Economic Studies in Inequality, Social Exclusion and Well-Being

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Almas Heshmati
Esfandiar Maasoumi
Guanghua Wan *Editors*

Poverty Reduction Policies and Practices in Developing Asia

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Economic Studies in Inequality, Social Exclusion and Well-Being

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Co-publication of the Asian Development Bank and
Springer International Publishing AG

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ISSN 2364-107X ISSN 2364-1088 (electronic)
Economic Studies in Inequality, Social Exclusion and Well-Being
ISBN 978-981-287-419-1 ISBN 978-981-287-420-7 (eBook)
DOI 10.1007/978-981-287-420-7

Library of Congress Control Number: 2015930204

Note:
In this publication, “$” refers to US dollars.

Printed on recycled paper

Acknowledgments

This edited volume is part of a project funded under the Asian Development Bank's Research and Development Technical Assistances (TAs): TA 7907 on Drivers of Poverty Reduction in Asia and the Pacific and TA 8239 on Addressing Knowledge and Statistical Gaps in Relation to Poverty Reduction, Inequality, and Inclusive Growth.

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Chapter 1
Introduction and Summary to Poverty Reduction Policies and Practices in Developing Asia

Almas Heshmati, Esfandiar Maasoumi and Guanghua Wan

Abstract A sustained rapid economic growth to reduce multidimensional poverty is a policy challenge facing developing Asia and the globe. This book is a joint effort to analyze poverty reduction in Asia. The focus is on drivers, best practices, and policy initiatives. This introductory chapter presents the background to the project and summarizes the contributions to this volume. It includes theoretical, methodological, and empirical research and policy-oriented papers with the aim to advance the measurement of poverty and poverty reduction policy analysis. The studies focus on: poverty alleviation with microfinance, urban, and rural poverty reduction policies, climate change and well-being, dimensions of poverty and its reduction, and decomposing poverty into its component sources. This edited volume by employing diverse up-to-date data and methods provide a wealth of empirical evidence and sound recommendations to policymakers and researchers in developing Asia to design and implement effective and inclusive policies and strategies to reduce poverty.

1.1 Background and Motivation

The major policy challenges facing developing Asia are how to sustain the rapid economic growth that reduces multidimensional poverty and is both socially inclusive and environmentally sustainable. Population growth, rapid urbanization,

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_1

provision of services, the need to reverse declined economic growth after the 2008 global financial crisis, and responding to climate change are among other challenges facing Asia. Asian Development Bank, in collaboration with Sogang University and Emory University, organized a workshop on “Poverty Reduction in Asia: Drivers, Best Practices, and Policy Initiatives” which was held at Sogang University, Seoul, Republic of Korea, August 23–24, 2013. Several prominent economists specializing in poverty analysis were invited to attend the workshop.

This edited volume is based on a selection of papers submitted to the workshop on poverty reduction and related issues in developing Asia–Pacific. Theoretical, methodological, and empirical research and policy-oriented papers were sought, with findings, conclusions and policy recommendations based on solid evidence and appropriate methods. The goal was to advance the development of new tools and measurement of multidimensional poverty and poverty reduction policy analysis. The papers could focus on Asia as a whole, a group of countries, or individual economies.

A total of 135 papers were received in response to the call for papers. From these, a number of papers were selected and anonymously reviewed for this edited volume. Following a two-stage review process and revisions based on comments and suggestions made by the referees and editors, 14 chapters were shortlisted for publication. These are organized into a number of individual and groups of developing Asia country studies focusing on: poverty alleviation with microfinance; urban and rural poverty reduction policies; climate change and well-being; dimensions of poverty and its reduction; and methodological issues decomposing poverty into its component sources. A brief summary of individual chapters is provided below.

1.2 The Book

1.2.1 Part One: Poverty Alleviation with Microfinance

This section contains two chapters. The first study (Chap. 2) “Poverty Alleviation with Microfinance: Bangladesh Evidence” is by Moshin Habib and Christine Jubb. As the title suggests, the study provides evidence of the impact of membership of a microfinance institution in Bangladesh on poverty alleviation. Using a quasi-experimental approach with a control group, interviews with members of a prominent Bangladesh microfinance institution were conducted in relation to their material possessions. Results show that in almost every aspect of material well-being, including income, ownership of assets, savings, and food intake, members of the microfinance institution are significantly better off than non-members when examined on a univariate basis. In multivariate tests, microfinance institution membership is found to be associated with higher household income and, further, household wealth, measured in terms of savings and is associated with longer membership of a microfinance institution.

The second study (Chap. 3) entitled “Does Microcredit Help the Poor and Financially Marginalized Communities? National Experience of Pakistan Poverty

Alleviation Fund (PPAF)” is by Zahoor Khan and Jamalludin Sulaiman. This study evaluates the microcredit program of PPAF. Micro-survey data collected during the loan periods comprising January 2003 to December 2006 and January 2004 to December 2007 were used, with a sample size of 2,070 respondents. The impact of the microcredit program on their clients was evaluated by using descriptive statistics, multiple regression, the mean difference model, and quartiles. The study reveals that PPAF does not focus on the extreme poor and marginalized segments in its operational areas because less than 25 % of the total credit was allocated for three extreme classes of the poor, while the remaining 75 % credit was disbursed among the vulnerable poor. Despite an overall positive impact, the program did not benefit the lower quartile community members during the study period.

1.2.2 Part Two: Climate Change and Well-Being

This part contains one study (Chap. 4) “Climate Change, Agricultural Production, and Poverty in India” by Saibal Kar and Nimai Das. The low-income group households in the South Asian countries are highly sensitive to climate-intensive sectors like agriculture and its related food production system. Therefore, climate-induced supply shortfalls in agriculture and, consequently, rising food prices can significantly impact the socioeconomic well-being of these households. The tension between economic development, climate change and agricultural production offers a challenging research question not dealt with in recent studies for India. This study explores the effect of climate change on farmland value and subsequently of a counterfactual measure of the farm revenue on rural consumption expenditure under alternative climate change scenarios. The results show a discerning impact of climate change on net revenue and, hence, the well-being of rural people.

1.2.3 Part Three: Urban Poverty Reduction Policies

This part consists of two chapters. The first study (Chap. 5) which is on “Urban Poverty in Developing Asia: Dichotomy between the Income and Non-Income Dimensions: Are We Not Grossly Underestimating its Incidence?” is by Dibyendu Samanta. It looks at the acute non-income deprivations visible in urban developing Asia, underlining that a focus on income poverty alone overlooks many critical dimensions of urban poverty. There are evidences to prove that there is a stark dichotomy between the income and non-income indicators of urban poverty and a gross underestimation of urban poverty in developing Asia. There is, thus, a need to broaden the definition of urban poverty in developing Asia, beyond the threshold of meeting the survival needs of food to an approach that looks at a minimal set of basic needs and capabilities for the urban population. This approach takes into account the huge deprivations related to shelter, access to basic infrastructure, access to health, education and social welfare, vulnerability in working conditions, and working poverty. This study shows that adopting broadened and higher poverty thresholds is critical for focusing policy attention on the right target group.

The second study (Chap. 6) "Housing Poverty and Inequality in Urban India" is by Sohail Ahmad. Inequitable distribution of resources, including physical capital such as housing, has posed a threat to sustainable development. Through a case study of housing in urban India that focuses on renter and slum dwellers, this study documents housing inequality and poverty, examines whether and why there is a gap in living standards, and estimates housing demand. Using household survey data, the study provides a decomposition analysis of the causes of inequality and estimates housing demands for owner, renter, and slum dwellers. The study results revealed that the average floor area consumption in renter/slum households is about two-thirds of the owner households. The inequality is attributed to differences in endowment levels and "rates of return" to these endowments. Ahmad concludes that to enhance housing consumption among renter/slum dwellers, there needs to be a focus on upgrading high-skill occupations and stable employment status, rather than just income improvement strategies.

1.2.4 Part Four: Rural Poverty Reduction Policies

This part comprises two chapters. The first study (Chap. 7) entitled "Evaluation of the Policy of Crop Diversification as a Strategy for Reduction of Rural Poverty in India" is by Aparajita Mukherjee. This paper examines the effectiveness of crop diversification in ensuring greater availability of food and nutrition to the rural poor in India. It undertakes empirical investigation with primary farm-level data to examine the extent and severity of poverty and food deprivation among the very marginal, marginal, and small farmers practicing crop diversification in different degrees, in three districts of an Indian state. The test results indicate an inverse association between the extent of crop diversification and the calorie intake per capita across the districts. In areas suffering from adverse soil and other characteristics, the small and marginal farmers are compelled to diversify away from water-intensive traditional crops to ensure a minimum acceptable level of consumption. However, they find it hard to avoid poverty and malnutrition. In contrast, in places without publicly supplied cheap irrigation facilities where the farmers develop access to irrigation through private investment, crop diversification enables the small and marginal farmers to maintain some reasonable level of consumption and positive net income. However, high-value crop production results in low profitability and relative inefficiency. The study indicates that a more direct policy intervention is needed to ensure effectiveness of crop diversification as a strategy for reduction of rural poverty in India.

The second study (Chap. 8) "Conflict and Livelihood Decisions in the Chittagong Hill Tracts of Bangladesh" is by Muhammad Badiuzzaman and Syed

M. Murshed. They analyze rural household livelihood and child school enrolment decisions in the post-conflict setting of the Chittagong Hill Tracts region of Bangladesh. The study uses current subjective perceptions regarding the possibility of violence in the future and past actual experiences of violence to explain household economic decision-making. Preferences are endogenous in line with behavioral economics. Regression results show that heightened subjective perceptions of future violence and past actual experiences of conflict influence current consumption and child enrolment and are likely to encourage risky mixed crop cultivation. The trauma emanating from past experiences combined with current high perceptions of risk of violence may induce bolder and riskier behavior in line with prospect theories of risk. Moreover, a post-conflict household-level Phoenix or economic revival factor may be in operation, based partially on greater intra-group trust.

1.2.5 Part Five: Dimensions of Poverty and Its Reductions

This part contains three studies. The first study (Chap. 9) “Decomposing Spatial Inequality in Sri Lanka: A Quantile Regression Approach” is by Thusitha Kumara. This paper uses the Blinder and Oaxaca decomposition method and its recent expansion by Machado and Mata to examine if well-being gaps between urban (richer regions) and rural (poorer regions) areas are the result of (i) regional/spatial differences in household characteristics or (ii) differences in location-specific returns to these characteristics. The data used in this study are from the household income and expenditure surveys for 2006/07 and 2009/10. The analysis suggests that the existence of barriers, such as remoteness and poor access to markets, that prevent lagging regions from being absorbed into the modern sector or growing region plays a larger role in perpetuating spatial inequality, especially for the poor, as compared to disparities in household characteristics (endowments) between regions and sectors.

The second study (Chap. 10) entitled “Non-Income Dimensions, Prevalence, Depth and Severity of Poverty—Spatial Estimation with Household-level Data in India” is by Panchanan Das. This paper examines the incidence, depth, and severity of poverty and the effects of the major non-income dimensions on poverty in India by using the 61st and 66th rounds of NSS household survey data. Poverty estimates are based on relative poverty lines at 75 % and 50 % of the median value of the distribution of per capita expenditure of the respective population groups. It focuses mainly on education, type of employment, land rights, social and religious factors, and gender-related issues in the non-income dimensions of poverty. The rising poverty incidence on the basis of the relative poverty line in urban areas supports the hypothesis that urban inequality has increased significantly during the post-reforms period in India. Per capita consumption expenditure on a monthly basis is used as a proxy for well-being or poverty. The study observes that land as a productive asset had very little positive effect on poverty. But the effect of education on the level of well-being was positive and increased with the level of education in every state. Technical education, a component of workers' skills, improved consumption per capita in all states excepting for Chhattisgarh and Kerala. Scheduled Tribes and Scheduled Castes among the social groups and Muslims among the religious groups are mostly deprived in terms of consumption per capita.

The last study (Chap. 11) entitled "Is Poverty Comparable across Varying Size of Population among Indian States?" is by Balakrushna Padhi and Mohammad K. Khan. The most popular measure of poverty, that is, the head count ratio is undoubtedly a simple measure with inadequacies of comparison. It also suffers from the mismatched contradiction between the count of the poor and their share in the population. Such inadequacies point toward its limitation in comparing poverty head count ratio across varying population sizes. Given these concerns, the measure of poverty accounting for its absolute count, intensity, as well as inequality is proposed here as a modified version of the Sen, Shorrock, and Thorn measure of poverty. Further, a decomposition exercise is carried out to comprehend the share of each of its components in the changing level of poverty, which is illustrated using the Indian data set. The salient observation made here relates to declining poverty levels in Indian states being in disagreement with reduced ill-fare as the poverty gap is on a rise along with the count of the poor. This raises apprehensions as to whether poverty reduction has to less to do with the changing state of the poor than the changing state of the non-poor.

1.2.6 Part Six: Sustainability in Poverty Reduction

This part contains two studies. The first study (Chap. 12) "The Role of Foreign Labor Migration and Land in Poverty Reduction: A Case of Nepal" is by Ramesh Sunam. Nepal has witnessed a decline in poverty in the last decade, although GDP growth is low and stagnant at around 4 %. The causes behind this decline are little known. Why certain households have a tendency to fall into poverty is also an area of poverty dynamics that has not been studied. This paper seeks to examine to the causes behind poverty dynamics in rural Nepal. It shows that nearly 29.5 % of the total 386 households studied have escaped poverty, while 7 % have fallen into poverty over two recent decades. Foreign labor migration, small business, and access to land define the movement of most households out of poverty, whereas loss of land, cultural burdens, and health costs are the main factors associated with descent into poverty. This paper suggests that two distinct sets of policies are required for addressing poverty—one set to enable escape from poverty and another set to prevent decline into poverty. Such policies need to consider the situation of the poor who cannot pursue labor migration and the left-behind household members, enabling their access to land for farming and creating local employment.

The second study (Chap. 13) entitled "Does Poverty Alone Keep Children Out of School? The Case of Children under Kinship Care in the Philippines" is by Joseph J. Capuno and Xylee Javier. While the importance of child education is universally recognized, there are millions of children who are out of school in developing countries. Many of these children are left in the care of their kin when their parents die or go to work abroad. This paper examines the welfare, particularly in terms of school attendance, of the children under kinship care in the Philippines. The household survey data set comprises 1,485 households with at least two members in the 6–12 years age group and one of these being the household head's child or grandchild and the other being the head's kin. Applying probit regression models, they find that a child under kinship care is about 3 % points less likely to be attending school than the head's child, other things being constant. However, there are no such statistically significant differences between the head's child and grandchild. While deprivation keeps some children out of school, ensuring their schooling participation would require more transfers than are needed to lift their households out of poverty. Targeting these children through conditional cash transfer programs could mitigate the effect of the apparent parental bias.

1.2.7 Part Seven: Alleviation of Poverty in Asia and the Pacific

This last part contains two studies. The first study (Chap. 14) entitled "Economic Class and Labor Market Segregation: Poor and Middle-class workers in Developing Asia and the Pacific" is by Phu Huynh and Steven Kapsos. Using an absolute definition of poverty and economic classes, this paper presents trends and estimates of the poor, near poor, and middle-class working population in developing Asia and the Pacific. It reveals that since 1991, working poverty has fallen remarkably, while middle-class jobs now account for nearly two-fifths of all employment in the region (671 million middle-class workers). However, a sizeable share of workers (around 28 % or 497 million) still lives just above the poverty line and remains highly vulnerable to falling into poverty. The paper also applies a class-based framework for assessing inequality in the labor market, with a special focus on Cambodia, India, Indonesia, and Viet Nam. It provides empirical evidence that economic participation is inversely related to affluence, while educational attainment and access to better quality jobs both increase with higher economic class status. In addition, it presents sex-and age-disaggregated analysis to highlight particular gaps for poor women and youth and suggests the measures that can help strengthen their position in the labor market.

The second and last study (Chap. 15) entitled "Foreign Direct Investment and the Poverty Reduction Nexus in Southeast Asia" by Nathapornpan P. Uttama attempts to empirically investigate the determinants of FDI and related factors on ASEAN's poverty reduction and focuses on spatial quantitative empirical evidence available on the ASEAN region. The spatial specification model is constructed and estimated by using the spatial panel data model technique. It is empirically estimated on the basis of a crucial assumption that individual country-specific factors such as globalization, finance, politics, infrastructure, and spatial FDI have an impact on poverty reduction in ASEAN. Data at the country level for ASEAN-6 during the period 1995–2011 are used. The analyses confirm the positive significant relationship between FDI inflows and poverty reduction in ASEAN, in terms of both individual and spatial aspects. Nevertheless, this relationship is significantly different between other factors and poverty reduction in ASEAN. For instance, while the relationship remains positive and significant for GDP growth, openness and foreign debt, it is significant negative for financial and infrastructure factors and ambiguous for political factors. The results are also robust to alternative model specifications. It concludes that FDI is conducive to poverty reduction.

This edited volume is authored by technical experts in the field who employ diverse up-to-date data and methods to provide empirical results based on representative household surveys, covering several countries in Asia and the Pacific. It contains a wealth of empirical evidence and sound recommendations to policymakers and researchers to design and implement effective policies and strategies to prevent and reduce poverty. The book is a useful resource to policymakers and researchers at national and international research institutes, universities, non-governmental, and governmental organizations involved in fighting poverty. It can also be used as a supplementary textbook in teaching advanced undergraduate or postgraduate courses in poverty, inequality, and welfare economics. Finally, the book appeals to a broader audience interested in economic development, resources, policies, and economic welfare and growth.

Part I
Poverty Alleviation with Microfinance

Chapter 2
Poverty Alleviation with Microfinance: Bangladesh Evidence

Mohshin Habib and Christine Jubb

Abstract This study provides evidence of the impact of membership of a microfinance institution (MFI) in Bangladesh on poverty alleviation. Using a quasi-experimental approach with a control group the members of which had never been members of a MFI, interviews with members of a prominent Bangladesh MFI were conducted in relation to their material possessions. In almost every aspect of material well-being, including income, ownership of assets, savings and food intake, members of the MFI are significantly better off than non-members when examined on a univariate basis. In multivariate tests, MFI membership is found to be associated with household income and, further, household wealth, measured in terms of savings, is associated with longer membership of a MFI.

Keywords Microfinance · Poverty alleviation · Economic development · Empowerment of women · Bangladesh · Well-being

2.1 Introduction

Poverty is a key issue in the development arena that has received significant attention from various agencies due to its relevance to human welfare and progress. The purpose of this study is to investigate the impact of membership of a microfinance program on poverty in Bangladesh at the household level. The study

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_2

provides evidence of the impact of microfinance institution (MFI) membership in terms of material outcomes and examines the influence of longer versus shorter MFI membership on these outcomes.

2.2 Poverty

Poverty in its most basic form can be defined as a deprivation of well-being and this has been the concern of policy makers and, more recently, of many non-governmental organizations (NGOs). Yet, poverty is not a problem that has eased with time. According to the United Nations Human Development Report, approximately 1.2 billion people *worldwide* earned only US$ 1 a day in 2000; 2.4 billion were without basic sanitation; 1 billion were illiterate; 100 million were homeless; and approximately 100 million children lived or worked on the streets (UNDP 2000, p. 19; Globalissues.org 2009).

The ramifications of poverty extend far beyond just the problems associated with a lack of income. Individuals living in poverty 'are particularly vulnerable to adverse events outside their control' (Smith 1776); they often lack social rights and are excluded from society. Despite the long-standing presence of poverty throughout the world, it was not until the 1970s that issues associated with poverty came to the forefront of debate and policy formulation in the area of development economics (Fukuda-Parr and Kumar 2003).

In broad terms, poverty can be said to result from distributional issues including unemployment, lack of income, lack of fulfillment of basic needs, landlessness, and unavailability of credit. It can be seen as the lack of means for the necessary expenditure enabling purchase of a minimum standard of living, for example, nutrition. This minimum standard varies from country to country. This notion reinforces the dynamic aspect of poverty as the 'poverty line' shifts with changes in the overall condition of the economy (Runciman 1962; Townsend 1985). Thus, poverty is multidimensional. Moreover, poverty restricts one's ability to participate in society.

The notion of deprivation is broader than the concept of poverty and is intrinsically multidimensional (Smith 1776; World Bank 2000). Deprivation has many forms, but what is common to all these forms is that deprivation restricts what Amartya Sen calls 'the capabilities that a person has, that is, the substantive freedom he or she enjoys to lead the kind of life he or she values' (Sen 1999, p. 87). This capability perspective further explains the notion of deprivation which Smith (1776) depicts as the inability 'to appear in public without shame' and which is directly related to the concept of social exclusion.

This paper presents evidence on the impact of membership of an MFI on material outcomes. The study uses interview evidence gathered from 198 Bangladesh microfinance members, together with evidence from 97 control group members who had never joined an MFI program, to test whether membership enables alleviation from poverty. Using both univariate tests of comparison between MFI and control group members and multivariate regression, evidence is found of higher income assets, savings, food intake, housing security and quality, and more income sources in the case of MFI members. Further, MFI members report better housing conditions as compared to non-members. Additionally, before and after MFI membership comparisons reveal significant improvement in material outcomes associated with becoming an MFI member. However, no evidence is found that longer duration of MFI membership is significantly associated with improved material outcomes apart from savings.

2.3 Microfinance's Role in Addressing Poverty

In recent years, numerous studies have noted the positive impact of microfinance on clients with regard to material well-being, reduction in exposure to seasonal vulnerability, contributions to consumption smoothing, and a better ability to deal with crises (Khalily 2004; Khandker 1998; Mustafa et al. 1996a, b; Pitt and Khandker 1998). However, few of these studies compare results with those not members of microfinance programs.

Microfinance has become an 'inducer' in many community development activities, and it is an ingredient in many larger programs, such as education and training, employment generation, empowerment of women, social responsiveness, and political awareness (ADB 2000; Alamgir 1997; Jahan 1991). It also promotes the growth of local enterprises and women entrepreneurs (Bertaux and Crable 2007; Morduch 1999; Pitt and Khandker 1998). Theoretically, these successes rely heavily on the conception that borrowers can make use of their social capital to overcome many problems associated with asymmetric information in credit markets, such as adverse selection, moral hazard, collateral and contract enforcement (Gomez and Santor 2001). Hossain's (2002, p. 159) study in Bangladesh reveals the importance of various factors behind the improvement in economic condition and, thus, improvement in material condition and poverty alleviation among microfinance borrowers. In this study, about 60 % of borrowers believe that capital gained from a microfinance program primarily assisted them in achieving a better socioeconomic condition.

Grameen Bank's (the pioneer of microfinance in Bangladesh) experiments and its success have led to wider acceptability of the notion that accesses to credit by the poor can bring about change in their socioeconomic situation (Khalily 2004; Simanowitz 2003). Hossain's (2002, p. 159) evidence shows that membership in a microfinance program has a positive impact on borrowers' perceptions of their income status.

Most studies on the impact of microfinance programs focus on poverty as measured by income alone (Alamgir 2000; Gomez and Santor 2001; Hietalahti and Linden 2006; Mosley and Hulme 1998; Shaw 2004), with a few studies examining two or more aspects of poverty concurrently (Berger 1989; Johnson 2005;

Khandker 1998; Rahman 2002; Zohir et al. 2001). In the context of the above discussion, the hypotheses tested in this study are as follows:

H1: *Individuals involved in a microfinance program exhibit increased income as compared to those not involved.*
H2: *Individuals involved in a microfinance program for longer rather than shorter durations exhibit increased household wealth.*

A major contribution of this paper is that it focuses on economic income and physical assets for MFI members as compared to non-members. As such, this study examines the issues from a wider perspective than most previous studies by looking beyond income parameters. The next section discusses the research design and data-gathering procedures used in the study.

2.4 Research Design and Sample Selection

The study gathered data from MFI members who had been in a microfinance program for at least two durations—4 and 8 years. The third group of respondents consisted of the control group[1] made up of people who are not members of any microfinance program. Two structured interview guides for MFI members and non-members were used. In the questions for MFI members, responses provide data for two different time segments, first, for the 'present' status of members and, second, for their status 'before they became a member of the MFI.' Copies of the structured interview guides were evaluated and critiqued by a microfinance expert in UNDP, a senior academic in development studies from the University of Melbourne and executives from the Grameen Bank and BRAC in Bangladesh.

Bangladesh was chosen as the geographical area for this research due to the success of microfinance in this country in improving the socioeconomic status of the vast majority of poor people (Bhatt and Tang 2001; Hashemi 1996; Holcombe 1995; Khandker 1998; Pitt and Khandker 1998). For the purpose of this study, the top 50 MFIs according to the Credit and Development Forum (CDF 2004) ranking were selected. After a series of communications with potential respondents, a successful negotiation was made with the Association for Social Advancement (ASA). In selecting specific locations for interviews, random sampling was used and three (Gaibandha, Gazipur, and Kurigram) of 64 districts were selected. All names of prospective participants provided were for female members, since members of the ASA are primarily women (99.99 %) (Chowdhury 2005).

[1] A second approach is the control group method which has been widely used. This requires a *before* and *after* comparison of a population that received a specific treatment (that is, a microfinance program) and an identical population (or as close as possible) that did not receive the treatment (Hulme 2000). This study uses a control group approach.

In the first stage, a sample was selected from the three chosen districts according to two categories: those with 4-year MFI membership (Group 1) and those with 8-year MFI membership (Group 2). Then, a random sampling technique was used to select 33 MFI members from each group. In this way, a total of 198 MFI members were selected for the interview process from the three districts (that is, 3 districts × 2 groups × 33 MFI members). It was also agreed with the participating MFIs that if a selected member did not wish to participate, details for a replacement MFI member would be provided.

In the second stage, we randomly approached one individual from each household, explained the project, and requested participation. Then, the potential participants were asked about their MFI membership status. People who had never been MFI members were interviewed (Group 3) until 99 agreed to participate, becoming the control group. Thus, 99 respondents from each of the three chosen districts (Groups 1, 2, and 3) participated to make up a total of 297 respondents.

The econometric tools used with the data to test the hypotheses include univariate tests of difference between the treatment and control groups, correlations and multivariate tests involving OLS regression.

2.5 Results: Microfinance and Poverty Alleviation

Income is the foremost determinant of the economic situation of individuals. Table 2.1 presents the monthly income earned by the interviewees divided into eleven ranges. The minimum income range is set as 500–999 taka and the maximum as 5,500 taka and above. The table provides percentages and the number of

Table 2.1 Total amount of monthly income (taka)

Total amount of monthly income[a]	Non-MFI members	MFI members				
	Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)		8 years ($N = 99$)	
			Before	After	Before	After
500–2,999	58 % ($n = 57$)	13 % ($n = 26$)	76 % ($n = 75$)	16 % ($n = 16$)	59 % ($n = 60$)	10 % ($n = 10$)
3,000 and above	42 % ($n = 42$)	87 % ($n = 172$)	24 % ($n = 24$)	84 % ($n = 83$)	39 % ($n = 39$)	90 % ($n = 89$)
Ave. monthly income	2,586	4,326	2,131	4,116	2,552	4,535
t test	−9.704		−14.466		−16.269	
p value	0.000		0.000		0.000	
Effect of membership	t test		−1.662			
Duration on income	p value		0.098			

[a]Amounts in Bangladeshi taka (1 AUD = 56 taka at the time of interviews)

Table 2.2 Number of income sources

Income source	Non-MFI members Control group ($N = 99$)	MFI members		
		4 and 8 years ($N = 198$)	4 years ($N = 99$)	8 years ($N = 99$)
Number 1	100 % ($n = 99$)	100 % ($n = 198$)	100 % ($n = 99$)	100 % ($n = 99$)
Number 2	24 % ($n = 24$)	79 % ($n = 156$)	86 % ($n = 85$)	72 % ($n = 71$)
Pearson's chi-squared test	82.246		5.923	
p value	0.000		0.015	
Number 3	2 % ($n = 2$)	23 % ($n = 46$)	22 % ($n = 22$)	24 % ($n = 24$)
Pearson's chi-squared test	21.917		0.113	
p value	0.000		0.736	
Number 4	0	3 % ($n = 5$)	3 % ($n = 3$)	2 % ($n = 2$)
Pearson's chi-squared test	2.543		0.205	
p value	0.111		0.652	

respondents in each income range. On average, MFI members earn 4,326 taka, 1.7 times more than 'control' group members (2,586 taka). MFI members achieve significantly higher income than control group respondents ($t = -9.704$, $p < 0.01$).

Moreover, MFI members from both groups (4 and 8 year) achieve a significant improvement after joining the program. Table 2.2 shows the average income of both the groups almost doubled over the membership period, increasing from 2,131 to 4,116 taka for the '4-year' group, and from 2,551 to 4,535 taka for the '8-year' group. If 2,500–2,999 taka is taken as a reference point, 58 % of the control group members have income within this low range, whereas this is so for only 13 % of MFI members (16 % of '4-year' and 10 % of '8-year' groups). T tests reveal a significant difference (-14.466, $p < 0.01$) between the 'before' and 'after' membership period. Income is also significantly (-16.269, $p < 0.01$) different in the 'before' and 'after' 8 years of membership. No association is found between membership duration and total monthly income.

Table 2.2 reveals that 79 % of MFI members have a second source of income as compared to only 24 % of the control group respondents. This difference is significant ($Chi^2 = 82.246$, $p < 0.01$). Moreover, 23 % of MFI members report having a third income source as compared to 2 % of the control group. This difference is also significant ($Chi^2 = 21.917$, $p < 0.01$). Lastly, although 3 % of MFI members have a fourth income source, none of the control group members does, but this difference is not statistically significant. Of the members from the 4-year group, 86 % have a second source of income as compared to 71 % of respondents from the 8-year group and this difference is also significant ($Chi^2 = 5.923$, $p < 0.05$). As the general nature of poverty in rural Bangladesh is chronic and seasonal, having multiple sources of income can better equip the rural poor to fight poverty. Thus, Tables 2.2 and 2.3 show that MFI members have an economic advantage over the control group respondents.

