Introduction and Overview

The State of Global Poverty

Over the past decades a mix of technology and economic integration transforming the world has lead to unprecedented increases in material wealth and prosperity. Between 1980 and 2005 the world economy grew at a steady pace despite several major disruptions including the Latin American debt crisis, the demise of the Soviet Union, the East Asia crisis, two global downturns, and the tragedy of September 11, 2001. Fortunately strong income growth was not only limited to developed countries. Income growth was especially strong in South and East Asia, but other developing regions were also able to realize strong increases in output. As a consequence the percentage of people living on less than $1 a day fell according to World Bank estimates from almost 27.9% of the population of developing countries to 18.4% (World Bank 2007).

Although these percentage reductions in poverty rates are important improvements, it is the absolute number of poor persons that is recognized in the public. The still high total number of poor persons often leads to the impression that global inequality has increased in the past decades. It is therefore very important to note that despite strong population growth, the absolute number of poor persons has decreased from more than 1.2 billion people in 1990 to 984 million in 2004. For the first time the number of people that live on less than $1 a day is below a billion. But this can not distract from the fact that still some 2.6 billion people, or almost half the developing world’s population, remain below the $2 a day poverty line (World Bank 2007).

It is also extremely important to keep in mind that poverty is not limited to the income dimension but encompasses aspects such as a low life expectancy, high child mortality and undernutrition rates. Differences in these dimensions between developing and developed regions are enormous as well. While in rich countries fewer than 1 child in 100 does not reach its fifth birthday, in the poorest countries as many as a fifth of children do not. And while in rich countries fewer than 5 percent of all children under five are malnourished, in poor countries as many as 50 percent are.
The Fight against Poverty

In times of increasing opulence in the developed countries as well as in certain population subgroups in developing countries, the persistence of significant percentages of world population in poverty becomes more and more unacceptable. Consequently this has lead to a lot of political activism. Numerous national and international organizations have formulated goals on how much poverty has to be reduced within the next decades, politicians have demanded time and again that development aid has to be increased dramatically, "Live-8"-Concerts have received a lot of public attention and celebrities as Bono are considered as "poverty experts".

Although globalization promises to improve the lot of humanity as a whole incalculably, there are signs of a backlash abound. The strong opposition against globalization is on the one hand due to the fact that in the rich world labor’s share of GDP has fallen to historic lows, while profits are soaring, and on the other hand due to the persistence of absolute poverty in developing countries. Reductions in poverty rates are consequently not only a very worthy goal on their own, but an equitable distribution of globalization’s profits is also the precondition for the general acceptance of liberal market economies.

Unfortunately not only the views of many adversaries of globalization but also most demands publicly announced by well-meaning politicians and celebrities are neither very realistic nor very likely to have the assumed positive effects on the poor. Although poverty in its many dimensions is clearly a very emotional topic, the fight against poverty should not be dominated by those expressing the most ambitious goals but by realism and scientific insights into the determinants of poverty.

Besides it is important to keep in mind that despite large income increases in the past and likely further increases in the future, that have the potential to lift a lot of people out of poverty, it cannot be neglected that resources are scarce and will remain so in the future. This is especially the case when we take into account that poverty is not the only problem that has to be tackled in the coming decades. Considerable resources have to be devoted for example to the fight against communicable and non-communicable diseases like HIV/AIDS and Malaria or the fight against global warming.

Prioritization and Efficiency

Due to the scarcity of resources a certain degree of prioritization is necessary. Although prioritization is certainly necessary, the resentment against this idea is widespread. Mainly this is due to the general notion that we shouldn’t have to prioritize. Whereas all demands for improvement in certain or all areas are un-
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controversial, efforts for prioritization not only say where we should do more, but also where we shouldn’t increase our efforts for the time being. This is then often seen as cynical. ¹

To be able to prioritize appropriately it is necessary to implement a cost-benefit analysis to be able to find the most efficient usage of the limited resources. The main precondition for this is a good knowledge about the determinants and the best policies to fight each problem. But before being able to analyze the determinants of the different global problems and especially of poverty it is of fundamental importance to find the right indicators for each phenomenon. Due to the multidimensionality of poverty there is a very large number of potential indicators and measurement issues are far from solved.

