Introduction and Overview

Have compassion for all beings, rich and poor alike; each has their suffering. Some suffer too much, others too little.
Buddha (563BC–483BC)

Fighting poverty and inequality is among the goals upon which the international community has agreed. The issue of lifting the poor out of poverty and enhancing the wellbeing of the deprived and marginalized is on top of the international agenda of researchers, policy makers, and the general public. This broad agreement becomes well visible by the Millennium Development Goals (MDG) which have been set by the international community in 2000 in the Millennium Development Declaration (UN, 2000). By setting these goals, which are inspired by the seminal work of Sen (1985), several aspects of development have become more important for researchers and policy makers alike.

The first aspect is that development and poverty need to be understood as multidimensional phenomena. By setting 8 goals (and specifying 21 concrete targets and 60 indicators to be measured and monitored) the view has become wider than just looking at money-metric goals such as increasing per capita income. Besides income poverty, which is one target of MDG1, the other goals focus on eradicating hunger (second target of MDG1), enhancing education (MDG2), increasing gender equality and empowerment of women (MDG3), reducing child mortality (MDG4), improving maternal health (MDG5), combating diseases such as HIV/AIDS and malaria (MDG6), ensuring environmental sustainability (MDG7), and developing a global partnership for development (MDG8). The second aspect besides setting these goals is that they should be measured and monitored regularly until 2015.

The essays presented in this book deal with the measurement and trends of poverty and inequality and follow the spirit of the MDGs in several aspects. Essay 1 deals with data generation out of incomplete data to being able to monitor the trends in (income) poverty and inequality over a longer time period. Essay 2 deepens the analysis of the first essay by determining the stability of poverty and inequality estimates using different methods of data generation. Essay 3 deals
with the measurement of multidimensional poverty and inequality and its monitoring over time. Essay 4 deepens this analysis by comparing different methods for data weighting and aggregation of multidimensional indicators.

**Trends of Worldwide Poverty and Inequality**

After the second world war, hopes were strong that the development (or catch-up) of the poorer parts of the world would take just a few years or at maximum some one or two decades—inspired by the success in economic development of post-war Europe. The belief was that by setting the overall macroeconomic conditions and by providing enough “money”, development would result nearly automatically (Kiely and Marfleet, 1998). With the end of the cold war, a market-based economic system became the “winner model” in the world, and policy recommendations for developing countries consisted of structural reforms, also called the “Washington consensus” (Williamson, 1990; Rodrik, 2003; Lora, 2001; Schweickert and Thiele, 2004). However, hopes did not materialize everywhere, but the effect on enhancing growth and reducing poverty and inequality were at best mixed (World Bank, 2005; Chen and Ravallion, 2008; Rodrik, 2006). Thus, since the 1990s, the focus of research and policy shifted back to answering the very essential questions why poverty and inequality persist in so many countries.

In this vein, the first Human Development Report (HDR) from 1990 has “the single goal of putting people back at the center of the development process in terms of economic debate, policy and advocacy ... [and addresses] the question of how economic growth translates—or fails to translate—into human development.”¹ Also, since the mid to late 1980s, measuring poverty and inequality and their trends have become easier. Household surveys have been conducted more frequently and in more countries, for example in a standardized way under the Living Standard Measurement Survey (LSMS) project of the World Bank. In parallel, the Demographic and Health Surveys, funded by USAID, have started collecting data on health and population trends that has led to more data collection. The literature on the trends in worldwide poverty in the 1990s using this data suggests that inroads into poverty have been made, however, not everywhere (Chen and Ravallion, 2008). This finding continues in the 2000s as well, and the latest MDG monitoring report (UN, 2009) raises the fear that the recent economic crisis together with rising food prices would increase vulnerability and lead to rising poverty, in some regions more (Africa) than others (East Asia).