Table 2.3 Total amount of monthly expenditure

Total amount of monthly expenditure[a]	Non-MFI members	MFI members				
	Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)		8 years ($N = 99$)	
			Before	After	Before	After
500–999	7 % ($n = 7$)	0	3 % ($n = 3$)	0	2 % ($n = 2$)	0
1,000–1,499	15 % ($n = 15$)	1 % ($n = 1$)	15 % ($n = 15$)	0	8 % ($n = 8$)	1 % ($n = 1$)
1,500–1,999	14 % ($n = 14$)	6 % ($n = 12$)	19 % ($n = 19$)	9 % ($n = 9$)	19 % ($n = 19$)	3 % ($n = 3$)
2,000–2,499	18 % ($n = 18$)	7 % ($n = 13$)	24 % ($n = 24$)	6 % ($n = 6$)	18 % ($n = 18$)	7 % ($n = 7$)
2,500–2,999	12 % ($n = 12$)	10 % ($n = 20$)	9 % ($n = 9$)	17 % ($n = 17$)	9 % ($n = 9$)	3 % ($n = 3$)
3,000–3,499	10 % ($n = 10$)	18 % ($n = 36$)	15 % ($n = 15$)	19 % ($n = 19$)	21 % ($n = 21$)	17 % ($n = 17$)
3,500–3,999	4 % ($n = 4$)	9 % ($n = 18$)	3 % ($n = 3$)	7 % ($n = 7$)	2 % ($n = 2$)	11 % ($n = 11$)
4,000–4,499	10 % ($n = 10$)	15 % ($n = 29$)	6 % ($n = 6$)	16 % ($n = 16$)	10 % ($n = 10$)	13 % ($n = 13$)
4,500–4,999	0	7 % ($n = 14$)	0	5 % ($n = 5$)	1 % ($n = 1$)	9 % ($n = 9$)
5,000–5,499	5 % ($n = 5$)	12 % ($n = 24$)	2 % ($n = 2$)	8 % ($n = 8$)	8 % ($n = 8$)	16 % ($n = 16$)
5,500 and above	4 % ($n = 4$)	16 % ($n = 31$)	3 % ($n = 3$)	12 % ($n = 12$)	1 % ($n = 1$)	19 % ($n = 19$)
Average monthly expenditure (taka)	2,389	3,715	2,237	3,455	2,586	3,975
t test *p* value	−8.000 0.000		−13.860 0.000		−15.321 0.000	
Effect of membership duration on monthly expenditure		*t* test *p* value	−1.672 0.096			

[a]Amounts in Bangladeshi taka (1 AUD = 56 taka at the time of the interviews)

Expenditure determines one's capacity to acquire necessities and, more specifically, for respondents to meet their basic needs and live a decent life. Table 2.4 shows that MFI members spend more each month compared to control group respondents. For example, in the highest expenditure category (5,500 taka and above), 16 % of MFI members are recorded as compared to only 4 % of control group respondents. Likewise, in the same expenditure category, MFI members from both the 4- and 8-year groups spend more after joining the microfinance program than before. It can also be inferred that after joining an MFI, members'

Table 2.4 Total amount of household savings

Total amount of savings[a]	Non-MFI members	MFI Members		
	Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)	8 years ($N = 99$)
No savings	70 % ($n = 69$)	–	–	–
1–999	12 % ($n = 12$)	13 % ($n = 25$)	14 % ($n = 14$)	11 % ($n = 11$)
1,000–1,999	6 % ($n = 6$)	30 % ($n = 59$)	34 % ($n = 34$)	25 % ($n = 25$)
2,000–2,999	3 % ($n = 3$)	20 % ($n = 40$)	20 % ($n = 20$)	20 % ($n = 20$)
3,000–3,999	1 % ($n = 1$)	6 % ($n = 12$)	6 % ($n = 6$)	6 % ($n = 6$)
4,000–4,999	–	3 % ($n = 6$)	2 % ($n = 2$)	4 % ($n = 4$)
5,000–5,999	1 % ($n = 1$)	9 % ($n = 18$)	11 % ($n = 11$)	7 % ($n = 7$)
6,000–6,999	–	2 % ($n = 3$)	–	3 % ($n = 3$)
7,000–7,999	–	2 % ($n = 3$)	1 % ($n = 1$)	2 % ($n = 2$)
8,000–8,999	–	1 % ($n = 2$)	–	2 % ($n = 2$)
9,000–9,999	–	–	–	–
10,000–10,999	2 % ($n = 2$)	4 % ($n = 9$)	4 % ($n = 4$)	5 % ($n = 5$)
11,000 and above	5 % ($n = 5$)	11 % ($n = 21$)	7 % ($n = 7$)	14 % ($n = 14$)
Average savings (taka)	960	3359	2818	3899
t test *p* value	−7.791 0.000		−2.170 0.031	

[a]Amounts in Bangladeshi taka (1 AUD = 56 taka at the time of the interviews)

income increases (revealed in Table 2.2) and this makes it possible for them to spend more. It is also apparent that, on average, the monthly expenditure of MFI members (3,715 taka) is 1.6 times more than that of the ‘control’ group (2,389 taka). This difference is significant ($t = -8.000$, $p < 0.01$).

Table 2.3 reveals that the average monthly expenditure of the ‘4-year’ group increased from 2,237 taka before joining to 3,455 taka after, while the ‘8-year’ group reported an increase from 2,586 taka before to 3,975 taka after. If 2,500–2,999 taka is taken as a reference point, the monthly expenditure of 67 % of respondents from the control group falls within this low range, whereas this is the case for only 23 % of MFI members (32 % of the ‘4-year’ group and 14 % of the ‘8-year’ group fall in the same low range). T tests for monthly expenditure between ‘before’ and ‘after’ joining, in both the ‘4-year’ and ‘8-year’ groups, are significant ($t = -13.860$, $p < 0.01$ and $t = -15.321$, $p < 0.01$, respectively). However, there is no significant difference ($t = -1.672$, $p > 0.05$) between membership duration and monthly expenditure.

Savings are an important asset that provides financial security in response to shocks. Compulsory savings schemes are practiced by most MFIs, including ASA. Table 2.4 shows savings reported by participants, divided into twelve ranges. The minimum savings range is set as 1–999 taka and the maximum 11,000 taka and above.

Table 2.4 shows that MFI members achieve higher savings than control group respondents, as 70 % of respondents from the control group have no savings as compared to MFI members, each of whom has at least some savings. It is also revealed that, on average, respondents from the '8-year' group have the highest savings (3,899 taka), followed by the '4-year' (2,818 taka) and control groups with an average of 960 taka. This is a significant difference ($t = -7.791$, $p < 0.01$). Savings is also significantly different ($t = 2.170$, $p < 0.05$) between the 4- and 8-year MFI member groups. Interestingly, in the highest range (11,000 taka and above), the '8-year' group numbers are almost double the '4-year' group. Membership duration does appear to have a significant impact on the level of savings achieved by MFI members, but whether this is because of compulsory savings cannot be discerned.

Table 2.5 shows the Pearson's correlations between MFI members' total loans and their total monthly income, expenditure, and household savings. There are significant positive correlations between loan amounts and other indicators of poverty. The Pearson's r between loans and income is 0.482; it is 0.352 between loans and expenditure; and 0.359 between loans and savings. Not unexpectedly, the highest correlation is between income and expenditure at 0.778.

Housing arrangements are an important determinant of economic status. Table 2.6 shows housing arrangements for all respondents.

The data reveal that 97 % of MFI members own the property they live in as compared to 36 % of control group respondents, a difference which is significant ($Chi^2 = 135.927$, $p < 0.01$). However, house ownership for 4- and 8-year MFI members is not significantly different. Nineteen percentage of control group respondents rent their houses. Conversely, no MFI members rent their houses after joining the program and this difference is also significant ($Chi^2 = 40.597$, $p < 0.01$). Table 2.6 shows that 23 % of control group respondents live on land which they do not own or rent, but use for free, compared to only 2 % of MFI members, a difference which is significant ($Chi^2 = 35.933$, $p < 0.01$). Likewise, a higher percentage (21 %) of control group members live in squatters compared to only 1 % of MFI members, a difference which is significant ($Chi^2 = 37.702$, $p < 0.01$).

Table 2.7 reveals materials used in the construction of respondents' houses.

MFI member and non-member respondents report similar flooring materials. However, an improvement in flooring materials is recorded after MFI membership compared to before for both the 4- and 8-year groups ($Chi^2 = 75.326$, $p < 0.01$;

Table 2.5 Pearson's correlations: member's total loans, income, and expenditure

Variable name	Total household savings after membership	Monthly household expenditure	Total monthly income
Monthly household expenditure	0.254(**)		
Total monthly income	0.380(**)	0.778(**)	
Total amount of loans received	0.359(**)	0.352(**)	0.482(**)

**Correlation is significant at the 0.01 level (2-tailed)

Table 2.6 Respondents' housing arrangements

Housing	Non-MFI members	MFI members				
	Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)		8 years ($N = 99$)	
			Before	After	Before	After
Owned	36 % ($n = 36$)	97 % ($n = 192$)	94 % ($n = 93$)	97 % ($n = 96$)	95 % ($n = 94$)	97 % ($n = 96$)
Pearson's chi-squared test p value	135.927 0.000					
t test p value			0.175 0.083		−1.421 0.158	
Rent	19 % ($n = 19$)	0	1 % ($n = 1$)	0	0	0
Pearson's chi-squared test p value	40.597 0.000		N/A		N/A	
Given as free use	23 % ($n = 23$)	2 % ($n = 4$)	4 % ($n = 4$)	2 % ($n = 2$)	4 % ($n = 4$)	2 % ($n = 2$)
Pearson's chi-squared p value	35.933 0.000		N/A		N/A	
Squatters	21 % ($n = 21$)	1 % ($n = 2$)	1 % ($n = 1$)	1 % ($n = 1$)	1 % ($n = 1$)	1 % ($n = 1$)
Pearson's chi-squared test p value	37.702 0.000		N/A		N/A	

Chi^2 = 25.402, $p < 0.01$). However, there is no significant difference in the type of flooring material used by people with different durations of MFI membership. Of the roofing materials listed in Table 2.9, 'straw' is the most vulnerable and unstable, while tin and brick (concrete) are more stable. The vulnerability of housing materials used is closely linked to economic situation, and investigating this issue in the context of Bangladesh helps evaluate the relationship between MFI membership and housing quality.

Table 2.7 shows that roofing type is significantly different between MFI members and non-members, with the difference being significant (Chi^2 = 9.670, $p < 0.01$). After joining the microfinance program, more than 27 % of respondents from both the 4- and 8-year groups were able to improve the condition of their roofs and avoid using straw. An additional 23 % in the '4-year' group and 24 % in the '8-year' group use tin in the 'after' category compared to 'before.' This is a significant difference for the '4-year' (Chi^2 = 24.057, $p < 0.01$) and '8-year' (Chi^2 = 23.689, $p < 0.01$) groups. However, there is no significant difference found for the duration of membership.

Table 2.7 House construction

Materials		Non-MFI members	MFI members				
		Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)		8 years ($N = 99$)	
				Before	After	Before	After
Floor	Brick	10 % ($n = 10$)	13 % ($n = 26$)	7 % ($n = 7$)	9 % ($n = 9$)	5 % ($n = 5$)	17 % ($n = 17$)
	Mud	90 % ($n = 89$)	87 % ($n = 172$)	93 % ($n = 92$)	91 % ($n = 90$)	95 % ($n = 94$)	83 % ($n = 82$)
Pearson's chi-squared test *p* value		0.569 0.451		75.326 0.000		25.402 0.000	
Effect of membership duration on floor material			Chi-squared value *p* value	2.834 0.092			
Roof	Brick	2 % ($n = 2$)	5 % ($n = 10$)	1 % ($n = 1$)	5 % ($n = 5$)	1 % ($n = 1$)	5 % ($n = 5$)
	Tin	84 % ($n = 83$)	90 % ($n = 179$)	65 % ($n = 64$)	88 % ($n = 87$)	69 % ($n = 68$)	93 % ($n = 92$)
	Straw	14 % ($n = 14$)	5 % ($n = 9$)	34 % ($n = 34$)	7 % ($n = 7$)	30 % ($n = 30$)	2 % ($n = 2$)
Pearson's chi-squared test *p* value		9.670 0.008		24.057 0.000		23.689 0.000	
Effect of membership duration on roof material			Chi-squared value *p* value	2.917 0.233			
Walls	Brick	5 % ($n = 5$)	14 % ($n = 27$)	6 % ($n = 6$)	13 % ($n = 13$)	3 % ($n = 3$)	14 % ($n = 14$)
	Tin	43 % ($n = 43$)	68 % ($n = 134$)	36 % ($n = 36$)	67 % ($n = 66$)	42 % ($n = 42$)	69 % ($n = 68$)
	Straw	46 % ($n = 46$)	6 % ($n = 12$)	39 % ($n = 39$)	7 % ($n = 7$)	34 % ($n = 34$)	5 % ($n = 5$)
	Mud	5 % ($n = 5$)	13 % ($n = 25$)	18 % ($n = 18$)	13 % ($n = 13$)	20 % ($n = 20$)	12 % ($n = 12$)
Pearson's chi-squared test *p* value		69.947 0.000		120.317 0.000		74.263 0.000	
Effect of membership duration on wall material			Chi-squared value *p* value	0.440 0.932			

The last section of Table 2.7 indicates the materials used by respondents in the walls of their houses. Compared to the control group, a greater proportion of MFI members use superior, more durable materials. The major differences are recorded between using straw and tin. Only 6 % of MFI members use straw as compared to 46 % of respondents from the control group. Of MFI members, 68 % use tin as compared to 43 % of the control group. This difference is significant ($Chi^2 = 69.947$, $p < 0.01$). Moreover, improvement in wall condition is recorded after MFI membership begins in both the 4- and 8-year groups. The ‘before’ and ‘after’ joining for the ‘4-year’ group is significantly different in terms of wall material ($Chi^2 = 120.317$, $p < 0.01$) and similarly for the ‘8-year’ group ($Chi^2 = 74.263$, $p < 0.01$). However, there is no significant difference between MFI membership duration groups.

Ownership of land is an important determinant of economic situation and is valuable in providing financial security as well as a source of earnings. Table 2.8 shows

Table 2.8 Respondents’ land ownership

Land owned (area in acres)	Non-MFI members	MFI members				
	Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)		8 years ($N = 99$)	
			Before	After	Before	After
No land	83 % ($n = 82$)	48 % ($n = 96$)	73 % ($n = 72$)	54 % ($n = 53$)	62 % ($n = 61$)	43 % ($n = 43$)
0.01–0.25	2 % ($n = 2$)	12 % ($n = 23$)	7 % ($n = 7$)	12 % ($n = 12$)	10 % ($n = 10$)	11 % ($n = 11$)
0.26–0.5	3 % ($n = 3$)	14 % ($n = 28$)	3 % ($n = 3$)	11 % ($n = 11$)	10 % ($n = 10$)	17 % ($n = 17$)
0.51–0.75	4 % ($n = 4$)	8 % ($n = 16$)	8 % ($n = 8$)	6 % ($n = 6$)	7 % ($n = 7$)	10 % ($n = 10$)
0.76–1.0	1 % ($n = 1$)	5 % ($n = 10$)	1 % ($n = 1$)	3 % ($n = 3$)	3 % ($n = 3$)	7 % ($n = 7$)
1.01–1.25	0	1 % ($n = 1$)	0	1 % ($n = 1$)	0	0
1.26–1.50	4 % ($n = 4$)	5 % ($n = 9$)	4 % ($n = 4$)	5 % ($n = 5$)	3 % ($n = 3$)	4 % ($n = 4$)
1.51–1.75	0	2 % ($n = 4$)	1 % ($n = 1$)	4 % ($n = 4$)	1 % ($n = 1$)	0
1.76–2.0	0	2 % ($n = 4$)	2 % ($n = 2$)	1 % ($n = 1$)	2 % ($n = 2$)	3 % ($n = 3$)
2.01–2.25	0	0	0	0	0	0
2.26–2.50	0	3 % ($n = 6$)	1 % ($n = 1$)	3 % ($n = 3$)	1 % ($n = 1$)	3 % ($n = 3$)
2.51 and above	3 % ($n = 3$)	1 % ($n = 1$)	0	0	1 % ($n = 1$)	1 % ($n = 1$)
Average area owned	0.16	0.33	0.18	0.31	0.22	0.35
t test *p* value	−3.358 0.001		6.449 0.000		7.404 0.000	
Effect of membership duration on land ownership		*t* test	−0.820			
		p value	0.413			

that 17 % of control group respondents own land compared to 52 % of MFI members. Three percentage of control group respondents own 2.51 acres of land or above as compared to only 1 % of MFI members. The table shows that, on average, MFI members own double the land area compared to control group respondents (0.33 acres compared with 0.16 acres), a difference that is significant (t test = −3.358, $p < 0.01$).

MFI members in both 4- and 8-year groups acquired more land after they joined the microfinance program. The average land area owned by both groups increased (from 0.18 to 0.31 acres and 0.22 to 0.35 acres, respectively). These differences are significant (t test = 6.449, $p < 0.01$ and t test = 7.404, $p < 0.01$). However, there is no significant difference between membership duration and land area owned by MFI members.

Table 2.9 arguably captures the very nature of poverty and its effects on human beings. It reveals the frequency of daily food intake reported by the respondents. The table shows that 39 % of control group respondents have three meals per day compared to 96 % of MFI members. On average, control group respondents have 2.38 meals per day or just over 7 meals every three days, whereas MFI members have less than three (2.95) meals daily. This difference is significant ($Chi^2 = 121.111$, $p < 0.01$). The table also shows a significant improvement in food intake by the 4- and 8-year groups after joining the microfinance program ($Chi^2 = 25.918$, $p < 0.01$ and $Chi^2 = 46.867$, $p < 0.01$, respectively). However, there is no significant relationship between duration of MFI membership and frequency of daily food intake.

Table 2.9 Respondents' daily food intake

Meals per day	Non-MFI members	MFI members				
	Control group ($N = 99$)	4 and 8 years ($N = 198$)	4 years ($N = 99$)		8 years ($N = 99$)	
			Before	After	Before	After
Once	1 % ($n = 1$)	1 % ($n = 1$)	5 % ($n = 5$)	0	10 % ($n = 10$)	1 % ($n = 1$)
Twice	60 % ($n = 59$)	4 % ($n = 7$)	47 % ($n = 47$)	3 % ($n = 3$)	36 % ($n = 36$)	4 % ($n = 4$)
Three times	39 % ($n = 39$)	96 % ($n = 190$)	47 % ($n = 47$)	97 % ($n = 96$)	54 % ($n = 53$)	95 % ($n = 94$)
Average meals/day	2.38	2.95	2.42	2.97	2.43	2.94
Pearson's chi-squared test p value	121.111 0.000		25.918 0.000		46.867 0.000	
Effect of membership duration on daily food intake		Chi-squared value p value	2.148 0.542			

Overall, these findings support the hypothesis of association between MFI membership and poverty alleviation. Table 2.9 shows that MFI members are far better off than non-MFI members in terms of their frequency of daily food intake.

2.5.1 Linear Regression Model 1

Table 2.10 presents a linear regression model with the difference in monthly income after joining the MFI compared to that before joining the MFI

Table 2.10 OLS linear regression model on 'income difference' ($N = 297$)

Dependent variable = 'current income'	Standardized coefficients		*t*	Sig.
	Beta	Std. error		
(Constant)	0.066	794.155	−1.281	0.201
Household size	0.520	63.588	1.478	0.140
MFIMembership	0.120	295.878	8.066	**0.000**
Mainhhincome	0.108	18.908	2.620	**0.009**
LandBalance	0.207	332.104	2.433	**0.016**
MobileBalance	0.068	377.233	4.466	**0.000**
RadioBalance	−0.062	246.696	1.425	0.155
Kurigram	−0.041	207.557	−1.368	0.172
foodprobD1	−0.020	30.792	−0.919	0.359
foodprobD2	−0.014	75.104	−0.424	0.672
houseOwnedYN	0.012	315.204	−0.231	0.817
Roof after	0.082	296.791	0.250	0.803
Floor after	0.029	341.416	1.598	0.111
Wall after	0.066	144.286	0.549	0.584
Average VIF	1.35			
F statistic	20.221			
p value	0.000			
Adjusted R^2	45.8 %			

Legend
Household size Household size (number of people within respondent's household)
MFIMembership Membership of a MFI (1 if respondent is a member, 0 = otherwise)
Mainhhincome Main source of household income (1 if agricultural, 0 otherwise)
LandBalance Ownership of land (in area) by respondent household
MobileBalance Ownership of mobile phone(s) by respondent household
RadioBalance Ownership of radio by the respondent household
Kurigram Program area (1 if respondent is a resident in relevant area, 0 otherwise)
foodprobD1 Duration in months of first annual incidence of difficulty in accessing food
foodprobD2 Duration in months of second annual incidence of difficulty in accessing food
houseOwnedYN Status of housing arrangements (1 if respondent own the house, 0 otherwise)
Roof after Condition of roof of respondent's house
Floor after Condition of floor of respondent's house
Wall after Condition of wall of respondent's house

('incomedifference') as the dependent variable. For the control group, the income difference is the amount of their present income. This model analyzes the relationship between many of the indicators of asset possession and quality of life, as posited in the earlier section. The table presents the linear regression results from regressing various socioeconomic variables with difference of monthly income in different periods of time. In this analysis, the full sample that includes interviewees from all groups ($N = 297$) is used.

The model has an adjusted R^2 of 45.8 %, with an F statistic of 20.221 ($p < 0.001$). The average variance inflation factor (VIF) of 1.35 shows that multicollinearity is not at a problematic level. As predicted, MFI membership is significant ($p < 0.001$) and positively associated with the dependent variable (incomedifference), which represents the difference in monthly income after compared with 'before' for MFI members and the current income for non-members. Hence, H1 is supported. Other significant variables include main household income attributable to agriculture (Mainhhincom) ($p < 0.01$), respondent's ownership of land ($p < 0.02$) and mobile phone(s) ($p < 0.001$).

The household size; ownership of radio; the program area (Kurigram); difficulty in accessing food in duration 1 (probfoodD1) and duration 2 (probfoodD2); respondent's status on house ownership (houseOwnedYN); and the quality of roof, floor, and wall of the house in which the respondent resides are not significant.

2.5.2 Linear Regression Model 2

Table 2.11 presents a linear regression model with square root of current savings by the respondents with 'Sqrtsavings' as the dependent variable. This variable represents the square root of the total amount of household savings. The variable is transformed so that regression assumptions are complied with more closely. This model analyzes the relationship between various socioeconomic variables that represent possession of assets and quality of life indicators as posited in the earlier section. However, this time the sample is restricted to only MFI members ($n = 198$) and the hypothesis variable distinguishes between 4- and 8-year duration memberships.

In this case, savings is used as the dependent variable as it is impossible to expect respondents to correctly recall their actual monthly income 4 or 8 years prior to joining the MFI program. Besides, current savings is an effective measure of asset accumulation. The model has an adjusted R^2 of 20.3 %, with an F statistic of 4.138 ($p < 0.001$). The average VIF of 1.18 shows that multicollinearity is not at a problematic level. Table 2.11 shows that the hypothesis variable, membership duration, is significant ($p < 0.05$) and, hence, there is a positive association with the dependent variable ('Sqrtsaving'). Thus, longer rather than shorter MFI membership is associated with household wealth through the level of savings and H2 is supported.

Table 2.11 Linear regression model on 'Sqrt savings' ($N = 198$)

Dependent variable = 'Sqrt saving'	Standardized coefficients		t	Sig.
	Beta	Std. error		
(Constant)		25.905	2.731	0.007
Kurigram	−0.062	6.604	−0.887	0.376
Memduration	0.132	5.910	2.007	**0.046**
Household size	−0.076	2.063	−1.136	0.257
Mainhhincome	0.146	0.548	2.161	**0.032**
Expensifees	−0.143	7.709	−2.117	**0.036**
Highestedu	−0.113	0.943	−1.560	0.120
Wall after	0.080	3.881	1.131	0.260
Roof after	−0.078	9.835	−1.147	0.253
Toiletathome	0.077	7.447	1.063	0.289
Fridgeownedafter	0.150	20.221	2.122	**0.035**
Mobileownedafter	0.160	10.285	2.179	**0.031**
Duckownedafter	0.087	3.444	1.300	0.195
Goatownedafter	0.082	2.420	1.231	0.220
Cowownedafter	0.076	2.040	1.113	0.267
foodprobD1	−0.116	1.440	−1.637	0.103
foodprobD2	−0.087	3.728	−1.225	0.222
Average VIF	1.18			
F statistic	4.138			
p value	0.000			
Adjusted R^2	20.3 %			

Legend
Household size Household size (number of people within the respondents' household)
MFIMembership Membership duration in MFI (1 = if respondent has been a member for 8 years, 0 = if respondent has been a member for 4 years)
Household size Household size (number of people within the respondents' household)
Mainhhincome Main source of household income (1 if agricultural, 0 otherwise)
Expensifees Reason for not consulting doctor in case of household sickness
Highestedu Respondent's highest educational attainment
Wall after Condition of wall of respondent's house
Roof after Condition of roof of respondent's house
Toiletathome Condition of toilet facility at respondent's home
Fridgeownedafter Ownership of fridge by the respondent's household
Mobileownedafter Ownership of mobile phone(s) by the respondent's household
Duckownedafter Ownership of duck by the respondent's household
Goatownedafter Ownership of goat(s) by the respondent's household
Cowownedafter Ownership of cow by the respondent's household
Kurigram Program area (1 if respondent is a resident in relevant area, 0 otherwise)
foodprobD1 Duration in months of first annual incidence of difficulty in accessing food
foodprobD2 Duration in months of second annual incidence of difficulty in accessing food

Among the other variables tested, as expected, the main source of household income being agricultural (Mainhhincome) is positively associated ($p < 0.005$), while ownership of fridge (Fridgeownedafter) and mobile phone (Mobileownedafter) by the respondents is found positively significant ($p < 0.005$). The expensiveness of medicines as a reason not to seek medical treatment (Expensifees) is negatively associated with 'Sqrtsavings' ($p < 0.005$). The program area (Kurigram) in which the respondent resides, household size, highest educational attainment, construction materials used to build the wall and roof of the respondent's residence, status of toilet at home, ownership of livestock (duck, goat, and cow) and the durations of difficulty in accessing food (foodprobD1) and (foodprobD2) are not significant.

2.6 Conclusions, Limitations, and Further Research

Countries across the developing and developed world are increasingly supporting microfinance in playing an active role in development initiatives. This study analyzes this role, and its findings further support and rationalize the need for microfinance programs in both the developed and developing world. Overwhelmingly, the tests of difference in this study show that income and asset possession by MFI members is significantly higher than for the 'control' or non-member group. However, in testing for shorter versus longer MFI membership effects, no significant difference was revealed. Only household savings and the presence of a second income source were found to be linked to the duration of membership.

Overall, MFI members are revealed as economically better off than control group respondents in many aspects, including income, savings, housing arrangements and quality, assets owned, and frequency of food intake. These findings support those of other research undertaken in different countries, e.g., Thailand (Coleman 2006), Philippines (Habib et al. 2006), Bangladesh (Husain 1998), and Malawi (Zeller et al. 1998). Consistent with Khandker (1998), membership duration is found to be associated with household wealth. The public policy implications of these findings reinforce the value of microfinance programs as a means of poverty alleviation. The findings contribute to many studies that demonstrate the effectiveness of this form of financing of microenterprises as a tool to fight poverty.

There are at least three potential drawbacks of impact studies like this: 'possible selection bias,' 'endogeneity of program placement,' and 'fungibility of fund' (Coleman 2006; Hulme 2000; Khalily 2004). First, in terms of potential selection bias, individuals participating in microfinance programs have their own personal and family characteristics (Khalily 2004) and these factors also play a key role in determining program participation. Hulme (2000, p. 85) mentions five possible sources of 'selection bias': (a) difficulty in finding a location with the same socioeconomic characteristics in both treatment and control groups; (b) difference in 'invisible' attributes (entrepreneurial drive and ability) among treatment and control groups; (c) any intervention that may result in a short-term positive response from the treatment group (Hawthorne effect); (d) the control group becoming contaminated by contact with the treatment group; and (e) 'fungibility' of the treatment group (e.g., credit is transferred or loans are misused).

A number of studies (Chen and Dunn 1996; Coleman 1999; Dunn and Arbuckle 2001; Hashemi et al. 1996; Mustafa et al. 1996b; Pitt and Khandker 1996) use a quasi-experimental design to estimate the effect of microfinance on participants. This study makes use of a control group to compare various aspects of the socioeconomic lives of MFI members with non-members. This approach helps minimize the effect of 'selection bias.'

Hulme (2000) also argues that careful selection of a control group that is far away from the treatment group can tackle the problem of location. But as Bangladesh is a densely populated country, with a microfinance operation in virtually every district, it was not possible to avoid the selection problem entirely and source control group respondents far from MFI members. However, the problem of contamination of the control group (d) can be addressed by an approach such as '*client-to-be*' (Hulme and Mosley 1996), a strategy this study adopted as the control group population had never been members of any MFI but had the potential to be clients of a MFI.

Second, in terms of the endogeneity of program placement, MFIs usually place their programs and branches in accessible areas with better infrastructural development (Khandker et al. 1995). Thus, the extent of the program impact also depends on program placement. However, Khalily (2004) suggests that this endogeneity has very little or no impact on those studies that identify socioeconomic, political, and environmental factors in assessing program impact at the household level. This study minimizes the 'endogeneity of program placement' by assessing the program's impact at the household level only.

Third, in terms of the issue of fungibility of credit, this is a critical problem in precisely determining the impact of credit (Adams et al. 1984; David and Meyer 1983; Pischke et al. 1983). This arises from an inability to distinguish the uses of microcredit and other funds between households and enterprises. No studies have successfully controlled for fungibility.

Overwhelmingly, evidence presented by this study is consistent with MFIs having made a substantial contribution to the overall improvement in the living standards and poverty situation of respondent MFI members as compared to control group members. But control for macroeconomic conditions or other exogenous variables such as market conditions and environmental conditions did not occur, and these are likely to affect microenterprise performance.

There are many areas for future research on exploring the linkages between MFIs and poverty alleviation: the impact of MFI membership on individuals over time, possible spillover effects arising from average neighborhood characteristics (using a larger sample size), other MFIs working in Bangladesh and comparing their impact on a larger scale, the experience of other countries and a cross-country comparison of MFIs' association with poverty alleviation.

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Chapter 3
Does Microcredit Help the Poor and Financially Marginalized Communities? Experience of Pakistan

Zahoor Khan and Jamalludin Sulaiman

Abstract The study aims to evaluate the microcredit programs operating across the Pakistan. Microsurvey data collected by Gallup Pakistan at the national level have been used. The sample size of the study consists of 2,070 respondents. The impact of the microcredit program on their clients has been evaluated by using descriptive statistics, multiple regression, the mean difference model (MDM), and quartiles. The study reveals that microcredit program in Pakistan may not be helpful for extreme poor in its operational areas across the country because disbursement of credit to the lower quartile income poor does not yield fruitful income change. Despite an overall positive change (7.76 %) in income, these programs show weak evidences of benefiting the lower quartile community members during the study period. The study suggests that microcredit is not equally beneficial to all segments of the poor.

Keywords Microcredit · Impact assessment · Pakistan

3.1 Introduction

Poverty and income inequality are correlated, which together form the root of many social and economic problems. More than 80 % of the world's population lives in countries where income differentials are widening. The poorest 40 % of the world's population account for only 5 % of global income. On the other hand, the richest 20 % account for 75 % of world income, according to

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_3

the United Nations Development Program (Ravallion 2010). Among the many initiatives taken against poverty worldwide, microfinance is one of the strongest instruments to effectively alleviate the level of poverty and improve the socio-economic conditions of the poor and marginalized segments of a community (Donaghue 2004).

Microfinance institutions (MFIs) have received growing attention at both national and international levels during the last two decades, particularly after the award of the Noble Prize to Muhammad Yunus. The major contribution of Muhammad Yunus has been making microfinance facilities accessible to the non-bankable poor on terms and conditions different from formal banking practices (Khan 2010; Khan et al. 2009). Like other developing economies, Pakistan is also suffering from poverty, in spite of adopting multidimensional measures to alleviate the absolute level of poverty. Based on the official statistics, the incidence of absolute poverty has decreased. The head count ratio (HCR) was 30.6 % in 1998–1999, but declined to 23.9 % points and subsequently to 22.3 and approximately 20 % points during 2004–2005, 2005–2006, and 2009–2010, respectively.[1] Pakistan is addressing the issue of poverty by taking various initiatives. These are, namely, Benazir Income Support Program (BISP), the rights source initiative, vocational training programs, Peoples' Work Program (PWP-I and II), Pakistan Baitul Mal (PBM), employees' old age benefit institution, and zakat and microfinance programs (Khan et al. 2013). This study focuses on the microfinance activities and the resulting outcomes in terms of socioeconomic uplifts and reduction in poverty and income inequality in the operational areas of these programs.

Pakistan Poverty Alleviation Fund (PPAF) is a major organization to shape and cater microcredit activities in the country. The PPAF was established as an autonomous body in April 2000 to cater to the microfinance requirements of the country. With an endowment of $100 million, it functions as a wholesale lender to NGOs engaged in providing microfinancing. It is one of the major organizations that has shaped microfinance and community development activities in the country. The PPAF offers its microcredit facilities in 104 districts across the country with the help of 68 partner organizations. It has made a disbursement of Rs. 17,448 million, facilitating around 6.18 million beneficiaries.[2] There are more than 30 microfinance institutions operating in Pakistan with diverse structures and mechanisms. The share of PPAF in the microfinance sector is more than 44 %. The main objectives of the study are to investigate empirically the following:

1. The outreach and accessibility of MFIs with regard to various categories of the poor and marginalized segments in its working area.
2. Socioeconomic impact of the microcredit programs for various groups of the poor.
3. The distributional effect of these programs for various classes in its operational areas.