This thesis will try to contribute to the discussion of appropriate poverty indicators. All four essays are concerned with measurement issues of the different dimensions of poverty or are contributing to the literature on the determinants of poverty. While the first essay is focused on the appropriate measurement of changes in income poverty, namely changes in the Foster-Greer-Thorbecke (FGT) indicators of poverty, and the determinants of the size of these changes, the second essay is concerned with finding a meaningful indicator for undernutrition. Generally a large set of potential indicators for the measurement of undernutrition exists, but almost all suffer from certain biases and limitations. The second essay will try to shed some light on these problems and will give a clear recommendation on what indicator should be used to measure undernutrition and its changes over time. Besides income poverty and undernutrition, child mortality is a very important third dimension of poverty. Although the measurement of infant or child mortality is less controversial, knowledge on the determinants of this phenomenon can still be improved. The same is true for the determinants of undernutrition. Besides it is unclear how closely these two different dimensions of poverty - undernutrition and child mortality - are related.

To be able to track progress in different poverty dimensions and to give a better picture of the general development status of a country different multidimensional indicators were developed. Probably the most prominent example of such an indicator is the Human Development Index. But even this often cited indicator is far from universally accepted and it is criticized in different ways. One of the most controversial aspects of the HDI is the use of average values for each country. The fourth and last essay tries to allow for such criticism and develops a methodology to create an distribution sensitive Human Development Index.

¹There have been very laudable efforts by the Copenhagen Consensus Project to establish a framework in which solutions to problems are prioritized based upon economic and scientific analysis of distinct subjects. The final 10 challenges found to hold the most promising opportunities include different dimensions of poverty, like communicable diseases, access to education, malnutrition and hunger and sanitation and access to clean water.
The Measurement of Changes in Income Poverty

Clearly one of the most important measurement issues of poverty is related to the measurement of poverty on the aggregate or macro level. The measures most often used to calculate the prevalence of poverty are the FGT poverty indicators. To be able to assess the impact of growth and distributional change on poverty reduction in a comparable manner for all countries, the relationship between growth, distributional change, and poverty reduction must be studied in a way that allows for country heterogeneity but remains tractable.

Although the usual measure of choice to analyze changes of poverty over time is the poverty elasticity, we propose an alternative measure to calculate the effects of income growth and distributional changes on poverty. Instead of studying the determinants of the percentage change in poverty (and the associated poverty elasticity of growth and distributional change), it is proposed to study the percentage point change in poverty (and the associated poverty semi-elasticity of growth and distributional change). It is argued that there are two distinct advantages to study absolute rather than proportionate poverty reductions. The first set of arguments is conceptual and relate to the fact that a strong bias is inherent in growth and distribution elasticities and that policy-makers are likely to be more interested in the percentage point changes in poverty rather than percent changes. The second set of arguments is empirical. It is shown that the estimation of semi-elasticities of growth and distributional changes on poverty rates is more precise. Besides using semi-elasticities avoids some arbitrary assumptions about excluding data from countries with low poverty incidence.

The Measurement of Undernutrition

A second dimension of poverty is the insufficient intake of energy through food and consequently the incidence of undernutrition. As undernutrition is a very severe and unacceptable dimension of poverty, the world community committed itself in the Millennium Development Goals (MDG) to reduce the number of people who suffer from hunger by half until 2015. The decision was made to use two different indicators to track progress with respect to the incidence of undernutrition. The first indicator is the FAO measure of access to an insufficient amount of calories. Unfortunately, there are considerable methodological as well as conceptual doubts about this FAO measure. The second measure used in the MDGs is 'underweight', which is an anthropometric indicator that measures the weight of a child for a certain age and compares it to a reference standard to be able to categorize a child as undernourished or not.

As Essay 2 argues, the choice of underweight as main indicator for the hunger dimension of poverty is not very fortunate. On the one hand, there are doubts...
about the general construction and interpretation of underweight that make it not very suitable to be used as a summary indicator. On the other hand, and this will be the main focus of this section, we can observe a bias in the development of underweight prevalence rates that is due to the large changes in the nutritional composition of diets in developing countries that are taking place. This so called ‘nutrition transition’ is characterized in large increases in the consumption of processed and semi-processed foods, that contain higher percentages of cheap fatty acids. Although this certainly means that total energy amounts taken up by children are increasing this should not be equalized with real improvements in their nutritional situation. This bias could lead to wrong conclusions concerning the fulfillment of the undernutrition aspect of MDG I.

Besides in 2006 a new multi-country reference standard was published by WHO. It is very likely that future progress in the fight against undernutrition will be tracked by using this new standard. The use of the new reference standard will result in clear changes in the prevalence and composition of undernutrition. Essay 2 therefore argues that this opportunity should be used to switch to stunting or a Composite Index of Anthropometric Failure instead of underweight as the main indicator to measure progress in the fight against hunger.

