggregate namely Gross (or Net) *National* Income (GNI or NNI). The difference between GDP (or NDP) on the one hand and GNI (or NNI) on the other is simply the net factor income (profits, interest and dividends) paid abroad. It is a difference that is shown in Figure 3.1 above as a positive figure (i.e. a transfer out of the country meaning that NNI< NDP (and also that GNI< GDP) but in general it can be either negative or positive. So a country such as Kuwait that in the past has made major overseas investments in foreign companies, real estate etc., using its huge oil surpluses now receives large inflows of profits and dividends from abroad. These make the Kuwait *national* income (GNI) larger than its *domestic* income (GDP). In 2014 for example, Kuwait's GNI per capita was $ $49,300 whereas its GDP per capita was $ 43,594. But a country such as China that has been a large recipient of overseas investments has a *national* income (GNI) that is lower than its *domestic* income (GDP): $7.400 versus $7,600 in 2014.

Box 3.1: The Main National Accounts Aggregates		
Production	**Incomes**	**Expenditures**
Value-Added by:	Wages	Private Consumption
Agriculture	+ Operating Surplus of Enterprises (including Depreciation)	+ Government Consumption
+ Industry		+ Gross Investment
+ Services-Private		+ Exports of Goods and Non-Factor Services
+ Services-Government		- Imports of Goods and Non-Factor Services
equals Gross Domestic Product (GDP) (basic prices)	**equals Gross Domestic Product (GDP) (basic prices)**	
+ Indirect Taxes less Subsidies	+ Indirect Taxes less Subsidies	
equals GDP (at market prices)	**equals GDP (at market prices)**	**equals GDP (at market prices)**
	+ Net factor Income from Abroad	+ Net factor Income from Abroad
	equals Gross National Income (GNI) at market prices	**equals Gross National Income (GNI) at market prices**
	+ Net Current Transfers	+ Net Current Transfers
	equals Gross National Disposable Income (GNDI) at market prices	**equals Gross National Disposable Income (GNDI) at market prices**
	- Depreciation	- Depreciation
	equals Net National Disposable Income (NNDI) at market prices	**equals Net National Disposable Income (NNDI) at market prices**

Disaggregations

We have already stated that although GDP is a single aggregate it is easily disaggregated to reveal from which sectors in the economy output is mainly arising and how sectors differ in their contributions to the overall growth of GDP in any given year. Analogously, GDP as an aggregate measure of *income* is also easily disaggregated to show which types of income are being generated by production. This dis-aggregation can be done it at least two distinct ways. The first focuses on different types of ***factor incomes*** such as the wages, rents, interests and profits shown in Table 3.1.above. It is this dis-aggregation that figures most prominently in the various theories of economic growth that we consider in Part II of the book.

The second focuses on the ***types of households*** – for example, urban versus rural or rich versus poor – that are the recipients of those incomes. This second type of income dis-aggregation provides a powerful tool for analysing particular aspects of economic change over time and the manner in which this benefits different parts of society.

Both dis-aggregations can be linked together in a matrix format that has come to be referred to as a ***Social Accounting Matrix*** (or SAM). SAMs as pioneered in the work of Richard Stone, Graham Pyatt and others show the sectors from whence production derives; how that production generates factor incomes of various types; and how factor income in turn, together with government and foreign transfers, creates income for particular household groups in society.

In brief although GDP and GDP per capita (and the other members of the family of national income aggregates) are mainly thought of as broad aggregates that indicate only the *average* performance of an economy, they do in fact provide great potential for a wide range of more disaggregated analysis of a type that is central to many of the development debates. This is because these popular aggregates are merely one simple representation of a complex system of national income statistics.

3.2.2 The Shortcomings of the Measure

Although widely used for the reasons just indicated, both GDP and GDP per capita are deeply flawed measures. This is for both practical and conceptual reasons.

Measurement
At the *practical level* it is an extremely difficult task for national income statisticians to measure the production of all activities in the economy with equal precision. Production of *tangible* goods (e.g. cars) produced by a well-established firm such as Ford or Toyota and sold into a commercial market with well-defined prices, is easy to measure. (note however that we need an accurate measure of both the **quantity** produced of each good and their price or **value** in order to accurately measure total production). This is a consequence of the trick of using money to put all production on to a common basis of measurement).

But the production of tangible goods produced in very small firms is less easy to handle because of the doubts about the quality of reporting. If the goods in question are produced on an individualistic or family basis as is true of a great deal of agricultural production in poorer countries, especially in African and Asian agriculture and by many millions of separate farms, then the measurement task becomes even more daunting. This is especially true if a large part of the output (notably food production in poor countries) is used for subsistence purposes and is never “priced” in a commercial market. In these cases the prices used to value production are necessarily notional rather than actual prices.

Valuation
Overlaying all this is the standard assumption of the national income statistician that all outputs have a value in the GDP calculation equal to the price at which they are sold. No matter that a designer dress sold to Nicole Kidman for use on Oscar night, for example, is grossly over-priced at, say $50,000, that is its price in the GDP calculus. No matter that many will adjudge junk food as damaging to health, the cheeseburgers or chicken nuggets sold by the well-known outlets will have a value in GDP based on the prices at which they are sold. In both these and all other cases the prices that consumers pay are assumed to signify the value that they acquire from their consumption – the negative judgements of others about the correctness of this assumption are neither here nor there.

Public services such as hospitals and schools add a further layer of complexity as we noted above. Since these are not sold in any market, their production value is taken to be equal to

what they ***cost*** to provide. As a consequence, higher costs associated with worsening inefficiency count equally with higher costs associated with more and better delivery of the service (e.g. more hip replacement operations per surgeon). The general point here is that national income statisticians do not entertain any value judgements. £1 or $1 of sale value or cost is treated equivalently by them irrespective of the merit, the value for money or the satisfaction generated by those outlays.

These two limitations – that of measurement problems/errors and that of valuation – add to the earlier health warning about the use of the GDP measures in this book. *These measures are not reliable in identifying or analysing small differences either across countries, or over time.*

Conceptual problems

The conceptual difficulties with the GDP concept compound these problems. Here are just **six** of the most intractable of these.

(i) Free Services

First, *services delivered free of charge* to a family member or friend have a zero valuation for national accounts purposes. So if you paint your friend's house or dig his garden for free then this does not figure in total GDP. If you re-invent yourself as a professional painter or gardener then the same work would now count in GDP.

This example taken on its own is trivial. But now transplant it to the context of a country changing over time or two countries with quite radically different forms of social organisation. In the first case (say the USA in the early 1960s) it may be quite common for women to stay at home to look after children. But by 2015 this is much less common – a much higher proportion of American women now go out to work and get paid for it. Measured GDP in the later year will be boosted by this fact: doubly so to the extent that the working women now also need to employ nannies to care for their children. In the second case, comparing an economy such as India where child minding by a close-knit family is common with one where it is not, will clearly understate the true production and income of the former if the conventional GDP measure is used.

This problem is particularly pertinent to the gender aspects of development and has been much analysed in this context (see for example Ester Boserup [1970])[4]. If we track back to the USA in 1965, no less than 67 % of a woman's working week was devoted to unpaid house-work. As a consequence this major part of the week of the typical American woman did not figure at all into US calculations of GDP. By 1995 the corresponding figure for housework had fallen to only 49 % of the working week. In terms of actual hours, women by 1995 were committing almost 13 fewer hours to housework than in 1965 but were providing 9 more hours on average of paid work. [5] A GDP calculation that put a monetary value on women's time spent on housework would have raised the actual level of the 1965 GDP far more that the 1995 level. Hence US growth over that thirty year period would have been *slower* if such a correction had been made.

(ii) Externalities - Indirect Consequences of Consumption

The second conceptual problem is that the benefits and the costs of certain types of consumption are inherently difficult to measure. Unfortunately, these hard to measure (or unmeasured) benefits and costs can substantially impact the true benefits that we acquire from that consumption. It has long been understood that the negative *environmental*

[4] Boserup, Ester., Women's Role in Economic Development, George Alen and Unwin, London, 1970

[5] Source is Robinson and Godbey [1999] as cited by Lomborg [2002] pg 83

effects of our own or another person's consumption (e.g. traffic noise and pollution) do not get factored in to GDP measures as negative income. So a given £1 or $1 amount of income in two locations of the same country – one very clean and one highly polluted – are treated as equally valuable in income and welfare terms. Symmetrically, reduced air pollution associated with cleaner electric or hybrid engines or higher energy efficiency in factories, does not raise real income calculations unless the full amount of the environmental gain is passed through in higher prices of the cars or the factory output. Given that many forms of pollution (e.g. emissions of carbon dioxide from automobiles) are far worse in rich than in poor countries even though the concerns about pollution are also greater, suggests that conventional GDP measures are increasingly overstating the true magnitude of a country's or an individuals' prosperity.

(iii) Public Goods - Collectively provided Goods and Services

Third, when *goods or services are collectively provided by the state* it is really hard to know whether they are being over or under-provided relative to the volumes that the public would choose in a hypothetical stateless market economy. This is a result of the cost-based approach to valuing these services for GDP purposes as discussed above. But debating this provides lots of juicy material for a good political dogfight! Politicians of liberal persuasion will invariably argue that the state commands too large a share of total national resources and that £1 or $1 of service delivered by the state gives *less value* than that which could accrue from private spending of the same amount on alternative goods and services. This logic suggests that government spending somehow fails to deliver value for money in this narrow sense. Thus the GDP aggregates that always include the outputs provided by government is arguably over-stated. But politicians of a more socialist persuasion will argue that, at the margin, taxation should be higher so that the state could deliver a larger proportion of total goods and services in the economy. In other words there is *too little* delivery of important public goods and services (roads, policing, health care) and that more output redirected via taxation to ensure increased state provision could increase the aggregate GDP[6].

In many developing countries the problem is even more difficult because of serious flaws in the processes whereby consumers of public goods and service interact (or fail to interact) with the governments that organise the *delivery* of these. Remember our discussion about democracy in Chapter 2. It is well established that public services in many low income countries get provided in disproportionate amounts to the richer quintiles of the populations with poorer households being marginalized.(see also World Bank [2004] and Deaton [2013].

The basic *measurement* issue here (we will consider the issue of delivery in a later chapter) goes back to the problem of valuation. Because statisticians rely on the device of valuing the output of public goods and services at the amounts they *cost* to produce, it is hard to be sure of the "true" value of such goods and services to the public who are supposed to benefit from them. We would only ever deduce the "true" value if individuals were required to individually pay for bits and pieces of public services: something that is not possible for the bulk of public services which are provided free of charge.

So the unfortunate and messy reality in many countries is that both the liberal and the socialist statements about public services can be true for different types of public service at one and the same time. There can be chronic examples of public sector inefficiency and waste in say health care coexisting with a chronic shortage of public provision of say

[6] See for example, the classic statement of this problem in J.K. Galbraith, *The Affluent Society*, 1958.

roads. It is hard in the messy real world to reach a definitive conclusion that either the liberal or the socialist political view is completely correct or completely incorrect.

What is clear is that the political argument here is invariably stated in terms of the *allocation of resources* (the state should control less or more depending on your politics). But the underlying economic issue has to do with how particular goods and service provided by the state should be *valued* (the costs of state delivered services are higher or lower than the "true" value that they provide to the public depending on your politics). It is also clear that in countries where governments are seriously incompetent, corrupt or both, the cost valuation placed on many public services will seriously overstate their true value to the public – remember the mega cathedral in Cote d'Ivoire referred to in Chapter One.

(iv) The "Bad" components of GDP?