In general, Latin America and the Caribbean (LAC) does on average better than other regions for the time period of investigation of the essays in this book. As shown in Appendix Table A.1, the region has, compared to other regions or

groups of countries, the highest GDP per capita in 1990 and 2005, even higher than the group of Middle Income Countries (MIC). Concerning non-income indicators, LAC is leading in, e.g., life expectancy, female literacy, and the Human Development Index (HDI). For most of the other selected indicators presented here, such as immunization, male literacy, school enrollment, infrastructure (roads, telephone connection), it is among the leading regions. Also the structure of the economy is in LAC relatively advanced with the lowest share of agriculture in GDP and the highest share of services. Concerning the ratio of exports to GDP, LAC is in the middle group. Inflation was still high in the 1990s, but has been substantially reduced to more sustainable levels, but it is still the highest compared to all other regions. GDP growth rates are rather low and even decreasing, in contrast to high and even increasing growth rates in East Asia and the Pacific (EAP) and South Asia. The MIC group also outperformed LAC in the 2000s. On the other hand, LAC still does better than Sub-Saharan Africa (SSA) and than the group of Least Developed Countries (LLDC) in levels as well as growth rates. The same holds for the selected non-income indicators.

Poverty, Inequality, and Policy in Bolivia and Colombia

The period of investigation of the essays in this book covers the 1990s and the beginning of the 2000s: For Bolivia the time period studied is from 1989 to 2002 and for Colombia from 1997 to 2003. This period also marks the beginning of the monitoring and reference years for achieving the MDGs: 1990 is the reference year for all goals set by the international community in 2000 (UN, 2000), that should be reached until 2015. For LAC countries, it marks the turning point of the focus of national and international policies. Leaving the so-called “lost decade” of the 1980s behind, the countries had gone through policies suggested by the “Washington consensus” which included the deregulation of product and capital markets, the liberalization of trade and FDI policies, fiscal reforms including tax reforms and decentralization efforts as well as increased public spending on health, education, and infrastructure, combined with the restructuring of publicly-owned firms, mainly by privatization (Klasen et al., 2005; Schweickert and Thiele, 2004).

In Appendix Table A.2, Bolivia and Colombia are shown in a comparative perspective with neighboring countries, i.e., some of the Andean countries (Chile, Ecuador, Peru). Bolivia is among the three poorest economies in Latin America, together with the struggling countries Nicaragua and Haiti. In per capita income, Bolivia is growing on the LAC average, whereas Colombia is growing a little faster. Both have higher population growth, Bolivia shows even in an in-

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2See Klasen et al. (2005) for more LAC countries.
ternational comparison a high level (Appendix Table A.1). Both countries have achieved moderate inflation rates. Bolivia is struggling from a rather low population density and problematic geographic conditions due to the difficult terrain. The structures of the Bolivian and Colombian economies are relatively similar at the first glance, having above average agricultural participation and a high share of services. For indicators measuring human development, Bolivia shows weak outcomes and is receiving quite high aid inflows compared not only to LAC but also to other regions.³ It is doing worse on life expectancy, immunization, infrastructure (roads, telephones), and also on the overall HDI value. For many of these aspects, Bolivia is doing similarly badly as countries in SSA or South Asia, except for education. Colombia, however, is very close to the average of LAC countries, both looking at income levels as well as non-income indicators.

Turning to the political and social stability of the countries, Bolivia was mainly under military rule in the 1970s and early 1980s, but a democratic regime was established in 1982 and has persisted ever since. The 1980s and 1990s were dominated by changing coalitions of parties representing the Spanish-speaking population but with little representation from indigenous groups.⁴ The early to mid-2000s were driven by protest, civil unrest, and political instability. From 2001 onwards, each Bolivian president remained in charge for approximately only a year (Klasen et al., 2005). At the end of 2005, the candidate of the “Movement for Socialism”, Evo Morales, won the election, being the first indigenous head of state. The situation in the country remained unstable with protest from the middle class and the richer lowland departments against the leftist policies⁵ (some regions even declared autonomy) but Morales was able to win a recall referendum in 2008, to get approved the new constitution in 2009 (allowing reelection), and to actually be reelected in December 2009 in the first round.

Colombia had only a short time under military rule in the mid-1950s, being under democratic rule ever since, with either conservative or liberal presidents. However, since the 1960s, Colombia has been suffering from the internal armed conflict with the Revolutionary Armed Forces of Colombia (Fuerzas Armadas Revolucionarias de Colombia, FARC), other paramilitary groups, and the drug cartels. The conflict became worse every decade, which up to today places Colombia internationally in the “leading group” for homicides with 45–61 homicides in 100,000 people (compared to 3–4 for Bolivia), only “outperformed” by