[1] Pakistan Economic Survey 2010–2011.

[2] Pakistan Poverty Alleviation Fund annual report 2008–2009 (www.ppaf.org.pk).

3.2 A Brief Review of Literature

Assessment of microfinance programs is essential for appropriate microfinance functioning. Microfinance assessment helps three major stakeholders: MFIs, donors, and regulatory authorities. The idea of microfinance impact assessment got momentum in the last decade. Broad-based and rigorous studies were conducted by prominent MFIs, aid agencies (AAs), and international financial institutions (IFIs) such as Grameen Bank, Department for Internal Development, the World Bank, and International Monetary Fund (Bauchet et al. 2011; Goldberg 2005; Khandker 2005; Kondo et al. 2008; Morduch and Roodman 2009). The existing literature about the impact assessment methods can be broadly divided into three categories:

(i) Experimental methods/randomized control trials (RCTs)
(ii) Counter factual combined (CFC) approach (CFC)
(iii) Parametric methods

Understanding the strengths and weaknesses of each method is imperative in investigating the basic question: "Does microfinance work against poverty?" This question can be answered differently by using different investigation methods. There is no single universal method of microfinance assessment (Odell 2010). Although there are rigorous studies (Banerjee et al. 2009; Coleman 2006; Pitt and Khandker 1998; Kondo et al. 2008; Roodman and Morduch 2009) across the world conducted by renowned policy and research institutions, there is no consensus about the impact assessment results and, in some cases, different researchers report contradictory results.[3]

The impact assessment outcomes in terms of poverty alleviation and socioeconomic uplift of the financially marginalized poor are sensitive to the selection of impact assessment methods. This has been evident from the study of renowned scholars such as Khandker (1998, 2005) and Morduch (1998, 2009). Why cannot a single microfinance impact assessment method be used as a universal impact assessment method? This question is of central importance in the literature on microfinance impact assessment. There can be various possible reasons. First, none of the existing microfinance impact assessment methods are error free; therefore, no impact assessment method in isolation can cover the scope of microfinance impact assessment. Second, the impact assessment experiments cannot be performed in an entirely controlled environment. The researchers have control over some factors (selection of location, clients and non-clients, etc.), while many other aspects (the difference between intrinsic abilities of clients, enthusiasm

[3] Khandker, in his 1998 and 2005 studies, uses quasi-experimental and panel data techniques, respectively. He investigated the impact of microcredit on poverty. He affirms positive impact of microfinance for clients in terms of poverty alleviation, especially for women and the extreme poor. Morduch (1999) and Roodman and Morduch (2009) reinvestigated the results of Khandker (1998, 2005) and concluded that he has exaggerated the results. For some important variables (women and the extreme poor), they found negative signs.

toward work, the difference in social, cultural and political values, etc.) are uncontrollable, thus yielding differences in the outcome of the same experiment. Third, heterogeneity in the operational areas and differences in participants' demographic characteristics are other hurdles to adopt a universal standard for microfinance impact assessment. However, a comparative analysis of the existing microfinance impact assessment methods will point out the relative importance of each method and its suitability in different situations.

Morduch (1998) evaluates the impact of microfinance programs on the well-being of poor marginalized groups. He conducted a survey in Bangladesh with the help of a well-established microfinance organization, using a panel data about the various demographic and non-demographic characteristics of the respondents. He finds a positive impact of microfinance programs on income smoothening and consumption smoothening. Coleman (1999) finds that provision of microfinance facilities can significantly increase the income of beneficiaries of these programs and, thus, change their status in the society. He took a sample of 900 clients of three different MFIs and investigated the impact of these programs on clients' earnings. He used a multiple linear regression model to measure the influence of a set of explanatory variables on a dependent variable *Y* (the income of the client).

Morduch and Haley (2002) evaluate the existing literature of impact assessment resulting from the intervention of microfinance programs in different parts of the world, using certain socioeconomic characteristics as a benchmark of microfinance program evaluation. They come to the conclusion that microfinance programs have a positive impact in terms of smoothing of earning and increasing the income level of clients, but point out that there is less evidence to support a positive impact in terms of improvement in health, nutrition, and primary school enrollment. Gallup Pakistan (2005) uses the CFC approach and finds that there has been a positive impact of PPAF microfinance activities on the consumption, income, and assets of the borrowers. However, the study did not explore the impact of the PPAF microfinance on poverty. Salma (2004) evaluates the impact of a microfinance program of the Development Program for the Hard-core Poor (PPRT) and the Ikhtiar Loan Scheme (ILS) of the Amanah Ikhtiar Malaysia (AIM). She focuses on two important goals: outreach of these programs and economic impacts resulting from these programs. She compares the socioeconomic conditions of PPRT beneficiaries with AIM beneficiaries and with non-clients as well. She uses various statistical techniques and concludes that more than four-fifths of AIM participants have crossed the poverty-line income as compared to less than one-third of the PPRT participants.

Kondo et al. (2008) use various impact assessment tools to investigate the impact of a microfinance program in the Philippines. She observes a significant impact on per capita income, food expenditure, and total expenditure, but with regressive features. Moreover, she points that MFIs are growing as a business and they tend to focus just on the disbursement of loans and their repayments, having nothing to do with creating opportunities for the poor and ensuring profits for them.

Shirazi and Khan (2009) investigate the impact of microcredit on poverty alleviation in Pakistan. They use a microsurvey of Gallup Pakistan (2005), which consists of 3,000 respondents. This survey comprises a control group of 1,500 respondents, while the remaining 1,500 respondents comprise the experimental group. They use the CFC approach for the impact assessment of microcredit on poverty alleviation in the working area of the PPAF. The study concludes that microcredit has reduced the absolute level of poverty by 3.05 % during the study period.

Khan (2011) uses microdata collected from 300 respondents through a detailed questionnaire from the clients of Islamic Relief (Pak). He also collected the same information, from the same intervention area of Islamic Relief, from about 100 respondents as a control group. He uses the mean difference model (MDM) to investigate the impact of the microfinance program of Islamic Relief (Pak). He further uses a logistic regression model for investigating the impact on social uplift and poverty alleviation of the respondents. He concludes that the respondents who avail the facility of Islamic microfinance are approximately 10 % more likely to increase their socioeconomic welfare as compared to non-clients.

Abiola (2011) applies a financing constraint approach to investigate whether MFIs have improved their access to credit for microfinance activities or otherwise. The study was conducted in Nigeria, using cross-sectional data to investigate the dependence of MFIs on their own internal funds. The findings of the study show that MFIs reduce financial constraints of microbusinesses. Roodman and Morduch (2009) find that small loans neither improve poor people's status nor help reduce poverty, and argue that microfinancing is not a miracle solution for poverty reduction. However, they admit that the poor need financial services for their survival and it is their basic right—like access to clean water and electricity, financial services are essential to a healthy and modern life.

We have tried to summarize the pros and cons of various contemporary impact assessment approaches, to provide a snapshot of their suitability in different circumstances. Tables 3.1 and 3.2 provide the key highlights of contemporary microfinance impact assessment methods, with their pros and cons and suitability of application in different situations.

Different approaches have been evaluated on the basis of their strengths and weaknesses and on their potential to investigate the impact of microfinance programs. These approaches are compared to find out the optimal approach in terms of compatibility with the objectives of MFIs. The initiation of microfinance programs was aimed at alleviating the absolute level of poverty and improving the socioeconomic lives of the poor on a sustainable basis (Yunus 2003). Some important impact assessment studies (Odell 2010; Banerjee et al. 2009; Bauchet et al. 2011; Coleman 2006; Roodman and Morduch 2009; Rahman 2010; Khan 2011; Khan et al. 2011; Morduch 1998) have gauged the impact of microfinance on socioeconomic variables. Our study also uses the same socioeconomic variables. The degree assigned to different approaches, against each objective of microfinance, is based on their suitability, objectivity, robustness, and feasibility. For example, RCTs are scientifically rigorous to report short-term impact assessment results (15–18 months), but fail to report a change in slow-growing variables such

Table 3.1 Pros and cons of contemporary impact assessments methods

Components	Randomized control trials (RCTs)	Quasi-experimental approaches	Parametric methods
Strengths	• Scientific in nature • Rigorous • Cure for selection bias • Provide exact benchmark for comparison	• Easy to apply • Objectively suitable • Generalizable • Applies to existing programs • Can report long-run results	• Easy to apply • Generalizable • Applied to existing programs • Can be used for short- and long-run impact analysis
Weakness	• Can produce only short-term results • Cannot be applied to existing programs • Difficult to apply when there are sufficient MFIs in a country • It reports only average impact • The result produced by this method cannot be generalized • RCTs are objectively weak	• Partially scientific in nature • Suffer from selection bias • Non-random placement of programs and clients • Incapable to provide an exact benchmark for comparison • Suffer from human personal likes and dislikes • Report average impact of the program • Suffer from heterogeneity	• Require a lot of assumptions like • Specific functional form • Normality of distribution of error term • IID sequence of the error term • Report average impact of the dependent variable • Specification is not possible without prior information • Suffer from heterogeneity
Opportunities	• Can be widely accepted because of • Scientific nature • Rigorous application • Avoidance of selection bias	• Can be widely accepted because of • Generalizability • Objectivity • Convenience	• Can be widely accepted because of • Generalizability • Objectivity • Convenience
Challenges	• How to make it suitable for long-run analysis? • How to apply to for already running MF programs? • How to incorporate the objectivity of MF programs while applying this method?	• How to remove selection bias? • How to control exogenous shocks that control and experimental groups suffer from? • How to enhance the scientific rigorousness?	• How to remove selection bias? • How to control heterogeneity across the clients and across the regions? • How to develop a group for comparison purpose?

Source Authors' own analysis

Table 3.2 Compatibility and suitability of the selected approaches

Objectives	RCTs	Quasi-experimental approaches	Parametric methods	Observations
Economic impact (short term)				
Change in income	Strong	Moderate	Moderate	RCTs are prepared over other methods
Change in consumption	Strong	Moderate	Moderate	
Change in savings	Strong	Moderate	Moderate	
Economic impact (long term)				
Change in status of poverty	Weak	Strong[a]	Moderate	Perhaps CFC can report better results if selection bias is properly taken care of
Vulnerability of poverty	Strong	Moderate	Strong	
Change in wealth accumulation	Weak	Strong	Moderate	
Change in product diversification	Weak	Strong	Moderate	
Business expansion	Weak	Strong	Moderate	
Social impact				
Change in well-being	Moderate	Moderate	Moderate	Either approach (quasi-experimental or parametric) can yield better output than RCTs
Change in women's empowerment	Weak	Moderate	Moderate	
Change in targeting poor clients	Weak	Moderate	Strong	
Health				
Change in infant mortality rate	Weak	Moderate	Moderate	CFC is better than any other approach because it reports net result
Education				
Change in number of school-going children	Weak	Moderate	Moderate	CFC is better than any other approach because it reports net result
Change in number of household members who know technical skills	Weak	Moderate	Moderate	

Source Authors' own analysis
[a]If carefully taken care of for selection bias

as alleviation in poverty and socioeconomic uplift. Similarly, quasi-experimental methods such as the CFC approach have the potential to report short- and long-run changes in socioeconomic variables, but lack internal validity. Same is the case with the parametric approaches of impact assessment as CFC.

It is evident from Table 3.2 that none of the approaches in isolation can fulfill the objective of microfinance assessment. Moreover, the comparison of different impact assessment approaches reveals a tradeoff between scientific robustness and program objectivity.

Finally, though microfinance is considered as a strong instrument that can alleviate the absolute level of poverty and improve distribution patterns in an economy, different studies across the world do not affirm this belief unanimously. Studies vary from positive impacts to negative impacts with different magnitudes.

3.3 Data and Methodology

3.3.1 Source of Data and the Collection Method

The data about the respondents were collected for the loan year, 2004–2007, and the previous year, 2003–2006, by Gallup Pakistan. The difference between the two time periods is at least 1 year. A sample size of 2,070 respondents was selected across the country. The selection of clients was carried under the condition that the selected client should have taken at least one loan during the period January 2004 and December 2007. The multistage sampling procedure was then adopted to minimize the selection bias of the study. This study uses before and after loan period data for the clients to show that socioeconomic and demographic characteristics remain the same, while changes in socioeconomic conditions come from the utilization of credit if other factors remain constant.

3.3.2 The Methodology

Various statistical and econometric techniques have been applied to investigate the impact of microcredit programs. Techniques used in this chapter have been given below with a short description of justification.

- Descriptive statistics of demographic and non-demographic characteristics have been calculated to assess the basic socioeconomic profile of the clients.
- A multiple regression model has also been used to investigate the determinants of household income. Theoretically, important demographic variables such as age, education level, household size, and square of education, and some non-demographic variables such as dummy variables for clients' credit utilization have been used.
- T-paired sample test has used to investigate the difference between variables of interest (household income, household expenditure, etc.) before taking a loan and after the utilization of the loan.
- The sectorwise income of the clients has been investigated before and after the utilization of the loan, and thus, the statistically significant difference has been considered as a positive impact of the microcredit and vice versa.
- Socioeconomic well-being of the clients has been measured in the operational areas by per capita income of individuals, households, and per capita consumption.[4]

[4] For more details, see Kondo (2008).

- Investigating the outreach to the poor and marginalized segments, various quartiles and deciles of household earning before and after the loan have been calculated. This is a way to judge the access to outreach of the MFIs. This technique will enable us how the MFIs are targeting poverty in its operational areas.
- Finally, distributional change due to the microcredit program for various classes of the poor has been investigated by the quartile approach.

3.4 Result and Discussion

Descriptive statistics of demographic characteristics and other economic information have been used to evaluate the lending methodology of MFIs. The average age limit is 39.5 years, which reflects that MFIs on average select mature clients for microcredit activities. The average household size is 5.8 or approximately 6 members in the working areas of MFIs. Education is a dominant determinant of household income. Average education in the working area of the MFIs is 4.1 years, which shows that the average education of the clients is primary level. The average earnings of the individual and household before a loan is Rs. 5,283 and Rs. 11,008, respectively. Keeping in mind the outreach of MFIs in targeting the poor and marginalized segments, we have used the then official poverty line of Rs. 878.64 per adult equivalent per month for the year 2006–2007 and the same poverty line has been used by the survey in 2005–2006.[5] A later section of this chapter discusses in detail the outreach and targeting poverty strategies of the MFIs.

Descriptive statistics of sectorwise income of the clients are calculated and reported in Table 3.3 (Table 3.4).

Descriptive statistics of respondents' earning from various sources have been calculated and presented in Table 3.3 for the study period 2003–2006 to 2004–2007. These statistics show that a major earning of clients is small enterprises, followed by livestock and agriculture, respectively, during the study period. Skewness and kurtosis values for both the periods are positive with high magnitudes, representing high fluctuations in the earning of clients. This phenomenon hints that MFIs have unevenly distributed among the poor and marginalized segments. As this issue is of great importance, we have devoted a separate section to investigate it. A pie chart of clients' earning from various sources illustrates this point (Fig. 3.1).

It is obvious from both the charts that earning sources are more or less consistent during the study period. Microenterprise is the dominant source in terms of earning of clients, followed by livestock and agriculture, respectively, in the operational areas of MFIs. Three dominant sectors—microenterprise, livestock, and agriculture—constitute 85–88 % of the total earnings of clients, from the previous year to the current year.

[5] Pakistan economic survey 2005–2006 (over view of the economy) p. xvii (http://www.accountancy.com.pk/docs/economic-survey-of-pakistan-2005-06.pdf).

Table 3.3 Descriptive statistics of MFIs' clients earning from various sources (2007)

Descriptive statistics	Agriculture	Livestock	Enterprise	Service	Daily wage	Others
Mean	1,118.5	1,306.6	2,810.6	394.3	290.3	88.4
Std. error	75.8	68.8	98.4	40.6	27.4	11.8
Range	50,000.0	25,000.0	90,000.0	22,000.0	16,000.0	8,000.0
Max.	50,000.0	25,000.0	90,000.0	22,000.0	16,000.0	8,000.0
Sum	2,314,146.0	2,703,254.0	5,815,197.0	815,862.0	600,700.0	182,800.0
Count	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0

Source Calculated from the survey data
The data are measured in terms of Pakistani rupees

Table 3.4 Descriptive statistics of MFIs' clients earning from various sources (2006)

Descriptive statistics	Agriculture	Livestock	Enterprise	Service	Daily wage	Others
Mean	971.4	1,065.6	2,255.5	331.9	297.1	98.8
Std. error	67.1	56.4	77.5	36.4	24.7	13.4
Range	45,000.0	21,600.0	45,000.0	20,000.0	11,000.0	10,000.0
Max.	45,000.0	21,600.0	45,000.0	20,000.0	11,000.0	10,000.0
Sum	2,009,896.0	2,204,774.0	4,666,582.0	686,600.0	614,600.0	204,400.0
Count	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0

Source Calculated from the survey data

Multiple regression model has been estimated by using theoretically relevant variables to investigate the determinants of household income (Table 3.5).

Determinants of the household income were specified on the basis of theoretically important and econometrically significant variables and model specification criteria, respectively.[6] The ultimate specification of the model has been made on the basis of several econometric criteria such as the Ramsey RESET test for general misspecification, the Wald test for linear coefficient restriction, normality of residuals, and the White heteroskedasticity-consistent standard errors and covariance for the presence of heteroskedasticity.[7] The age of a respondent is considered as an indicator of maturity. The age of the family head (showing maturity) and family size (sharing burdens/helping hands) significantly affects saving decisions and planning for investment at household levels.

The education level of the clients is another important variable that influences investment and production decisions. A highly educated client is expected to possess better understanding, knowledge, and managerial skills, and, thus, has the

[6] Khan (2011), "Financing non bankable masses: An analytical study of conventional verses Islamic microfinance programs [A case study of Sungi development foundation and Islamic relief (PAK)]." Dissertation submitted in partial fulfillment of the requirements of MS Economics Degree: IIIE, IIU Islamabad.

[7] See Appendix 1.

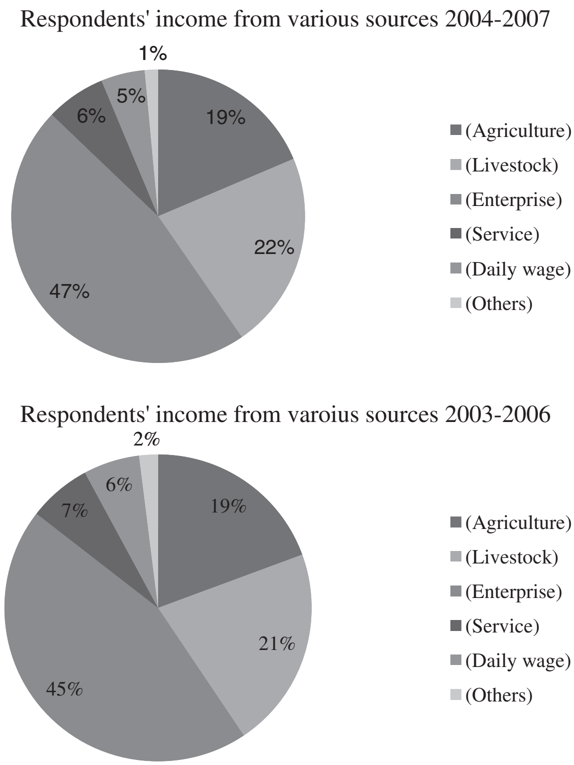

Fig. 3.1 Client S′ income from various sources for current and previous years. *Source* developed from the survey data

Table 3.5 Multiple regressions for household income determination

Dependent variable: HHIAL (household income after loan)				
Variable	Coefficient	Std. error	*t*-statistic	Prob.
C	4,082.776	776.9938	5.254580	0.0000
AGE	64.43702	14.73756	4.372298	0.0000
EDU	353.2423	68.55224	5.152892	0.0000
(EDU)^2	−3.723324	0.677554	−5.495244	0.0000
HH size	610.2858	76.15387	8.013851	0.0000
D_06	951.6051	274.8672	3.462053	0.0005
D_07	1,245.315	374.3596	3.326521	0.0009

HHIAL = 4082.77 + 64.43, AGE + 353.24, EDU − 3.72(EDU^2) + 610.2, HHS + 951.6, D06 + 1245.31, D07 (See Appendix 1 for description of variables) ability to invest the borrowed money in more efficient, secured, and profitable businesses. Household size is an important variable of household income. Surprisingly, the household size has a positive sign. This phenomenon can be interpreted in this situation in terms of the poor households having no other options for their survival, except to become a part of the labor force irrespective of their age. All regressors are positively related and statistically significant with household income except education square. It represents that households' income increases with a decreasing rate due to the education level of the respondents. Perhaps, it represents that the higher education of the clients of MFIs is a misfit with their skills in microfinance activities. This empirical finding does not affirm theoretical justification of education of MFIs' clients accounting for higher earnings.

Various dummy variables (D_06, 07) were used to show the duration of membership of the clients. Average monthly earning of the clients who were attached to MFIs for two or more years (D07) is greater than the average earning of those clients who are members of the MFIs for 1 year or less (D06). This finding is theoretically sound as utilization of credit for more time enhances the expertise of clients, which ultimately increases earning from business.

To investigate the economic impact resulting from the microcredit program of the MFIs on the poor and marginalized segments, this study investigates change in individual income, individual expenditures, total household income and total household expenditures, and other sources of income of households of the clients before and after joining microcredit programs. The difference is thus checked for statistical significance. The null and alternative hypotheses are as follows:

(i) $H_0 : \mu_{\text{inc}(T1)\text{after}} = \mu_{\text{inc(To)before}} \Rightarrow \text{Difference} = 0$
$H_1 : \mu_{\text{inc}(T1)\text{after}} \neq \mu_{\text{inc(To)before}} \Rightarrow \text{Difference} \neq 0$
(ii) Level of Significance: $\alpha = 0.01$
(iii) Test statistic under H_0 is given by: $t = \frac{\bar{d}}{Sd/\sqrt{n}}$
(iv) The critical region is $|t| \geq t\ 0.005, (2070)$

As a rule of thumb, when t-estimated value is greater than t-tabulated value, we reject H_0. This means that the difference between the incomes of clients before and after joining the microcredit program is statistically significant. Rejecting the null hypothesis means that the study did not find sufficient evidence to conclude that the microcredit programs in Pakistan have not significantly brought a positive change in the earning level of its clients.

Similarly, the difference between other variables, before and after the utilization of credit, has been investigated and reported in Table 3.6, with corresponding significance levels. Table 3.6 shows that the microcredit programs brought a significant positive change in terms of household income, the individual's income, and household expenditures. Two variables—other sources of household earnings and other sources of individual earnings—are statistically insignificant at 1 % significance level. This implies that the clients rely on the microcredit facility provided by MFIs. Perhaps they do not have much difficulty in terms of repayment of their loans or they do not have other sources of funding (Table 3.7).

Table 3.6 Summary of statistical inferences: economic impact noticed

Elements	Difference	*T*-value	Significance level (%)
Monthly expenditure of household before and after loan	1,369.61	17.2	1
Total individual income before and after loan	1,016.73	24.3	1
Total household income before and after loan	1,800.87	29.8	1
Other sources of income of individual before and after loan	10.43	1.1	Insignificant at 1
Other sources of income of household before and after loan	72.69	2.1	Insignificant at 5

Source Authors' estimation

Table 3.7 Summary of statistical inferences: economic impact noticed (sectorwise)

Elements	Difference	*T*-value	Significance level (%)
Personal monthly income before and after loan (agriculture)	147.05	10.67	5
Personal monthly income before and after loan (livestock)	240.93	10.34	5
Personal monthly income before and after loan (enterprise)	555.15	12.98	5
Personal monthly income before and after loan (service)	62.47	3.43	5
Personal monthly income before and after loan (daily wage)	−6.71	−0.39	Insignificant at 5
Personal monthly income before and after loan (others)	−10.43	−1.01	Insignificant at 5

Source Authors' calculations

We have further estimated the economic impact of the microcredit programs profession-wise. As discussed earlier, microenterprise, livestock, and agriculture are dominant sectors for the utilization of microcredit in the intervention areas of the MFIs. Therefore, the sectorwise impact has also been investigated. Monthly personal income from all sources except daily wage and others are statistically significant at 95 % confidence level.

Income and consumption are often used as a proxy of economic welfare indicators (Rahman 2010). Table 3.8 shows per capita income of individuals and households, and per capita consumption to investigate the economic welfare of the clients in the operational areas. The statistical significance of per capita values was estimated before and after the loan period and found to be statistically significant with 99 % confidence interval. The concept of per capita income in terms of macroeconomics is used as a proxy of economic welfare of the residents of a country. The higher the GDP per capita, the higher the economic welfare, and vice versa. By looking into the per capita income of households and per capita consumption, it seems that the average number of the total clients is not poor in the working

Table 3.8 Socioeconomic indicators of clients

Variables	After loan	Before loan
Per capita income of household	12,819.3*	11,019.1*
Per capita income of individuals	6,118.3*	5,101.9*
Per capita household expenditure	9,748.9*	8,379.0*

*Significant at 99 % confidence level

Table 3.9 Access to the poor or targeting poverty by MFIs (before loan)

Statistics	Individual income before loan	HH income before loan
Min	200	2,000
Quartile-1	3,800	8,000
Quartile-2	5,500	10,000
Quartile-3	8,000	14,000
Max	48,000	60,000

Source Authors' calculations

areas of the MFIs. There may be two possibilities: First, perhaps the MFIs did not identify their target group for microcredit activities according to the official definition of poverty (calories intake approach Rs. 878.64[8] per adult per month). Second, The MFIs may not extend the microcredit facility to the poor and extremely poor because it may think these groups have a high chance of default.

We now investigate the outreach of the MFIs. This study uses the official poverty line of Rs. 878.64 per adult equivalent per month (2006–2007), and the same poverty line has been used by the survey in 2005–2006.[9] If we multiply 878.64 with the average household size, then the resulting outcome will be Rs. 5,100. This is the minimum amount required by each household to satisfy its basic needs per month. This amount can be used as a proxy of the poverty line for the clients of the MFIs. Table 3.9 represents quartile earning of individuals and households along with minimum and maximum values per month. In the working areas of the MFIs, minimum earning is Rs. 2,000 per month per household. The first quartile, which is equivalent to the 25th percentile, is equal to Rs. 8,000, representing that 25 % of the survey households have an income less than Rs. 8,000 per month. The members of these households are either lying on the poverty line or just below it. It is a surprising fact that less than 25 % of the total targeted households are poor according to the official definition of poverty. According to this finding, out of the total clients (2070), less than 500 clients are poor. This indicates that a selection bias has been committed either by considering some other benchmark of poverty or by ignoring the target group intentionally due to the high chance of default. Of the total clients, 31 % have

[8] Pakistan economic survey 2005–2006.

[9] Pakistan economic survey 2005–2006 (over view of the economy) p. xvii (http://www.accountancy.com.pk/docs/economic-survey-of-pakistan-2005-06.pdf).

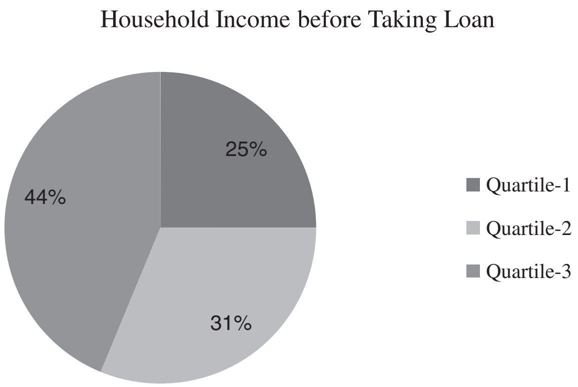

Fig. 3.2 Household income before loan

Table 3.10 Re-access of poverty level after the utilization of loan for at least 1 year

Statistics	Household income after loan
Min	1,300
Quartile-1	8,000
Quartile-2	12,000
Quartile-3	15,000
Max	90,000

Source Authors' calculations

an income between Rs. 8,000 and Rs. 10,000 per month. It shows that 25 % clients of MFIs do not fall under the official definition of the poor. The remaining 44 % of the total clients comprise the non-poor and quasi-non-poor. In a nutshell, about 25 % of the total clients of the MFIs in Pakistan are the poor according to the official poverty line of that time, while 75 % of the total clients are either the non-poor or quasi-non-poor or vulnerable to poor.[10]

This disbursement pattern of credit favors the MFIs in two different ways: First, targeting the non-poor and quasi-non-poor reduces the chance of default and assures regular periodic repayments from clients. Second, the earning of these groups is relatively flexible as compared to the poor and ultra-poor, so the MFIs can charge a desirable level of interest for the further expansion of credit facility. Quartile earning of households has been represented in Fig. 3.2 (Table 3.10).

Table 3.9 uses household income data after the utilization of credit. Surprisingly, the household earning in the first quartile does not show any change. This implies that microcredit cannot help the lower quartile income poor in terms of their socioeconomic well-being.[11] The study deduces another result from this

[10] For details of the poor and poverty categories, see Appendix 2.

[11] This statement is relevant for this case only. We cannot generalize the result for any other study.

Table 3.11 Change in distribution pattern in the working area of the MFIs (quartilewise)

Statistics	Household income after loan (improvement) (%)
Quartile-1	0.00[a]
Quartile-2	16.67
Quartile-3	6.67
Overall	7.78

Source Our own estimation
[a][Quartile value (2006–2007) − quartile value (2005–2006)/ quartile value (2006–2007)] × 100

finding that microcredit provision is perhaps not a proper tool to help the extreme poor and ultra-poor. We have to design some other programmes to help these people and to minimize the intensity of their poverty level. Second and third quartile earning has improved after the utilization of credit. The findings support the theoretical justification of proper utilization of credit disbursement for those clients who are either lying on the poverty line or vulnerable to poverty. Microcredit cannot bring a positive change in the socioeconomic life of the extreme poor and ultra-poor. Microcredit may be a proper instrument to protect the vulnerable to poor from falling into the poor or the ultra-poor category (Table 3.11).

This last section shows the impact of the microcredit programs on the distribution pattern in the operational areas. As discussed in the earlier sections, microcredit does not suit to the poor and ultra-poor because they are not credit worthy. Findings of this study affirm this statement. The lower quartile (which comprises the ultra-poor and extreme poor) represents no improvement in the distribution pattern. The second quartile (which comprises the vulnerable to poor group) has shown dramatic improvement in the distribution pattern. The earning of the vulnerable to poor group improved by 16.67 % during the study period. The third quartile and the upper quartile (which consist of the non-poor community) represent a 7.78 % improvement in the distribution pattern as compared to the previous years. The overall improvement in the distribution pattern of the household income during the study period was observed as 7.78 %.

3.5 Conclusion and Policy Implications

The study reveals the following important results:

1. Demographic characteristics such as age, education, and family size, and non-demographic characteristics such as experience and utilization of credit for a long time period are the significant determinants of household income in the working areas of the MFIs.
2. The MFIs do not focus on the extreme poor and marginalized segments in its operational areas across Pakistan because less than 25 % of the total credit are allocated for the poor, ultra-poor, and extreme poor, while the remaining amount (more than 75 %) are disbursed among the vulnerable to poor, quasi-poor, and non-poor.

3. The socioeconomic impact of the microcredit program of the MFIs across the different clients is not the same. We did not notice any positive change in the lower quartile of household income (which comprises the extreme poor, ultra-poor, and the poor), while the household income of the middle and upper quartile increased by 16.67 and 6.6 %, respectively.
4. Interestingly, the MFIs overall economic impact is noticed as 7.78 % during the study period. This is a very impressive figure which represents that the distribution pattern in the operational areas has improved by the same magnitude. However, unfortunately, this improvement excludes the poor, ultra-poor, and extreme poor.