The fourth conceptual difficulty with the standard GDP measures is that they include various outputs that all of us for one reason or another would be happier to see reduced. Increasingly we spend money *individually* to protect our houses from thieves, to avert future illnesses by downing vitamins or paying gym fees, and insure ourselves against accidents. Governments now, and always have, expended money on our *collective* behalf– sometimes most of what they raise – to deter invasion, to sanction thieves and murderers, and to avert the consequences of floods or famines. More recently they have taken to regulating (poor) driving behaviour, the decisions of (bad) bankers, and the pricing of monopoly utility companies. None of these individual or collective expenditures really contribute positively to incomes or well-being. They are all incurred to counter or avoid some nasty things ("bads" as opposed to goods) that might otherwise afflict us – the burglary of our house, ill-health, invasion, bank failures, road accidents etc.

So there is a respectable logic that says we ought to adjust GDP to remove some of these "bads" or "regrettable necessities".[7] This idea was taken up most authoritatively in a famous paper by William Nordhaus and James Tobin published in 1972 (Nordhaus and Tobin [1972])[8]. They adjusted GNP by subtracting an allowance for defence expenditures, and for the various dis-amenities of urban life such as pollution, congestion, crime. They also added in estimates for the value accruing from leisure time and the usage of consumer durables. These various adjustments resulted in an alternative aggregate measure of development that they christened the "Measure of Economic Welfare" (MEW). The MEW that they calculated for the USA was around 100% larger than conventional GNP mainly because of the large value ascribed to leisure time (as we saw in Chapter 2, citizens of the USA now benefit from a lot of this). However, the computed *growth rate* of

[7] This argument has been applied most forcefully to the military component included in the GDP aggregate. To the extent that a country maintains a large armaments industry or its government has a large army, then a significant proportion of total measured GDP will be linked to these militaristic activities that arguably provide zero or even negative welfare benefit. Developing countries in general do not have large industries producing military equipment: most are dependent on importing their military gear from industrialised countries such as the USA, Britain, France and Russia. However, a large number of these countries, as we saw above, are engaged in various civil or military conflicts. As a consequence they maintain armies that are large relative to both their total populations and to their means to pay for them. Would it not make sense as several economists such as Paul Sweezy have suggested, to delete this element of a country's production to obtain a truer indication of its *useful* GDP? See for example, Paul M. Sweezy, *Modern Capitalism and Other Essays,* Monthly Review Press, 1972.

[8] Nordhaus, William and James Tobin, "Is Growth Obsolete?" *Economic Growth*, 50th Anniversary Colloquium, Vol. 5., National Bureau of Economic Research, Cambridge Mass., 1973

MEW (1929-1965) was quite a lot lower than that of GDP because of a variety of factors including the rapid growth of military expenditures.

Dennison [1991], Hicks and Streeten [1979] and others have criticised the MEW concept on various grounds. Hicks and Streeten use a *reductio ad absurdam* line of argument to make the most telling comment. They write:

> *"if there were no war or risk of war, there would be no need for defence expenditures and no one would be the worse without them. But similar reasoning could be applied to other components of basic needs. We do not want medical services from nurses, doctors and hospital for their own sake. If it were not for disease and accident we would never incur this expenditure…. Even food for under- or malnourished people is a necessity to prevent hunger, disease or death. A logically consistent application of the Nordhaus -Tobin principle would lead to the inclusion in the national income only of those items that we do not really need, the inessentials and frills, which would be a paradoxical conclusion, contrary to the judgement of those who wish to exclude all frivolous luxuries from national income accounts"* and furthermore*….."it is not possible to distinguish between good and bad "artificially" created wants without introducing value-judgments and it is not possible to distinguish between "anti-bads" (the need for deodorants or anti-dandruff shampoo created by the fear of social ostracism) and goods (the need for literature created by the desire to participate in society)."*

So the conclusion is that adjustments such as those proposed by Nordhaus and Tobin are hard to justify bearing in mind the variety of purposes that the GDP aggregate serves. It may have been regrettable, for example, that almost one quarter of Ethiopia's budgetary expenditures during the 1998-2000 Eritrea-Ethiopia war were devoted to army wages and other military costs but this was the reality. (Addison and Roe [2006]). Furthermore, those in the army derived income from their wages and in the absence of such wages would have been poorer in some sense – we cannot just assume away the regrettable fact that in military situations, many people (including many poor people) derive their livelihoods from fighting or preparing to fight.

Box 3.2: Adjusting the GDP Aggregates

It is very convenient to have a single number to tell us how well the economy is doing and how levels of welfare within the country may be changing at least on average. But the various flaws that we have discussed obviously cast doubt on how well it really does such jobs in practice. So it is not surprising that the economics profession has committed much time and energy to devising various adjusted versions of GDP. All these take account of some at least of the acknowledged difficulties as discussed above. Here are some of the things that have at various times been added to, or deleted from the GDP aggregates to give us a more reliable impression of the true state of affairs:

Additions:

Leisure Time – more of this is synonymous with improved welfare even though of itself it may reduce rather than increase monetary income

Unpaid labour used in the household – this adjustment is particularly important if we want to properly recognise the contribution of women's unpaid work to well-being

Non-monetary transactions that take place outside the household – this adjustment would recognise the crucial role in many societies of unpaid work for charities (often a major substitute for publicly provided services) and the benefits generated by community based but voluntary labour

Deductions:

Environmental decay and the using up of non-renewable resources. The depreciation of physical capital (machines and buildings) is already deducted in the standard presentations of the national income aggregates to provide a better measure of a country's productive power (see Box 3.2). It is a logical additional step to extend this approach to "natural capital", such as mineral resources, tropical forests and wetlands, and deduct a monetary amount to reflect the impairment and depletion of that capital. This type of adjustment has been developed in papers by, for example, Hartwick [1977], Hartwick [1990] El Serafy [1989 and 1995], and Neumayer (2004).

Declining Health. An exactly similar approach could be proposed to encompass "human capital". This would enable any catastrophic event such as the HIV/AIDs epidemic to be reflected fully in a country's adjusted GDP via a mark-down representing the decline in the health of the population associated with the epidemic.

The production of "bads" including military equipment, wages paid to the army.

Other Possible Adjustments:

Allowing for improved life expectancy. Use expected lifetime earnings instead of actual income in the GDP calculations

Recognising income inequality. Use "poverty weights" as proposed by Ahluwalia and Chenery [1974] to weight the incomes of lower income groups more highly than higher income groups. This offsets the effect that in normal GDP growth calculations, the higher income groups get a disproportionate weight

*Use a variety of social indicators t*ogether with GDP to produce a composite weighted measure of development or the "quality of life". The Human Development Indicator as discussed below is the most well-known of such composite measures.

(v) New Products and Services – how they distort the numbers

GDP aggregates are widely used both to compare countries *at a point in time* (e.g. 2015 and to trace the progress of countries *over time* (e.g. 1950 to 2015). The reality is that the modern world is remarkably good at developing new products (completely new products, such as the microwave oven or the Sony Walkman of the 1980s, or more commonly far better versions of old products). The *Wall Street Journal* in November 2004 reported that in the previous year alone the major Western corporations had launched no fewer than 34,000 new foods, drinks and beauty products. Just one company namely General Mills had managed no less than 92 new products including modern "essentials" such as pourable cake frosting and square-bottomed Old El Paso taco shells. Such a huge pace of innovation is difficult for the statisticians to keep pace with. At the very least their failure to do so must significantly impact the interpretation of the GDP aggregates at any point in time. But the inexorable emergence of new products exerts a potentially huge distorting effect when GDP levels are compared over time – and especially long periods of time.

The problem here largely relates to the weights used in the various price indices that are used to add up the numerous components of GDP (remember the economist's trick as we described it earlier). Since these weights are not up-dated on a regular basis especially in low-income countries (e.g. the consumer price index weights used in Zambia in 2012 were still based on weights calculated in the 1990s), (a) completely new products do *not* appear in the price indices even though they can convey substantial utility to their users and (b) the lower real costs of the technically improved old-established products, do not get reflected in the price indices. The result is a systematic under-estimation of the true size of any rise in GDP in real terms (i.e. when adjusted for price increases which are mainly over-stated).

Over long periods of time characterised by rapid technological innovation (e.g. most of the 19th and 20th centuries, this systematic bias will hugely distort our perceptions of how fast GDP and GDP per capita are changing. This point has been analysed in detail

especially by William Nordhaus (1997). [9]Bradford DeLong has estimated that fully 75% of expenditures by the turn of the century were on commodities that did not even exist prior to 1800. (Source: DeLong (1997) web site). Companies such as General Mills not only invent a staggering array of new products such as square bottomed taco shells, but we increasingly spend our hard-earned incomes on such products.

This tendency has led DeLong to suggest that even the huge 800% gain in world income per capita that historians have estimated for the period 1820-2000 is a serious under-estimate of the gains that were actually achieved. He puts this error as equal to a 400 percent increase in GDP per capita from the levels of 1800 ***in addition*** to the measured gains arising for all the other reasons. To see this in more tangible terms try to imagine the higher costs of living today's life with today's income but without cars, electrical appliances, inside flushing toilets, telephones, computers etc. etc.).

(vi) Sustainability – what happens if resources are finite?

Many countries including about half of all developing countries derive at least part of their incomes from the exploitation of depletable natural resources such as oil and gas or minerals such as copper, gold and diamonds. These resources all decline in quantity (if not necessarily in value) as they are extracted over time. In other words the investment in them in each year is typically negative. Although conventional measures of GDP take no account of this depletion, there is a strong argument that they should do so. But how?

In general economists for some time have been using the idea of "natural capital" which is basically the value of all natural resources in an economy including forests, fertile land, soil as well as the more obviously depletable resources such as oil and gas as listed above. They can then calculate the amount of such capital that has been depleted in any given year (i.e. the negative investment in natural capital) and deduct this from the conventional measure of GDP. The resulting adjusted GDP is often referred to as "Green GDP"

The main technical problem relates to the value to put on the amount of depletion. The prevailing *market price* is obviously too high since this reflects all the costs that go into mining the resource. There is much controversy about how exactly to proceed once this basic point is accepted. But there is broad agreement that the correct *theoretical* approach is to compute the following in which *P* is the price of the resource, *MC* is the marginal cost of extracting it and *R* is the amount of extraction in the year for which the calculation is being done.:

$$(P - MC)R \qquad [1]$$

Equation [1] relates to a fully depletable resources such as oil. For *renewable* natural resources such as forests the "R" term needs to be interpreted as the difference between the harvesting of the resource during the year and the amount of regeneration associated with, for example, replanting

[9] See, W Nordhaus, "Do Real Wage and Output Series Capture Reality? The History of Lighting Suggests Not," in Timothy Bresnahan and Robert Gordon, eds., The Economics of New Goods (Chicago: University of Chicago Press: 0226074153), 1997/

The practical difficulty is that *MC* is not readily known or calculated and so most studies, notably studies by the World Bank[10], that attempt to calculate green GDP use instead average cost (*AC*) in Equation [2] instead of *MC*. A slightly more sophisticated approach takes explicit account of the number of years' reserves of the resources that still remain. So in the so-called El Serafy (1979) formula equation [1] becomes:

$$(P - AC).R.[\frac{1}{(1+r)^{n+1}}] \qquad [2]$$

where r is the time discount rate and n is the number of years of remaining resources (calculated most easily as the ratio of reserves to current production). In this formula the depreciation (negative investment) in the depletable resource is set equal in effect to the difference between the rents being extracted from the resources in the current year (i.e. the first part of the formula) and the *sustainable* level of such rents in the longer term. Clearly for a very long-lived resource (e.g. 1000 years of stocks remaining), the amount of depletion suggested by Equation [2] is very small indeed and green GDP will be approximated reasonably well by conventional GDP.

Let us be clear what the "Green GDP" aggregate tells us that conventional GDP does not. It tells us whether the income and consumption levels that a country is enjoying in any particular year are based on *sustainable* production or are in part the consumption of an income source that cannot be replaced. If, for example, green GDP is very low compared to conventional GDP then the income levels of future generations are likely to be lower than those of the current generation unless the country in question finds large new sources of income generation to replace those coming from the depletable natural resource such as oil. Some OPEC countries with limited reserves of oil and gas clearly have a high level of current GDP and income per capita relative to their sustainable or green GDP levels. Far sighted ones such as Dubai have invested billions of dollars of their oil wealth in order to establish new income streams for the future from activities such as air-lines, golf, tourism, real estate and modern transhipment port facilities.