³Bolivia is taking part in the HIPC initiative.
⁴Bolivia has a very large indigenous population and is one of the most ethnically diverse countries in Latin America.
⁵These include a strengthening of the rights of the indigenous people, partly nationalization of the natural resource sector (mainly gas) and/or stronger control over foreign firms, and a less restrictive approach towards coca growing.
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South Africa. The same holds for internally displaced people with 2.6–4.7 Mio. people, only “outperformed” by Sudan with 4.6–4.9 Mio. people. Since 2002, Colombia has been ruled by Alvaro Uribe, an independent liberal candidate. He was able to win great public support due to his strong priority to end the internal armed conflict, following the so called “democratic security policy” with a rather tough approach to overcome the violence and to stabilize the country. Stabilizing the country and achieving increased economic growth made it possible for him to initiate and push trough a constitutional reform (allowing reelection), and actually Uribe was reelected in 2006 in the first round. He was only stopped by the Colombian Constitutional Court to run for a third term. Instead, his political heir Juan Manuel Santos was able to clearly win the selections, expected to continue the most of the politics adopted under Uribe.

Comparing the two countries presented in this book reveals how poverty and inequality might harm growth and cause social turmoil and political change (as suggested by the case of Bolivia) and how political and social instability might harm growth and non-income wellbeing such as subjective perceptions on life satisfaction and personal safety (as suggested by the case of Colombia). The political and social struggle of the 1990s and 2000s shows how important policies directed to enhancing wellbeing are. The long-lasting segmentation of Bolivia along the ethnic divide, which strongly coincides with the divide between highlands agriculture and lowlands resource-based economy, led to turmoil (Klasen et al., 2005) and finally to the success of the leftist government of Evo Morales. The burden of the internal armed conflict hinders Colombia to grow beyond the Latin American average and to converge towards the richer neighbors with similar initial conditions.

Measurement of Wellbeing, Poverty, and Inequality

Many different measures have been proposed to measure and monitor poverty and inequality. The essays in this book apply several measures and thereby shed light on different aspects of poverty and inequality. From the Foster-Greer-Thorbecke set of decomposable poverty measures (Foster et al., 1984), we use the poverty headcount or poverty incidence (abbreviated FGT0 or P0) that measures the proportion of poor people in the total population, the poverty gap (FGT1 or P1) that measures the depth or intensity of poverty showing how far the population is on average from the poverty line, and the poverty severity (FGT2 or P2) that takes

the inequality of incomes among the poor into account. The FGT measures, especially FGT0, are the most frequently calculated and best available measures.

For measuring inequality, we use the Gini coefficient, the Atkinson indices, the Theil index, and Quantile-Ratios (Sen and Foster, 1997). The Gini coefficient can be derived from the Lorenz curve and measures how close the Lorenz curve is to the curve of total equality. The Gini is lower the closer the Lorenz curve is to the equality curve: it would be 0 for perfect equality and 1 for perfect inequality. Its intuitive interpretation and the availability of data for many developing countries makes it the most widely used inequality measure. The Atkinson index can be made more sensitive to the lower end of the income distribution by increasing the “inequality aversion” parameter in the Atkinson formula. The Theil Index offers the advantage, in contrast to the Gini, to be additively decomposable over subgroups of all observations \( N \) (as the weighted average of inequality within subgroups plus inequality between those subgroups) and ranges from 0 to \( \ln N \). The last inequality measure used is the quantile ratio, defined as the ratio of the richest quantile to the poorest quantile (for example the richest decile to the poorest decile), sometimes also called Kuznets ratio. It is the easiest to calculate and also the most intuitive to understand.

All these poverty and inequality measures require household survey micro data. Especially for inequality, the data should be of high quality because the inequality measures take the whole distribution into account for calculating the indices, and some of them are sensitive to data at the tails of the distribution. For poverty, only the lower end of the distribution is relevant, i.e., the people up to the poverty line. To follow poverty and inequality trends, this data needs to be comparable over time. Unfortunately, household survey design often change over time (e.g., in sampling, questions, recall periods) making sound analysis and clear statements difficult. Essay 1 and especially Essay 2 come up with some suggestions how to deal with some aspects of data generation and data comparison.