3.6 Policy Implications

Taking into consideration the findings of the study, we suggest the following policy implications:

1. The overall economic impact of microcredit of the MFIs on their clients in the operational areas is positive, representing the probability of success of this facility for non-operational rural areas and urban slums.
2. We have noted in the earlier section that MFIs in Pakistan do not pay proper attention to the lower quartile poor in its operational areas. Perhaps microcredit is not fit for this segment (as we did not notice any positive income change). This experience shows that financing the extreme and ultra-poor through microcredit is not beneficial in uplifting the socioeconomic life of these people. Wage employment along with social safety nets may be the more suitable options for such classes of poor (Please see Appendix 2 for suggested measures against each category of poor).
3. The experience of Pakistani MFIs shows that an appropriate class of the poor for microcredit may be the vulnerable to poor group. This class has the potential to utilize the credit and can improve its income-consumption pattern significantly than other categories of the poor.
4. Microcredit is not equally beneficial for all poor classes. Microcredit as a magic bullet against poverty may not work effectively across all classes of the poor. The disbursement of credit to the lower quartile income poor may not yield fruitful income change.
5. Demographic characteristics such as age, and non-demographic characteristics of the clients such as experience and utilization of credit for a long time period are the significant determinants of household income in the working areas of Pakistani MFIs. This finding has an important policy implication. By targeting mature and experienced clients, utilization of credit for a longer duration can enhance the chance of optimal utilization of credit for productive purposes.

Appendix 1

Descriptive statistics of demographic characteristics and other economic information

	AGE	EDU	HHS	MXAL	MXBL	OSIAL	OSIBL
Mean	39.5	4.1	5.8	9,806.5	8,426.2	83.4	92.6
Median	40.0	4.0	5.0	10,000.0	8,000.0	0.0	0.0
Max	70.0	98.0	16.0	80,000.0	90,000.0	8,000.0	10,000.0
Min	18.0	1.0	1.0	98.0	98.0	0.0	0.0
S.D	9.3	9.0	2.0	4,407.3	4,506.5	524.3	586.3
Skw	0.1	9.7	1.2	3.1	7.1	8.8	8.8
Kurt	2.7	101.2	5.6	35.3	114.1	98.3	100.7
Count	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0

	OSIHBL	OSIHAL	THIAL	THIBL	TMIAL	TMIBL
Mean	660.7	595.1	12,818.2	11,008.2	6,336.0	5,283.1
Median	0.0	0.0	12,000.0	10,000.0	6,000.0	5,000.0
Max	30,000.0	30,000.0	90,000.0	60,000.0	90,000.0	48,000.0
Min	0.0	0.0	1,300.0	1,900.0	0.0	0.0
S.D	2,383.9	2,053.6	6,256.1	5,591.3	5,430.2	4,600.9
Skw	6.2	5.4	2.3	2.2	3.2	2.2
Kurt	56.5	44.3	17.3	12.9	34.1	15.5
Count	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0	2,070.0

List of abbreviations used for various variables

Abbreviation	Description
Age	Age of the respondent
Edu	Education of the respondent
HHS	Household's size
MXBL	Monthly expenditure of household before loan
MXAL	Monthly expenditure of household after loan
TMIAL	Total individual income before loan
TMIBL	Total individual income after loan
THIBL	Total household income before loan
THIAL	Total household income after loan
OSIBL	Other source of income of individual before loan
OSIAL	Other source of income of individual after loan
OSIHBL	Other sources of income of household before loan
OSIHAL	Other source of income of household after loan
D05	Year one (2005) D05
D06	Year two (2006) D06
D07	Year three (2007) D07

Abbreviation	Description
Livestock	Personal monthly income? (Livestock)
Enterprise	Personal monthly income? (Enterprise)
Service	Personal monthly income? (Service)
Daily wage	Personal monthly income? (Daily wage)
Others	Personal monthly income? (Others)
Agriculture	Personal monthly income in the previous year? (Agriculture)
Livestock	Personal monthly income in the previous year? (Livestock)
Enterprise	Personal monthly income in the previous year? (Enterprise)
Service	Personal monthly income in the previous year? (Service)
Daily wage	Personal monthly income in the previous year? (Daily wage)
Others	Personal monthly income in the previous year? (Others)

Regression result of determinants of household income

Output of Ramsey RESET test

Ramsey RESET test

F-statistic	0.033033	Probability	0.855798
Log likelihood ratio	0.033160	Probability	0.855504

Dependent variable: HHIAL

White heteroskedasticity-consistent standard errors and covariance

Variable	Coefficient	Std. error	*t*-statistic	Prob.
C	4,082.776	776.9938	5.254580	0.0000
Age	64.43702	14.73756	4.372298	0.0000
Education	353.2423	68.55224	5.152892	0.0000
(Education)^2	−3.723324	0.677554	−5.495244	0.0000
Household_Size	610.2858	76.15387	8.013851	0.0000
D_06	951.6051	274.8672	3.462053	0.0005
D_07	1,245.315	374.3596	3.326521	0.0009
R-squared	0.075965	Mean dependent var		12,728.94
Adjusted R-squared	0.073276	S.D. dependent var		6,189.882
S.E. of regression	5,958.783	Akaike info criterion		20.22650
Sum squared resid	7.32E+10	Schwarz criterion		20.24556
Log likelihood	−20,917.31	*F*-statistic		28.25285
Durbin–Watson stat	1.200818	Prob (*F*-statistic)		0.000000

Included observations: 2069

White heteroskedasticity-consistent standard errors and covariance

Variable	Coefficient	Std. error	*t*-statistic	Prob.
C	3,779.080	1,750.722	2.158584	0.0310
Age	72.78585	50.16933	1.450804	0.1470
Education	399.4733	269.9845	1.479616	0.1391
(Education)^2	−4.208619	2.826686	−1.488888	0.1367
Household_Size	694.0680	476.6797	1.456047	0.1455

Variable	Coefficient	Std. error	*t*-statistic	Prob.
D_06	1,075.822	766.5836	1.403398	0.1606
D_07	1,397.099	914.3611	1.527951	0.1267
Fitted^2	−5.08E−06	2.96E−05	−0.171943	0.8635
R-squared	0.075980	Mean dependent var		12,728.94
Adjusted R-squared	0.072841	S.D. dependent var		6,189.882
S.E. of regression	5,960.180	Akaike info criterion		20.22745
Sum squared resid	7.32E+10	Schwarz criterion		20.24924
Log likelihood	−20,917.30	*F*-statistic		24.21009
Durbin–Watson stat	1.200905	Prob (*F*-statistic)		0.000000

Wald test of linear restrictions

Wald test			
Equation: untitled			
Null hypothesis	D(6) = 0		
	D(7) = 0		
F-statistic	40.22184	Probability	0.000000
Chi-square	80.44368	Probability	0.000000

Wald test			
Equation: untitled			
Null hypothesis	EDU (2) = 0		
	EDU^2 (3) = 0		
F-statistic	19.97667	Probability	0.000000
Chi-square	39.95335	Probability	0.000000

Appendix 2

Categories of poor and poverty

Measurement of poverty on the basis of national poverty line	Suggested measures
(i) Extremely poor, <50 % of the prescribed amount (PA)	(a) Donation
	(b) The provision of basic needs, i.e., food, shelter, education
	(c) Subsidy, especially on food items and utility services
(ii) Ultra-poor >50 % but <75 % of the PA	(a) Donations
	(b) Wage employment
	(c) To provide basic needs, i.e., food, shelter, education
	(d) Cash for work
	(e) Various short-term trainings
	(f) Subsidy, especially on food items and utility services

Categories of poor and poverty	
Measurement of poverty on the basis of national poverty line	Suggested measures
(iii) Poor >75 % but <100 % of the PA	(a) Donations
	(b) Self-employment
	(c) The provision of basic needs, i.e., food, shelter, education
	(d) Cash for work
	(e) Various short-term trainings
	(f) Subsidy, especially on food items and utility services
	(g) Microfinance
(iv) Non-poor >100 % of the PA	(a) Various trainings for improvement in productivity
	(b) Self-employment
	(c) Microfinance

Source Authors' own point of view

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Part II
Climate Change, Disaster Management and Poverty Reduction

Chapter 4
Climate Change, Agricultural Production, and Poverty in India

Saibal Kar and Nimai Das

Abstract The low-income households in the South Asian countries are highly sensitive to climate-intensive sectors like agriculture, mainly due to the negative impact of climate change on the food production system as a whole. Climate-induced supply shortfalls in agriculture, and consequent food price shocks may adversely affect consumption in these households. The tension between economic development, climate change, and agricultural production offers a challenging research question not dealt with in recent studies for India. We explore the effect of climate change on farmland value and use a counterfactual measure of the farm revenue on rural consumption expenditure. We found a discerning impact of the climate change on the net revenue and well-being of the rural people. A theoretical exercise generalizes the empirical findings.

Keywords India · Poverty · Agriculture · Food production · Climate change

JEL Classification C23 · C68 · Q11 · Q21

4.1 Introduction

The Intergovernmental Panel on Climate Change (IPCC) observed that the Earth's current climatic system, when compared with how it was in the pre-industrial era, has visibly changed at both global and local levels. The changing climate of the

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_4

Earth's surface systems is now an integral issue in almost all international policy forums. Since climate change is a significant concern for the global environmental order, a large number of studies have been undertaken over the last three decades in order to explore its social and economic impacts. Not surprisingly, global warming affects different regions and sectors differently based on their sensitivity and adaptive capacity, and different groups of people are exposed to different degrees of vulnerability caused by the same degree of climate change (Forsyth 2000). The vulnerability of natural and human systems, especially in weaker economies, and their adaptations to climate change has attained critical dimensions. Nevertheless, the effects are expected to hit developing countries the hardest owing to their relatively high dependence on climate-sensitive natural resources in the base sectors like agriculture. This chapter is an attempt to measure the effects of rising temperatures and irregular rainfall on the crop production patterns in India between 1997 and 2008. The empirical findings are supported by a theoretical exercise where we model the welfare impact with the use of a general equilibrium framework.

It is well known that climate change has several adverse effects on natural ecosystems and humankind, manifested through declining rainfall and rising temperatures. Besides, severity of extreme climates (drought/flood) that threaten food production and livelihood in a country has emerged as a major fallout of climate changes (IPCC 2012). Crop production in developing and transition countries still relies heavily on the carrying capacity of the surrounding ecosystems for adequacy of water, soil quality, climate regulations, and other attributes associated with a cleaner atmosphere. Despite technological advances in crop production and irrigation systems, local weather and general climate continue to play decisive roles. In fact, the climatic variations affect the supply side (crop production) directly by changes in the agro-ecological conditions. The demand side, on the other hand, is affected via growth and distribution of incomes (Schmidhuber and Tubiello 2007), which too are related to human adaptations of climate change. The response to climate-induced market contraction, therefore, seems to impart serious socioeconomic consequences, particularly for those in agriculture. Recently, Tirado et al. (2010) offer a vivid analysis of a countrywide impact of climate change on food production and nutrition of people, identifying two major challenges threatening current as well as future food production. These are (i) climate change and the consequent loss of ecosystems and (ii) the growing use of biofuel-based crops that adversely affect land and soil fertility.

The implications are obviously quite pervasive. At present, more than 800 million people living in tropical and subtropical countries are food insecure (Narain et al. 2009). The situation is likely to worsen—the number of food-insecure people is likely to increase as changes in extreme weather events and mean climate parameters negatively affect crop, animal yields, and agro-ecosystem resilience. The situation has deteriorated for the world food system, which has responded negatively to climate-induced supply shortfalls in the agricultural sector. Higher commodity prices appear to be direct consequences of these changes, manifested through increasing input prices. These directly contentious elements not only make the present study quite interesting, but also a vexing exercise empirically.

Note that, agricultural inputs and natural resources are critical determinants of food supply. Degradation of natural resources (like soil, forest, and water) hampers supply of inputs. Lower availability of and access to water, fertilizers, pesticides, energy, etc., in turn, affects agricultural productivity and food production. Most variables in our structure are, therefore, 'endogenous.' Nevertheless, in most developing countries, there is a rising inclination toward use of chemical fertilizers and pesticides for enhancing crop productivity. However, this results in depletion of soil nutrients. Fortunately, this trade-off is directly measurable. In the medium to long run, the food supply is certainly going to fall and create pressure on prices and, hence, on food security for millions of poor people in developing countries.

Further, note that the world food production slowed down in the decades of the 1980s and 1990s. Growth rates of rice and wheat have begun to stagnate in Asia. In India, the growth rate of food grains including rice was lower than the population growth rate during the 1990s (see Fig. 4.1). Although the growth rate of wheat was moderately high as compared to the population growth during the same time, wheat grew at a rate below 3 % in the 1990s against its best performance of above 9 % in the 1960s. This mismatch between growth of food crop production and population has been quite alarming since the 1990s. Further, several studies predicted that despite a substantial increase in national food grain production in India, the productivity of some important crops (like rice and wheat) could decline considerably with climatic changes. Due to a 2–3.5 °C rise in temperature,

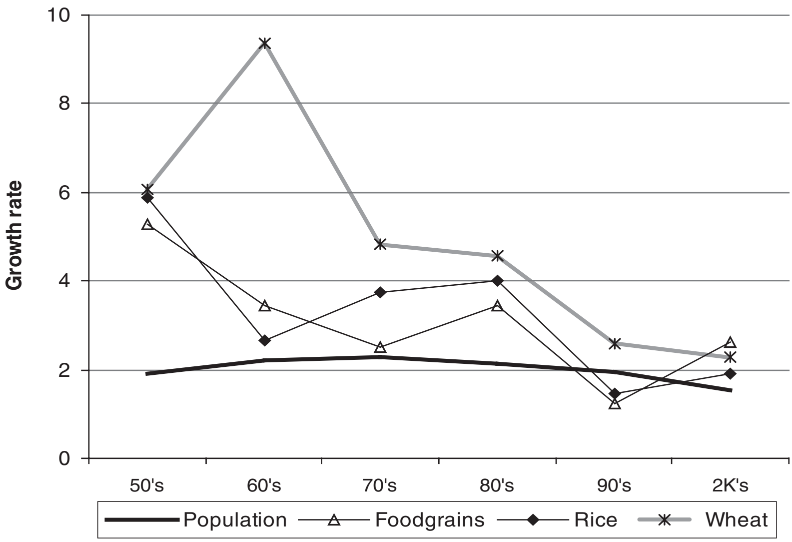

Fig. 4.1 Growth rates of population, all food grains, rice, and wheat in India. *Note* Decadal growth rates estimated from the Reserve Bank of India database between 1950–1951 and 2010–2011

accompanied by a 7–25 % change in precipitation, farmers may lose net revenues between 9 and 25 %, which must adversely affect GDP by 1.8–3.4 % (Kumar and Parikh 2001; Sanghi and Mendelsohn 2008). Notwithstanding evidence suggesting that higher precipitation is expected to increase net revenue from agriculture, the overall negative impact due to temperature increase more than compensates for the small positive impact due to higher precipitation (the former effect is seen to dominate the latter for India).

The World Bank comments that cooler regions around the Himalayas will be net gainers of climate variability, whereas the dryer regions of Rajasthan (western India) will be adversely affected. Disproportionate effects of climate change have been noticed at local levels giving legitimacy to several microcase studies that together can offer an understanding of the bigger picture. The small and marginal farmers are likely to be victims of such climatic stresses because affluent farmers may benefit due to their high adaptive capacity (access to credit, larger market share, crop insurance, etc., facilitate adaptation, Brine et al. 2004). Consequently, the costs of climate change are not borne uniformly by agricultural groups, which are heterogeneous in terms of assets, human capital, and access to credit. The demand-side effects on prices will also be uneven across income groups.

4.2 Methodology and Dataset

The recognition of climate change as an important economic phenomenon has been accommodated by both partial equilibrium and general equilibrium approaches using the well-known general circulation model for a forecast of the climate change associated with emission of greenhouse gases. However, in contrast to aggregative (structural) general equilibrium models, the partial equilibrium models are capable of producing quantitative analysis using specific factors of importance at the local or regional levels (Palatnik and Roson 2009). The contemporary empirical literature on estimating climate change-induced impacts on farming systems is rooted in three predominant approaches: crop simulation models, agronomic statistical models, and hedonic price models (Jacoby et al. 2011; Hertel and Rosch 2010; Zhai et al. 2009; Schlenker and Roberts 2009).[1]

An alternative to the crop simulation approach is to estimate statistical relationships between crop yields, on the one hand, and climatic parameters, especially temperature and precipitation, on the other, using relatively less calibrated data. This is readily implemented for large geographic areas (Hertel and Rosch 2010; Lobell and Burke 2010). Finally, the so-called *hedonic approach* for analyzing the impact of climate change on farming systems (Jacoby et al. 2011) is known as the Ricardian Model that predicts choice of the highest yield on any given set of

[1] See also Lobell and Burke (2010). Inferences made by the structural approach are rooted in laboratory experiments and, hence, generate biased results for the larger area studies with diverse agricultural production systems (Nhemachena et al. 2010).

land. The approach focuses on the impact of climate on land values, not yields. This technique draws heavily on the underlying observation by Ricardo (1817) that under competition, rental value of land reflects net productivity/profit from the land. The main advantage of this approach is that it automatically takes the farm-level adaptations into consideration, while assessing the direct effect of climate on crop performance.

This is what we also adopt in this paper (also see Mendelsohn et al. 1994; Nhemachena et al. 2010; Kurukulasuriya and Mendelsohn 2008; Kumar and Parikh 2001). By looking at the cross section of farms, the Mendelsohn version of the Ricardian technique examines farmers' behavior to mitigate the problems associated with suboptimal climatic conditions. The comparison across space tenders efficient adaptation responses to avoid overestimation of the damages associated with any deviation from the optimum (Sanghi and Mendelsohn 2008, p. 656). Fundamentally, the Ricardian function is a locus of the maximum net revenue choices for different crops, which have their own net revenue functions with respect to climate (Seo and Mendelsohn 2007, p. 6).

Let us briefly explain how the Ricardian approach captures farm-level adaptation for changing scenarios of climate. In Fig. 4.2, the revenue functions for different crops C_1, C_2, etc., are plotted against the exogenous weather conditions. The response of a crop, say C_2, with respect to the weather conditions W_1, W_2, etc., should be concave to the weather axis, which means that a given climate (suppose W_2) is required to attain the best possible level (the peak). For each crop, there is a known weather condition at which that crop grows optimally during a crop season. Therefore, different crops attain their optimum level at different climatic conditions. This means a rational farmer may switch to C_3 from C_2 when the climate condition changes from W_2 to W_3. In view of this, a representative farmer may respond along the loci of optimum levels for the crops against climate change scenarios. Nevertheless, the movement along this envelope curve for the

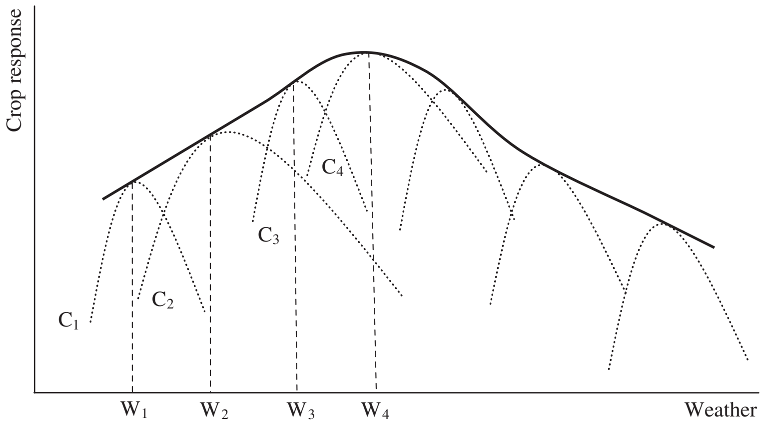

Fig. 4.2 Crops response against changing climatic conditions

farmers against changing climate is costly and involves economic decisions such as the choice between alternative input requirements demanding solution of a constrained optimization problem. Overall, the relevant decision variables should be the returns from farmland, which usually is the net revenue from cultivation. Based on the structure, the model is specified as:

$$\begin{aligned} R = \alpha &+ \beta_{1j}\mathrm{NT}_j + \beta_{2j}\mathrm{NT}_j^2 + \beta_{3j}\mathrm{NT}_j^3 + \beta_{4j}\mathrm{NR}_j + \beta_{5j}\mathrm{NR}_j^2 + \beta_{6j}\mathrm{NR}_j^3 \\ &+ \beta_{7j}\mathrm{NT}_j\mathrm{NR}_j + \lambda_1\mathrm{IRR} + \lambda_2\mathrm{HYV} + \lambda_3\mathrm{IRRxHYV} + \lambda_4\mathrm{HDI} \\ &+ \gamma_m\mathrm{SD}_m + \theta_n\mathrm{YD}_n + u, \end{aligned} \tag{4.1}$$

where NT = normal temperature (j = January, April, July, and October; or kharif, rabi, and zaid), NR = normal rainfall, IRR = irrigation intensity, HYV = intensity of high-yielding seeds, IRRxHYV = interaction between high-yielding variety (HYV) and irrigated areas to reorganize their collective effect for green revolution, HDI = value of human development index, SD = soil type dummy (m = 1–6 for 7 soil types), YD = year dummy (n = 1997–2008 for 13 years), and u = error term.

First, we consider eight climate variables—daily temperature (°C) and monthly precipitation (mm) for the months of January, April, July, and October, which strongly correspond to the cropping seasons in India. For example, January represents the growing season for winter crops. Similarly, April is the growing season for summer crops. The month of July, the monsoon season, is the growing season for *kharif* crops. October is the harvesting season for monsoon crops as well as sowing season for winter crops. However, inclusion of every month of the year in the analysis may lead to insignificant results, since the climates of many months are closely related to the preceding or following months. Thus, an effort has been made to capture any intra-season climatic vacillation in the second model by considering the average value of climate variables such as the daily temperature and monthly rainfall for each individual cropping season in India. Notably, as per the national meteorological department, the country is largely subject to four seasons: winter (January and February), summer (March–May), monsoon (June–September), and post-monsoon (October to December). The crops are broadly divided into three categories, namely *kharif, rabi,* and *zaid* crops. The season for kharif or monsoon crops starts from June and ends in September. The rabi or winter season is during October to February, and the zaid or summer crop season is between March and May.

For the second model, we consider six climate variables—temperature and precipitation for the kharif, rabi, and zaid seasons. Since our analysis is at the state level, statewide assessment of climate variables, spread over particular places in the countryside, involves a methodological intricacy to determine the *climate surface* for a state. In the literature, the climate surface of a region is estimated for a climatic variable using all the places which have recorded the values of that variable within a 600-mile radius. Nevertheless, the weather stations closer to a given geographical center representing state surface climate would usually have more weight in the state surface climate. Therefore, the weighted regression should be run using the weight as the inverse of square root of a station's distance to the

Table 4.1 Regression results for temperature in Madhya Pradesh

	Winter	Summer	Monsoon	Fall
Constant	59.73*	122.05*	52.71*	47.35*
Latitude	−3.14*	−2.35*	−1.24*	−2.262*
Longitude	6.88E−4	5.34E−4*	4.37E−4*	−1.102
Altitude	−2.05E−3*	−3.46E−4*	−3.21E−3	1.35E-4
Shoreline	8.56E−2	5.91E−4	6.12E−3	8.56E-2*
Latitude squared	−4.23E−2	−4.35E−2	−1.73E-3	2.36−2
Longitude squared	−6.66E−3	5.34E−3	−2.76E−4	−1.26−2*
Altitude squared	4.40E−7*	1.91E−6	3.25E−5	−4.84E−7*
Shoreline squared	−1.79E−5	−2.33E−5*	−4.23E−5	−1.69E−5*
Latitude × longitude	5.16E−2	3.25E−3	−2.85E−2	3.24E−2
Latitude × altitude	2.36E−4	1.55E−4*	5.24E−3	−1.36E−3
Latitude × shoreline	−1.02E−4	−2.13E−4	−2.42E−4	−2.15E−4
Longitude × altitude	−1.04E−4	3.64E−4	−1.14E−4*	−1.44E−4
Longitude × shoreline	−9.29E−4	−4.07E−4	−5.57E−3*	−6.09E−4*
Altitude × shoreline	−4.06E−7	−7.32E−6	−3.28E−6	−7.14E−6
R-squared	0.53	0.52	0.65	0.61
Observations	79	79	79	79

*Statistically significant at the 5 % significance level

state geographical center. In practice, a climate variable like temperature (suppose *T*, which is essentially an average of maximum and minimum temperatures) for 30 years (we consider 1961–1990) is nonlinearly regressed on latitude, longitude, altitude, and shoreline distance including its corresponding square and intersection terms. The predicted normal temperature ($\hat{\bar{T}}$) is used to estimate the Ricardian model. Therefore, a total of 152 (2 × 4 × 19) *separate regressions*, each for average temperature or total rainfall, are conducted for the respective four seasons of the nineteen states. The sample regression results for the state of Madhya Pradesh (the central province, as an example) are depicted in Table 4.1 for the temperature variables using 30-year averages for temperature for the period 1961–1990 for 111 weather stations in India.

4.2.1 Estimation of the Ricardian Model

To estimate the model 4.1, we used pooled cross-sectional and time series data at the state level, for India, over the last two decades. The states are considered as units of analysis, and substantial variations in climatic, geographic, and economic factors exist among states. In India, many nodal agencies are involved in the collection and compilation of data on various aspects like agriculture, poverty, and climate. For the agricultural sector, we use data from the Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, covering agricultural area, production, yields, cost of cultivation, etc., by crops and by states. Historical data on two usual indicators of climate change, namely temperature and precipitation, are available from the Indian Meteorological Department. The Planning Commission of India and the Reserve Bank of India provide databases for the socioeconomic variables.[2]

The use of official data for the Ricardian model involves some special treatments, which are described below. The dataset covers nineteen major states producing 90 % of agricultural output. These include Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttaranchal, and West Bengal over 13 years between 1996–1997 and 2008–2009. These states spread across the diversified agro-climatic zones such as north and northeastern Himalayan to the Gangetic plains of east and the plateau and hills of central, southern, and western India. During the period under consideration, some states were divided; we have not included the newly formed states of Chhattisgarh, Jharkhand, and Uttaranchal due to little information available for these states. Estimation of net revenue is given by

$$\mathrm{NR} = \left\{ \sum_{i=1}^{n} [(\mathrm{GV}_i - \mathrm{CA1}_i) \times \mathrm{GA}_i] \right\} \Big/ \sum_{i=1}^{n} \mathrm{GA}_i, \tag{4.2}$$

where i indicates a crop which takes values 1 to as much as 24 crops including five major crops (paddy, wheat, jowar, bazra, and maize) as well as nineteen minor crops (ragi, arhar, gram, groundnut, sunflower, sugarcane, cotton, onion, jute, lentil, potato, urad, sesamum, coconut, peas, soya bean, niger seed, barley, rapeseed, and mustard). GV is gross value per hectare of farmland for crop i. $\mathrm{CA1}_i$ is per hectare A1 type cost which essentially covers all the explicitly purchased farm inputs for crop i. GA is gross cropped area for crop i. Notably, the above derivation of net revenue is designed for a representative state during a particular year. It may easily be replicated for the rest of the states for all individual years.

The estimation of net revenue is based on the Cost of Cultivation of Principal Crops in India published by the Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India. This dataset by type of crops across the states covers a wide range of disaggregated information including values and costs specified in the above equation. Nominal net revenues are expressed in 1999–2000 INR (Indian Rupee, currently at US\$1 = 60 INR) using the agricultural GDP deflator estimated from the Reserve Bank of India database. Figure 4.3 offers the average net revenue (real) over the period across states of India.

The increasing coverage of weather stations for the specified radius may, in fact, improve upon the optimality of the regression results. Unlike the main explanatory variables, namely temperature and precipitation, the geographic and

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[2] We have gathered consumption and price data from the Central Statistics Office and the National Sample Survey Office of India.

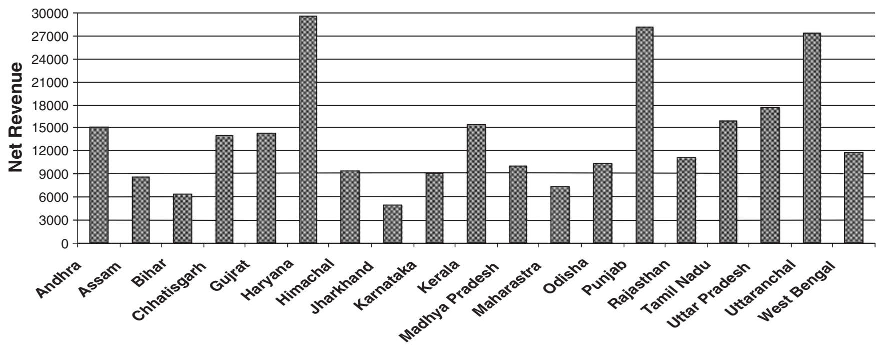

Fig. 4.3 State-level average net revenue per hectare during 1996–1997 to 2008–2009 (in INR)

socioeconomic control variables in our Ricardian model may be assessed directly from the official data sources. Before discussing the assessment of these control variables, let us explain the relevance of the model. The inputs, namely irrigation and HYV seeds, are the most important variables for modern agricultural practices following the Green Revolution in India. The irrigation intensity is measured by the share of irrigated area to cropped area. Similarly, the HYV intensity is defined as the area using HYV to the cropped area. The interaction term of HYV and irrigated areas is consequently important. Soil fertility is another crucial factor for cultivation. As per the soil map of India,[3] there are six major soil types: forest and mountains, alluvial, red and yellow, black, laterite, and arid. Most of the states, however, encompass a mixture of soils with one or two predominant types. Using a soil fertility standard for mixed varieties (alluvial soil represents more fertility vis-à-vis arid soil), the soil dummies are constructed for the states. Finally, Human Development Index (HDI) and Below Poverty Line (BPL) are included (in alternate regressions) in order to estimate the adaptive capability of the farmers in response to climate changes. While the composite variable HDI controls for health, education, and financial status, the poverty level of the rural population (BPL) serves as an indicator of regional disparity.

We use a simulation technique to produce state-level annual net revenues, to be aggregated for the country in the following way:

$$\Delta \mathrm{NR} = \sum_{\mathrm{n}=1}^{19} [\mathrm{NR}(W_n + \Delta W_n) - \mathrm{NR}(W_n)], \tag{4.3}$$

where Δ represents change for a variable, say net revenue denoted by NR for any of the four representative seasonal months, W is climactic variable, and n stands for state. The equation, therefore, gives us the amount of net revenue change for a particular year in India.

[3] The map is available online at url: www.mapsofindia.com.

4.2.2 Estimation of Climate Change Impact on Poverty

The impact of climate change on poverty and, subsequently, the well-being of the rural population may be judged by a two-step approach: climate change-induced returns from agricultural land and then a counterfactual measure of these farmland values on consumption expenditure under alternative climate change scenarios. We start from a basic income–consumption relation for a representative rural household. Consumption expenditure at the household level mainly depends on consumption of food and non-food items, when sources of income include both farm and non-farm activities: $C = A_L R(W) + wL_o$, where consumption (C) is determined by two components of income—climate(W)-induced farm revenue (R) from the amount of farmland (A_L) and earning from the fraction of labor (L_o) service in the off-farm sector with wage rate w. Based on this model, we conduct the following regression exercise using a control variable, namely the household size (HHS):

$$\mathrm{CEP} = \alpha + \beta_1 \mathrm{FLR} + \beta_2 \mathrm{OFE} + \lambda \mathrm{HHS} + u, \tag{4.4}$$

where CEP is consumption expenditure, FLR is farmland revenue, and OFE is off-farm earning, deflated by the agricultural GDP deflator (1999–2000 base) and transformed into natural logarithm values. Household size controls for variation in the number of inhabitants.