In spite of the substantial anxiety raised about the sustainability of incomes, the absolute differences between green and conventional GDP are not large for the world as a whole. Weill quoting a study by Weitzman (1999) estimates that for the world's 14 most important minerals including oil, coal and gas, the annual global consumption/depletion is equivalent to 1.4% of total world GDP. ($341 billion)[11]. This would be the *average* decline in global incomes if we suddenly ceased to produce and consume these 14 minerals. But of course for individual major producers such as Saudi Arabia for oil and Chile for copper the percentage losses associated with an end to resource depletion would be far higher than this: a 40% reduction for Saudi Arabia for example in relation to oil alone.

[10] the World Bank routinely calculates the depreciation of normal and natural capital in estimating what it terms "adjusted savings". This is included as part of its annual World Development Indicators for which downloading options are explained in Data Box A.

[11] Weitzman, Martin, "Pricing the Limits to Growth from Mineral Depletion", *Quarterly Journal of Economics*, Vol. 114, My 1999. Also in Weill, David N., *Economic Growth*, Addison-Wesley, 2005, Ch. 16

3.3 Traded versus Non-Traded Goods and Services – a Crucial Distinction

In this Section we continue our critical evaluation of the GDP measures by introducing a distinction that plays a critical role in much of the analysis in this book. This is the distinction between goods and services that are actually traded (or are potentially tradable) internationally and those goods and services where this is much less possible and likely (e.g. haircuts, the services of accountants and lawyers and psychiatric counselling). The distinction sounds like a technical nicety. In fact the failure to understand it has led to huge errors in many peoples' interpretation of how far development has proceeded in particular countries in the past 50-60 years. In the next few paragraphs we explain the systematic biases than can and do arise when comparing GDP levels across countries that use different currencies. (i.e. most countries).

Productivity Differentials by Sector are Key

The analysis starts by re-iterating the *third* and *fourth* of the basic elements of the bare-bones model as introduced in Chapter 2. These are:

- that many of the most significant increases in the productivity of labour and capital over time come from the *changing structure of an economy* (i.e. the manner in which its resources are re-allocated as between various types of productive activity such as agriculture, industry and services).

- the most important drivers of that changing structure are changes in *consumer preferences* and the changes over time in the *relative prices* of different goods and services

The reality of 20th and 21st century development to date has been that economic growth has been fuelled predominantly by large productivity changes in ***manufacturing*** sectors with productivity in ***services*** lagging seriously behind: (for this purpose we ignore the agricultural sector although it has somewhat more in common with manufactures in this regard than with services). This in turn means that relative prices in manufacturing have been generally falling while those in services have been generally increasing. In most countries for example the relative price of (say) a haircut has risen relative to the price of a camera because the wage and other costs of producing the haircut will be rising relatively more rapidly given the slow growth of service sector productivity[12].

But now relate this observation to the fact that most manufactured goods in an increasingly liberal world order are internationally *tradable* while most services are far much less likely to be tradable or traded internationally. This means that in any given economy with a reasonably integrated labour market, the income gains that are observed in practice (and show up in the national income accounts) will be a weighted average of :

- income gains rising from much higher productivity in (traded) manufactures

12 This proposition is explained for the case where Wages represent the only cost of production and we also assume a perfectly competitive economy. Then in each sector $P = MC = W / MPL$ where W = the wage rate and MPL = the marginal productivity of labour. Over time the W paid in the different sectors is likely to rise at a similar rate in any given economy. But if the MPL in manufacturing rises much faster than that in the services sector then it is clear that relative prices will fall in manufacturing and rise in services.

- income gains from increased wages and prices (un-associated with productivity changes) in (non-traded) service sectors.

Here is a case where economists are in some danger of being tripped up by their own trick of weighting all production in the GDP aggregates by prices. That trick is easy to pull off when there is no ambiguity about *which* prices to use It is potentially very confusing where there are two or more prices to choose from.

The problem does not arise so much if we are examining one economy in isolation. But it is a major source of potential error when comparisons across different economies are made. This is because each economy will have its own set of prices and these get harmonised incompletely, if at all, by the forces of international trade. We can see this by examining explicitly the overall price levels in two economies namely a Rich Developed Economy (R) and a Poor Economy (P). Denoting the weights of non-traded goods (NT) in the two economies by α (rich country) and β (poor country) respectively, and allowing these weights to differ as between the two economies, the two price indices are:

$$P_R = \alpha P_{NT\,R} + (1-\alpha) P_{T.R} \qquad [2]$$

$$P_P = \beta P_{NT.P} + (1-\beta) P_{T.P} \qquad [3]$$

Next take the ratio of the price levels in the two countries. And then invoke a simple purchasing power parity (PPP) view of the exchange rate (S) between the two countries (i.e. assume that the nominal exchange rate reflects the overall relative price levels) we would have:

$$S = \frac{P_R}{P_P} = \frac{\alpha P_{NT.R} + (1-\alpha) P_{T.R}}{\beta P_{NT.P} + (1-\beta) P_{T.p}} \qquad [4]$$

This is the standard "exchange rate "assumption that until recently was routinely used to make income comparisons between countries. (see Table 3.3 below for an example). Notice that it assumes that the prices of both traded and non-traded goods prices enter fully into the determination of the exchange rate. But this of course is quite unrealistic. Even with very open trade, if goods and services of certain types are *not traded* internationally then they have no way of impacting on the exchange rates that we see quoted in the financial press.

A more correct view of exchange rate determination would be to see it as narrowly dependent – at least in the long run[13] - only on the ratio of *traded* goods prices as between the two countries. That is:

$$S = \frac{P_{T.R}}{P_{T.p}} \qquad [5]$$

[13] Short run models of the exchange rate play an important part in macroeconomic management in both rich and poor countries. They are discussed in Part IV of the book.

Notice that this approach allows only that part of output of the two countries that is ***traded*** to impact their bilateral exchange rate. This can include *some* service activities that are traded internationally (e.g. the increasingly important call centres based in India; the computer software activities of a burgeoning I.T. sector in Bangalore; and the ticketing of British Airways flights by centres offshore from the UK). But it means that the exchange rates as seen in the financial newspapers will not capture *any* influences from the vast bulk of service activities in either the rich or the poor economy of our example. But we know that the services sector component of GDP is large in most cases. 48% of GDP in India and 60% of GDP in Kenya for example is made up of service sector activity. *To the extent that the prices of the non-traded services are not adequately represented in the price of traded goods (that do impact S) then the exchange rate will be a seriously misleading statement of overall price differences between the two representative countries.*

To see just how serious this problem can be in practice, we re-arrange the equations above to derive an equation in the exchange rate and the ratio of *overall* prices in the two economies. This is done following Krugman and Obstfeld [2000] [14]by dividing the numerator of Equation [4] by the price of traded goods in the rich country *($P_{T.R}$)* and the denominator by the equivalent price of traded goods in the poor country ($P_{T.P}$). It is noted in doing this that the ratio of these two divisors determines the "correct" exchange rate (as in Eq. [5]), we derive Equation [6] below.

$$\frac{P_R}{P_p} = \frac{P_{T.R}}{P_{T.P}} x \left[\frac{\alpha(P_{NT.R} / P_{T.R}) + (1-\alpha)}{B(P_{NT.P} / P_{T.P}) + (1-\beta)} \right] \qquad [6]$$

Then once again invoking Equation [5] and re-arranging [6] we derive the expression below for the exchange rate in terms of the overall relative prices of the two countries.

$$S = \frac{P_R}{P_P} x \left[\frac{\beta(P_{NT.P} / P_{T.P}) + (1-\beta)}{\alpha(P_{NT.R} / P_{T.R)} + (1-\alpha)} \right] \qquad [7]$$

The term in the square bracket can be thought of as the Exchange Rate Deviation Index (ERDI). It denotes the size of the error causes by the assumption that the exchange rate properly represents ***overall*** price level differences between two countries when in truth it only reflects differences in ***traded goods*** prices. Only if the term in the square bracket has a value of unity would the exchange rate be equal to the ratio of the two *overall* price levels. That exchange-rate basis is similarly inappropriate for international income comparisons if the term in brackets is not equal to unity.

The component terms inside the square bracket show how the error arises. Above all it can arise because

- the non-traded prices in the poor country are likely to be low relative to the poor country's traded goods prices (see the numerator of Eq [7])

[14] Krugman, Paul R. and Maurice Obstfeld, *International Economics, Theory and Policy*, Fifth Edition, Addson-Wesley, 2000

- the non-traded goods may have a higher weight in the price index of the poorer country than the richer – though this is less certain

- the ratio of non-traded to traded goods prices are likely to be lower in the poor country than in the rich country. (compare the numerator and denominator of Eq. [7]).

In plainer language, this means that the very low cost of mainstream services (haircuts, domestic servants, civil servants) that one typically encounters in poorer countries such as India and Kenya do not get captured in the exchange rates of these countries vis-à-vis, for example, the US dollar, even though they can be a very large part of total economic activity. Hence the exchange rate seriously overstates the true *overall* prices of goods and services in these poorer countries: the exchange rate is over-devalued relative to the true PPP exchange rate which is defined in terms of traded goods only.

A Numerical Example:
We have laboured this point because it is crucial to understanding the problem of comparing development trends across countries. Many otherwise very competent studies of development have seriously over-stated the development gaps by failing to recognise the errors of using exchange-rate based comparisons of income. Because this is such an important conclusion a numerical example is provided in Box 3.3 to help fix the point.

The example assumes that the prices of traded goods in the two countries are the same but that non-traded goods are much cheaper in the poor country. Then four cases are simulated representing different possible weights (the α and βs) of traded and non-traded goods in the two countries (the USA and a hypothetical poor countries namely NToraria). The examples calculate TWO versions of the exchange rate between the two countries. S1 is based on the assumption in Eq. [4] that the exchange rate accurately reflects the *overall* differences in price levels. *This simple "exchange-rate" view is seriously in error for the reasons discussed above.* The alternative exchange rate S2 (the correct " PPP exchange rate") adjusts for this systematic error.

The calculations of GDP per capita in a common currency (the US$) show the magnitudes of the mistakes that can arise by making the assumptions underlying S1. Note that the error gets progressively smaller as we move from Case A through Case D and the relative importance of the two classes of goods becomes ever closer in the two countries. But the error is not eliminated because even when traded and non-traded goods constitute 50% of the price index in *both* countries, the absolute level of non-traded goods prices is still lower in the poorer country (30 versus 90). The reader is invited to check that the error disappears when those two prices are set equal in Case D. Additionally, you should check that the percentage error shown in the example is indeed equal to the term in square brackets in Equation [7].

Applying these Ideas in Practice
A massive UN research activity was initiated in the late 1960s under the direction of Irving Kravis, Alan Heston and Robert Summers[15]. It was possibly the largest ever programme of applied economic research. It sought to measure the true costs of a wide range of tangible goods and services in an increasingly enlarging range of countries to provide direct measures of overall $P_{R/}\, P_p$ and so by implication of the ERDI as defined by Equation [7]. Based on this research effort, it has become increasingly possible for the World Bank and similar agencies to compare the income levels of different countries using both the traditional (exchange-rate based) and the more correct PPP approaches. This has been an eye-opener in terms of our understanding of both

[15] For example see Summers and Heston [1984]

- the differences in *levels of income* between countries, and
- the changes in income gaps over time

Our earlier comparisons between incomes in France and Tanzania provided merely one typical example of this phenomenon.