Specific methods to follow the trends of poverty and inequality jointly over time have evolved and have been applied to a range of countries, some of which are also applied in this book. A special group of methods can be grouped under the topic of “pro-poor growth” which is, generally speaking, growth that is beneficial to the poor of the income distribution. Questions addressed by pro-poor growth methods are, for example: How can a poverty decline be decomposed in

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10The Lorenz curve depicts on the \( x \)-axis the cumulative share of people ordered by increasing income and on the \( y \)-axis the cumulative share of income. The total equality curve is the 45 degree line.

11It is calculated as the area between the Lorenz curve and the equality curve divided by the total area under the equality curve.

12For inequality, it would matter if you had a very rich person, e.g., Bill Gates, in the sample, but for poverty, it would not since only persons below the poverty line enter the calculations.
ranging incomes and falling inequality (growth-inequality decomposition of Datt and Ravallion (1992))? What is the required growth rate to achieve the same poverty decrease as observed if the income distribution had remained constant (poverty equivalent growth rate of Kakwani and Son (2006))? How much does each quantile of the income distribution benefit from growth (growth incidence curve of Ravallion and Chen (2003))? Did the poor grow faster than the non-poor (pro-poor growth rate of Ravallion and Chen (2003))? The standard data used to apply the described poverty and inequality measures and their trends over time as well as the pro-poorness of the trends are income or expenditures data, as done in Essay 1. Wellbeing, however, goes beyond income as outlined above. For this purpose, standard pro-poor growth methods are applied to non-income indicators, which are similar to the MDGs or multidimensional (composite) measures such as the HDI, in Essay 3. These analysis are extended and different aggregation weighting schemes in multidimensional indices are discussed and applied in Essay 4 putting normative and also subjective aspects in the center of analysis.

**How to Overcome Missing Data Problems?**

Essay 1, based on joint work with Stephan Klasen and Julius Spatz, and Essay 2, based on joint work with Boris Branisa, address the question how to overcome the problem of missing data by using household survey matching techniques. In many developing countries, a time series of nationally representative household budget or income surveys does not exist, while there often are urban household surveys as well as nationally representative Demographic and Health Surveys (DHS) which lack information on incomes. This makes an analysis of trends and determinants of income poverty and inequality over a longer time period impossible.

Using these data sets nevertheless for poverty and inequality analysis, these analysis have to be either restricted to urban areas only, or these analysis have to rely on alternative wellbeing measures such as asset indices, that can be created using the DHS data (Sahn and Stifel, 2000, 2003; Filmer and Pritchett, 2001). Such asset indices are applied to many countries to assess poverty differentially and poverty trends over time. While asset indices are often well-correlated with income, it is not clear how well they are able to reproduce poverty trends over time.

The problem of missing data is also relevant for Bolivia where there exist urban household surveys—leaving nearly half of the population uncovered—and nationally representative DHS since 1989, while comparable nationally representative household income surveys only exist since 1999. In Essay 1, we adjust a technique developed for poverty mapping exercises by Hentschel et al. (2000) and Elbers et al. (2003) to link urban household income surveys with DHS data to generate a nationally representative time series of household income data from 1989.
to 1999. We show that our extension of the poverty mapping methodology is able to reproduce trends in differential in poverty well where we have comparable data. It also appears superior to the use of asset indices for measuring trends in poverty which might more reflect changes in preferences, prices, and non-income indicators. As such the proposed method is of considerable use for situations where nationally representative income surveys are lacking, but DHS data are available.

**Essay 2** address the questions on how to judge the goodness of fit of the methodology of **Essay 1** by statistical procedures. The methodology presented in **Essay 1** was based on the data constraint of having only one nationally representative pair of different household surveys (one survey such as an LSMS having income and the other survey such as a DHS not having income in the survey), and to have some urban LSMS surveys for other years together with some nationwide DHS. Having a second pair of full surveys allows us in **Essay 2** to make a backward and forward check of the approach described, in the sense of an out-of-sample prediction that can be compared to observed data. Our technique explicitly estimates the stability of this backward extension by repeating it for two base periods with two sets of nationally representative data of LSMS and DHS (1998/9 and 2002/3) for Bolivia. Furthermore, we use and compare two different methods of modeling dynamics. What is normally applied in the literature is to neglect dynamics. However, changes in endowments and changes in returns are likely to occur over time and thus impact on income poverty and inequality.13