Note that the state-level climate-induced net revenue per hectare of farmland, estimated in the previous section, needs further refinement, wherein we convert per hectare farm revenue to per month per person basis at the state level. To this end, we used gross area under cultivation and persons involved in agriculture, as (i) self-employed in agriculture, (ii) self-employed in non-agriculture, (iii) agricultural labor, (iv) non-agricultural labor, and (v) others (such as salaried). In normal circumstances, a rural household is expected to derive a larger part of its income from agriculture, supported by other sources. The non-agricultural laborers are casual off-farm wage earners, and it is easily verifiable that the wages are broadly similar as per the National Sample Survey of India (NSS) reports. Thus, the statewide average monthly income of a person from off-farm occupations is estimated from the weighted daily earnings from regular wage/salary source and casual off-farm labor's earning over a particular month. Nevertheless, owing to the unavailability of data for each year, some interpolation mechanisms have been used for normalizing the NSS dataset for each year.

4.3 Empirical Results and Discussions

The estimate of the impact of climate variables on agriculture using the Ricardian model is depicted in Table 4.2. This regression model is essentially a restructured functional relationship between net revenue from agriculture and climate variables across space and over time for India, while controlling for various geographic and economic variables.

Table 4.2 Ricardian regression results for net revenue in India

Variable	Coefficient	Coefficient	t-Statistic
Constant	198.15	200.03	18.68
January temperature	−172.83	−172.84	−3.11
April temperature	−360.23	−360.23	−5.98
July temperature	−205.57	−205.57	−4.56
October temperature	157.77	157.77	16.01
January precipitation	11.50	11.50	3.01
April precipitation	−5.67	−5.67	−6.53
July precipitation	−0.61	−0.61	−8.94
October precipitation	8.67	8.67	6.05
January temperature square	−59.88		−17.11
April temperature square	110.51		3.44
July temperature square	−88.01		−2.93
October temperature square	−63.51		−8.84
January precipitation square	−2.32		−7.09
April precipitation square	2.35		2.71
July precipitation square	0.60		5.48
October precipitation square	1.16		2.23
January temperature cube	−8.75		−1.22
April temperature cube	2.09		4.14
July temperature cube	−7.95		−12.33
October temperature cube	−14.92		−2.71
January precipitation cube	−0.37		−1.17
April precipitation cube	0.05		1.79
July precipitation cube	0.01		0.52
October precipitation cube	0.02		3.39
January temperature × precipitation	−9.67		−5.18
April temperature × precipitation	3.64		2.62
July temperature × precipitation	−1.06		−1.43
October temperature × precipitation	−0.75		−0.82
Irrigation	33.99	33.99	5.52
HYV	28.18	28.18	11.62
HDI	–	4.21	3.21
BPL	−1.47		−3.11
Soil dummy 1	7.04	7.04	8.18
Soil dummy 2	8.13	8.13	6.47
Soil dummy 3	3.56	3.56	2.57
Soil dummy 4	1.17		1.01
Soil dummy 5	6.59		5.76
Soil dummy 6	−3.65		−2.33
Soil dummy 7	−6.07		−0.63

(continued)

Table 4.2 (continued)

Variable	Coefficient	Coefficient	t-Statistic
Year dummy 1997	76.58		3.05
Year dummy 1998	37.15		2.12
Year dummy 1999	−73.24	−73.24	−0.95
Year dummy 2000	−30.53	−30.53	−1.09
Year dummy 2001	−26.75	−26.75	−9.09
Year dummy 2002	34.13	34.13	7.40
Year dummy 2003	57.44	57.44	7.05
Year dummy 2004	−45.61	−45.61	−0.66
Year dummy 2005	29.38		−0.53
Year dummy 2006	4.88		0.07
Year dummy 2007	52.11		2.33
Year dummy 2008	70.01		0.79
Constant	33.99		5.52
R-squared	0.87	0.76	
Sample period	1997:2008		
Total panel (unbalanced) observations	229		
Dependent variable	Net revenue		

Not unexpectedly, the control variables offer appropriate directions. The net revenue is responsive to different types of soil as per their fertility levels. The dummy variables for all the years are significantly positive. The time dummies suggest fluctuations in annual values because of unweighted climate and economic effects. This might even suggest ‘no trend’ in the coefficients of year dummies.

The irrigation intensity has a positive impact on net revenue since more irrigation facilities are indeed associated with enhanced productivity and, therefore, revenue. The coefficient for HYV areas is positive, reflecting the desirable positive effect of net revenues in the course of higher productivity that followed the Green Revolution in India. Likewise, the coefficient of the composite index of human development is positive in the second regression, while the BPL effect is negative. That more poor regions will generate less net revenues in agriculture is straightforward, and the impact of climatic variations on consumption would, therefore, also be highly sensitive to that.

The regression results clearly indicate that most of the climatic factors are statistically significant. This embodies a discerning impact of the climate variables on net revenue. In addition, the importance of quadratic and interaction terms of climate reveals underlying nonlinear effects. Looking at the marginal climate effects by seasons, January, April, and July temperatures have negative influence, while the October temperature effect is positive. According to the Indian crop calendar, the summer crops for the Kharif season are usually sown in April, grown in July, and harvested in October. Likewise, October is the sowing month, January is growing, and April is harvesting for the winter crops (Rabi). The positive effect appearing for October alone implies that a rising temperature during the harvesting period of summer crops could possibly be favorable for the ripening process. On the other hand, rising temperature in other seasons might lead to heat stress on crop cultivation systems. For instance, incremental warmth for harvesting Rabi crops in April could cause strain on ripening of heat-sensitive winter crops like wheat. Furthermore, the October precipitation (harvesting period for summer crops) turns out to be of strictly positive influence. However, an additional bit of precipitation in pre-monsoon and monsoon seasons adversely affects crop production. But the comparative detrimental effect of supplementary monsoon rainfall is especially marginal as it usually harmonizes with the monsoon. Note that the adverse effect of higher rainfall for Kharif crops (during April) may, however, cause harm to the growth of seeds in the sowing season.

4.3.1 Effect of Climate Change on Agriculture

For the sensitivity analysis, we now turn to the simulation of climate change impact on net revenue for the 2 °C increase in mean temperature and 7 % rise in mean rainfall. The resulting impacts by seasons are depicted in Table 4.3. As seen from the regression results, there is a considerable variation for both temperature and rainfall effects on the net revenue change. A 2 °C increase in temperature for any seasonal month when nothing else changes shows that the net revenue would decline by INR1594 (USD $1 = INR 45, the average exchange rate during this period) for January, INR566 for April, and INR204 for July, respectively. Conversely, these undergo increases in the month of October by approximately INR728.

In conformity with our regression results, a 7 % rise in the precipitation is good for the growing period of Rabi crops and harvesting period of Kharif crops. These are associated with respective increases in the revenue by INR106 for January and INR90 for October. However, simulation of monsoon precipitation in July has almost no effect on the farm revenue. A moderately adverse effect on the revenue by approximately INR95 is observed for rising precipitation in April (during pre-monsoon season associated with the Kharif crops). Note that these simulation results for India are obtained from the average value over 13 years by aggregating statewide values. For regional patterns of agricultural response to climate change across major agricultural producing states, see Fig. 4.4 for January temperature simulation. Notably, it is just a representative of the seasonal months; the same simulating figure can be done for other seasonal months too.

Table 4.3 Simulation of temperature and precipitation effects on net revenue (in INR)

	Winter	Summer	Monsoon	October
Temperature effects (+2 °C increase)	−1,594.17	−565.64	−204.37	+728.09
Precipitation effects (+7 % increase)	+105.67	−95.37	−8.55	+90.34

Average net revenue (per hectare in real terms) is INR 12,263.56

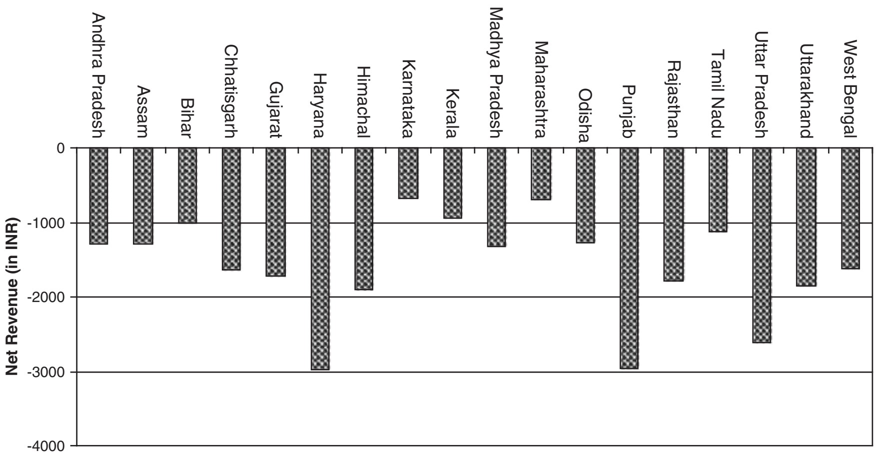

Fig. 4.4 Statewide January temperature effects (change in net revenue for +2 °C) in India

4.3.2 Effect of Climate Change on Poverty and Well-Being

The climate-induced welfare effects on the rural people who, by and large, rely on agriculture are measured by the estimated income–consumption relation depicted in Table 4.4. It is well known that the regression results are expected to show a positive and significant association between both farm and off-farm incomes and the consumption expenditures. It is also clear from the table that the comparative effect of farm earning is more than the off-farm earning as determinants of the consumption of rural agro-based commodities. Hence, poverty analysis based on climate sensitiveness in rural India may be derived from the changes in consumption level subject to climatic variations in net revenue from agriculture.

Table 4.4 Regression results for income consumption relationship in rural India

Variable	Coefficient	t-Statistic
Net revenue	12.02	6.35
Off-farm earning	3.86	4.09
Household size	0.57	3.91
Constant	63.41	8.94
R-squared	0.614	
Cross-sections used	19	
Sample period	1996:2008	
Total panel (unbalanced) observations	229	
Dependent variable	Consumption expenditure	
Method	Pooled least squares (weighted)	

Table 4.5 Simulation of climate change effects on consumption (INR)

	January	April	July	October
Temperature effects (+2 °C increase)	−29.35	−15.83	−11.20	+17.12
Precipitation effects (+7 % increase)	+5.76	−8.96	−0.16	+4.03

Estimated average consumption (monthly per person in real terms) is INR 347.82

The sensitivity analysis shows that a simulation of climate change for 2 °C increase in temperature and 7 % rise in rainfall is quite significant (Table 4.5). There is considerable variation in consumption for climate-induced changes in net revenue. The 2 °C increase in temperature, ceteris paribus, during a particular season leads to a decline in per capita monthly consumption expenditure by INR29 for January, INR16 for April, and INR11 for July, respectively, and subsequently for other months. For example, a moderately adverse effect on the consumption by approximately INR4 is observed for higher precipitation in April. Clearly, these simulations are amenable to changes in both directions, and we develop a theoretical model under the assumption that rise in temperature and decline in precipitation are the main outcomes of climate change. The reduction in consumption is still a predominant outcome of such changes, which in view of the empirical and simulation results would make a case for those monthwise specifications when lower precipitation lowers crop production.

4.4 A Model

The empirical results delineate that a climate shock leads to decrease in agricultural production, mainly depending on the sensitivity of the sector on climatic factors, such as temperature and rainfall. Compared to a steady-state equilibrium, it is expected that if the environmental shock leads to a rising temperature and lowers supply, the price must rise at a given level of demand. If the wages and other factor prices do not change, this should, consequently, lower real income of all factors of production. Individuals who are already vulnerable are likely to suffer owing to this change. The above reactions to climate change lead to the welfare implication we wish to derive in this model. The model actually goes beyond the typical rural economy and involves a larger canvas, wherein the urban counterparts of the rural marginal workers feature in the welfare calculations. Using a standard general equilibrium model, we exemplify that the overall welfare implications are, however, conditional on a set of critical factors that include the magnitude of climatic changes and the sensitivity of prices to such changes. To start with, consider four sectors describing the model economy. Commodity X is defined as an industrial good using labor (L) and capital (K). There are two agricultural products, the food grains (A) and the cash crops (C), both of which use labor, land, and climatic factors, such as rainfall (R) as inputs. There is a fourth sector, called the urban informal sector (I), which uses labor and capital like the industrial units. However, the unorganized nature of I leads to market-determined wage for the labor force. The unskilled workers in sector I move between agriculture and the urban informal sector. The urban informal sector is an offshoot of jobs being rationed in the formal industrial units due to wages ($\bar{w}$) higher than the market clearing level as negotiated by the labor unions in a typical organized sector. The free mobility of labor between the other three sectors equalizes nominal wage (w). We have argued at length (see Marjit and Kar 2011) that the workers moving in from the rural sector in search of urban jobs cannot wait indefinitely for a formal manufacturing job to open up. The urban informal sector helps to clear the labor market, unlike in the typical Harris-Todaro (1970)-type structures where the job acquisition rate in such industries comes with a probability based on the prevailing unemployment rate. The real wage earned by workers in the urban informal sector shall be used as a measure of well-being among the poor. The price of the informal commodity or service is held as the *numeraire*, $P_I \equiv 1$. All other prices $P_i,\ i = X, A, C$ are expressed in terms of the *numeraire*.

The return to capital is also determined by its mobility between the formal and informal units. We further argue that the climatic factor input, namely rainfall, cannot be directly priced. Instead, per unit value of water resources is based on a shadow price of, say, the price of groundwater or of the irrigation facility provided by the state and given by ρ. We use the water resources as an outcome of climate shocks (related literature suggests that global warming is largely responsible for changes in the level of water resources available to farmers). On the other hand, rent on land (τ) is determined from Eqs. (4.6) and (4.7) along with full employment conditions given by (4.9)–(4.12). Technology is neoclassical with diminishing marginal productivity and CRS, markets are competitive, and resources are fully employed. The following equations describe the model and use conventional symbols, such as a_{ij} representing input–output coefficients.

$$\bar{w}a_{LX} + ra_{KX} = P_X^* \tag{4.5}$$

$$wa_{LA} + \tau a_{TA} + \rho a_{RA} = P_A \tag{4.6}$$

$$wa_{LC} + \tau a_{TC} + \rho a_{RC} = P_C^* \tag{4.7}$$

$$wa_{LI} + ra_{KI} = P_I \equiv 1 \tag{4.8}$$

$$a_{LX}X + a_{LA}A + a_{LC}C + a_{LI}I = L \tag{4.9}$$

$$a_{KX}X + a_{KI}I = K \tag{4.10}$$

$$a_{TA}A + a_{TC}C = T \tag{4.11}$$

$$a_{RA}A + a_{RC}C = R \tag{4.12}$$

$$D_A(P_A) = S_A(P_A) \tag{4.13}$$

Equations (4.5)–(4.13) determine nine unknown variables w, r, τ, ρ, X, A, C, and I as in standard-specific factor models, where input–output coefficients are given by $a_{ij} = a_{ij}(w_i/w_n)_j$; $i, n = L, K, T, R$ and $j = X, A, C, I$; $i \neq n$ and factor endowments are *L, K, T, and R*. For example, given the internationally traded price of X and the negotiated wage, we can determine r, the return to per unit capital. Given the return to capital and the unit price of the informal good, it is easy to determine the informal wage, w. Free mobility of labor settles wage at w in all the sectors. Equation (4.9) offers the equality between demand and supply of agricultural commodities in the home country, determining the price of this non-traded good in the process. It can also be assumed that the agricultural food grains are traded along with the cash crops, denoted by C. In that case, the international price of A is given for a small open economy, Eq. (4.9) is superfluous, and all the factor prices are determined from a system of eight equations and eight unknown variables.

Let us consider an environmental shock to this economy, as many in the developing world are facing in reality. If it is a pure rise in temperature due to emission of green house gases (GHG), think of R as a temperature parameter, any rise in which lowers output. Technically speaking, this is the Rybczynski effect of an endowment shock working in the opposite direction. Alternatively, if R is treated as rainfall, excessive rainfall causes similar damage to agricultural crops via flooding. So, let us assume that R is rainfall, which becomes scarce owing to higher average annual temperatures—a globally accepted hypothesis of the effect of global warming. This is naturally in agreement with some of the empirical observations discussed earlier. In effect, R falls and we shall now calculate the effects on various agricultural products, industrial products, factor prices, and the changes in aggregate income.

Using (4.8), and taking percentage changes, such that, $\hat{A} = \frac{dA}{A}$, we get

$$\lambda_{RA}[\hat{a}_{RA} + \hat{A}] + \lambda_{RC}[\hat{a}_{RC} + \hat{C}] = \hat{R}. \tag{4.14}$$

In Eq. (4.10), $\hat{R} < 0$, and since the endowment effect is primary (which will change prices as a secondary effect), it is likely to affect production of A and C directly, other things remaining constant. Using (4.7) and (4.10) at unchanged prices

$$\lambda_{RA}\hat{A} + \lambda_{RC}\hat{C} = \hat{R} \tag{4.15}$$

$$\lambda_{TA}\hat{A} + \lambda_{TC}\hat{C} = \hat{T}. \tag{4.16}$$

Solving for $(\hat{A}, \hat{C})$ combination from (4.11) and (4.12) yields

$$\hat{A} = \frac{\lambda_{TC}\hat{R}}{[\lambda_{RA}\lambda_{TC} - \lambda_{TA}\lambda_{RC}]} < 0, \quad \text{iff}, \ \frac{\lambda_{RA}}{\lambda_{TA}} > \frac{\lambda_{RC}}{\lambda_{TC}} \Rightarrow \Delta = [\lambda_{RA}\lambda_{TC} - \lambda_{TA}\lambda_{RC}] > 0. \tag{4.17}$$

Condition (4.13) states that the agricultural product A is more rain dependent than C. It follows that $\hat{C} = \frac{-\lambda_{TA}\hat{R}}{[\lambda_{RA}\lambda_{TC} - \lambda_{TA}\lambda_{RC}]} > 0$. The decline in water resources, thus, implies that the agricultural product which is heavily dependent on water will face lower output in the next period, whereas the other product which uses land resources more extensively shall benefit. The intuition is straightforward. If lack of water hinders production in A, then some of the land area under cultivation of A-type crop will be released and taken up by C-type agricultural product. Therefore, output of C must rise in the following period. Note that this does not have to be a comparison of food grains and cash crops; it can also represent the observed transition from Kharif to Rabi crops in the case of India. The latter is much less dependent on rainwater, essentially because it is cultivated in the winter months.

Proposition 1 *If climate shocks in the medium to long run lower production of one type of crop while expanding production of other types and if the agricultural employment falls overall, then the formal industrial sector should also be adversely affected directly through resource constraints.*

Proof Intuitively, one could argue that the changes in production shall not remain confined within the boundaries of the agricultural sector only. Suppose the shift in production from A to C lowers employment in agriculture. Therefore, the employer of all surplus labor, the so-called informal sector, will have to readjust w to accommodate more workers. This, in turn, must raise capital's return in this sector as well as the formal industrial sector. This opens up a possibility that the formal sector will have to shrink. The reverse happens if employment rises and draws labor out of the informal sector into expanding agricultural sector. This should raise the informal wage and lower the return to capital. Consequently, given intensity assumptions (suppose the formal industrial sector is more capital intensive), one sector should expand and the other shrink.

The fall in output and supply of A-type agricultural products at unchanged demand should inevitably raise the price of that commodity via Eq. (4.13). We use this price effect to calculate the changes in factor prices from Eqs. (4.5)–(4.7). Note that since P_X does not change and $\bar{w}$ remains same, the rental rate is unaffected in (4.5). Hence, using (4.8), it is immediate that the nominal wage of workers remains unchanged as well. Therefore, the effect of a rise in P_A restricts itself to changes in (ρ, τ) combinations from Eqs. (4.6) and (4.7). The international price of commodity C is also held constant.

Once again taking percentage changes and retaining the factor intensity assumption,

$$\hat{\tau} = \frac{-\theta_{TA}\hat{P}_A}{[\theta_{RA}\theta_{TC} - \theta_{TA}\theta_{RC}]} < 0 \quad \text{and} \quad \hat{\rho} = \frac{\theta_{TC}\hat{P}_A}{[\theta_{RA}\theta_{TC} - \theta_{TA}\theta_{RC}]} > 0, \quad (4.18)$$

where $\theta = [\theta_{RA}\theta_{TC} - \theta_{TA}\theta_{RC}] > 0$. The derivations in (4.14) offer the effects of a deficient rainfall on returns to factors that are quite important and unique for agricultural production. Note that what we suggest here is a long-run relationship. If shortage of rainfall leads to drought in a particular year, then the production pattern is unlikely to get affected on a more permanent basis as we contemplate would be the tendency in this case.

Proposition 2 *A decline in precipitation would unambiguously lower welfare in terms of consumption if the negative employment (and income) effect in the food grain sector is strong and outweighs that in the informal sector.*

Proof We begin by calculating the welfare implications. Assume that the direct utility function for the group of identical workers in the country be $V = V(D_X, D_A, D_C, D_I)$, where the arguments are consumption of *all* commodities produced at home. Thus, we measure overall change in welfare by calculating change in consumption levels domestically. Note that the condition of balanced trade requires that

$$P_X^* \mathrm{d}D_X + P_A \mathrm{d}D_A + P_C^* \mathrm{d}D_C + \mathrm{d}D_I = P_X^* dX + P_A dA + P_C^* dC + dI. \tag{4.19}$$

Rearranging, $P_A dD_A + dD_I = P_X^*(dX - dD_X) + P_A dA + P_C^*(dC - dD_C) + dI$. Define the poor man's consumption basket and related welfare by

$$d\Omega = P_A dD_A + dD_I. \tag{4.20}$$

Since commodities A and I are non-traded, while X and C are traded internationally, using (4.19) and (4.20), we get

$$d\Omega = P_X^*(dM_X) + P_C^*(dM_C) + P_A dA + dI, \tag{4.21}$$

where the right-hand side of Eq. (4.21) represents total change in output, with M_j defining net import demand for good j. In our case, it is safe to assume that X is imported, while C is exported.

$$\text{Note that } P_A dA + dI = w(dL_I + dL_A) + \rho dR. \tag{4.22}$$

However, the net import demand functions should be rewritten as

$$M_j = M_j(P_j^*, P_k^*, \Omega), dM_j = S_{jj} dP_j^* + S_{jk} dP_k^* + \mu_j d\Omega = \mu_j d\Omega$$
$$\text{as} \quad dP_j^* = dP_k^* = 0,$$

where $S_{jj} = \frac{dM_j}{dP_j^*}$ $S_{jk} = \frac{dM_j}{dP_k^*}$ are the own price and cross-price effect, respectively, while $\mu_j = \frac{\delta M_j}{\delta \Omega} > 0$ is the income effect.

Since $\mu_j = \frac{m_j}{P_j^*}$, where m_j represents the marginal propensity to consume import good j, using (4.17),

$$d\Omega = P_X^*(\mu_X d\Omega) + P_C^*(\mu_C d\Omega) + P_A dA + dI$$

$$d\Omega(1 - P_X^* \mu_X - P_C^* \mu_C) = P_A dD_A + dD_I$$

or

$$d\Omega = \frac{1}{(1 - P_X^* \mu_X - P_C^* \mu_C)}[w(dL_I + dL_A) + \rho dR]. \tag{4.23}$$

Note that $0 < (1 - P_X^* \mu_X - P_C^* \mu_C) < 1$ as the sum of mpc in X and C must be <1.

Therefore,

$$\frac{d\Omega}{dR} = \frac{1}{\left(1 - P_X^* \mu_X - P_C^* \mu_C\right)} \left[w \left(\frac{dL_I}{dR} + \frac{dL_A}{dR} \right) + \rho \right].$$

Finally,

$$\frac{d\Omega}{dR} \underset{<}{\overset{>}{-}} 0, \text{ iff, } \left[w \left(\frac{dL_I}{dR} + \frac{dL_A}{dR} \right) + \rho \right] \underset{<}{\overset{>}{-}} 0.$$

Rearranging,

$$\frac{d\Omega}{dR} \underset{<}{\overset{>}{-}} 0, \text{ iff, } \left[w \frac{dL_I}{dR} + \rho \right] \underset{<}{\overset{>}{-}} - \left[w \frac{dL_A}{dR} \right]. \tag{4.24}$$

Here, $w\frac{dL_I}{dR}$ is the income gain accrued by joining the informal segment, while $w\frac{dL_A}{dR}$ is the income loss among agricultural workers.

4.5 Concluding Remarks

We found a discerning impact of the climate variables on net revenue and, hence, well-being of the rural people. Looking at the marginal climate effects by seasons, January, April, and July temperatures have a negative influence, while the October temperature effect is positive. Our results show that the rainfall coefficients move in the expected direction, though not as intensively as one expects with temperature. However, simulation of monsoon precipitation in July has almost no effect on the farm revenue. Finally, we found a moderate variation in consumption for climate-induced change in net revenue. To address the challenges on sustainable economic development and poverty, adaptation and mitigation strategies are required and may include financial incentives for improving land management, maintenance of carbon content, and efficient use of fertilizers and irrigation. These incentives will have synergies toward sustainable development and create efforts to reduce vulnerability. The generalized model also showed that the welfare implications of climate change for workers are not unambiguous. The overall welfare gain is largely negative if the income gain among the informal workers is outweighed by the loss to the agricultural workers, particularly in comparison with the initial rental value of the land resources. Future empirical evidence on the welfare implications of climate change may benefit from the construction presented in this chapter.

Acknowledgments The authors are indebted to the South Asia Network of Economic Research Institutes (SANEI) for facilitating this study through a financial grant and reviews. Comments from T.N. Srinivasan and Wahiduddin Mahmud are gratefully acknowledged. The authors thank an anonymous reviewer of this volume for suggestions with chapter guidelines. Research assistance by Shruti Chakraborty is also duly acknowledged. The usual disclaimer applies.

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Part III
Urban Poverty Reduction Policies

Chapter 5
Urban Poverty in Developing Asia—Dichotomy Between the Income and Non-income Dimensions: Are We not Grossly Underestimating Its Incidence?

Dibyendu Samanta

Abstract This paper looks at the acute non-income deprivations visible in urban developing Asia, drawing upon various evidences to drive home the point that if we just look at the income poverty in urban Asia, we are ignoring many critical dimensions of urban poverty. There are evidences to prove that there is a stark dichotomy between the income and non-income indicators of urban poverty and a gross underestimation of urban poverty in developing Asia. There is, thus, a need to broaden the definition of urban poverty in developing Asia (and, in fact, the world over), beyond just the austere threshold of meeting the survival needs of food (nutrition), to one that includes a minimal set of basic needs and capabilities for the urban population. Such an approach should take into account the huge deprivations related to shelter, access to basic infrastructure, access to health, education and social welfare, vulnerability in working conditions and working poverty. Adopting broadened and higher poverty thresholds that would faithfully report urban poverty, however, is only the initial step in the formulation of a forward-looking urban poverty reduction strategy for developing Asia. But it is an important first step as it is critical for focusing policy attention on the right target group.

Keywords Urban poverty · Urban poverty in Asia · Income poverty · Non-income poverty · Underestimation of urban poverty · Deprivations in urban Asia

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_5

5.1 Introduction

This is the "Asian urban century". The pace of urbanization that Asia is experiencing is quite unprecedented in the history of the urban–rural demographic transition in the world.[1] While Latin America has taken 210 years (1750–1960) to advance from a 10 % level of urbanization to 50 %, Europe has taken 150 years (1800–1960), North America has taken 105 years (1825–1930), and Asia is expected to take only 95 years (1930–2025) to reach the "tipping point" in the urban transition (ADB 2012a, b, c).

The per capita income in PPP US$ of Asia (5,578) was almost half of that in the world (10,740) in 2010 (UN database, accessed on 16 May 2013). There are grave disparities within Asia with respect to the current levels of per capita income between two regions: East Asia and Pacific and South Asia. While East Asia and Pacific's per capita income stood at 7,472 PPP US$ in 2010, that of South Asia was less than half of that (3,271 PPP US$). But per capita income in Asia has grown by 6.9 % between 1990 and 2010 (the fastest anywhere in the world), as against a much moderate growth of 2.6 % in the world as a whole. While per capita income in East Asia and Pacific has grown by 7.4 %, South Asia's per capita income has grown moderately by 4.5 %.

The good performance on economic growth has not necessarily translated to commensurate income poverty reduction in Asia. Even though Asia has uplifted more out of poverty than what the developing world as a whole has been able to do, and the entire poverty reduction in the developing world is seen to be largely because of Asia, poverty is still prevalent in Asia in significant numbers. Using the poverty ratios following the well-accepted $1.25 a day poverty line at 2005 PPP that the World Bank PovcalNet database regularly updates and releases in the public domain (accessed on 16 May 2013), it can be seen that the developing world has uplifted 693.4 million out of extreme poverty during the last two decades (1990–2010), while Asia alone has uplifted 786.0 million in this period (Table 5.1).

While East Asia and Pacific has reduced its poverty incidence by 43.8 % points and uplifted 675.5 million people out of poverty in the last two decades, the progress of South Asia has been moderate, with a reduction in poverty incidence by only 22.8 % points and with 110.5 million people uplifted out of poverty. Out of the 1.2 billion poor in the developing world in 2010, 757.7 million are in Asia (506.8 million in South Asia and 250.9 million in East Asia and Pacific). However, Asia did not have disproportionate numbers of poor people in 2010. While Asia had 62.6 % of the share of the total population in the developing world in 2010, it also had a proportionate share of 62.4 % of the number of the poor. But within Asia, there are highly disproportionate shares noticeable, with East Asia and

[1] "Asia" for the current background paper denotes the 45 developing economies (listed in Table 5.6) of Central and West Asia (10 countries), East Asia (5 countries), South Asia (6 countries), South-East Asia (10 countries) and the Pacific (14 countries).

Table 5.1 Aggregate poverty: regional aggregations using 2005 PPP and $1.25 a day poverty line (1990 and 2010)

	East Asia and Pacific (EAP)	South Asia (SAS)	Asia	Eastern Europe and Central Asia (ECA)	Latin America and Caribbean (LAC)	Middle East and North Africa (MNA)	Sub-Saharan Africa (SSA)	Developing world
1990								
Head count ratio (%)	56.2	53.8	55.2	1.9	12.2	5.8	56.5	43.1
Number of poor (in million)	926.4	617.3	1,543.7	8.6	53.4	13.0	289.7	1,908.4
Share of the poor population in the developing world (%)	48.5	32.3	80.9	0.5	2.8	0.7	15.2	100.0
Share of the population in the developing world (%)	37.8	26.3	64.1	9.0	10.0	5.2	11.8	100.0
2010								
Head count ratio (%)	12.5	31.0	20.8	0.7	5.5	2.4	48.5	20.6
Number of poor (in million)	250.9	506.8	757.7	3.2	32.3	8.0	413.7	1,215.00
Share of the poor population in the developing world (%)	20.7	41.7	62.4	0.3	2.7	0.7	34.1	100.0
Share of the population in the developing world (%)	34.6	28.1	62.6	7.0	10.0	5.7	14.7	100.0

Note Asia is the sum of East Asia and Pacific (EAP) and South Asia (SAS) regions as defined by the World Bank
Source Calculations based on World Bank PovcalNet database, accessed on 16 May 2013

Pacific having 34.6 % of the population in the developing world, but only 20.7 % of the poor, and South Asia having 28.1 % of population, but 41.7 % of the poor in the developing world.

5.2 Income Poverty Incidence in Urban Asia: Has There Been "Urbanization of Poverty" in Asia?

Any study on urban income poverty is highly constrained by the lack of data. The Global Monitoring Report 2013 (World Bank and IMF 2013) gives urban poverty data for the period 1990–2008.[2] Calculations reveal that, in the developing world as a whole, both in terms of the HCRs and in terms of absolute numbers, both rural poverty and urban poverty have decreased in the period 1990–2008. While the numbers of the rural poor have gone down by a huge margin of 541.2 million (37.3 % of the rural poor in 1990), urban poverty has gone down by only 25 million (7.9 % of the urban poor in 1990)[3] (Tables 5.2 and 5.3). While this phenomenon could be called "urbanization of poverty", it is much less dramatic than what has been estimated by Ravallion et al. (2007).[4] The huge decline in rural poverty numbers is entirely due to East Asia and Pacific, where it declined by 562.4 million. The decline in urban poverty numbers is also due to East Asia and Pacific, where it declined by 72.5 million. As the Global Monitoring Report puts it, this has been made possible largely through the efforts of the People's Republic of China (PRC). South Asia and sub-Saharan Africa are the two regions that have shown net additions to the urban poor. In South Asia, 25.9 million have fallen into poverty in the urban areas.