Box 3.3: A Numerical Example

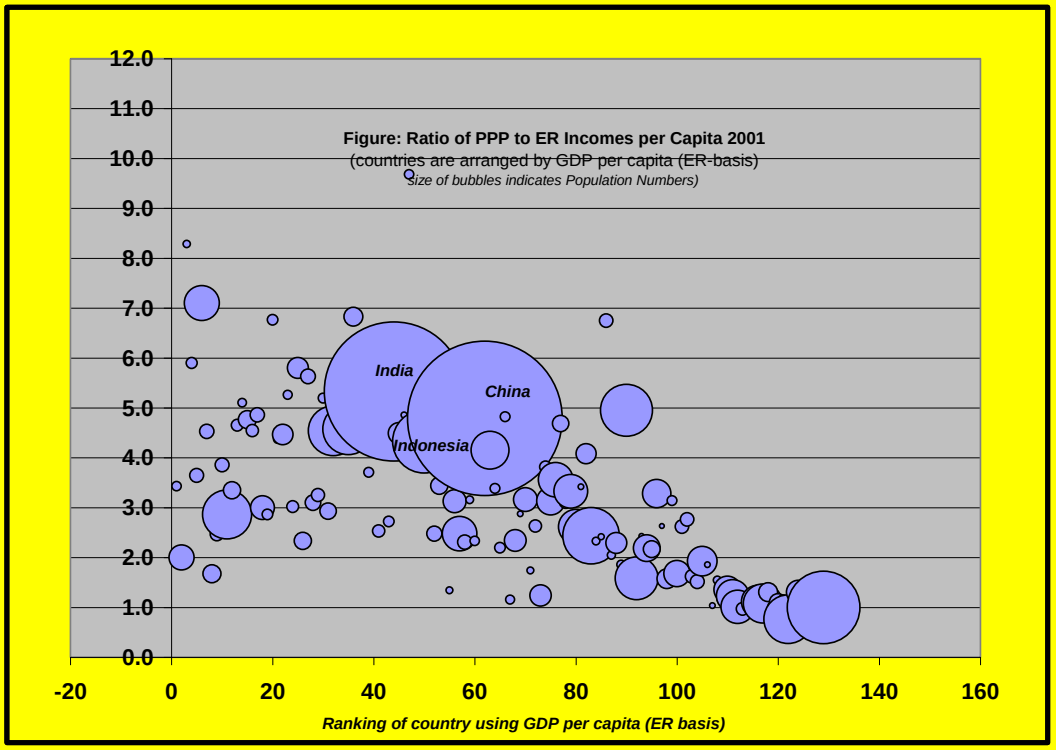
	Rich Country (USA)		Poor Country (NToraria)	
	Traded Goods	Non-Traded Goods	Traded Goods	Non-Traded Goods
	Price Index		Price Index	
	100	90	100	30
	Traded Goods	Non-Traded Goods	Traded Goods	Non-Traded Goods
	share in price level		share in price level	
Case A	0.8	0.2	0.2	0.8
Case B	0.7	0.3	0.3	0.7
Case C	0.6	0.4	0.4	0.6
Case D	0.5	0.5	0.5	0.5

	Overall Price Level		Exchange Rates	
			S1	S2
	Rich Country	Poor Country	based on Overall Prices	based on Traded Gds Prices
Case A	98.0	44.0	0.45	1.0
Case B	97.0	51.0	0.53	1.0
Case C	96.0	58.0	0.60	1.0
Case D	95.0	65.0	0.68	1.0

	GDP - Per Capita		GDP - Per Capita		
			Poor Country ($)	Poor Country ($)	
	Rich Country in $US	Poor Country (pesos)	using S1	using S2	Error
Case A	30,000	800	359	800	-441
Case B	30,000	800	421	800	-379
Case C	30,000	800	483	800	-317
Case D	30,000	800	547	800	-253

The reason has been that the PPP calculations have shown that the traditional approaches result in a systematic understatement of the income of all the poorest countries of the world – an understatement amounting to between 200% and 400% in most cases. Figure 3.2 below evidences this point by comparing the traditional and true-PPP measures of per capita income for 129 countries for which data on both bases were available (for 2001). The countries are ordered from left to right on the basis of their income levels as measured by the standard method of exchange rate conversions (the Atlas method in the World Bank's nomenclature). For all the poorest countries (numbers 1 through 60 in the listing) the PPP incomes (on the vertical axis) are typically 2 to 5 times (200% to 500% higher) than the levels indicated by traditional measures of per capita income. Only for the last quarter of the distribution (the richest 30 countries) do the discrepancies fall significantly below 200%. In other words the exchange-rate based approaches to comparing GDP understate the true income of the world's poorer countries by 200-500 percent. The size of the bubbles in Figure 3.2 indicate population size so that we can see what a huge number of the world's total population are affected by the measurement errors.

Figure 3.XX: Comparing Incomes on Exchange Rate and PPP bases[16]



A few examples can serve to emphasise the critical importance of these points and also bring the numbers in the Figure a bit more up-to-date. India is the world's second most populous developing country. Its per capita income in dollars (using a standard exchange rate conversion) was $1,570 in 2014. This is equivalent to 2.8 percent of the USA level (i.e. the US was 100/2.8 or 36 times richer than India per capita in 2014). However, India's PPP-based income per capita in the same year was several times higher at $5,630 which is the equivalent of some 10 percent of the US level (on this basis the USA is only some 9 times richer than India). These differences matter enormously in shaping our view of the state of global development: after all there were almost 1.3 billion people in India in 2014. An income gap of 9:1 vis a vis the USA as against a gap of 36:1 is clearly a difference of some material importance to a huge number of people!

Box 3.4: The International Comparisons Project (ICP)

The ICP is one of the largest global statistical research exercises ever undertaken. Over the past forty years it has played the key role in identifying the true differences between income levels across countries by undertaking very sophisticated comparative studies of price differentials.

It had its origins in embryonic work in the OEEC (the predecessor of OECD) in the 1950s but was then pursued by Irving Kravis, Alan Heston and Robert Summers at the University of Pennsylvania. An initial compendium of results for 34 countries was published in 1982. The

[16] Source: World Bank, World Development Report, 2003

same team also created the Penn World Tables[17] that updated and reconciled the materials from various rounds of the ICP and added short-cut estimates for additional countries. These tables can be consulted through the internet link shown below and are used extensively later in this book.

The ICP was taken over as a cooperative venture between the United Nations Statistical Office (UNSO) and Eurostat (the Statistical Office of the European Union) in the 1980s. Initially, different regional agencies of the UN and other organisations such as OECD provided estimates for their respective regions with UNSO adjusting to ensure comparability. By 1995 there had been several rounds of ICP estimation for some 87 countries. Since 1996 the World Bank has been reporting adjusted GDP estimates based on variants of the ICP methodology for now over 120 countries. (see for example World Development Indicators (WDI) 2003). Extremely valuable compilations of GDP and GDP per capita based on the methodology have been compiled and are still being up-dated by Angus Maddison in particular (see Maddison (2002) and (2003)[18].

Evidently the technical adjustment of using the PPP-based approach does not magically change crushingly poor countries such as India let alone Rwanda into rich ones. However, it does radically change our assessment of *precisely how poor they are.* Most significantly it radically undermines certain common perceptions about how the gaps between rich and poor countries are evolving over time – and how impossible they may be to fill. This point looked at in much greater detail in Chapter 4.

Summary

In this Section we have shown why it is critically important to recognise the large errors associated with an exchange rate basis for converting incomes into a common currency. Whenever possible, a true-PPP exchange rate should be used instead. Box 3.5 provides a further algebraic explanation of one of the standard explanations of the biases in the exchange rate approach as already discussed. It also provides a complementary intuitive explanation of the same point.

[17] These can be accessed from the Center for International Comparisons at the University of Pennsylvania, See http://pwt.upenn.edu. See also Summers and Heston (1984) ,(1988) and (1991)

[18] Maddison, Angus, The World Economy, A Millennial Perspective, OECD Development Centre Studies, Paris, 2002

Box 3.5: Why Exchange Rate and PPP Comparisons of Incomes Diverge

When we compare the income of an American with that of a Kenyan we typically do two things. First, we capture the fact that Americans ***produce*** more manufactured goods per person and so gain a *true* income advantage. Secondly we capture the fact that doctors, hairdressers and other service providers in the USA ***cost*** much more than in Kenya – this is an *illusory* income advantage for the Americans based on the inflated general price level. So the *exchange rate based comparison* says something about what the Kenyan could buy in the USA at the US price level, including services at the inflated US prices. The more correct approach (after all how many Kenyans get their hair cut in the USA?) is to ask what the Kenyan can buy with the available shilling income **in Kenya**. This is what the true-PPP–based comparison attempts to do. For manufactured and agricultural (or more correctly "traded") goods the US and Kenyan price levels (in a common currency) will not diverge too much unless there is very high trade protection. Hence PPP and exchange rate comparisons will give similar answers. For services (or more correctly "non-traded items in GDP), the two price levels are likely to diverge hugely. Since services are a large part of Kenya's overall GDP those divergences can have a big effect on the overall comparison.

An algebraic explanation derives from the theory about this point attributable to Paul Samuelson (1964) and Bela Balassa (1964)[19]. It is commonly called the "productivity differential model". In what follows the subscripts "K" and "US indicate the two countries and "S" denotes the number of Kenyan shillings per US dollar – the exchange rate

Using Eq. [5] in the text, $P_K^T = P_{US}^T.S$ [1]

but if in both countries prices are determined by Wage rates (*W*) and productivity levels (*MPL*), then

$P_K^T = W_K^T / MPL_K^T$ and equivalently for traded goods in the USA [2]

Then combining [1] and [2] we see that $\frac{SW_{US}^T}{W_K^T} = \frac{MPL_{US}^T}{MPL_K^T}$ [3]

Eq [3] tells us that the differential levels of productivity *in the traded goods sector* determines the wage differentials (measured in shillings) between the US and Kenya. But if we now note that wages *in different sectors* within Kenya will have some tendency towards equality because of the potential inter-sectoral movements of labour, then as a rough approximation $W_K = W_K^T = W_K^{NT}$ …and equivalently for the USA. [4]. But IF as is likely the wide productivity differentials in the traded sectors between Kenya and the USA are NOT matched by similar differentials in productivity in non-traded services (as Paul Krugman is fond of asking "how much more efficient can an American hamburger flipper be to the corresponding person in a poor country?) then we see that the LARGE wage differentials in traded goods implied by Equation [3] will be broadly applicable also to wages in the non-traded sectors and so (through Eq.[4] to wages in the economy as a whole. But since price levels are a function of wages rates (Eq.[2]), price levels in the two countries will also reflect this large wage differential. This is in spite of the fact that in the large non-traded sector of the Kenyan economy productivity levels (for. e.g. hamburger flippers and hairdressers) are unlikely to be far below those obtaining in the USA.

[19] This model (or effect) states that an increase in the relative productivity of tradable versus non-tradable goods of one country relative to foreign countries raises its relative wage. This in turn will raise the relative price of non-tradables (where no productivity change has occurred) and the relative average price level of that country. This is the equivalent of an appreciation of that country's real exchange rate (RER) – a subject which is much discussed in Part IV of the book

3.4 Introducing the Human Development Indicator

The Background

As was noted earlier there is a long tradition of economists trying to develop alternative (and normally broader) indicators of development to compete with or even replace the GDP measure. The other indicators that have been widely used attempt to capture various important components of "development" as identified in Chapter 1. Above all they include fundamental basic needs such as literacy rates, life expectancy, degree of access to basic human needs such as clean water and shelter, degree of inequality, quality of nutritional standards. They are generally referred to by the generic title of "social indicators". The main issue has not been whether these social indicators can *individually* tell us anything about the development of particular countries – clearly they all do in their own ways. Rather the issue that has preoccupied economists is whether groups of these social indicators can be added together in some way to provide an alternative *aggregate* or "*composite*" measure of development.

Three main technical points together explain why this is an undertaking full of pitfalls:

1. No set of disparate social indicators measured in a variety of different units will succumb at all to the economist's trick of using prices as the common unit of valuation. There is no meaningful way of attaching prices to, say, a country's degree of inequality, its population's literacy rate, and the percentage of its children attending primary schools, in order to add them together! In the absence of "price" as the basis for weighting the various different indicators together, some alternative weights have to be selected. This has typically needed to be done on an arbitrary basis.