**How to Investigate Multidimensional Pro-Poor Growth?**

**Essay 3**, based on joint work with Kenneth Harttgen and Stephan Klasen, and **Essay 4**, based on joint work with Adriana Cardozo, address the question how to investigate the multidimensionality of wellbeing and poverty and their distribution and changes over time. In this context, pro-poor growth has recently become a central issue for researchers and policy makers, especially in the context of reaching the MDGs. The various proposals to measure pro-poor growth have also allowed a much more detailed assessment of progress on reducing poverty as they explicitly examine growth along the entire income distribution, rather than simply focusing on mean progress. However, current concepts and measurements of pro-poor growth are entirely focused on the income dimension of wellbeing, which neglects the multidimensionality of poverty and wellbeing. There are no corresponding measures for tracking progress on non-income dimensions of poverty.

In **Essay 3**, we propose to extend the approach of pro-poor growth measurement to non-income dimensions of poverty by applying the growth incidence

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13This is investigated, for example, by Grimm (2004) for Cote d'Ivoire and by Bourguignon et al. (2005) in a multi country study for 4 countries in Latin America and 3 in Asia.
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curve to non-income indicators. This extension allows the assessment of the link- 
age between progress in income and non-income dimensions of poverty. Cate-
gorizing the different and conflicting definitions, we introduce three definitions 
of pro-poor growth: weak absolute pro-poor growth, relative pro-poor growth, 
and strong absolute pro-poor growth. Pro-poor growth in the weak absolute sense 
means that the income growth rates are, on average, above 0 for the poor. Pro-
poor growth in the relative sense means that the income growth rates of the poor 
are higher than the average growth rates, thus that relative inequality falls. Pro-
poor growth in the strong absolute sense requires that absolute income increases 
of the poor are stronger than the average, thus, that absolute inequality falls. The 
definition of strong absolute pro-poor growth is the strictest definition of pro-poor 
growth and the hardest to achieve, which is also shown empirically by White and 
Anderson (2000). This is why most researchers concentrate, in general, on the 
weak absolute and relative definition. But this ignores that decreases in relative 
inequality might be—and often are—accompanied by increases in absolute in-
equality, which is seen as undesirable by many and can be an important source of 
social tension (Atkinson and Brandolini, 2004; Duclos and Wodon, 2004; Klasen, 
2004).

We investigate the multidimensionality of pro-poor growth empirically for Bo-
livia between 1989 and 1998 in Essay 3. We find that growth was pro-poor both 
in the income and in the non-income dimension, but results for the non-income 
dimensions are less clear when the poor are ranked by income. The objective 
of Essay 4 is to deepen this analysis for Colombia between 1997 and 2003. We 
benefit from the rich data set available to us that allow us to create indicators 
reflecting human and physical capital (education and assets), health status, and 
subjective welfare. By applying the method of Essay 3 to the Colombian Liv-
ing Standard Measurement Survey (LSMS) we discuss whether changes in assets, 
education, health, and subjective welfare were more beneficial to the poor than 
to the non-poor. For constructing indices, we select a subset of variables and ap-
ply polychoric principal component analysis (PPCA), suggested by Kolenikov and 
Angeles (2009) to define weights. Their methodology allows to correctly calculate 
the correlation matrix before applying traditional principal components analysis, 
diverging from the standard procedure used up to now in the literature. Results 
are compared to the same indicators using normatively selected weights to enrich 
the discussion about the weighting procedure of multidimensional indicators.

Although the time span is short and covers a turbulent economic period with a 
large recession, it is quite relevant because it gives an insight into how it affected 
non-income dimensions like education, health, assets ownership, and access to 
public services. We find that multiple dimensions of welfare might contradict 
each other in the short run, particularly when they depend on public policies. 
Public spending can thus play an important role for counteracting the depth of
economic crisis like the one experienced in Colombia in 1999. We also find that even though infrastructure conditions and access to education improved due to reforms and higher public spending, self reported welfare perception was largely driven by available income and thus by consumption possibilities. In contrast to the available literature on Colombia, our subjective welfare indicator does not show improvements in self reported welfare of Colombians between 1997 and 2003. Results also show that while income and expenditures fluctuated according to economic growth, reflecting the effects of the 1999 economic crisis, non-income indicators proved to be more stable, less unequally distributed, and had minor improvements during the period of analysis.

The Appendices following Essay 4 contain additional country specific information on the data sets and results of the respective empirical analysis. The Bibliography for all parts is also located at the end of the book.