In Asia as a whole, while the numbers of the rural poor went down very significantly by 574.2 million (47.4 % of the rural poor in 1990), urban poverty has also gone down, but by a much lesser margin of 46.6 million (20.7 % of the urban poor in 1990). Thus, Asia has also been witness to "urbanization of poverty" between 1990 and 2008. It must be noted that urbanization of poverty is concomitant to the urbanization of the population, and as urbanization gathers pace in Asia, there is bound to be some amount of urbanization of poverty. The question really is

[2] The set of data released do not match with and is not comparable to the only other available cross-regional study by Ravallion et al. (2007) that pertains to the period 1993–2002 and used 1993 PPP and $1.08 a day poverty line to arrive at poverty head count ratios.

[3] There is a slight mismatch of the data released by the Global Monitoring Report 2013 with the World Bank PovcalNet database in that the numbers of the rural and urban poor calculated from GMR 2013 do not exactly match the number of the total poor as given in the PovcalNet, though both pertain to measuring poverty based on the line fixed at $1.25 a day at 2005 PPP.

[4] Ravallion et al. (2007) had noted that over the period 1993–2002 (it is a frequently referred study), the number of people living on $1.08 a day or less (this was the prevalent poverty line at that time) fell by 148.1 million in rural areas, but rose by 49.9 million in urban areas in the developing world. It was found that the poor have been urbanizing even more rapidly than the population as a whole, what they termed the "urbanization of poverty".

Table 5.2 Aggregate poverty: regional aggregations using $1.25 a day poverty line

	Head count rates below $1.25 a day				Number of poor (in million)				Decline/increase 1990–2008 (in million)	
	2008		1990		2008		1990			
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
East Asia and Pacific	20.4	4.3	67.5	24.4	215.5	37.7	778.0	110.3	562.4	72.5
South Asia	38.0	29.7	50.5	40.1	422.7	140.8	434.4	114.9	11.8	−25.9
Asia	29.4	13.2	60.2	30.5	638.2	178.6	1212.4	225.1	574.2	46.6
Europe and Central Asia	1.2	0.2	2.2	0.9	1.7	0.5	3.2	2.2	1.5	1.7
Latin America and the Caribbean	13.2	3.1	21.0	7.4	16.4	13.8	27.1	22.8	10.7	9.0
Middle East and North Africa	4.1	0.8	9.1	1.9	5.5	1.5	9.9	2.2	4.4	0.7
Sub-Saharan Africa	47.1	33.6	55.0	41.5	247.8	96.1	203.2	59.3	−44.7	−36.8
Developing world	29.4	11.6	52.5	20.5	910.9	293.0	1,452.1	318.0	541.2	25.0

Note Asia is the sum of East Asia and Pacific (EAP) and South Asia (SAS) regions as defined by the World Bank
Source Calculations based on Global Monitoring Report 2013 and World Bank Indicators database for population figures

whether the shares of the urban poor have grown disproportionately to the urban shares of population.

Urban poverty incidence is not proportionate in Asia, which had 60.9 % of the share of the urban poor as against 53.5 % of the share of the urban population in the developing world in 2008. Moreover, what is alarming is that this incidence of urban poverty was with just an urbanization level of 38.4 % in 2008. However, the gap had decreased between 1990 and 2008. In 1990, the urban poverty incidence was even more disproportionate, with Asia having 70.8 % of the share of the urban poor as against only 47.6 % of the share of urban population in the developing world.

Urbanization of poverty is visible in Asia, but there are significant region-wise disparities. Of the 293 million urban poor in 2008 in the developing world, in what is extremely disproportionate, 48.1 % was in South Asia (which had only 18.8 % of the share of the urban population in the developing world); another 12.9 % was in East Asia and Pacific (which had 34.8 % of the share of the urban population in the developing world). While in East Asia and Pacific, the incidence of rural poverty went down by a large margin of 47.1 % points, the incidence of urban poverty

Table 5.3 Aggregate poverty: regional aggregations using $1.25 a day poverty line (shares of the numbers of poor and population)

	Share of the poor population in the developing world (%)				Share of the population in the developing world (%)			
	2008		1990		2008		1990	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
East Asia and Pacific	23.7	12.9	53.6	34.7	34.1	34.8	41.7	29.1
South Asia	46.4	48.1	29.9	36.1	35.9	18.8	31.1	18.5
Asia	70.1	60.9	83.5	70.8	70.0	53.5	72.8	47.6
Europe and Central Asia	0.2	0.2	0.2	0.7	4.7	10.1	5.3	15.8
Latin America and the Caribbean	1.8	4.7	1.9	7.2	4.0	17.6	4.7	19.8
Middle East and North Africa	0.6	0.5	0.7	0.7	4.3	7.4	3.9	7.5
Sub-Saharan Africa	27.2	32.8	14.0	18.7	17.0	11.3	13.4	9.2
Developing world	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note Asia is the sum of East Asia and Pacific (EAP) and South Asia (SAS) regions as defined by the World Bank
Source Calculations based on Global Monitoring Report 2013 and World Bank Indicators database for population figures

also went down by a smaller margin of 20.1 % points. In South Asia, on the other hand, while rural poverty went down by 12.5 % points, the incidence of urban poverty fell by 10.4 % points (though in absolute numbers, it went up by 25.9 million). Thus, while in East Asia and Pacific, the pace of decline in rural poverty outstripped the urban poverty decline, in South Asia, there was an increase in the numbers of the urban poor as against a decrease in the numbers of the rural poor.

5.3 Why Is Examining Only Income Poverty in Urban Asia not Enough?

If urban poverty measurement in Asia takes into account just the numbers of people living below an income poverty line (fixed in terms of income at $1.25 a day at 2005 PPP to make cross-national, regional and global comparisons possible), the urban poverty incidence, though significant in terms of numbers, does not appear to be very grave, with only 13.2 % of the urban population living below the poverty line (29.7 % being the HCR in South Asia and only 4.3 % in East Asia and Pacific) in 2008.

But, as ADB (2013a, b, c), Haddad (2013) and Satterthwaite (2004) have argued, the characteristics of urban poverty are totally different from that of rural poverty. First, unlike rural poverty, urban poverty is inherently multidimensional in nature, and its many dimensions relate to the unmet needs and inherent vulnerability of the poor as manifested by their lack of access to economic and livelihood resources, land and housing, physical infrastructure and services, health and education facilities, social security network and empowerment. Second, urban poverty is a highly monetary phenomenon because unlike the rural poor, the urban poor have to buy almost everything from the market, making them more vulnerable to internal and external shocks to the economy. Third, urban areas have the extremes of wealth and poverty often existing side by side, and urban averages hide deprivation on a scale rarely seen in rural areas. Thus, urban inequality reduction ought to be a critical strategy for urban poverty reduction, without which much of the potential poverty reduction would not be possible on the ground. Fourth, informal ties and reciprocities are likely to be more fragile in the more mobile context of urban areas. Poverty targeting becomes more complicated due to a greater mobility of residence. Fifth, institutional complexity is likely to be higher in urban areas, with more competition between various types of formal and informal sources of authority. Sixth, access to services may appear enhanced in urban areas, but often their quality is uneven and the competition for them is intense. Satterthwaite (2004) and Mitlin (2004) had concluded that urban poverty is often grossly underestimated. Official statistics tend to systematically under-report urban poverty due to lack of cost-of-living adjustments like transport and housing in the income/consumption poverty estimates, lack of disaggregation within urban areas and inadequate definitions of access to water supply and sanitation, adequate shelter or other infrastructure variables.

This paper looks at the acute non-income deprivations visible in urban Asia, drawing upon evidences from different databases such as ADB, UN-HABITAT, WHO, UNICEF, UNESCO, UN, ILO and the World Bank to drive home the point that if just the income poverty in urban Asia is considered, many critical dimensions of urban poverty are overlooked, resulting in a gross underestimation of its incidence.

5.4 Dimensions of Non-income Poverty in Urban Asia: How Acute Are the Deprivations?

5.4.1 Shelter Poverty

Informal settlements in Asian cities provide much of the total supply of land and housing to the poor in Asian cities, as formal planned housing is often not available at prices, locations and flexible conditions that make them accessible to the poor. Informal settlements, however, provide a poorer quality of service and carry uncertainty about title and tenure. Between 30 and 60 % of urban dwellers in developing Asia live without secure tenure (Bartlett 2011).

In order to measure the progress on the Millennium Development Goal (MDG) related to slums, UN-HABITAT has adopted a functional definition of slums based on the household as the basic unit of analysis and five measurable shelter deprivation indicators: "A slum household consists of one or a group of individuals living under the same roof in an urban area, lacking one or more of the following five amenities: (1) durable housing (a permanent structure providing protection from extreme climatic conditions); (2) sufficient living area (no more than three people sharing a room); (3) access to improved water (water that is sufficient, affordable and can be obtained without extreme effort); (4) access to improved sanitation facilities (a private toilet, or a public one shared with a reasonable number of people); and (5) secure tenure (de facto or de jure secure tenure status and protection against forced eviction). Since information on secure tenure is not available for most countries, only the first four indicators are used to define slum households, and then to estimate the proportion of the urban population living in slums" (UN-HABITAT 2010). These criteria are very different from and more broad-based than those used by various countries in the region. This is the reason that the UN-HABITAT slum data are at a significant variance from, and often much higher than, national estimates.

UN-HABITAT statistics show that in UN-HABITAT (2012), 523.2 million slum dwellers, or 60.7 % of the developing world's slum population, live in Asia (Table 5.4), out of which 206.5 million are in East Asia and 200.0 million in South Asia. Thus, 77.8 % of the slum population in Asia is concentrated in these two UN regions.[5]

Table 5.5 has a very interesting story to tell. What is noticeable from Table 5.5 is that between 1990 and 2009, slum population in terms of the proportions of urban population seems to have gone down in all the Asian countries for which data are available. However, slum population figures for 2009 in absolute numbers have a different story to tell. The PRC has seen an addition of 48.9 million to its slum population in the last two decades, and Pakistan has added another 11.9 million. Nepal, the Philippines and Viet Nam have also shown net additions to their slum populations in the last two decades. In Bangladesh, Nepal, Pakistan and the Philippines, more than 40 % of the urban populations are seen to be living in slums. India has seen slum population decline by 16.3 million in the same period, the highest decline seen in Asia.

Slum population in the PRC in 2009 was 180.6 million (29.1 %) and in India 104.7 million (29.4 %). To put these numbers into perspective, using the $1.25 a day at 2005 PPP, the urban poverty incidence in the PRC in terms of income levels in 2009 was only 0.6 % of the urban population, while in India, in 2009–2010, using the same poverty line, the income poverty incidence in urban India was 28.9 % (though according to the national urban poverty line, the incidence was much lower at 20.9 %). Thus, while the urban poverty numbers and the numbers of people living in slums match quite closely in case of India, there is a huge disparity, of unbelievable proportions, in the PRC.

How do we explain the PRC's case? Foggin (2008) has noted that because of the rapid influx of rural labour into the cities, scattered villages within cities have grown up, which are often hidden behind walls. These are the "new slums" in the PRC.

[5] The UN subregions of Asia are significantly different from the World Bank subregions of Asia.

Table 5.4 Slum population (absolute numbers and proportions), Asia: 1990, 2000, 2010, 2012

Major region or area	Urban slum population at mid-year by region (million)				Proportion of urban population living in slum (%)			
	1990	2000	2010	2012	1990	2000	2010	2012
Eastern Asia	154.2	191.6	197.5	206.5	43.7	37.4	28.2	28.2
Southern Asia	181.7	194.4	190.6	200.5	57.2	45.8	35.0	35.0
South-eastern Asia	68.9	78.2	76.5	79.9	49.5	39.6	31.0	31.0
Western Asia	17.8	22.0	34.1	35.7	22.5	20.6	24.6	24.6
Oceania	0.4	0.5	0.6	0.6	24.1	24.1	24.1	24.1
Asia-Pacific region	422.9	486.6	499.4	523.2	39.4	33.5	28.6	28.6
Developing world	650.4	759.9	820.0	862.6	46.2	39.4	32.6	32.7

Source United Nations Human Settlements Programme (UN-HABITAT), Global Urban Indicators Database 2012

Table 5.5 Slum population (absolute numbers and proportions), some Asian economies: 1990, 1995, 2000, 2005, 2007 and 2009

Economy	Proportion of urban population living in slums (%)						Slum population at mid-year (million)					
	1990	1995	2000	2005	2007	2009	1990	1995	2000	2005	2007	2009
Bangladesh	87.3	84.7	77.8	70.8	66.2	61.6	20.0	23.5	25.8	27.8	27.8	27.5
Cambodia	–	–	–	78.9	–	–	–	–	–	2.1	–	–
The PRC	43.6	40.5	37.3	32.9	31.0	29.1	131.7	151.4	169.1	183.5	182.9	180.6
India	54.9	48.2	41.5	34.8	32.1	29.4	121.0	122.2	119.7	112.9	109.1	104.7
Indonesia	50.8	42.6	34.4	26.3	23.0	23.0	27.6	29.0	29.7	24.8	22.5	23.3
Lao PDR	–	–	–	79.3	–	–	–	–	–	1.3	–	–
Mongolia	68.5	66.7	64.9	57.9	57.9	–	0.9	0.9	0.9	0.9	0.9	–
Myanmar	–	–	–	45.6	–	–	–	–	–	6.7	–	–
Nepal	70.6	67.3	64.0	60.7	59.4	58.1	1.2	1.6	2.1	2.6	2.9	3.1
Pakistan	51.0	49.8	48.7	47.5	47.0	46.6	18.1	20.7	23.9	27.2	28.5	30.0
The Philippines	54.3	50.8	47.2	43.7	42.3	40.9	16.5	17.2	17.6	18.0	18.1	18.3
Thailand	–	–	–	26.0	26.5	27.0	–	–	–	5.5	5.8	6.1
Viet Nam	60.5	54.6	48.8	41.3	38.3	35.2	8.1	8.9	9.4	9.5	9.4	9.2

Source UN-HABITAT, Global Urban Indicators Database 2012

Miller (2013) has noted that 250 million migrant workers have moved to cities in the PRC for the sake of a better life between 1980 and 2011. Since the discriminatory Chinese household registration system (hukou), implemented in the PRC in 1958, remains in effect (except in small and medium towns) even today, most of the migrants are forced to live in squalor and highly congested houses that lack even the basic amenities. The hukou system in the PRC uses residency permits to divide Chinese citizens into urban and rural dwellers. A person's hukou status determines his or her access to state services. Under normal circumstances, a person with a rural hukou status is not eligible for state services in urban areas and vice versa. Hukou status is primarily inherited from one's parents at the time of birth—so children born in urban areas to parents with rural hukou end up being designated as rural hukou holders. This situation has led academics and human rights activists to describe the hukou system as being discriminatory in nature (Cheng 2003; Solinger 2004). In February 2012, restrictions on migration were relaxed in the small and medium towns in the PRC. But hukou still remains in force in the large cities of the PRC (provincial cities such as Beijing, Shanghai, Tianjin and Chongqing; special cities such as Shenzhen and Dalian), which are the destinations of most rural–urban migration (World Bank and IMF 2013).

On the one hand, if not for the PRC, there would have been no decline in the numbers of the poor (or urban poor) in purely income terms in the developing world over the last two decades. On the other hand, the slum population numbers (definition involving durable housing, sufficient living area, access to improved water and access to improved sanitation facilities) reveal that examining income poverty is not enough—a thorough investigation of the non-income indicators is essential for a more accurate measurement of urban poverty. Indonesia had a slum

Table 5.6 Urban poverty numbers and slum population (shelter and service deprivation) numbers, some Asian economies: latest year

	Urban poverty incidence (World Bank PovcalNet $1.25 a day)		Urban poverty incidence (national)		Proportion of urban population living in slums	
	Year	HCR (%)	Year of national survey	HCR (%)	Year	%
Central and West Asia						
Pakistan			2006	13.1	2009	46.6
East Asia						
The PRC	2009	0.6	2009	–	2009	29.1
Mongolia			2009	30.6	2007	57.9
South Asia						
Bangladesh			2010	21.3	2009	61.6
India	2009–2010	28.9	2010	20.9	2009	29.4
Nepal			2011	15.5	2009	58.1
Southeast Asia						
Cambodia			2007	11.8	2005	78.9
Indonesia	2010	18.3	2011	9.2	2009	23.0
Lao PDR			2008	17.4	2005	79.3
Myanmar			2010	15.7	2005	45.6
Thailand			2010	3.0	2009	27.0
Viet Nam			2008	3.3	2009	35.2

Source World Bank PovcalNet database, accessed on 16 May 2013; Framework of Inclusive Growth Indicators 2012, ADB; UN Millennium Database 2012; World Development Indicators database 2012; UN-HABITAT, Global Urban Indicators Database 2012 population (according to the UN-HABITAT definition) of 23.3 million in 2009, as against a $1.25 a day number of urban poor of 23.5 million in 2010. Thus, in Indonesia's case, the numbers largely match (Table 5.6). Table 5.6 juxtaposes the income poverty against the slum population numbers (which is really shelter and service deprivation combined).

There are huge disparities between the urban poverty HCRs and the share of slum population (in the urban population), which clearly bring forth the dichotomy between the income and the non-income indicators of urban poverty. The least gap among the two is for India, while the highest gap is seen in the case of Lao PDR and Cambodia (the difference being more than 60 % between the two). Very high gaps of more than 40 % are also noticed in the cases of Bangladesh and Nepal.

Shelter deprivations are not just restricted to the slums proper, but are also alarmingly high across the non-slum households in many Asian countries (UN-HABITAT, Global Urban Indicators Database 2010). According to the UN-HABITAT classification, the areas of non-slums—16.4 % in Bangladesh, 18.5 % in Pakistan, 9.2 % in Nepal and 13.8 % in Uzbekistan—are such that 75 % or more of the total number of households in them can be classified as "slum"[6] households.

5.5 Congested Living

Unlike their counterparts in other regions, the residents in Asian cities live in very congested areas. Average urban densities in Asia range from 10,000 to 20,000 per km^2, which is almost double of that in Latin America, triple of that in Europe and 10 times of that in US cities (UN-HABITAT 2010).

Although many Asians do not live in cities, those who do are crowded into relatively small areas. Of the top 10 densest megacities (over 10 million population) in the world, seven are in Asia. Dhaka is the densest city in the world, followed by Mumbai (Fig. 5.1). Land markets in high-density cities reflect the growing demand for land in central urban areas. Scarce supply drives up land prices in prime locations, forcing the urban poor into slums and the peripheries. The urban poor live in informal settlements or in conditions that are more congested than where the non-poor live.

[6] This definition is not the national definition of slum, but the more stringent definition as adopted by the UN-HABITAT.

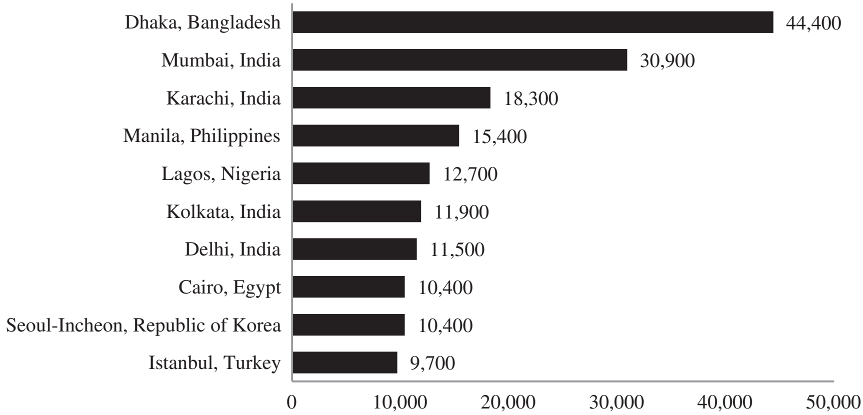

Fig. 5.1 Top ten densest cities (over 10 million population) in the world, population density (persons per km2): 2012 *Source* http://www.demographia.com

5.6 Urban Service Deficits and Deprivations

The high degree of "urban service deprivation" suggests that the official urban poverty figures do not fully reflect the poor state of affairs in urban Asia (Table 5.7). Only 66 %, on an average, of the population in urban Asia has access to piped water supply on premises. The situation with respect to drinking water supply in urban areas is especially bad in Afghanistan, Bangladesh, Azerbaijan, Cambodia and Lao PDR.

The sanitation facilities in urban areas are even worse—15 % of the population in urban Asia, on an average, has seen no improvement with respect to the sanitation facilities. The situation is abysmal in Afghanistan, Bangladesh, India and Nepal. Thirteen per cent of households in urban Asia still are forced to use shared latrines. Thirty-six per cent of the urban population in Nepal, 31 % in Mongolia, 26 % in Bangladesh and 24 % in the PRC are forced to use community latrines. Even in 2010, 72.7 million people in the urban Asia were openly defecating. The situation with regard to open defecation in urban areas is specifically worse in countries such as India and Indonesia, where 51.5 and 14.9 million people, respectively, still openly defecate.

Settlements of the urban poor often lack access to water and sanitation infrastructure. These communities exist off the grid and rely on private, small-scale distributors of water, such as vendors or public taps. The result is that most urban slum dwellers pay several times more than their higher-income counterparts (UNHRC 2012).

Table 5.7 Progress on sanitation and drinking water, urban Asia: economy estimates for 2000–2010

Economy	Water supply facilities			Sanitation facilities				
	Improved		Unimproved	Improved	Unimproved			
	Total improved (%)	Piped on premises (%)	Total unimproved (%)	Total improved (%)	Total unimproved (%)	Shared (%)	Open defecation (×1000)	Open defecation (%)
Central and West Asia								
Afghanistan	78	16	22	60	40		142	2
Armenia	99	98	1	95	5	4	0	0
Azerbaijan	88	78	12	86	14	11	0	0
Georgia	100	92	0	96	4	3		
Kazakhstan	99	82	1	97	3	3	0	0
Kyrgyz Republic	99	89	1	94	6	5	0	0
Pakistan	96	58	4	72	28	6	2,492	4
Tajikistan	92	83	8	95	5	4	0	0
Turkmenistan	97		3	99	1			
Uzbekistan	98	85	2	100	0		0	0
East Asia								
The PRC	98	95	2	74	26	24	0	0
Hong Kong, China								
Republic of Korea	100	99	0	100	0		0	0
Mongolia	100	26	0	64	36	31	51	3
Taipei,China								
South Asia								
Bangladesh	85	20	15	57	43	26	835	2
Bhutan	100	81	0	73	27	21	3	1
India	97	48	3	58	42	19	51,451	14

(continued)

Table 5.7 (continued)

Economy	Water supply facilities			Sanitation facilities				
	Improved		Unimproved	Improved	Unimproved			
	Total improved (%)	Piped on premises (%)	Total unimproved (%)	Total improved (%)	Total unimproved (%)	Shared (%)	Open defecation (×1000)	Open defecation (%)
Maldives	100	96	0	98	2	2	0	0
Nepal	93	53	7	48	52	36	725	13
Sri Lanka	99	67	1	88	12	7	60	2
Southeast Asia								
Brunei Darussalam								
Cambodia	87	63	13	73	27	10	426	15
Indonesia	92	36	8	73	27	10	14,870	14
Lao PDR	77	55	23	89	11	5	62	3
Malaysia	100	99	0	96	4	4	0	0
Myanmar	93	19	7	83	17	12	161	1
The Philippines	93	61	7	79	21	17	1,368	3
Singapore	100	100	0	100	0		0	0
Thailand	97	80	3	95	5	5	0	0
Viet Nam	99	59	1	94	6	5	0	0
The Pacific								
Cook Islands	98		2	100	0		0	0
Fiji	100	97	0	94	6		0	0
Kiribati								
Marshall Islands	92	1	8	83	17	12	2	4
Micronesia								
Nauru	88		12	65	35	31	0	0
Palau	83	43	17	100	0		0	0

(continued)

Table 5.7 (continued)

Economy	Water supply facilities			Sanitation facilities				
	Improved		Unimproved	Improved	Unimproved			
	Total improved (%)	Piped on premises (%)	Total unimproved (%)	Total improved (%)	Total unimproved (%)	Shared (%)	Open defecation (×1000)	Open defecation (%)
Papua New Guinea	87	57	13	71	29		43	5
Samoa	96	84	4	98	2		0	0
Solomon Islands								
Timor-Leste	91	45	9	73	27	11	41	13
Tonga	100		0	98	2			
Tuvalu	98	97	2	88	12		0	2
Vanuatu	98	52	2	64	36	33	0	0
Developing Asia	95	66	5	84	16	13	72,733	3

Source World Health Organization and UNICEF, Progress on Sanitation and Drinking Water: 2012 Update
Note The blank cells denote that data for those countries were not available. According to the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation, an improved drinking water source is one that, by the nature of its construction, adequately protects the source from outside contamination, particularly faecal matter. An improved sanitation facility is one that hygienically separates human excreta from human contact

5.7 Social Poverty: Lack of Access to Education, Health and Social Security Systems

There is a general lack of access to health, education and social security systems in developing Asia, especially South Asia. Social deprivations are bound to be even greater among the urban poor, though there is no data set available to support this.

In 2012, developing Asia had an average school life expectancy[7] of only 11.4 years as against an average of 16.5 in North America and Western Europe (the developed countries) (Table 5.8). The school life expectancy in developing Asia varied from a high of 17.2 in the Republic of Korea to as low as 7.3 in Pakistan.

The child mortality rates in urban Asia in 2010 ranged from 3 per 1,000 live births in Samoa to 78 in Pakistan.[8] Between 1990 and 2010, all economies in developing Asia succeeded in reducing under-five mortality rates, but very high urban child mortality rates were observed in Bangladesh. Urban Asia, on an average, has an under-five mortality rate of 41 as against 7 in North America and Western Europe (ADB 2012a).

Immunization coverage among 1-year-olds,[9] on an average, in urban Asia was 79 % as against 96 % in urban North America and Western Europe in 2010. It varied from a high of 98 % in Maldives and Kazakhstan, to a low of 38 % in Azerbaijan. Urban India also had abysmally low immunization coverage at 56 %.

WHO (2013) has estimated that 100 million people in the world are pushed under the poverty line each year because they use health services for which they are forced to pay out of their own pockets, due to the lack of public health services.[10] In 2011, Turkmenistan had the highest (100 %) out-of-pocket health expenditure as a proportion of total health expenditure both in Asia and in the world. Bangladesh and India had an exceptionally high out-of-pocket health expenditure proportion of 96.6 and 86.0 %, respectively. Nepal had a proportion of 90.4 %, Pakistan 86.3 % and the PRC 78.8 % in 2011. In comparison, the average out-of-pocket health expenditure in the developed economies was 49.6 % in 2011.

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[7] School life expectancy is the number of years that children can expect to spend in school given current enrolment ratios.

[8] Under-five mortality rate measures the probability (expressed as a rate per 1,000 live births) of a child born in a specified year dying before reaching the age of five if subject to current age-specific mortality rates.

[9] Child immunization measures the percentage of children aged 12–23 months who received vaccinations before 12 months or at any time before the survey.

[10] Household out-of-pocket expenditure on health comprises cost-sharing, self-medication and other expenditure paid directly by private households.

Table 5.8 Education and health attainment levels and out-of-pocket health expenditure, Asian economies: latest year

Economy	School life expectancy (years) (national)	Under-five mortality rate (per 1,000 live births) (urban)	Immunization coverage among one year old (%) (Urban)	Out-of-pocket health expenditure (per cent of private expenditure on health) (national)
Developing Asia	11.4	41	79	78.6
Central and West Asia	8.7	–	–	–
Afghanistan	8.1	–	–	94.0
Armenia	12.2	26	70	89.4
Azerbaijan	11.7	51	38	89.3
Georgia	12.8	24	64	89.2
Kazakhstan	15.3	30	98	98.7
Kyrgyz Republic	12.6	35	64	85.3
Pakistan	7.3	78	68	86.3
Tajikistan	11.5	70	87	85.4
Turkmenistan	–	73	–	100.0
Uzbekistan	11.6	51	88	90.2
East Asia	11.9			
The PRC	11.7	–	–	78.8
Hong Kong, China	15.5	–	–	–
Republic of Korea	17.2	–	–	77.1
Mongolia	14.3	31	91	93.1
Taipei,China	–	–	–	–
South Asia	10.6			
Bangladesh	–	62	92	96.6
Bhutan	12.4	–	–	94.7
India	10.4	60	69	86.0

(continued)

Table 5.8 (continued)

Economy	School life expectancy (years) (national)	Under-five mortality rate (per 1,000 live births) (urban)	Immunization coverage among one year old (%) (Urban)	Out-of-pocket health expenditure (per cent of private expenditure on health) (national)
Maldives	12.5	23	98	88.3
Nepal	8.9	47	93	90.4
Sri Lanka	–	–	–	83.0
Southeast Asia	12.2			
Brunei Darussalam	15.0	–	–	98.9
Cambodia	10.5	29	90	73.4
Indonesia	12.9	38	75	75.7
Lao PDR	10.1	–	56	78.2
Malaysia	12.6	–	–	76.8
Myanmar	9.4	–	–	92.7
The Philippines	11.7	28	88	83.9
Singapore	–	…	…	87.6
Thailand	12.3	–	93	55.8
Viet Nam	11.9	16	95	93.3
The Pacific	–			
Cook Islands	12.5	–	–	–
Fiji	13.9	–	–	65.8
Kiribati	12.0	–	–	6.5
Marshall Islands	11.7	–	–	75.2
Micronesia	–	–	–	97.5
Nauru	9.3	–	–	–
Palau	–	–	–	–

(continued)

Table 5.8 (continued)

Economy	School life expectancy (years) (national)	Under-five mortality rate (per 1,000 live births) (urban)	Immunization coverage among one year old (%) (Urban)	Out-of-pocket health expenditure (per cent of private expenditure on health) (national)
Papua New Guinea	–	–	–	55.9
Samoa	13.0	3	–	63.8
Solomon Islands	9.3	–	–	56.7
Timor-Leste	11.7	59	71	14.2
Tonga	13.7	–	–	67.8
Tuvalu	10.8	–	–	–
Vanuatu	10.6	27	69	56.7
North America and Western Europe (average)	16.5	7	96	49.6

Sources Millennium indicators database online (UNSD); Global health observatory data repository (WHO); The State of the World's Children Report, 2012 (UNICEF); Institute for Statistics Data Centre (UNESCO); World Development Indicators database

Table 5.9 Government expenditures on education, health and social security and welfare (percentage of total expenditure), Asian economies: 2011

Economy	Government expenditure on education	Government expenditure on health	Government expenditure on social security and welfare
Developing Asia	14.9	5.0	9.4
Central and West Asia	–	–	–
Afghanistan	–	–	–
Armenia	11.4	6.7	35.7
Azerbaijan	8.2	3.2	9.7
Georgia	8.8	5.4	20.8
Kazakhstan	–	–	–
Kyrgyz Republic	21.3	10.4	15.6
Pakistan	–	–	–
Tajikistan	16.7	6.5	12.8
Turkmenistan	–	–	–
Uzbekistan	–	–	–
East Asia	–	–	–
The PRC	14.0	5.3	10.2
Hong Kong, China	17.6	11.6	11.2
Republic of Korea	15.1	1.0	22.2
Mongolia	13.3	6.9	36.2
Taipei,China	13.1	1.4	23.4
South Asia	–	–	–
Bangladesh	11.4	5.6	2.1
Bhutan	17.9	6.9	4.9
India	16.5	4.0	5.6
Maldives	14.6	3.1	7.7
Nepal	17.9	7.2	3.2
Sri Lanka	8.6	6.3	8.7
Southeast Asia	–	–	–
Brunei Darussalam	18.3	8.3	4.8
Cambodia	13.7	12.2	5.2
Indonesia	–	–	–
Lao PDR	–	–	–
Malaysia	21.6	7.5	3.6
Myanmar	–	–	–
The Philippines	16.5	2.3	5.7
Singapore	21.0	8.1	7.7
Thailand	19.4	9.9	6.8
Viet Nam	–	–	–

(continued)

Table 5.9 (continued)

Economy	Government expenditure on education	Government expenditure on health	Government expenditure on social security and welfare
The Pacific	–	–	–
Cook Islands	13.4	11.2	–
Fiji	27.7	15.1	0.5
Kiribati	18.6	16.3	3.1
Marshall Islands	–	–	–
Micronesia	–	–	–
Nauru	–	–	–
Palau	–	–	–
Papua New Guinea	10.0	5.7	1.5
Samoa	19.8	17.9	4.3
Solomon Islands	–	–	–
Timor-Leste	6.2	3.6	9.1
Tonga	–	–	–
Tuvalu	–	–	–
Vanuatu	26.1	10.8	0.2
Asia (average)	15.3	8.9	12.9
North America and Western Europe (average)	23.3	9.5	22.2

Source Framework of inclusive growth indicators, 2012 (ADB)

Developing Asia also has much lower levels of public spending on education and health than the developed countries.[11] Developing Asia, on an average, spent just 14.9 % of the total government expenditure on education and 5 % on health, as against 23.3 % on education and 9.5 % on health in North America and Western Europe (Table 5.9).