2. If the various social indicators all move in a similar fashion (i.e. if their time series show a high degree of statistical correlation with each other) it is a trivial to choose the weights to add them together. Any arbitrary set of weights will be as good as any other since the choice of those weights will not affect the movement over time of the composite aggregate. However, in this case, the same information could be obtained by examining *any one* of the set of indicators. If there are "n" indicators then "n-1 of these are redundant as is the composite measure. By contrast, if the degrees of correlation between the series are low, then each of the indicators can potentially add some new information to our assessment of a country's "development". But paradoxically in this case, the precise weights that are chosen will be critical in determining how the composite indicator moves over time. If we cannot scientifically determine the "correct" weights, anything we say about "development" based on the composite indicator will itself be arbitrary.(see the later reference to the results from Estes[1984] as an extreme example).

3. The problem of selecting the appropriate weights is compounded by the biases potentially arising from the *scaling* of component indicators. Hicks and Streeten [1979] point out that even life expectancy (an easily measured variable) could be scaled from a minimum of say 40 years to a maximum of 75 (reflecting present day experience) or from 40 -100 years to capture likely future developments. In the first case, a country with average life expectancy of 60 years will be positioned 57% along the scale but only 33.3% along in the second case. When we recognise that we may have the same ambiguity about the scaling of all the other indicators in the composite index, then the arbitrariness of the final result is further increased.

Notwithstanding these general technical objections, a variety of attempts have been made to construct composite indicators of development. The examples have included:

- Drewnowski and Scott's index of the "Level of Living" proposed in a paper in 1966. This added together physical basic needs such as nutrition, shelter, health with cultural needs such as education, leisure and security. But because many of the component series were difficult to obtain on a regular basis and for many countries, the idea never really advanced beyond the conceptual stage.

- McGranahan's[20] "Development Index" based on 18 core indicators divided between 9 social and 9 economic indicators. This index was a good example of one where the overall change over time was pretty insensitive to the choice of component variables and weights (see Hicks and Streeten [1979]. Logically then is there a justification for committing the time and energy to compile large numbers of indicators? Perhaps because the answer was "probably not" this index too enjoyed only a short shelf life.

- Morris D. Morris' "Physical Quality of Life Index" (PQLI) as proposed in 1977 went the route of simplifying matters by using only *three* simple indicators each with the same weight. These were life expectancy at age one, infant mortality and literacy. These three are all *outcome* indicators of the development process. Hence they say something about the gains from successful development and the downsides of failed development. But the index was criticised for claiming to measure the physical quality of life when in reality it only measures progress in reducing mortality and raising literacy! Similarly the justification for equal weights for all three indicators has no obvious rationale other than simplicity.

- Tata and Schultz's "Human Welfare Index" analysed ten variables and separated these into three key groups using factor analysis. Their results broadly confirmed the differentials in development that were capable of being spotted using simpler methodologies. Tata and Schultz (1988) – *Annal of the Association of American Geographers* [1988]

- Estes' "Index of Social Progress" controversially resulted in the USA being ranked lower on the development scale than Colombia, Cuba and Romania – a clear example of how the "right" (or wrong?) choice of weights can give almost any answer about degrees of development that you care to find. Estes [1984] *Social Development Issues.*

The Human Development Index (HDI)

This general line of economic endeavour moved on to a somewhat more secure level in 1990. In that year, the UNDP began to compute its Human Development Index (HDI) and this has established itself as by far the most important aggregate measure of development alongside the GDP measures already discussed. It was published first in the 1990 issue of the UNDP's *Human Development Report* and has appeared in that same report every year since then. Like the Morris PQLI it benefits from using only three main variables. But it combines these in a way that provides a more compelling story about the development process. In brief the UNDP argues that successful development is indicated by:

- A long and healthy life. This is measured by *life expectancy at birth(i)*

[20] McGranahan [1972] and McGranahan, D.V., C. Richard-Proust, N.V. Sovani and M. Subramanian [1970]

- The enjoyment of that life supported by reasonable educational abilities. This is measured by a weighted average of the *adult literacy rate (ii)* (two thirds weight) and a combined *secondary and tertiary enrolment rates(iii)* (one third weight).

- The enjoyment of that life supported also by a decent standard of living. This is measured by an adapted version of *GDP per capita(iv)* in PPP terms.

The four measurable indicators that go to make up the HDI are referenced in the list above by the small roman numerals. As we noted above both the *scaling* and the *weighting* of the component indicators are crucial aspects of any composite indicators. In the HDI the weights on the three elements are set equal (one third in all cases). The scaling is as follows:

Table 3.3: The HDI Weights and Scales

Indicator	Maximum Value	Minimum Value
(i) Life Expectancy at Birth (years)	85	25
(ii) Adult Literacy Rate (%)	100	0
(iii) Combined gross enrolment rates (%)	100	0
(iv) GDP per capita (PPP $US)	40,000	100

The actual process of positioning each country's indicators according to this scale is to normalise the actual measure in each case by first, subtracting from it the minimum values shown above and then dividing the result by the difference between the maximum and minimum values. This shows the achievement of a country relative to the whole length of the scales. [21]

Formally, and for indicator "i" and country "j" we have:

$$I_{ij} = \frac{X_{ij} - \min X_i}{\max X_i - \min X_i}$$

where X_i = the value of the indicator "i" and

I_i = the index value of the indicator "i"

In the case of the GDP indicator, the log of income is used as the measure of X_{ij}. This has the effect of compressing the upper ranges of income (especially from $10,000 per capita to $40,000 per capita) relative to the scale that would be obtained were natural numbers (i.e. unadjusted income) to be used. So substantively this has the effect of placing a higher development value on income gains at the *lower end* of the income range than at the higher

[21] In the early versions of HDI, this process was done the other way round. Specifically, an individual country's performance was subtracted from the *maximum value* of each variable, and the result was then divided by the length of the full scale. This generated what was called a "deprivation index" for each indicator

end. Technically this has a similar effect on the final index as would the use of an exponentially weighted utility function – Box 3.6 provides one important example.

Box 3.6: The Atkinson Welfare Function and the HDI

In early versions of the HDI calculation, the process of compressing the higher income levels as described in the text above was achieved in a different way from now by converting incomes in each country into an equivalent measure of the welfare deriving from that income. This was done by transforming the income date through the following welfare function due to Tony Atkinson (Source: *Journal of Economic Theory* 1970)

$$W(Y) = \frac{1}{1-\varepsilon} Y^{1-\varepsilon}$$

where W(Y) = the welfare level associated with income

ε = the elasticity of marginal utility with respect to income

when $\varepsilon = 0$ there is no decline in the marginal utility of income as income increases so W and Y are equal.

When $\varepsilon = 0.5$ a 10% increase in Y results in only a 5% gain in welfare (because of the decline in the marginal utility of the extra income) and

When $\varepsilon = 0.667$, a 10% increase in Y results in only a 3.33 % gain in welfare.

Once the indices are computed for all three components of the HDI, they are combined in a simple arithmetic average for each country as follows.

$$HDI_j = \frac{1}{3} \sum_{i=1}^{3} I_{ij}$$

Some selected numerical results from the use of the HDI are presented at the end of this present Chapter.

3.5 Classifying Countries

This is all we need to say for the moment about *measuring* development. What about the results? World Bank data indicates that there are now 209 separate national economies in the world with some degree of sovereign authority over their futures. Having understood some of the basics of measuring development, we next consider how to classify these countries to provide some basis for much of the further analysis in this book. A useful starting point is to use the World Bank's own classification. This is based squarely on income (GDP of GNI) levels. In this present Section we use both exchange rate-based and PPP-based measures of income to:

- Describe and comment on the World Bank classification of countries
- Make some use of this to present some simple statements about the major differences in prosperity levels across different countries

3.5.1 The World Bank's classification of countries

The WB *World Development Report* of 2006 classifies all countries with populations greater than 30,000 into four main income groups as follows:

- Lower Income countries ($ 825 or less of unadjusted GNI)
- Lower Middle-Income countries ($826-3,255)
- Upper Middle-Income countries ($3256- $10,065)
- High –income countries ($10,066 or more)

The numbers shown in brackets are cut-off points in terms of Gross National Incomes (GNI) in 2005. These are incomes on an exchange rate basis (i.e. not PPP) Table 3.3 shows in summary terms how the world divides up as between these four groups of countries in 2005.

Box on Data: A - Accessing the World Bank's GDP Data

All the GDP and GNI variables referred to in this Chapter can be found and down-loaded from the World Bank's *World Development Indicators (WDI)* which is updated annually. Although *WDI* is available in hard copy form, there are various ways to access the data electronically.

Purchase a CD containing all the data series together with associated definitions and explanations of concepts (this is the most expensive option especially for the individual reader)

- Purchase an individual or institutional subscription to the on-line access provide via the Bank's web site namely www.worldbank.org. From the home page search on "Data" to get to the WDI and other data sets of the Bank (this is a substantially cheaper route but still costs around $100 per annum)
- Sample the on-line subscription series at the Bank's web site (as above). This is a free service but provides access only to a limited set of the WDI tables and does not allow downloads in Excel format
- Gain access to the WDI data (and other important international data sets) via the Economic and Social Data Services (ESDS) service maintained under licence in the UK by the University of Manchester (but not presently available in the USA and elsewhere). This is available free of charge to most Universities and their students in the UK but users do need to acquire a user ID and password which is normally linked to an Athens password (check with College IT departments for full information on how to obtain these).

  All the full access methods listed above will give readers access to standard WDI tables as published in, for example, the Bank's annual *World Development Report*. Additionally users can construct their own individualised data sets by selecting in the three dimensions of (i) countries (there were 209 of these in the September 2006 edition, (ii) data series (695 in the 2006 edition) and (iii) years (data for the period from 1950 to 2004 were available but available series are quite sparse in the years prior to 1990. The more recent editions of WDI show only those data back to 1990). Intelligent use of these series provides readers with the scope to construct a very wide range of date sets, and charts to assess particular propositions about development and the contrasts between countries. Extensive use is made of this capability in Chapter 5.

The two main target groups for much of our later analysis are shown in Table 3.3 in a **bold** font. There are 59 Low-Income countries that together account for 37 % of global population. This is where most of the severely poor of the world reside. It is also where we find most of the CARLs (countries with abundant rural labour as described in Chapter 2), HIPCs (Heaviliy Indebted poor countries as discussed in Chapter 1) and Paul Colliers' 'bottom billion' poorest persons. It is also where we find most of the "stupid" poverty as U2 singer Bono has labelled it (extreme poverty relievable by a few simple health and other measures).

If we re-work the numbers using the exchange-rate basis of conversion, these poor countries account for a mere 3.1% of total world production or income. On average the people in these countries receive an income of $580 per annum or only $ 1.6 per day. Adding the lower Middle-Income countries increases the number of "poor" countries in total to 113 countries that together account for around 75 % of total world population. But these countries and people

together produce only 14% of total world production. People living in these countries on average receive an income of only $ 3.5 per day.

In brief the lowest income countries represent almost one third of all countries in the world and 37% of its population but they achieve only 3% of total world income. The richest countries represent around 25% of all countries and only 15.7% of world population but achieve no less than 78 % of total world income.

Box 3.7: A Warning about using Average Income Data

The severe *inter-country* inequalities that Tables 3.3 indicates are emphasised even more by the further comparisons that can be derived from rich-country publications such as *Forbes Magazine*. For example, in 2005 it was estimated that the 691 billionaires in the world enjoyed combined wealth of $ 2.2 trillion (let's spell this out – it is $2,200,000,000,000). This was the equivalent of the **total** income of the poorest 47% of the world's population – all the people in the low-income group in Table 3.3 plus a few from the lower-middle-income group. Scandalous this may appear to be. But it is also a reminder and a warning that Table 3.3 is still using *average* income data.