The Relationship between Undernutrition and Child Mortality

Poverty and changes in poverty are determined by various household, individual socio-economic and demographic characteristics as well as by various environmental factors. Essay 3, which is based on joint work with Kenneth Harttgen, is concerned both with the regional differences and the interdependencies of the outcomes and determinants of two of the most important poverty dimensions, namely child mortality and child undernutrition in South Asia and Sub-Saharan Africa. Child mortality and undernutrition remain still on a high level both in South Asia and Sub-Saharan Africa. Arguing that child mortality and undernutrition are highly correlated, i.e that a bad nutritional status of the child strongly increases the child’s mortality risk (see e.g. Pelletier et al, 1995), a puzzle arises when comparing the two regions regarding the outcomes of both phenomena. Anthropometric outcomes of children are considerably better (but still on a very low level) in Sub-Saharan Africa than in South Asia. In contrast to the severe anthropometric failure in South Asia, Sub-Saharan African countries suffer from relatively high rates of child mortality (see e.g. Klasen, 2007; Ramalingaswami et al, 1996). This regional puzzle of child mortality and undernutrition between both regions is called the South Asia - Sub-Saharan Africa Enigma. To shed more light on this puzzle and the underlying reasons is of particular relevance. First, it would allow a much more detailed assessment of what is needed to reduce child mortality and undernutrition in these two regions. Second, it could show how strong
child mortality and undernutrition are correlated and whether it is really sufficient to reduce undernutrition in order to reach the goal of reducing child mortality. Approaches using macro-data have not been able to explain the South Asia - Sub-Saharan Africa Enigma appropriately, however, and less attention has been paid so far to the analysis of determinants of undernutrition and child mortality based on micro-data, i.e. population based household survey data.

Essay 3 analyzes the determinants of child mortality as well as of child undernutrition based on large-scale Demographic and Health Surveys (DHS) data for a sample of five developing countries in South Asia and Sub-Saharan Africa, namely Bangladesh, India, Uganda, Mali, and Zimbabwe. In particular, Essay 3 investigates the effects of a set of individual, household and cluster socio-economic characteristics both on child mortality and undernutrition based on the analytical framework proposed by Mosley and Chen (1984). The aim of the paper is helping to explain the South Asia - Sub-Saharan Africa Enigma. To achieve this, first, Essay 3 analyzes the relationships between child mortality and undernutrition. The aim of this analysis is, first, to identify determinants that affect child mortality and undernutrition in different ways, which would help to explain the South Asia Sub-Saharan Africa Enigma. Second, analyzing the determinants of child mortality and undernutrition, Essay 3 concentrates on region-specific and country-specific differences both in the outcomes and determinants of both phenomena. This allows one to identify major differences that drives the puzzle of child mortality and undernutrition in the two regions and between countries. The main result of Essay 3 is the identification of several determinants that differ significantly from each other regarding their impact on child mortality and undernutrition, regarding the two regions of South Asia and Sub-Saharan Africa, and also regarding countries within the two regions. Whereas the access to health infrastructure is relatively more important to reduce the risk of child mortality than the reduce the risk of undernutrition, the nutritional status of the mother, which is worse in South Asia than in Sub-Saharan Africa, has a much higher impact on child undernutrition than on child mortality, which can partly explain the Enigma.
The Multidimensional Measurement of Poverty

As the preceding sections have shown, poverty has many faces and can be measured in different ways and by using different indicators. The most well-known indicator that takes this multidimensionality of poverty into consideration is the Human Development Index published by the United Nations Development Program (UNDP). One of the most often heard critiques of the HDI is that it does not take into account inequality within countries in its three dimensions. In Essay 4 a relatively easy and intuitive approach which allows to compute the three components and the overall HDI for quintiles of the income distribution is therefore suggested. This allows to compare the level in human development of the poor with the level of the non-poor within countries, but also across countries. An empirical illustration for a sample of 14 low and middle income countries as well as Finland and the United States shows that inequality in human development within countries is indeed high.

When examining the individual components it becomes clear that the biggest effect of inequality on the quintile-specific HDI is in the income component. In many countries the richest quintile has an income that is often more than twice or even up to five times as high as among the poorest quintile. Here many of the Sub-Saharan African countries have the highest inequality, followed closely by the Latin American. The differential in educational achievements between the richest and the poorest quintile are also sizeable, but smaller than in the income index. The smallest differential is found in life expectancy achievements, although the differential is still very substantial.

Although among rich countries all three differentials are considerably smaller, the results also show that the level of inequality is not directly linked to the level of human development itself. Comparing the rank positions of the different quintiles this point. For example the richest quintile in Bolivia is at rank 34, i.e. among the countries with the high human development, whereas the poorest quintile is at rank 132. The average HDI of Bolivia was in last year’s report at rank 112. Looking at a developed country like the US shows, that the richest quintile would top the list of human development achievements, whereas the poorest quintile in the USA only achieves rank 48, considerably worse off than the richest quintile in South Africa, Bolivia or Indonesia.