Government expenditure on education was less than 10 % of the total government expenditure in Timor-Leste, Azerbaijan, Sri Lanka and Georgia. Government expenditure on health was less than 5 % of the total government expenditure in Azerbaijan, Republic of Korea, Taipei,China, the PRC, India, Maldives, the Philippines and Timor-Leste.

Government expenditure on social security and welfare was generally low in most of developing Asia.[12] The average for developing Asia is just 9.4 %, as

[11] Government expenditure on education consists of expenditure by government to provide education services at all levels. Government expenditure on health consists of expenditure by government to provide medical products, appliances and equipment; outpatient services; hospital services; public health services; etc.

[12] This is the government expenditure that provides benefits in cash or kind to persons who are sick, fully or partially disabled, of old age, survivors, families and children, unemployed or socially excluded, among others.

Table 5.10 Working poverty, world and Asian regions: 2002 and 2012

Region	World		East Asia		South-East Asia and the Pacific		South Asia		Asia	
Year	2002	2012	2002	2012	2002	2012	2002	2012	2002	2012
Number of working poor at the US$1.25 a day level (million)	663.5	383.8	204.4	46.3	66.5	35.4	232.3	155.9	503.2	237.7
Number of working poor at the US$2 a day level (million)	1173.1	853.7	372.9	113.2	136.3	98.3	417.0	391.2	926.2	602.7
Share of working poor at US$1.25 a day in total employment (%)	24.6	12.3	26.9	5.6	26.7	11.7	42.9	24.4	32.2	13.9
Share of working poor at US$2 a day in total employment (%)	43.5	27.3	49.1	13.6	54.6	32.5	77.1	61.3	60.3	35.8

Source Key Indicators of the Labour Market, ILO database

against an average of 22.2 % in North America and Western Europe. Of the 28 developing Asian economies, 10 had percentages below 5 %, among them the major countries being India, Bangladesh, Nepal, Malaysia and Azerbaijan.

5.8 Lack of Access to Decent Livelihood (Working Poverty)

Working poverty is typically high in Asia, and the majority of the working poor eke a living in the informal sector in vulnerable conditions. The decent work deficits of those employed in the informal economy include poor-quality, unproductive and un-remunerative jobs that are not recognized or protected by law, absence of rights at work, inadequate social protection and lack of representation and voice (ILO 2013a, b).

Table 5.11 Status of employment, world and Asian regions: 2002 and 2012

Region	World		Developed economies and European union		East Asia		South-East Asia and the Pacific		South Asia		Asia	
Year	2002	2012	2002	2012	2002	2012	2002	2012	2002	2012	2002	2012
Total employment (million)	2,696	3,127	446	469	759	830	250	302	541	639	1,550	1,771
Wage and salaried workers (employees) (million)	1,210	1,512	380	405	316	409	81	111	99	140	496	660
Wage and salaried workers (employees) (%)	44.9	48.4	85.2	86.3	41.6	49.3	32.4	36.6	18.3	22.0	30.8	36.0
Persons in vulnerable employment ('000')	1,417	1,539	48	47	429	406	162	185	435	491	1,027	1,081
Share of vulnerable employment in total employment (%)	52.6	49.2	10.8	10.1	56.5	48.9	65.1	61.1	80.4	76.9	67.3	62.3

Source Key Indicators of the Labour Market, ILO database

In 2002, 84.4 % of the working poor[13] (at the US$2 a day level) of the world were concentrated in Asia (Table 5.10). Though this share has come down, that of Asia in 2012 was still unacceptably high at 78.9 %. Also, the share of the working poor in total employment in Asia at both levels (US$1.25 a day and US$2 a day) is much higher than the world average, especially those in moderate poverty. The numbers are completely abysmal in South Asia, where 24.4 % of the working population is under extreme poverty and, what is more alarming, 61.3 % of the working population is under moderate poverty.

The proportion of the wage and salaried workers is the lowest in Asia, while the incidence of vulnerable employment is the highest (Table 5.11). In developing Asia, nearly 1.1 billion workers (62.3 %) are classified as own-account or contributing family workers with limited job stability, earnings and protection (ILO 2013a, b). These workers are often informally employed, with few opportunities for regular, salaried employment. In 11 of the developing economies in Asia, less than one in two workers is engaged in paid wage employment. In Bangladesh, Pakistan, India, Lao PDR and Nepal, salaried work accounts for less than one-fifth of all jobs.

5.9 Conclusion

There is a stark dichotomy between the income and non-income indicators of urban poverty and a gross underestimation of urban poverty in developing Asia. The case of the PRC is especially interesting in this context. There is a need to broaden the definition of urban poverty beyond just the austere threshold of meeting the survival needs of food (nutrition) to one that meets a minimal set of basic needs and capabilities, which takes into account the huge deprivations related to shelter, access to basic infrastructure, access to health, education and social welfare, vulnerability in working conditions and working poverty. Adopting broader and higher poverty thresholds that would faithfully report urban poverty, however, is only the initial step in the formulation of a forward-looking urban poverty reduction strategy for developing Asia. But it is an important first step as it can be critical for focusing policy attention on the right target group. The new thresholds should form the basis of not only the measurement and monitoring of poverty in the country, but also, more importantly, the development of a consistent operational approach to targeting a range of poverty alleviation, housing, social protection and livelihood and decent job creation programs to the urban poor, combined with a focus on breaching the inequities between the poor and the non-poor, especially in the fields of health, education and access to basic infrastructure. It is critically important to do so because how developing Asia deals with the challenge of

[13] Working poor, according to the ILO definition, comprise the number of employed persons living in households in which per capita income/expenditure is below the poverty line, where employment status is determined at the individual level and poverty at the household level.

urban poverty would largely determine the pace of global urban poverty reduction in the coming decades.

It is now well acknowledged that poverty is inherently multidimensional in nature. Poverty analysis took a new broader dimension when Amartya Sen introduced and developed the capability approach that viewed poverty as a multidimensional concept and not just a result of deprivation of a single resource. The concept of capability has been extremely influential at both the academic and institutional levels. It has shaped the aggregate alternatives devised and implemented by the United Nations Development Programme's (UNDP) Human Development Initiative, which, since the 1990s, have measured the progress of individual well-being, and, with the introduction of the Human Development Index (HDI), could serve as a frame of reference for both social and economic development, by combining indicators of life expectancy, educational attainment and income into a composite index. Since the beginning of the new millennium, a host of indicators called the MDGs are being tracked in the context of the United Nations' Millennium Development Initiative. Eight MDGs with 18 measurable time-bound targets and 48 indicators were drafted to translate the commitment into reality by the end of 2015. The goals covered major aspects of social development, including eradicating extreme hunger and poverty; achieving universal primary education; promoting gender equality; reducing child mortality; improving maternal health; combating HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and developing a global partnership for development. The MDG discourse, thus, went well beyond the monetary approach and encompassed a number of fundamental capabilities. Measuring socio-economic progress, thus, gained pace, and demand for indicators from microsurveys also increased across the world. The Oxford Poverty and Human Development Initiative (OPHI) has developed an international poverty measure called the multidimensional poverty index (MPI), which was included for the first time in the UNDP flagship Human Development Report in 2010. The index reflects the multiple deprivations that a poor person faces with respect to education, health and living standards. It is a composite measure from microsurveys with a set of indicators that has overlapping areas with the MDGs.

Urban poverty, as discussed, is inherently much more multidimensional in nature than rural poverty or national poverty. But the measurement of the extent or the incidence of the multidimensional urban poverty is inhibited by the huge data gaps that exist across most nations in Asia (this would be true for the world as a whole) related to almost all the income and the non-income dimensions of urban poverty that have been discussed. Neither comparable estimates for income urban poverty for Asian nations (except three countries) nor most education and health indicators by their rural and urban splits are available. Working poverty data are available only at the regional level. Only the service delivery parameters of water and sanitation are available across urban parts for a reasonable number of countries. Thus, though extremely pertinent, it is impossible to come up with a multidimensional urban poverty index across the Asian nations (or for that matter, for most of the other countries in the world). The UN-HABITAT's functional definition of slums and the data corresponding to that, which forms a part of the UN Global Urban Indicators Database, are the only attempt at the global level that attempts to come up with a multidimensional urban poverty measure that is comparable across countries. As discussed, this definition not only measures the slum population, but also encompasses the deprivations of urban populations of countries related to the four dimensions of housing/shelter, congestion, water and sanitation. In the absence of country-level comparable data sets on the income and non-income urban poverty parameters, it is not possible to go beyond this definition and database. But even the basic urban deprivation index developed by UN-HABITAT is enough to put forward a strong case to point out the gross underestimation of urban poverty, as well as the dichotomy between the income and non-income dimensions of urban poverty for the Asian nations. It is very important to broaden the concept of urban poverty and start measuring the income as well as the various non-income dimensions of urban poverty across nations at regular fixed intervals through national microsurveys. The results can then be analysed by researchers or international organizations to come up with comparable estimates for each of the dimensions, as well as for the construction of a composite multidimensional urban poverty measure across nations.

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Chapter 6
Housing Poverty and Inequality in Urban India

Sohail Ahmad

Abstract Inequitable distribution of resources, including physical capital such as housing, poses a threat to sustainable development. Employing a case of housing in urban India, focusing on renter and slum dwellers, this study documents housing inequality and poverty, examines whether and why there is a gap in living standards (measured by dwelling size), and estimates the demand for housing. The study uses decomposition analysis to identify causes of inequality and estimates demand for housing among owner, renter and slum dwellers, employing a national representative microdata over a survey of 50,000 households. The results revealed that the average floor area consumption in renter/slum households is about two-third of the owner households, *ceteris paribus*. The reason for poor quality of renter/slum dwellings is not limited to differences in endowment levels, but also includes different 'rates of return' to these endowments. In order to enhance housing consumption in renter/slum dwellers, in addition to income improvement strategies, there needs to be a focus on skills upgradation and provision of a stable employment base. Moreover, renters/slums dwellers are concentrated in million plus cities and in the western and eastern regions of the country. Therefore, specific housing programs should be designed to target these regions.

Keywords Living standard · Housing · Poverty · Inequality · Renter · Slum · India

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_6

6.1 Introduction

India has the second largest urban population in the world (after the PRC) with 377 million people (Census of India 2011b). Urban India is characterized by severe housing poverty as well as inequality, with about 24 million housing shortages in 2007 (NBO 2007) and about 93 million slum dwellers spread unevenly in 49,000 slums across the country (NBO 2010).[1] Moreover, one-third of urban dwellers live in rental accommodations, which are poorly equipped. For instance, renter households have lower living standards than the owner households and are almost comparable to slums on certain indicators. Therefore, slums as well as rental dwellings can be perceived to be representative of housing poverty and inequality. Slums have been widely discussed among researchers and policy-makers (Angeles et al. 2009; Dupont 2008; Habitat 2003a, b; Mathur 2009). Recently, a serious attempt has been made through the ambitious program Rajiv Awas Yojana (RAY) to make India slum-free within five years (MHUPA 2011). In contrast, there are few studies dealing with issues of rental dwellings, despite their significance for the urban poor in developing economies (Habitat 2003a, b). The few studies that have dealt with rental dwellings have focused on the low-income and informal settlements, whose poor conditions are obvious and are rarely at the national level. For example, Ha (2002) critiqued that the Republic of Korea's state housing development authority has focused on expansion of housing development for sale rather than provision of rental accommodation, resulting in poor conditions of low-income rental accommodation. Rakodi (1995) has examined policies related to rental housing in the cities of developing countries. Urban the PRC presents some interesting findings, where privatization of public-owned housing based on 'work unit socialism' has led to housing inequality, on the one hand, and somehow state-controlled migration has led to poor housing conditions for migrant households, on the other hand (Sato 2006).

Studies of housing poverty and inequality in India have been limited to descriptive analyses (Mahadeva 2006; Mathur 2009), but recently empirical analyses have been added (Ahmad 2012; Mehta and Mehta 1989; Tiwari and Parikh 1998; Tiwari et al. 1999), including a focus on rental and slum dwellings at the national level (Chandrasekhar and Montgomery 2010). This study focuses on whether and why the renter/slum households have a lower living standard (measured by the floor area consumption) in comparison with the owner households and estimates housing demand. The study also contributes to expanding the definition of poverty merely from income (or consumption expenditure) to physical and social capital, such as housing (Baud et al. 2008; Chandrasekhar and Montgomery 2010; Wratten 1995).

The objectives of this study are twofold: first, to assess patterns of housing and amenities in urban India, with an emphasis on renters and slums, including causes for differences, and second, to estimate housing demand for owner, renter and slum dwellers. The prevalence of widespread poorly equipped rental and slum

[1] The recent data reveal between 65 million (Census of India 2011a) and 45 million (NSSO 2012) slum dwellers in urban India.

dwellings (in terms of floor area) is *not only* differences in endowment levels, but also, to a large extent, different 'rates of return' to these endowments.

6.2 Methods and Data

6.2.1 Methods

6.2.1.1 Estimates for Differences in Living Standard

The source of differences in living standard can be differences in household characteristics (endowments) as well as differences in returns to these characteristics. The characteristics effect arises on the possibility that the household attributes contributing to living standards, for example, income and employment status, may vary. The coefficients effect, i.e., 'returns to endowment' reflects how differences in the regression coefficients across groups affect living standard. Although interpretations are not straightforward, labor economics literature has shown that the characteristics effect is not based on discrimination, but the coefficient effect may be related to an unequal treatment by the society. Most studies employ the Blinder–Oaxaca decomposition to identify disparities, such as ethnic and caste disparities, in living standards and earnings (Kijima 2006; Gang Sen et al. 2008; Van de Walle and Gunewardena 2001). Neumark (1988) provides a more general decomposition method that does not assume that one of the groups has a discriminatory structure. This study uses the Neumark method to decompose the disparities in mean living standards, measured by floor area consumption, between the owner and renter/slum households into the component explained by the differences in endowments and returns to these endowments (Eq. 6.1).

$$\bar{y}_o - \bar{y}_r = \left(\bar{X}_o - \bar{X}_r\right)\beta + \left[\bar{X}_o(\beta_o - \beta) - \bar{X}_r(\beta_r - \beta)\right] \tag{6.1}$$

where $\bar{y}_o$ and $\bar{y}_r$ represent average floor area of the owner and renter households; $\bar{X}_o$ and $\bar{X}_r$ represent the mean value of the explanatory variables in the owner and renter households, which are the same as used in the housing demand estimates such as households' income and land possession, demographic characteristics, labor characteristics, sociocultural characteristics, and locational characteristics (refer to Table 6.3 for details). β, β_o, and β_r represent the parameters estimate, where β can be estimated using the weighted average of the floor area consumption of owner and renter households on the pooled sample, and similarly β_o and β_r separately for owner and renter households. The first term on the right side of the equation, which reflects the difference between the mean values of the explanatory variables (or determining factors), represents the endowments effect; the second term represents the coefficients effect; and the over bar represents the value of the sample average. Please note that the Eq. 6.1 deals with owners and renters; we can, similarly, have an equation for owners and slum dwellers by replacing renters with slum dwellers. Though the use of 'floor area per household' as a measurement of living standards is questionable, many studies have used it in housing inequality studies (Huang and Jiang 2009; Logan et al. 1999). The explanatory variables are similar to those used in the housing demand estimations, mainly derived from housing economics literature (for details. See the next part).

6.2.1.2 Estimates for Housing Demand

The housing demand function can be written as Eq. (6.2), where Q is the living standard, P is the unit price of dwelling, Y is the income of the household, Z is the vector of households' demographic and socioeconomic characteristics, and L refers to the locational characteristics.

$$Q = Q(P, Y, L : Z) \tag{6.2}$$

The living standard (Q) is measured by the total floor area consumed by the household. Unfortunately, the dataset does not have any information about the unit price of dwelling, except rent for only rental accommodation. Therefore, we do not use the price component in estimations that could give a relatively higher value of coefficients. Average monthly consumption expenditure as a proxy for income (Y) is used. Since income is difficult to measure and there is a high probability that it will be misreported, permanent income, which can be measured by consumption expenditure, can provide a better measure in explaining living standard. Two variables capture location effects (L)—city size and region. The household characteristics (Z) include principal occupation, employment status, household size, gender of household head, and household's sociocultural background. This study employs a log-linear functional form where both the dependent variable Q and the independent variable Y take logarithmic form so that the estimated coefficients can be directly interpreted as the income elasticity of the living standards. Few independent variables are treated as dummy variables. Household principal occupation can be categorized into five classes—professional/managerial, associate professional, clerical, sales/service worker, and elementary worker, using NCO-2004 two-digit codes. Two locational variables, city size and region, are used to control housing disparities on account of geographical variation. Large towns may have less floor area per household, a proxy to living standards, due to land supply constraints (Sivam 2002). Cities/towns are categorized into five classes based on the population figures of the 2001 census—class I (less than 50,000), class II (50,000–99,999), class III (100,000–499,999), class IV (500,000–999,999), and class V (million plus cities). India has 6 regions excluding all union territories except Delhi and Chandigarh.[2]

[2] These are as follows: Central—Madhya Pradesh, Uttar Pradesh, Chhattisgarh, and Uttaranchal; Southern—Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu; Western—Gujarat, Maharashtra, and Goa; Eastern—Odisha, Bihar, Jharkhand, and West Bengal; Northern—Haryana, Himachal Pradesh, Punjab, Rajasthan, Delhi, and Chandigarh; and North Eastern—Assam, Sikkim, Nagaland, Manipur, Mizoram, Tripura, and Meghalaya.

6.2.2 Data

This study uses the 65th round of India's National Sample Survey (NSS) on 'Housing Condition and Amenities in India,' the microdata provided by the National Sample Survey Organization (NSSO 2010). The data were collected through a stratified multi-stage sample design in urban India during 2008–2009 (here after 2009), with a total of 56,474 households selected randomly from 4,735 Urban Frame Survey blocks. The 65th round collected data on household characteristics, housing characteristics, and the micro environment, among others. A temporal comparison has been made, using the previous dataset from the same theme conducted in 2002 (NSSO 2004).

6.3 Results

6.3.1 Housing Poverty and Inequality in Urban India

The results provided in this section are based on the summary statistics of the sample survey (Table 6.4), including the *t*-test (chi-square test) associated with testing the null hypothesis that the relevant owner and renter (or slum) household mean values (frequencies) were equal. In addition, some of the results are derived from the comparison of selected variables between the present survey (2009) and the previous survey on the same theme (2002). An empirical result which estimates the causes of differences in living standard is derived from a decomposition analysis.

The *t*-test assessed the means of owners and renters (or slum dwellers) and revealed that important socioeconomic characteristics such as floor area consumption, income, and land possession were statistically different. For instance, average dwelling sizes (in m^2) for owner, renter, and slum dwellers were 51, 30, and 25, respectively. The average dwelling size of slum households was half of that of the owners, but surprisingly renters' dwelling size was very close to that of the slum dwellers. Slum households were dominated by low-skilled occupations and poor employment status. Relatively large proportions of socioculturally disadvantaged communities were living in slums, which were concentrated in million plus cities, and the western and northern regions. The 2009 data reveal extremely poor conditions of slums—one-fourth of the households live in structurally poor dwellings, 43 % of the households live with more than three persons per living room, only one-third of the households has their own toilet, and more than half do not have access to motorable roads (Table 6.1). The owner dwellings are better equipped in comparison with rental dwellings. For instance, the rental dwellings are overcrowded (about 6 % points) with poor sanitation facilities. In comparison with the owner households, the renter and the slum households consume 33 and 38 % less floor area, provided other variables are constant.[3]

[3] This is based on the result of a regression where variables are the same as used in Table 6.3 with additional independent variable tenure: owner (reference group), renter, and slum.

Table 6.1 Changes in housing conditions of urban households, 2002 and 2009

	2002				2009			
	Owner	Renter	Slum	Aggregate	Owner	Renter	Slum	Aggregate
Consumption expenditure (Rs.)	4,501.47	3,447.95	2,929.97	3,920.82	5,760.90	4,763.00	3,924.30	5,187.77
Living space per capita (in m^2)	11.87	10.42	5.84	10.51	12.22	10.73	6.92	11.00
Dwelling with more than three persons per living room (%)	27.90	29.52	52.72	32.02	23.41	29.63	42.92	27.95
Structurally bad dwelling (%)	9.54	11.10	24.28	12.21	9.28	10.82	23.54	11.83
Separate kitchen (%)	67.47	51.56	30.08	56.75	71.94	54.3	39.04	61.92
Own toilet (%)	66.06	48.11	21.45	53.55	71.3	48.44	31.22	58.68
Tap as a drinking water (%)	68.85	79.08	78.72	73.65	69.8	81.77	77.23	74.42
Motorable access road (%)	60.4	69.14	44.26	60.9	62.77	69.56	45.85	62.28
Sample size (≈) (% of total)	21,867 (61.39)	13,752 (38.6)	6,130 (14.64)	41,829 (100)	31,518 (65.55)	16,563 (34.45)	8,273 (14.68)	56,354 (100)

Notes The owner and renter households are only from non-slums, while the slum households include all irrespective of their tenure. *Source of data* (NSSO 2004, 2010)

Table 6.2 Decomposition sources of inequality in dwelling size between owner and renter/slum, 2009

Difference of floor area consumption	Renter		Slum	
	Characteristics (endowments)	Structures (returns to endowments)	Characteristics (endowments)	Structures (returns to endowments)
Logarithm	0.168	0.331	0.25	0.248
Percentage	33.67	66.33	50.2	49.8

Notes The owner and renter households are only from non-slums, while slum households include all irrespective of their tenure. *Source of data* NSSO 2008–2009

In the span of 7 years (2002–2009), housing conditions have not improved significantly, but incremental changes have been noticed in select indicators (Table 6.1). Though these surveys are not based on a panel data, this comparison provides trends of dwelling conditions. The share of households with more than three persons per living room decreased from 32 to 28 %. Similar improvement has been reported in owner, renter, and slum households. Public infrastructure, such as ‘tap as a drinking water’ and ‘motorable access road,’ has improved only marginally, and even decreased in slums.

The empirical estimates, decomposition sources of inequality in housing consumption, show that the magnitude of differences between the owner and the renter households and between the owner and the slum households are similar (log (floor area) ≈0.50) (Table 6.2). About one-third of the difference is accounted to differences in endowment levels, while two-third is due to different returns of these endowments between owner and renter households. It means that if the owner and the renter households had the same endowments, then one-third of the lower living standards in the renter households would disappear, and, in the same way, if the renter households had the same return to these endowments, then two-third of the lower living standards would disappear. However, differences between owner and slum households are equally due to differences in endowment levels and the returns of these endowments (about 50 %). This is one of the important findings, where a significant proportion of living standard differences (50–66 %) is contributed by different returns of endowments, that is, an unequal treatment by the society.

6.3.2 Housing Demand in Urban India

Housing demands are estimated employing ordinary least squares (OLS) regression, where the dependent variable is the floor area and the independent variables are socioeconomic characteristics of the households. All models show a modestly high level of goodness to fit with adjusted R-Square from 0.33 to 0.41 (Table 6.3).

6.3.2.1 Effects of Income and Land Possession

Income is the single-largest determinant of housing consumption. The income elasticities of owner, renter, and slum households are 0.42, 0.45, and 0.26, respectively. Therefore, a 10 % increase in consumption expenditure enhances

Table 6.3 Estimation results of housing demand in urban India, 2008–2009

Independent variables	Non-slum				Slum	
	Owner		Renter			
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
Income and land possession						
Consumption expenditure (log)	0.422	0.001***	0.458	0.001***	0.258	0.001***
Land possession	0.110	0.001***	0.087	0.001***	0.111	0.001***
Demographic characteristics						
Household size	0.012	0.001***	0.015	0.001***	0.043	0.001***
Male-headed household	−0.073	0.001***	−0.028	0.090*	-0.052	0.013**
Labor market characteristics: principal occupation and employment status						
Associate professional (ref: Prof./managerial)	−0.002	0.907	−0.033	0.105	0.046	0.271
Clerical (ref: Prof./managerial)	−0.027	0.074*	-0.087	0.001***	0.035	0.387
Sales/service worker (ref: Prof./managerial)	−0.154	0.001***	−0.221	0.001***	−0.161	0.001***
Elementary worker (ref: Prof./managerial)	−0.250	0.001***	−0.289	0.001***	−0.223	0.001***
Self-employed (ref: regular wage/salary earning)	0.004	0.608	−0.098	0.001***	−0.006	0.715
Casual labor (ref: regular wage/salary earning)	−0.031	0.005***	−0.094	0.001***	−0.021	0.230
Others (ref: regular wage/salary earning)	−0.029	0.232	−0.165	0.001***	0.107	0.044**
Sociocultural characteristics: religion and social group						
Muslim (ref: Hindu)	−0.064	0.001***	−0.062	0.001***	−0.030	0.109
Christian (ref: Hindu)	−0.037	0.014**	0.053	0.011**	−0.064	0.054*
Others (ref: Hindu)	0.041	0.014**	0.154	0.001***	0.127	0.001***
SC and ST (ref: others)	−0.152	0.001***	−0.073	0.001***	−0.053	0.003***
OBCs (ref: others)	−0.026	0.001***	−0.023	0.038**	0.063	0.001***

(continued)

Table 6.3 (continued)

Independent variables	Non-slum				Slum	
	Owner		Renter			
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
Location characteristics: town size and region						
Class I (<50,000) (ref: million+)	0.141	0.001***	0.190	0.001***	0.303	0.001***
Class II (50,000–99,999) (ref: million+)	0.143	0.001***	0.207	0.001***	0.294	0.001***
Class III (100,000–499,999) (ref: million+)	0.061	0.001***	0.131	0.001***	0.289	0.001***
Class IV (500,000–999,999) (ref: million+)	0.084	0.001***	0.062	0.001***	0.059	0.008***
Region—Southern (ref: Central)	−0.029	0.004***	−0.002	0.913	−0.086	0.001***
Region—Western (ref: Central)	−0.167	0.001***	−0.130	0.001***	−0.200	0.001***
Region—Eastern (ref: Central)	−0.104	0.001***	−0.107	0.001***	−0.225	0.001***
Region—Northern (ref: Central)	−0.006	0.006***	−0.035	0.001***	−0.042	0.001***
Region—North Eastern (ref: Central)	0.109	0.001***	0.057	0.004***	0.182	0.001***
Constant	0.006	0.911	−0.605	0.001***	0.674	0.001***
Adjusted *R*-square	0.41		0.41		0.33	
Number of observations	26,437		14,023		7,694	

Notes ***: *p*-value < 0.01, **: *p*-value < 0.05, *: *p*-value < 0.1; *DV* Total Floor Area (log); slum samples include both owner and renter households corresponding housing consumption by 4.2, 4.5, and 2.6 %, *ceteris paribus*. The income elasticities are consistent with previous studies, which showed that income elasticities in developing countries are inelastic, with little difference between owner and renter households (Ahmad et al. 2013; Malpezzi and Mayo 1987; Tiwari and Parikh 1998). The income elasticities are smaller in magnitude from the earlier study in urban India, where income elasticities for both owner and renter households were 0.9 (Tiwari and Parikh 1998), and urban Bangladesh, where income elasticities for owner, renter, and slums were 0.69, 0.67, and 0.39, respectively (Ahmad 2015). The amount of land possessed, a proxy to well-off sections of society, is one of the important determinants for housing consumption. As quantity of land possessed increases, housing consumption also increases irrespective of tenure.

6.3.2.2 Effects of Labor Market Characteristics: Principal Occupation and Employment Status

Two household variables related to labor market—principal occupation and employment status—have been used in the estimates. As expected, the results revealed that the 'principal occupation' affects housing consumption considerably and the effect of 'employment status' is significant, though smaller in magnitude. Households with a better principal occupation consume more floor area, controlling other variables. For instance, households with 'sales/service' principal occupation consume 15, 22, and 16 % less floor area as compared to the 'professional/managerial' category in owner, renter, and slum households, respectively, *ceteris paribus*. Similarly, households with better employment status consume more floor area, but in a smaller magnitude. For instance, households with 'casual labor' consume 3 and 9 % less floor area in comparison with the 'regular wage/salary earning' category in owner and renter households, respectively, *ceteris paribus*.

6.3.2.3 Effects of Other Variables: Demographic, Sociocultural, and Location Characteristics

Demographic, sociocultural, and location characteristics are important variables in determining housing consumption, albeit of lesser magnitude than income, and land possession, as revealed from standardized coefficients (not presented here). Male-headed households consume less floor area in comparison with female-headed households, *ceteris paribus*. Across the models, household size positively impacts the floor area consumption, but with a relatively higher magnitude in the case of slum households, similar to what other studies in India have revealed (Ahmad 2011; Tiwari, and Parikh 1998).

Despite affirmative action over the past few decades, households from socioculturally disadvantaged communities lack housing consumption in comparison with their counterparts (Sachar 2006). For instance, Muslim households living in owner/rental dwellings consume 6 % less floor area in comparison with Hindu households, *ceteris paribus.* This is also true for Scheduled Caste and Scheduled Tribe communities. Moreover, the social group has a more significant bearing than the religious group.

Variables related to location, city size, and region revealed that small cities have better housing consumption irrespective of their tenure. This is understandable since housing and land supply have fewer constraints in small towns/cities than in large cities (Pugh 1991; Sivam 2002, 2003). Similarly, housing consumption varies regionally, provided other variables are constant, particularly between the western (Gujarat, Maharashtra, and Goa) and eastern (Odisha, Bihar, Jharkhand, and West Bengal) regions. In comparison with the central region (Madhya Pradesh, Uttar Pradesh, Chhattisgarh, and Uttarakhand), households living in western and eastern regions consume 10–22 % less floor area, *ceteris paribus*. To sum up, there are significant disparities in living standards based on city size and region.

Conclusion

The aim of this study was to bridge the gap in housing consumption between renter/slum and owner households in urban India. Therefore, the study first assessed housing poverty and inequality in urban India and estimated determinants of housing consumption among owner, renter, and slum dwellers. The purpose of such analyses was to provide evidence-based urban/housing policy interventions to reduce housing poverty and inequality in urban India. This study used a nationally representative microdata and employed econometric analyses derived from housing economics literature (Malpezzi and Mayo 1987). The followings key findings emerged:

- The renters and slum dwellers have low-living standards, as measured by the floor area consumption, in comparison with the owner households. They are also at the lower end of the socioeconomic composition, being largely engaged in low-skilled occupations and casual employment.
- The disparities in the living standards between owner and renter households were due to their low endowment (34 %) as well as different returns to endowment (66 %), while corresponding disparities between owner and slums were equal, about 50 % each. This means renter dwellers face more unequal treatment than slum dwellers by the society.
- The determinants for housing consumption in renter dwellers are income, high-skilled occupations, and stable employment status. In addition, renter households in small towns/cities consume a large-sized dwelling in comparison with million plus cities. Similarly, determinants for housing consumption among slum dwellers were the same except stable employment status, since self-employed and casual laborers were not significant. Moreover, magnitudes

of these variables in determining housing consumption were large in renter than slum households.
- Notably, determinants for housing consumption among renters and slums significantly vary by city size and regions. Households living in million plus cities, and western and eastern regions lag behind their counterparts, *ceteris paribus*.