The *Forbes* article also pointed out that no fewer than 78 (check) of the 691 ultra rich individuals are from countries included in low and middle-income categories! 2 were from Sub-Saharan Africa. So never forget that there is great wealth (albeit for only a few) even in the poorest countries.

These are staggering inequalities and are the frequent subject of alarmed comment. This is as it should be. But good analysis is not much helped by serious exaggeration and the reality is that global inequalities are not quite so bad as the last paragraph suggests. Look now at the PPP-converted incomes per capita shown cols 3 and 5 of Table 3.3. Col 3 shows that in PPP terms the low-income countries account for 9.6 % of total world income and not the even more miserly figure of only 3.1% shown above. Similarly their average per capita income in 2005 was around $2486 which is the equivalent of 26.4 % of the average for the world as a whole. It represents a bit more than $6 per day as compared to $1.6 per day on the basis of unadjusted income data.

A presentation of the same data in Figure 3.2 below, shows the global divide more graphically.

The data in Table 3.3 and Figures 3.2 and 3.3 can be used to make the following simplified but useful categorisation of the problem of global inequality.

- around *15%* of the countries by number of the world are low-income (so ***seriously*** poor on the average)
- a further ***one quarter*** of countries are low middle-income which means that their average person also has a very ***low income***
- together these two groups of poor countries account for about 40% of all the countries of the world (82 countries in total)
- they account for 48% of a total world population of 7.26 billion
- a large proportion of the populations in these countries survive (if that is the right word) on less than $2 of (unadjusted) income per day.
- At the other end of the income scale are the sharp distinctions that we observe within the World Bank's group of 56 "high-income" countries. Some of these are indicated in Box 3.8.

The better news is that the percentages in each of the first four bullet points above have all reduced during this present Millennium when the issue of world poverty has been much more firmly on the agenda. But notice that we are here talking about poor *countries*. For the moment we abstract from the reality underlying these data that there are also many poor people in countries classified as high income or rich.

Table 3.3a: How the World Divides: Income Levels by Country in 2014

	No of Countries	Population	GNI total (Atlas method) $ billion	GNI Total - PPP basis $ billion	GNI per capita (Atlas method) $US	GNI per capita PPP basis $US
Low Income	31	622	391	977	629	1,570
Low Middle-Income	51	2,879	5,792	17,274	2,012	6,000
Upper Middle Income	53	2,361	18,604	33,474	7,901	14,179
High Income	78	1,399	53,538	57,000	38,274	40,749
of which OECD	32					
TOTAL	213	7,261	78,325	108,412	10,787	14,931

Table 3.3b: How the World Divides: Shares in Global Incomes by Country in 2014

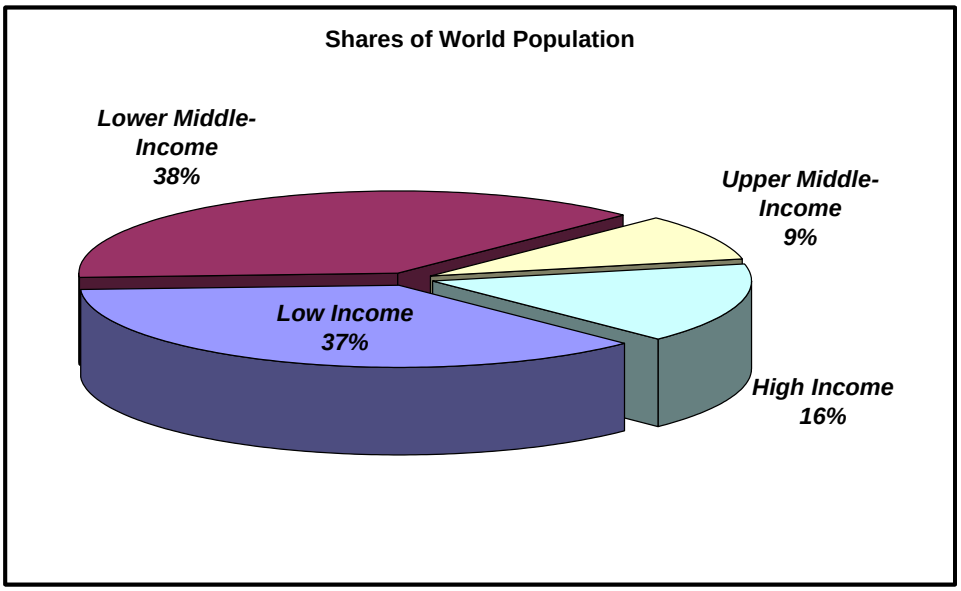
Shares of the Above	No of Countries	Population	GNI total (Atlas method) $ billion	GNI Total - PPP basis $ billion	GNI per capita (Atlas method) - % of World average	GNI per capita PPP basis - % of World average
Low Income	14.6%	8.6%	0.5%	0.9%	5.8%	10.52%
Low Middle-Income	23.9%	39.7%	7.4%	15.9%	18.7%	40.18%
Upper Middle Income	24.9%	32.5%	23.8%	30.8%	73.2%	94.96%
High Income	36.6%	19.3%	68.4%	52.4%	354.8%	272.92%
of which OECD	15.0%					
TOTAL	100.0%	100.0%	100.0%	100.0%		

The income gaps between rich and poor countries are readily exampled by using Table 3.3a. If the data in column 5 is used, the average per capita income of the rich country group is on average *60 times* larger than that in the poorest countries ($38,274 versus $629). If the PPP data in column 6 is used instead, then the absolute income gap is still a whopping $US39,000 but the absolute difference is now *26 times* ($40,749 versus $1,570). So apart from the fact that the PPP numbers are technically more correct, their use also brings solutions (the closing

of income gaps) into the range of the possible and takes them away from the sphere of the "extremely unlikely". This becomes even more apparent when we look in more detail at the actual changes over time achieved by some developing countries in the past half century in Ch. 4 below. In fact even in the past ten years (since 2005), the numbers of low income countries as defined by the World Bank has declined from 59 countries with a combined 2.35 billion people to the 31 countries with a combined population of 622 million people as shown in our table for 2014. Of course the statistical counterpart of this has been an increase in the number of people living in the lower Middle Income group where there is also a huge incidence of poverty: 2.88 billion people were in that grouping in 2014 versus 2.48 billion in 2005. This is partly a statistical aberration dependent on where the dividing line between countries is drawn but also a reflection of the reality of large income gains in many erstwhile low income countries. As we will see later it is a change that has removed many million from poverty – particularly in China.

Figures 3.2. and 3.3 present some of the same information in graphic form.

Figure 3.2: Shares of Poor Countries and Poor People



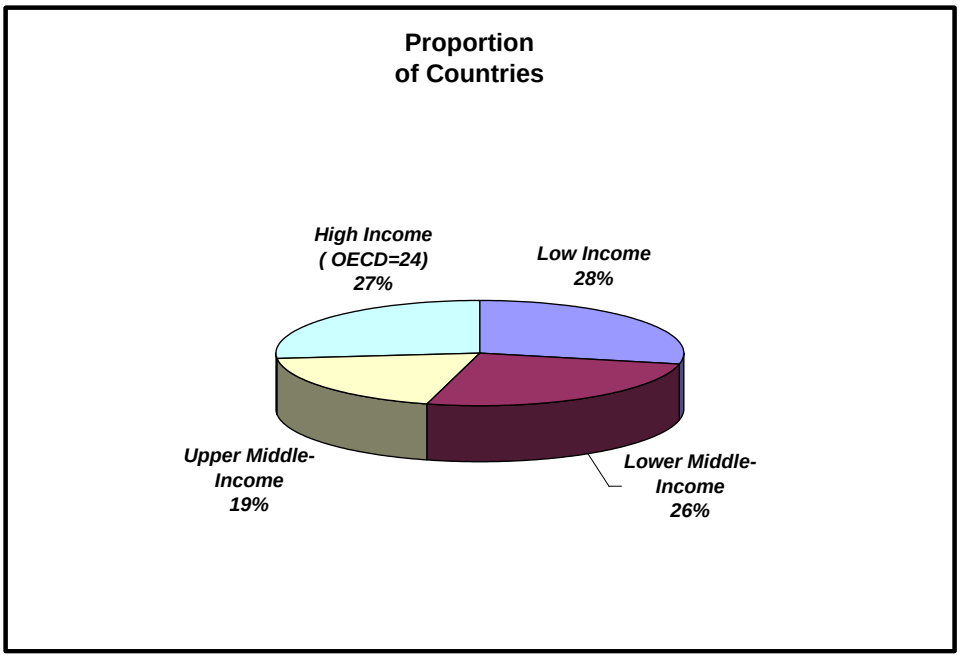
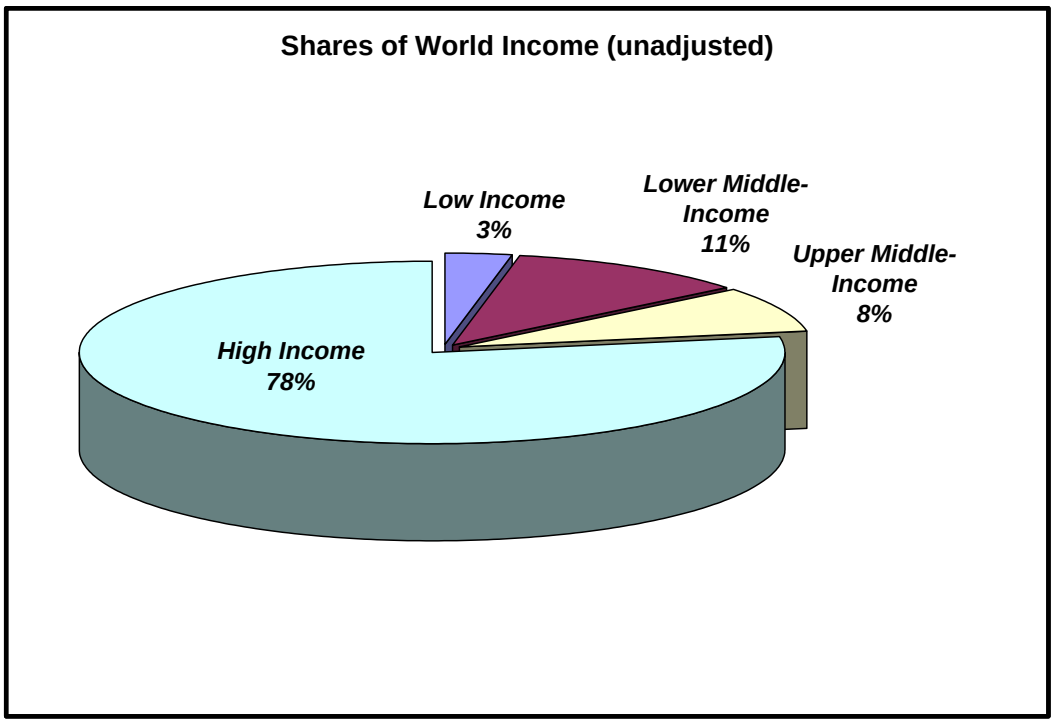
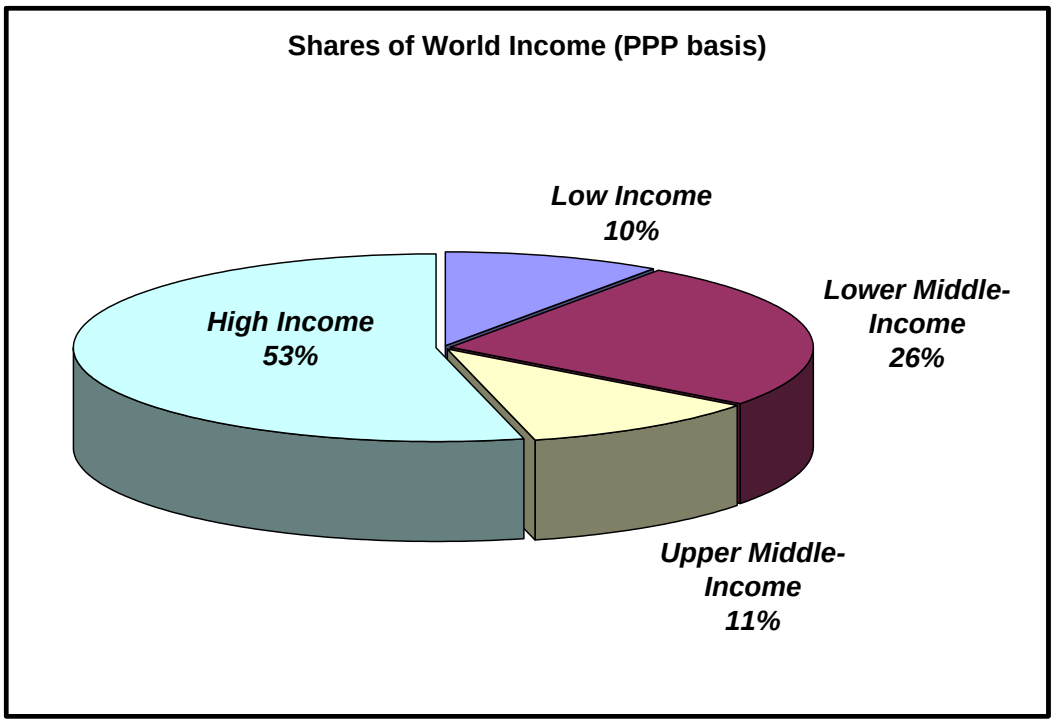


Figure 3.3: Shares of Global Income



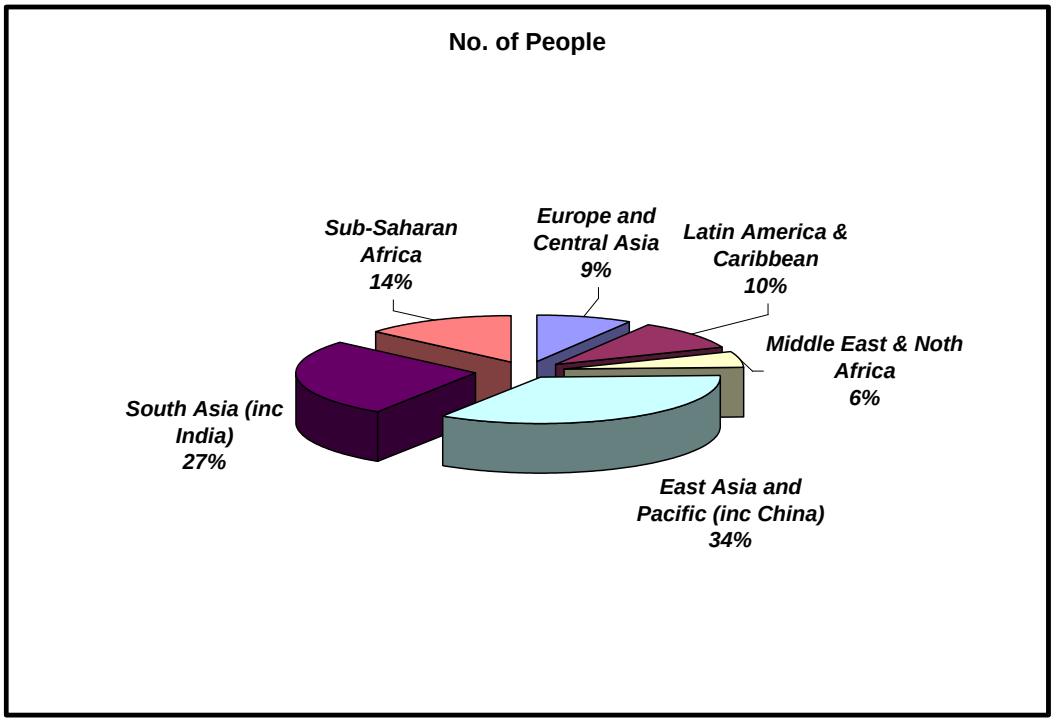


Various dis-aggregations of the basic classification can give us greater insights into the location and nature of the huge divides in income shown in Figures 3.2 and 3.3 . The most straightforward of these is one based on geography. Table 3.4 below shows where in the world the Low-Income and Lower Middle-Income countries are to be found. The data show both the unadjusted and the PPP versions of the income numbers.

Table 3.4: Where in the World are the Poor People? - (data are for 2005)

	No. of Countries	of which Upper Middle Income	No. of People (million)	Total GNI ($ billion)	Total GNI PPP ($ billion)	GNI per capita ($US)	GNI per capita - PPP ($ US)
Europe and Central Asia (ECA)	27	10	473.0	2,134	4,324	4,113	9,142
Latin America & Caribbean (LAC)	32	16	551.4	2,358	4,472	4,008	8,111
Middle East & North Africa (MENA)	14	3	305.4	707	1,856 0	2,241	6,076
East Asia and Pacific (inc China)	24	4	1885.3	3,032	11,149	1,627	5,914
South Asia (inc India)	8	0	1470.0	990	4,618	684	3,142
Sub-Saharan Africa	48	7	741.4	584	1,469	745	1,981
Totals	153	40	5426.4	9,806	27,888	6,987	9,420
TOTAL WORLD	209	40	6437.8	44,318	60,644	6,987	9,420

Figure 3.4: The Geographical Location of the (153) Poorer Countries



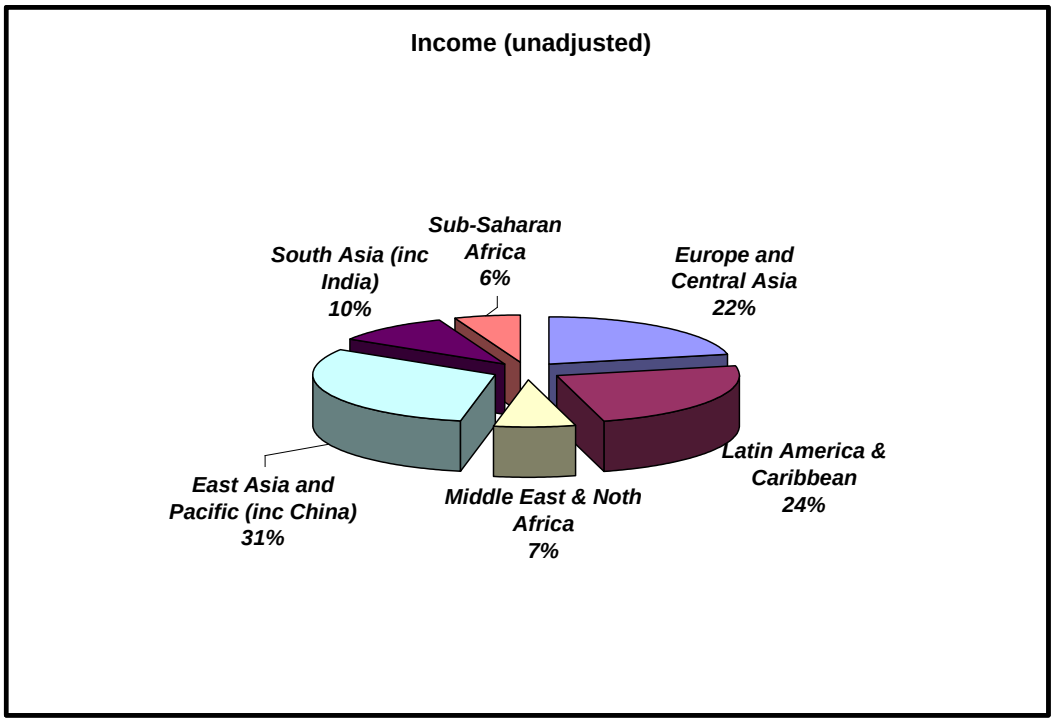


Table 3.4 differs slightly from the earlier one by including *all* middle-income countries and not just low middle-income countries. But it is readily seen that the upper middle-income countries that have been added (i.e. countries with incomes up to $10.065) are located primarily in Eastern Europe (e.g. Hungary, Poland and the Czech Republic), Latin America and the Caribbean (countries such as Argentina, Chile Venezuela and Barbados); and in the Middle East (e.g. Saudi Arabia) – see the numbers in Column 2.

The hard core of seriously poor countries are concentrated in the other *three* geographical regions, of East Asia (including China), South Asia (including India) and Sub-Saharan Africa. In these three regions there are also far fewer Upper middle-income countries. To repeat the hard core of poorer countries is located in :

- in East Asia where China dominates the numbers
- in South Asia where India is the dominant country, and
- in Sub-Saharan Africa.

Notice that notwithstanding the much publicised and recent economic successes of China and India they are still the world's largest ***low-income*** economies: although China has recently been re-classified as a "low middle-income" country. It can be noted also that these three poorer regions have a very substantial gap in their levels of per capita income as compared with the other three regions. For example, the average per capita income in the richer developing country regions of ECA and LAC, is more than twice that of East Asia and more than five times that of Africa and South Asia. Additionally the two poorest regions - South Asia and Africa - suffer a significant income deficit even in relation to the third poorest region namely East-Asia. These intra-poor-region inequalities persist even when the PPP income data are used although this adjustment certainly narrows the gaps in proportional terms.

Figure 3.4 shows these geographical facts in a more graphic form for the 153 poorer countries of the world (209 in total minus 56 high income countries).

So on either basis, the table reflects a definite pecking order in relative prosperity even among the world's poorest regions. It is especially significant that the two poorest regions account for more than 2.2 billion persons: around one third of total world population. Sub-Saharan Africa also has the dubious distinction of having the largest number of very poor countries: only Botswana, Gabon, Mauritius, Seychelles, and Mayotte in this region were classified as upper middle-income in 2005. Sub-Saharan Africa contains no high income *countries* even though it does have the small number of individual multi-millionaires spotted by *Forbes Magazine (Box 3.6 above)!*

Box 3.8: High Incomes and Development – Not a Straightforward Link!

Although we are using an income measure (GDP or GNI) as our measure of "development" for the moment, we must continue to remind ourselves of the limitations of this association. One way to do so is to examine the obvious differences between countries that are associated together for some purposes as "rich" countries.

Let us look first at the list of 56 countries included in the World Bank's classification as "high-income" countries. They include 24 high-income countries of the OECD most of which have been popularly thought of as advanced developed countries for decades or even for centuries (e.g. UK, France, the USA). Such countries are often referred to also as "advanced industrial countries" – the additional adjectives also connoting something more about the nature of "development" However, the list of 56 high-income also includes countries such as Kuwait, Qatar and the United Arab Emirates. These are high-income countries certainly but there are dimensions of their social, political and industrial development that clearly put them in a different category to the advanced countries of the west. The list also includes several very small countries such as the Cayman Island, the US Virgin Islands, Andorra, Aruba and San Marino where high incomes are associated with very small populations and, typically, with a very narrow range of productive activities including off-shore banking. In some of these cases these countries are better seen as offshore affiliates of large Western economies rather than as well-rounded economies in their own right.

Second, the OECD "rich countries" club includes new arrivals such as South Korea, Greece and Portugal that both meet the OECD entry requirements and also have an income level that qualifies them as "high-income" under the World Bank definitions. Until the 1970s these

countries were rightly thought of as lower-income and "less-developed". Korea in the mid-1950s had a per capita income no higher than many countries of Sub-Saharan Africa today. These new entrants still retain certain institutional and structural features that differentiate them from the longer established OECD members. This is true even more of other newer OECD members such as Hungary, Mexico and the Slovak Republic that are still classified by the World Bank as Upper Middle-Income countries.

So even within the so-called "rich countries" club of the OECD it is rather more useful to think of various degrees of development rather than of some absolute standards.

3.5.2 Re-working the Classification using PPP- based Incomes

The discussion in the earlier sections of the Chapter have alerted us to the dangers of using exchange-rate based measures of income for comparison purposes. Hence Tables 3.3 and 3.4 and Figures 3.2. and 3.3 both show some of the key income numbers on a PPP as well as an exchange rate basis.

This re-working (e.g. the last column of Table 3.4) has the effect of

- moving all the income levels of lower income countries upward significantly in the manner indicated also in Figure 3.5 below.
- radically reducing the sizes of the income gaps between richer and poorer countries (including the income gaps between relatively higher and lower income countries in the lower-income classifications).
- not significantly changing the *relative* positioning of the different countries

Figure 3.5: Comparing Incomes on Exchange Rate and PPP bases ***(Source: World Development Report, 2003).***

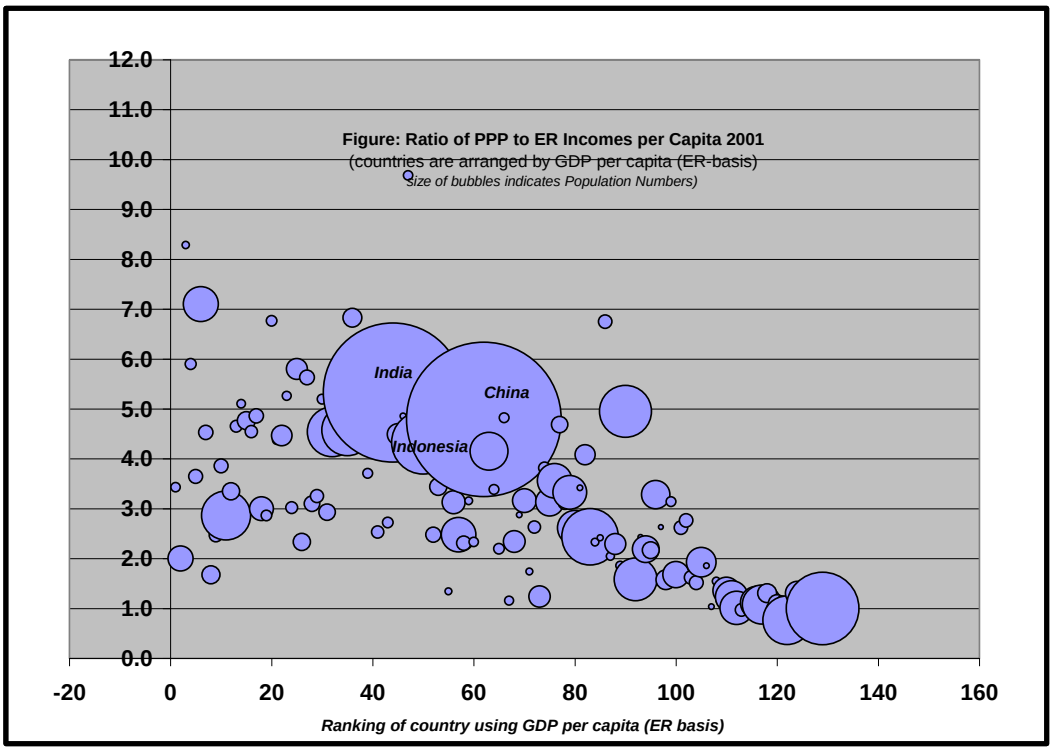


Figure 3.5.as was noted earlier provides a graphical comparison of the income levels of 129 countries where data on per capita income are available on both bases from the World Bank

sources. The countries are ranked in ascending order of incomes per capita using the conventional GDP per capita exchange rate numbers. Each bubble indicates a separate country with the sizes of those bubbles being drawn proportional to that country's population. The comparison shows how the switch to a PPP basis of measurement moves all lower income countries upwards on the income scale: their incomes per capita are typically multiplied by 3-5 times by this adjustment. By so doing it creates a steadier rate of progression through the lower income ranks and up towards the middle and higher levels of income. It suggests that there may indeed be a smoother progression in development tendencies and not the sharp two-way divide (the "haves and the "have-nots") that features in some discussions.

The bubble sizes tell us something particularly important about the adjustment to a PPP basis. Some of the larger population countries such as India, China, and Indonesia are significant beneficiaries of the PPP adjustment. Their per capita incomes rise by 5.3 times, 4.8 times and 4.3 times respectively. Together, these three countries alone account for 2.5 billion people or some 40% of total world population.

We return to this point in Chapter 4. Here we merely note that It is not a minor error to understate the incomes of so many people by a factor of some 400%

3.6 Further Insights from the Human Development Index

HDI and the extent of Under-development

The Human Development Index is a summary measure that brings together just three[22] of the very many facets that can be argued to contribute to a country's development: namely income (but weighted to the lower incomes); education and life expectancy. What do the results tell us about the current state of development and the inequalities between countries that still exist? The UNDP classifies countries rather differently from the World Bank into countries with:

- High Human Development (63 countries in the 2006 Report)
- Medium Human Development (83 countries) and
- Low Human Development (31 countries)

In the 2006 Human Development Report, 177 countries are classified on this basis. The numbers in each group are as shown in brackets above. Norway, Iceland and Australia were the top ranked countries according to the HDI and had index values in excess of 0.957 (the maximum is 1.00). Niger, Sierra Leone, Burkina Faso and Mali were the lowliest ranked countries with index values of less than 0.350.

Box on Data: B - How to Access the UNDP's HDI and related data

Electronic access to the UNDP data referred to in this Section is available free of charge via the web site namely www.undp.org From the home page, the selection of "Statistics" followed by "Get Data" will take you to all the data tables shown in the most recent Human Development Report (HDR). These can be downloaded for further analysis in the MS-Excel format. Other individualised data sets can be constructed by choosing (i) countries and (ii) indicator. Readers are encouraged to look at

[22] The UNDP in the years since 1990 has experimented with a number of variants of its HDI. Examples include the Human Poverty Indexes 1 and 2; an index of Gender-Related Development; and a measure of Gender Empowerment. These variants all add one or more additional variables to the basic HDI variables in order to caste light on particular aspects of development. The Poverty and Gender indices are discussed in later chapters.

the data for themselves both to check out the tables that we have provided here but also to look more deeply into the tendencies and differences that they reveal.

From the "Statistics" page, the selection of "Composite Indicators" will provide access to the full detail on the most recent HDI data sets as well as explanations on the sources and methods used to construct the underlying series. The most recent HDI data set includes the data for XXX countries and the scope to compare HDI outcomes back to 1974.

A new feature introduced in the 2004 HDR is the capacity to explore various trends in development using animated charts based on the HDR data sets.

The same "Get Data" page also provides an electronic link to the "Millennium Development Goals" This shows the monitorable data series that indicate progress towards meeting the MDGs (as explained in Chapter 4 below) and where the main priorities for more intensive effort now reside.

A summary by major geographical regions of the HDI values in 2006 is shown in Table 3.5. These regions are ranked by income level.

Table 3.5: The Human Development Index by Region, 2004 *(Source: UNDP Human Development Report, 2006)*

	GDP per capita (PPP US$) 2001	*GDP index*	*Human development index (HDI) value 2004*
All Developing countries	**4,775**	**0.650**	**0.679**
Least developed countries	**1,350**	**0.430**	**0.464**
Sub-Saharan Africa	**1,946**	**0.500**	**0.472**
South Asia	**3,072**	**0.570**	**0.599**
East Asia and the Pacific	**5,872**	**0.680**	**0.760**
Arab States	**5,680**	**0.670**	**0.680**
Central and Eastern Europe and the CIS	**8,802**	**0.750**	**0.802**
Latin America and the Caribbean	**7,964**	**0.730**	**0.795**
OECD	**27,571**	**0.940**	**0.923**
High-income OECD	**32,003**	**0.960**	**0.946**

It can be seen that *at this level of aggregation* of countries, the rank order of the HDI is very similar to that of the GDP measure but the rankings are not identical. Both indicators clearly define Sub-Saharan Africa and South Asia as far and away the world's least developed regions. They also show the unambiguously superior performance of the OECD countries on both measures.

There is no real ambiguity about where to find the two extremes of severe under development and poverty and high levels of development and prosperity.

Both indicators suggest that the gap in well-being between the two poorest regions (Sub-Saharan Africa and South Asia) and the next poorest (East Asia, the Arab States, Central and Eastern Europe, Latin America and the Caribbean) is very substantial. But the HDI shows a very much narrower development gap as between East Asia and the Arab States relative to the GDP measure (in earlier years such as 2001, the ranking of those two regions was reversed by the HDI measure). The judgement here is that the superiority of the Arab states in terms of *income levels* is not translated so effectively into human development as it is in East Asia. Similarly the HDI somewhat reduces the gap in development as between the Central and Eastern Europe vis a vis Latin America and the Caribbean.

This less than perfect correlation between the GDP and the HDI indicators is also visible when countries are looked at individually. Although the countries in the "High" HDI category nearly all have very high levels of income per capita, there are several exceptions that together tell us something about the interpretations that can be placed on the HDI. Specifically nine of the high HDI countries have GDP per capita levels less than $10,000 compared to the average for the 63 countries of more than $20,000. These high HDI but relatively low income countries are a mix of transition countries such as Bulgaria and Romania and some Latin economies including Cuba, Panama and above all Mexico. Additionally four other HDI countries until recently had incomes below $10,000. (these are the four European transition economies of

Poland, Lithuania, Latvia, and Croatia). These countries all make up for their relatively low incomes by virtue of very good performance in relation to life expectancy and educational inputs (enrolment rates) and outcomes (literacy). Cuba with a life expectancy of 77.6 and a score on the education index of 0.93 (versus 0.97 and 0.96 in the US and the UK respectively) ranks no less than 43 places *higher* on the basis of HDI than on the basis of the GDP per capita measure. The other relatively low income countries in the high HDI group are all Latin American and Caribbean economies that have also done somewhat better in relation to education and life expectancy than have other countries in that region with similar levels of GDP per capita. Examples include Argentina, Uruguay and Costa Rica.

There are plenty of arguments to be had over issues like whether Belarus for example really belongs in the "high" development group given their relatively extremely undemocratic system and poor regard for human rights, or whether Cuba's very low income is really compensated by its good record on educational access. Those and many other aspects of the HDI classification are the direct result of the choice of just three variables to include in the Index, and the equal weights ascribed to them. Adding further variables (such as human rights) can clearly generate different results but would immediately raise the problem of appropriate weights as discussed earlier.

The most important interpretations that come from the HDI relate to countries whose HDI rank is *very much lower* than their rank on the basis of GDP per capita. Examples among the high HDI countries include Qatar (19 places lower in the HDI than the GDP rankings); Kuwait (17 places lower); the United Arab Emirates (25 places lower); and Bahamas (15 places lower). These results confirm the adage that money can't buy you everything and certainly is not guaranteed of itself to buy you "development".

As regards the 34 countries classified in 2003 as Low HDI, the majority have GDP per capita levels (PPP basis) of less than $1000 and four only (Angola, Kenya, Djibouti and Gambia) have incomes above $2000 – and even then only just. Only 4 of the 34 are ***not*** in Africa. The exceptions are Pakistan, Nepal, Yemen and Haiti.

The Bottom Line

For our purposes the most important point is that *there is absolutely no ambiguity as between the HDI and the GDP measures about who are the poor countries of the world.* Severe poverty is again confirmed as having an AFRICA label attached to it! Nor is there any suggestion that anything better than a low level of human development is possible with meagre incomes of circa $1,000 per annum or less. Only two countries ranked as Medium HDI namely Madagascar and the Republic of Congo have incomes below that figure (in fact $ 978 and $ 857 in PPP terms respectively). These small countries have managed to do quite a lot better than most of their neighbours especially in terms of educational performance and this marginally moves them to the Medium level classification. But this is exceptional. All 81 of the other Medium HDI countries have incomes per capita well above $1,000 at least in PPP terms.