Rental and slum dwellings together form the large share of housing stock in urban India. Therefore, policy-makers should recognize their importance in formulating urban/housing policy and programs. As expected, slum dwellers live in poor quality of dwellings, but surprisingly renters also live in poorly equipped dwellings. This is in contrast to our neighboring country Bangladesh, where urban renters live in better dwellings than owners (Bangladesh Bureau of Statistics 2010). Moreover, rental housing is not on the agenda of policy-makers. Since poor quality of rental housing is more due to different returns to endowments (about 66 %) than differences in endowment levels (34 %), this implies there is unequal treatment by the society. This should be rectified through appropriate policies and programs, which are, not exhaustive but indicative, as following. Besides income improvement strategies, in general, there needs to be a focus on upgrading the job skills of low-skilled workers (sales/service and elementary workers) and providing a stable employment base to the self-employed, casual, and others workers. Additionally, these specific groups of households can be targeted through housing subsidies (or concessions). Spatially, renter/slum households are located in million plus cities, and western (Gujarat, Maharashtra, and Goa) and eastern (Odisha, Bihar, Jharkhand, and West Bengal) regions. Therefore, the focus of such interventions should be targeted in these regions through special housing/urban programs.

Acknowledgment The author is thankful to the National Sample Survey Office (NSSO) for providing datasets, the Japan Society for the Promotion of Science (JSPS) for Grants-in-Aid for Scientific Research, and anonymous reviewers for their critical reviews of the manuscript. This manuscript was revised while affiliated with the School of Planning and Architecture, Vijayawada (SPAV). The article is the sole responsibility of the author and does not express the views of the institutions author is affiliated.

Appendix

See Table 6.4.

Table 6.4 Summary statistics of the sample survey, 2009

Variables	Non-slum				Slum		Statistics[a]
	Owner		Renter				
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
DV: Floor area (square meter)	50.84	35.61	29.87	23.13	25.20	19.89	(−68.56) {−62.95}
Income and land possession							
Consumption expenditure	5760.94	4601.44	4731.08	3682.53	3924.28	2363.34	(−24.91) {−35.10}
land possession	2.33	1.46	1.67	1.08	1.64	1.16	(−51.10) {−39.68}
Demographic characteristics							
Household size	5.03	2.52	3.70	2.08	4.50	2.36	(−58.11) {−17.23}
Male-headed household	0.87	0.33	0.89	0.31	0.88	0.33	(5.30) {0.69}
Labor market characteristics: principal occupation and employment status							
Occupation—Prof./manag.	0.26	0.44	0.18	0.38	0.12	0.32	(−19.35) {−27.04}
Occupation—Assoc. prof.	0.06	0.24	0.07	0.26	0.03	0.17	(5.32) {−10.64}
Occupation—Clerical	0.06	0.23	0.06	0.25	0.04	0.19	(3.80) {−7.01}
Occupation—Sales/service	0.45	0.50	0.47	0.50	0.49	0.50	(4.58) {6.86}
Occupation—Elementary	0.17	0.38	0.21	0.41	0.32	0.47	(9.41) {29.66}
Status—regular wage/salary	0.30	0.46	0.52	0.50	0.36	0.48	(48.4) {10.53}
Status—self-employed	0.46	0.50	0.25	0.43	0.32	0.47	(−46.6) {−22.78}
Status—casual labor	0.14	0.35	0.13	0.34	0.26	0.44	(−2.05) {26.22}
Status—others	0.10	0.30	0.10	0.31	0.06	0.24	(0.049) {−11.23}
Socioculturalcharacteristics: religion and social groups							
Religion—Hindu	0.75	0.43	0.80	0.40	0.73	0.44	(11.23) {−4.08}
Religion—Muslim	0.15	0.36	0.11	0.31	0.18	0.38	(−12.49) {6.04}
Religion—Christian	0.06	0.24	0.07	0.25	0.05	0.22	(3.22) {−3.19}
Religion—others	0.04	0.19	0.03	0.16	0.04	0.20	(−6.83) {1.66}

(continued)

Table 6.4 (continued)

Variables	Non-slum				Slum		Statistics[a]
	Owner		Renter				
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Social group—others	0.42	0.49	0.43	0.50	0.33	0.47	(1.90) {−15.11}
Social group—SC and ST	0.21	0.40	0.21	0.41	0.36	0.48	(0.503) {30.54}
Social group—OBCs	0.37	0.48	0.36	0.48	0.30	0.46	(−2.37) {−11.45}
Location characteristics: city size and region							
Class I (<50,000)	0.35	0.48	0.26	0.44	0.19	0.39	(−2.37) {−26.88}
Class II (50,000–99,999)	0.14	0.35	0.12	0.32	0.13	0.34	(−7.16) {−1.67}
Class III (100,000–499,999)	0.24	0.43	0.25	0.43	0.24	0.43	(2.33) {−0.169}
Class IV (500,000-999,999)	0.10	0.30	0.13	0.34	0.12	0.32	(11.28) {5.37}
Class V (million+)	0.17	0.38	0.24	0.43	0.31	0.46	(17.23) {28.59}
Region—Central	0.22	0.41	0.14	0.34	0.13	0.34	(−20.97) {−17.52}
Region—Southern	0.22	0.41	0.30	0.46	0.23	0.42	(19.56) {2.34}
Region—Western	0.16	0.37	0.13	0.34	0.32	0.47	(−7.61) {33.19}
Region—Eastern	0.15	0.36	0.13	0.34	0.15	0.35	(−5.57) {−1.88}
Region—Northern	0.67	1.71	0.83	1.86	0.56	1.58	(9.06) {−5.41}
Region—North Eastern	0.12	0.32	0.13	0.33	0.06	0.24	(3.81) {−14.71}
Number of observations	31,518		16,563		8,273		

Notes

Slum samples include both owner and renter households

[a]The statistics is the t-value in case of average and chi-square value in case of frequency; figures in ( ) are the t-values associated with testing the null hypothesis that the relevant owner and renter household mean values were equal; figures in { } are the t-values associated with testing the null hypothesis that the relevant owner and slum mean values were equal

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Part IV
Rural Poverty Reduction Policies

Chapter 7
Evaluation of the Policy of Crop Diversification as a Strategy for Reduction of Rural Poverty in India

Aparajita Mukherjee

Abstract This paper examines the effectiveness of crop diversification in ensuring greater availability of food and nutrition to the Indian cultivators, under varied irrigation and infrastructure conditions. We undertake empirical investigation with primary farm-level data into the extent and severity of poverty and food deprivation among very marginal, marginal and small farmers, practicing crop diversification to different degrees, in three districts of an Indian province. The viability of the strategy is also examined by comparing farm-level efficiency and profitability of high-value crops vis-à-vis traditional crops. By and large, our test results indicate an inverse association between the extent of crop diversification and calorie intake per capita across the regions. In areas suffering from adverse soil and other characteristics which make it difficult to develop irrigation, farmers are compelled to diversify away from water-intensive traditional crops to ensure a minimum acceptable level of consumption, but they still find it hard to avoid poverty and malnutrition. By contrast, in places where the farmers develop access to irrigation through private investment, crop diversification enables them to maintain some reasonable level of consumption and positive net income. But high-value crop production results in low profitability and relative inefficiency. The study indicates the need for a more direct policy intervention to ensure effectiveness of crop diversification as a strategy for reduction of rural poverty in India.

Keywords Crop diversification · Marginal and very marginal farmers · Irrigation and infrastructure · Poverty and malnutrition · Efficiency and profitability

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_7

7.1 Introduction

According to World Bank's estimate for 2010, India has the largest number of the poor in the world, comprising one-third of the world's poor (World Bank 2010).[1] Notwithstanding the fact that the method of estimating poverty is fraught with confusion and controversies (Himangsu 2008; Patnaik 2010; Raphelle 2013; Gangopadhyay and Singh 2013), and different procedures for estimation of poverty are followed by different agencies such as the World Bank, the Asian Development Bank, and others, estimated figures of absolute poverty and poverty ratio indicate that in India, poverty is still quite high, though there is a falling trend in the poverty ratio (Himangsu 2008). Further, Indian researchers observe a divergence between poverty measures based on real expenditure and those based on direct calorie requirement. Estimates of the proportion of the population not getting adequate calorie are even higher than the estimated figures of poverty ratio (Himangsu 2008; Deaton and Dreze 2009; Patnaik 2010).

The agricultural sector in India, being dominated by very marginal, marginal and small farmers, faces the problem of low productivity, low availability of food grains and low income (Desai et al. 2011), leading to a high level of poverty, particularly in areas with extremely backward infrastructure and irrigation systems. While during 1992–1993 to 1996–1997, the average annual compound growth of the yield rate of food grains was 2.05, it was 1.23 during 1997–1998 to 2001–2002 and came down to 1.09 during 2002–2005 to 2005–2006.[2] Wheat and coarse cereals also experienced a similar trend, with wheat experiencing a negative rate of growth during the last phase. As a result, the average annual compound growth rate of food grain production, which was 3.22 in the 1950s, came down to 1.66 in the 1990s. This led to an absolute decline in the per capita net availability of cereals and food grains from 468 and 510 g per day per head in 1991 to 422 and 454 g in 2000, to 407 and 444 g in 2009, respectively.[3] The chemical-based technology, which leads to degradation of the fertility of soil through overuse of chemical fertilizers combined with a water-intensive traditional crop-based cropping pattern, is alleged to have contributed to the continuously falling yield rates throughout the country, making traditional crop-based agriculture nonviable (Sing 2004; World Bank 2005). Based on observations of

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[1] World Bank estimates Indian poverty at a head count ratio of 32.7 % at $1.25 per day as the poverty line income, the absolute figure being around 400 million, whereas world poverty is estimated at 1.2 billion. ADB, on the other hand, uses $1.35 per day as the poverty line for India.

[2] We have estimated the average annual compound growth rates on the basis of data obtained from Agricultural Statistics at a Glance 2010, Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Government of India (website: http://www.dacnet.nic.in/eands).

[3] Agricultural Statistics at a Glance 2010, Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Government of India (website: http://www.dacnet.nic.in/eands).

the alleged failure of the traditional crop-based agriculture to face competition in the global market, diversification of the cropping pattern to high-value crops is suggested (World Bank 2005) as a major way out from the agrarian impasse. Our objective is to analyse situations under which such a transformation can be viable and serve as a strategy for reenergizing Indian agriculture, providing the farmers a way out from extreme vulnerability, and enabling them to avoid conditions of poverty and malnutrition.

This study is based on an empirical investigation with the use of primary data on different aspects of farming relating to 360 farming households belonging to different size classes of landholdings. We selected 6 administrative blocks of three districts in West Bengal, an Indian province, in order to consider varied conditions with regard to irrigation and infrastructure.

7.2 A Brief Overview of Existing Literature and the Proposed Framework of Analysis

We have not come across any study examining the relationship between crop diversification and poverty as such. Most studies, as we shall see below, observe the negative relationship between the extent of diversification, on the one hand, and farm size, and availability of irrigation and rainfall, on the other (Joshi et al. 2004; Singh and Sidhu 2004; Rao et al. 2006). This seems to indicate a direct relationship between crop diversification and small and marginal farmers' destitution due to lack of adequate water for cultivation. One of the observations the researchers arrive at is that diversification and production of labour-intensive high-value crops are taken up more by the small farmers than by the large farmers, to ensure bare subsistence by minimizing the risk of loss of livelihood associated with production of highly water-intensive traditional crops, particularly in areas suffering from acute problems relating to availability of irrigation (Joshi et al. 2004). The need to maintain a minimum level of income in the face of a high level of uncertainty, rather than profit consideration, induces the small farmers in less irrigated areas to undertake cultivation of horticultural crops side by side with cereals. A more disaggregated study using district-level data came to a similar observation that while existence of demand is a necessary condition for growth of high-value crops, high-value crops are more concentrated in districts with a higher concentration of small farmers (Rao et al. 2006).

In investigating the factors behind declining crop diversification in Punjab, some studies have observed that availability of greater irrigation facilities at cheap rates leads to specialization in one or two traditional crops, while lack of such facilities results in the adoption of diversification as a coping strategy (Singh and Sidhu 2004). In discussing agricultural crisis in India in the post-green revolution period, Sing (2004) also points out how diversification may help farmers to avert critical conditions.

A study on Indian agriculture conducted by the World Bank (2005), however, arrives at a different view that increased diversification in the crop sector came about primarily 'to increase income rather than as a coping strategy to manage farm-level risk and uncertainty'. Diversification is observed to be the result of expansion of the market for high-value crops, greater access to markets and prospect of increased profitability in an open economy.

That increasing prospect of profits through expansion of market demand plays an important role in crop diversification had already been indicated by other researchers. It had been observed (Gulati and Batila 2001) that increased share of capital formation at the private and farm level in the face of a declining trend in public investment influenced the composition of agricultural production in favour of diversification away from food grain crops. As indicated, when falling public investment in irrigation induces the farmers to undertake private investment, they prefer to shift from cereal to non-cereal high-value crops.

Some researchers have shown there has been a substantial change in the composition of food (except for the lowest 30 % of the income groups) both in rural and urban areas (Rao 2000), which serves as a factor inducing private investors to shift their investment initiative towards non-food grains (Gulati and Batila 2001). A study of the consumption pattern of 200 landless rural households in Tamil Nadu (Rajuladevi 2001), however, indicates abject poverty and extreme dependence on cereals as the main item of consumption. A study on the NSSO 59th round data also reveals changes in the consumption pattern except for the lowest stratum.

The studies discussed helped us to design the framework of the proposed study and develop the following propositions and hypotheses for empirical verifications. While lack of access to publicly supplied cheap irrigation is the single most important factor inducing crop diversification, crop diversification takes place under two alternative conditions: first, when it is possible to take initiative at the private level to develop farmers' access to irrigation; second, when it is not possible to develop irrigation by individual initiative because of extremely adverse natural conditions. In the first case, the farmers undertake diversification to ensure positive returns on their investment—expansion of market and other infrastructure play an inducing role in this case. We hypothesize that diversification may act as an effective strategy for reducing poverty among marginal and very marginal farmers under this situation. In the alternative situation, farmers take up diversification and production of high-value labour-intensive crops, using family labour, as a strategy for maintaining bare subsistence—in this situation, farmers find it hard to avoid poverty and malnutrition. We further hypothesize that small and marginal farmers in destitution choose to diversify towards production of high-value crops even if these are less viable from the point of view of efficiency and profitability.

7.3 The Methodology

We use farm-level data collected on the basis of carefully designed[4] samples of farming households through a field survey of six villages from three districts of West Bengal, an Indian province, to carry out our empirical investigation. The three districts selected from West Bengal are Hooghly, Burdwan and North 24 Parganas—each of these districts represents particular characteristics with regard to availability of irrigation.[5] Burdwanis well endowed with public irrigation facilities, with almost 90 % of its irrigated area under government canals and high soil fertility. Hooghly depends on a combination of public and private sources of irrigation, with less than 30 % of its irrigated area under canals and deep tube wells. North 24 Parganas is not endowed with any public irrigation and infrastructure facilities in the most part and also suffers from high salinity of the soil, particularly in the southern part of the district. The districts are also different with respect to the cropping pattern. While Burdwan is mainly a traditional crop producing area, Hooghly produces both rice and potato, two traditional water-intensive crops, in substantial proportion, though some parts of the district produce vegetables and jute in considerable proportion. North 24 Parganas is famous as a producer and supplier of fruits and vegetables to urban areas surrounding the provincial capital Kolkata, which also serves as an outlet to the overseas market. Two separate administrative blocks were selected in each of these districts: one relatively more endowed with public irrigation and infrastructure, and the other with either less or none of these facilities. We selected villages/mouzas from each block representing the characteristics of the respective blocks with regard to irrigation and infrastructure, and constructed a sample of 60 farming households from the selected villages within each block following a stratified random sampling procedure so that four size classes—<0.5 ha (very marginal), 0.5 to <1 ha (marginal), 1 < 2 ha (small) and 2 < 4 ha (medium)—of agricultural holdings were represented proportionately in the population (the number of farms with more than 4 ha of farm size was negligible in the population). We kept the sample size at 60 for each of the blocks, with a total of 360 households from 6 blocks ($6 \times 60 = 360$).[6] Data on broad aspects of farming, including conditions with regard to irrigation and infrastructure, and consumption of different food items by the farmers were collected on the basis of structured questionnaires.

We measured the degree of crop diversification using Simpson's crop diversification index:

$\mathrm{CDI} = 1 - \sum \left(p_i / \sum p_i\right)^2$ where p_i being the area under the ith crop. The value of CDI lies between 0 and 1, indicating complete specialization, when the value

[4] The sample design is described in Appendix 1.

[5] Data and information on availability of irrigation as well as cropping pattern of the districts are obtained from District Statistical Hand Book, Bureau of Applied Economics and Statistics, West Bengal.

[6] Details on the selection procedure are provided in Appendix 1.

is 0 and extreme diversification when the value approximates 1. Using CDI, we identified two groups of regions as ‘more diversified’ and ‘less diversified’.

We estimated nutritional intakes of the farmers in both these regions on the basis of consumption data collected by us, using nutritional conversion rates as used by NSSO.[7]

To examine the viability of crop diversification in terms of its impact on relative farm-level efficiency, farm business income and profits per unit of investment, we estimated profitability under vegetables production and production of Aus, Aman and Boro. We undertook a comparative analysis of efficiency in the production of vegetables vis-à-vis these traditional crops using the non-parametric technique of Data Envelopment Analysis (DEA).[8] However, since DEA does not measure efficiency in absolute terms, but relative to the best practice within the sample (its value lying between 0 and 1, with 1 representing the best practice), the proportion of farms having a high DEA score and average DEA score of a category need to be considered by comparing the relative efficiency of different categories.[9]

In this paper, we restrict ourselves to comparing the overall technical efficiency (OTE) in input use between high-value crops and traditional crops using the DEA technique with the assumption of constant returns to scale with single crop models, instead of analysing scale efficiency and pure technical efficiency of a farm under the variable returns to scale assumption with a multi-crop model. This is because our major concern is to evaluate the effectiveness of crop diversification as a poverty alleviating strategy and compare the relative viability of high-value crops vis-à-vis traditional crops rather than the efficiency of a multi-crop farm. We also estimate profits on the basis of prices of output actually received and prices of inputs actually paid by farmers, and estimate farm business income by incorporating the imputed value of family labour and other owned inputs in the cost calculation.

Since both the ranges of CDI and efficiency scores obtained from DEA are censored, whenever we have conducted regression analysis with any of these two variables as the dependent variable, we have used the Tobit regression model.

7.4 Results of Empirical Investigation

7.4.1 Extent of Crop Diversification in Relation to the Pattern and Extent of Irrigation

The selected villages in our sample are endowed with different kinds of irrigation (publicly supplied cheap irrigation system vis-à-vis privately developed costly irrigation) to different degrees, are placed at different distances from cold storages,

[7] Appendix 2 of NSSO Report No. 471(55/1.0/9).

[8] Detailed analysis of the technique is provided in Appendix 2.

[9] Another major limitation of the DEA technique is that the results are too sensitive to not only measurement error, but also input and output specification and size of the sample.

Table 7.1 Ranking of blocks and Simpson's crop diversification index (CDI)

Infrastructure rank	Block	Irrigation code	CDI	CDI rank
1	Pandua	1	0.45	6
2	Memari	1	0.49	5
2	Balagarh	2	0.64	3
5	Bongaon	3	0.67	2
3	Hasnabad	6	0.68	1
6	Golsi	2	0.55	4

Source Field survey

markets, highways and railway stations, and are connected through different types of roads with these centres. Accordingly, we use a coding system to rank the survey villages in order of the extent and availability of irrigation from public and private sources and infrastructures,[10] including distances from the marketing and storage centres, and type of link roads. We also estimate the crop diversification indices pertaining to the villages. Table 7.1 presents ranks of the blocks with regard to irrigation and infrastructure and the respective crop diversification indices.

The ranking of blocks shows that Memari and Pandua, the two least diversified blocks, fall in the same irrigation type with availability of publicly supplied cheap canal and deep tube well irrigation along with other sources. But the village in Pandua block placed in the best condition with regard to infrastructure is least diversified among the survey villages, followed by the village in Memari placed in the second best position with regard to infrastructure and second lowest position with regard to diversification. This confirms that when there is no lack of cheap publicly supplied water, farmers are induced to specialize in traditional crops, even in the presence of good infrastructure.

Villages under Balagar and Golsi, which depend on private and costly irrigation systems have an almost nonexistent public system of irrigation, enjoy the second position with regard to the extent of irrigation. While the much better position of Balagar with regard to infrastructure enables it to diversify its cropping pattern, the worst infrastructure condition in Galsi keeps it less diversified. This supports our proposition that when farmers develop access to irrigation at high private cost, they diversify the cropping pattern to ensure good returns, but extent of diversification depends on the availability of infrastructure in such cases.

Villages under North 24 Parganas, the most diversified district in our sample, exhibit the worst irrigation and infrastructure conditions. The selected villages in Hasnabad, the most diversified among all the villages, are placed in the worst condition with regard to irrigation, suffer from high salinity of the underground water and depend mainly on rainwater; these villages are also very backward in terms of infrastructure. Consequently, farmers here are subject to high levels of vulnerability.

[10] Details of coding are given in Appendix 3.

The selected villages in Bongaon, the second most diversified villages, are placed in the second worst condition with regard to irrigation, suffer from weather-related risk and uncertainty, though to a lesser extent compared to Hasnabad, even though they are almost as diversified as Hasnabad. Placed in the second worst condition with regard to infrastructure (after the village in Golsi), Bongaon allocates the highest proportion of land to vegetables. These two areas, thus, represent the cases where acute shortages of irrigation and infrastructure induce farmers to adopt diversification just as a survival strategy, to avoid the chance of falling into extreme poverty and crisis, even in the absence of good infrastructure.

7.4.2 Determinants of Crop Diversification: The Role of Irrigation, Farm Size and Family Labour

Table 7.2 shows that the more diversified villages have higher proportions of marginal and very marginal farmers, and a lower average farm size compared to the less diversified villages. Further, average family labour days used per hectare of land and proportions of family labour in total labour days used (Table 7.3) are higher for both traditional and high-value crops, with vegetables showing a much greater dependence on family labour in the more diversified villages. Villages in Hasnabad and Bongaon, the worst affected with acute shortage of irrigation and infrastructure, diversify their cropping system to the highest extent depending mainly on family labour. Balagar, with its dependence on private sources of irrigation and relatively good infrastructure, also diversifies to a great extent.

Table 7.2 Farm size and family labour days with CDI

		Less diversified blocks			More diversified blocks		
		Memari (%)	Pandua (%)	Galsi (%)	Balagarh (%)	Bonga (%)	Hasnabad (%)
Proportion of farming household	Farm size $0 < 0.5$(ha)	30.89	27.42	30.91	39.06	41.88	45.45
	$0 < 1$ (ha)	61.56	67.47	63.64	84.37	74.71	68.28
Average farm size		0.98	0.86	1.01	0.69	0.79	0.83
Average family labour days per hectare		134.82	138.33	45.38	252.68	179.48	236.59
CDI		0.49	0.45	0.55	0.64	0.67	0.68

Table 7.3 Percentage of labour days provided by the family members in total labour days

Crops	Less diversified blocks			More diversified blocks		
	Memari	Pandua	Galsi	Balagarh	Bonga	Hasnabad
Aus and Aman	36.66	19.64	2.55	36.83	33.62	39.42
Boro	22.23	29.99	8.59	32.13	26.64	50.69
Vegetables	8.69	19.62	54.68	65.89	54.08	85.61

Table 7.4 Results of Tobit regression with crop diversification index (CDI) as the dependent variable with all 360 households

	Intercept	Family labour	Farm size	Irri area	Fertili/hec	D_{1Bal}	D_{2Bon}	D_{3Hasna}	D_{4galsi}	D_{5Mem}
Coefficient value	0.373 (17.27)	0.00011 (3.29)	−0.038 (−2.17)	0.024 (2.45)	6.03791e−07 (0.37)	0.35 (14.45)	0.34 (13.65)	0.35 (12.62)	0.27 (10.54)	0.26 (10.24)

To recheck the validity of the conclusions, we estimate the overall impact of family labour, farm size, extent of irrigation and use of fertilizers on crop diversification across different regions of our sample. We run a Tobit regression with CDI[11] (lying between 0 and 1) as the dependent variable with 360 farm households and five area dummies to represent six irrigation–infrastructure types, the intercept representing the benchmark value of the least diversified region (Pandua). The result shows (Table 7.4) that use of family labour has a strong positive association and farm size has a strong inverse association with crop diversification, confirming our hypotheses and supporting the observations already made in the literature that crop diversification is more confined to smaller sized farms. The result on family labour strengthens the argument that smaller sized farms find advantage in producing labour-intensive high-value crops with the use of family labour to a large extent. The strong positive relation between the extent of irrigation and crop diversification, however, does not tell us anything about the importance of the pattern of irrigation. It does not help us to examine the validity of the argument that availability of publicly supplied cheap irrigation leads to specialization in water-intensive traditional crops and increasing access to costly irrigation developed through private investment induces crop diversification. This specific hypothesis is supported by the result that the coefficient of dummies shows significant positive difference in the crop diversification index from the benchmark value of Pandua represented by the coefficient of the intercept which also is significant. This shows that, other things remaining the same, the extent of crop diversification increases significantly over different infrastructure levels and irrigation types compared to the lowest index of Pandua, the most advanced village with regard to irrigation and infrastructure.

7.4.3 The Relationship Between the Extent of Crop Diversification and Pattern of Consumption, Poverty and Malnutrition Among Farmers Belonging to Different Size Classes

Based on primary data on value of output and cost of production of different crops pertaining to the selected villages in the three districts, we estimate the net per

[11] We use CDI as the dependent variable, whose value lies between 0 and 1 (see the methodology). Since the range of value of CDI is censored, OLS estimation may produce biased estimates. The Tobit regression model is more appropriate in this case.

Table 7.5 Net per capita earnings of the farming households from the production of cereals potato and vegetables (Rs. at current prices) and crop diversification indices

Farm size in hectare	Memari (CDI)	Galsi (CDI)	Pandua (CDI)	Balagarh (CDI)	Bonga (CDI)	Hasnabad (CDI)
0 < 0.5	2325.20 (0.48)	1,541.23 (0.55)	3,742.59 (0.44)	2,080.83 (0.65)	1,458.20 (0.60)	1,253.45 (0.73)
0.5 < 1	3,802.66 (0.51)	4,565.64 (0.55)	5,731.87 (0.43)	3,819.91 (0.67)	3,352.72 (0.72)	1,206.26 (0.69)
1 < 2	5,404.41 (0.46)	5,121.49 (0.57)	7,462.01 (0.48)	5,120.80 (0.54)	1,156.57 (0.73)	2,940.12 (0.55)
2 < 4	5,623.36 (0.55)	9,131.40 (0.57)	5,267.69 (0.44)	2,636.63 (0.52)	809.71 (0.72)	4,270.39 (0.64)
Average	4,010.77 (0.49)	4,489.11 (0.55)	5,841.18 (0.45)	3,227.40 (0.64)	1,949.54 (0.67)	1,960.79 (0.68)
Labour days per family member engaged in cultivation	57.74	28.33	95.26	172.94	120.23	139.42

Crop diversification indices are in parentheses

capita earning of the farming households derived from the cultivation of major food crops, cereals, potato and vegetables, which are shown in Table 7.5 along with crop diversification indices. It is seen that per capita earning from cultivation of cereals, potato and vegetables is extremely low, particularly in more diversified rain-fed areas—it is very low compared to the less diversified areas and much lower than the poverty-level income. It is also seen that very marginal and marginal farmers (<0.5 h, and 0.5 to <1 h) with higher crop diversification indices in the most diversified areas suffer from a huge shortfall of earning from the poverty line income from cultivation of food crops. The big shortfall of earning from the poverty line income across the classes, particularly in the rain-fed regions, leads to greater diversification. Apart from vegetables, the farmers are likely to produce fruits, oilseeds, jute and fibres to a much larger extent, compared to the districts endowed with much greater irrigation facilities, in order to meet their cash needs.[12]

We conduct an analysis of variance for per capita earning across size classes and over regions. It is seen that while variations both among size classes and among regions are statistically significant, the degree of variation across regions is stronger ($F = 4.04$, $P = 0.02$) than the variation across size classes ($F = 3.72$, $P = 0.04$). This provides some factual ground in favour of the argument that lower the size of farm, the greater would be the need to earn supplementary income over and above the main income from production of food crops, and this need is stronger in rain-fed regions.

[12] In some cases (Table 7.5), larger farmers are found to have lower earning per capita compared to smaller farmers, which may be due to the fact that they depend more on other non-food crops.

Table 7.6 Average per capita per day consumption (in kg)

Blocks name	Cereal	Pulses	Vegetables	Potato	Fish and chicken
Memari	0.56	0.03	0.13	0.12	0.03
Galsi	0.56	0.03	0.37	0.28	0.06
Pandua	0.58	0.02	0.18	0.40	0.10
Balagarh	0.57	0.03	0.17	0.21	0.04
Hasnabad	0.43	0.03	0.31	0.18	0.03
Bonga	0.57	0.03	0.13	0.14	0.04

Further, it is observed that in villages undertaking cultivation of high-value crops to a larger extent (all the more diversified villages), labour days per family member engaged in cultivation are considerably higher compared to the less diversified villages, i.e. on an average, a farmer in the more diversified villages puts in much more labour compared to a farmer in the less diversified villages for bare subsistence (the last row of Table 7.5).

A comparative analysis of earnings from cultivation of cereals, potato and vegetables gives us a very partial idea regarding the comparative well-being of the households since we have not included income from oil seeds and jute in the analysis. We conduct a direct estimation of per capita consumption of different items of consumption to arrive at a comparative analysis with regard to poverty.

As Table 7.6 shows, consumption of cereal does not show any systematic pattern across blocks. However, the least diversified village in Pandua, with the highest level of total income from cultivation of food crops among the survey villages, also enjoys the highest level of consumption of cereal and potato. The most diversified Hasnabad, which suffers most from an acute problem with regard to irrigation and high salinity of soil, has a very low per capita earning from food crops and consumes a meagre quantity of cereal per capita. Though it supplements the consumption of cereal with a higher quantity of vegetables compared to most of the survey villages, its overall consumption level remains very low. However, the other two more diversified villages, namely, Balagar and Bongaon have a relatively high level of consumption of cereals and high-value crops not only compared to Hasnabad but also Memari, the other mono crop area in the sample with substantially higher earnings from food crops. It appears that income levels of more diversified areas would increase substantially to almost reach the levels of less diversified areas in our sample if income from cultivation of other crops, namely jute, fruits, oil seeds and fibre crops are included in the estimation of income from cultivation. Except the area under most adverse natural conditions (Hasnabad), all the more diversified areas have been able to surpass the consumption level of Memari, a mono crop region enjoying irrigation and infrastructure advantage.

We estimate the amount of intake of different nutrients[13] by the sample farmers belonging to different size classes of agricultural holdings for each of the

[13] Estimation of consumption of different nutrients are based on conversion rates obtained from Appendix B of NSSO Report No. 471 (55/1.0/9).

Table 7.7 Average per capita consumption of fat, protein and calorie[a] with crop diversification indices

	Less diversified blocks			More diversified blocks		
	Memari	Pandua	Galsi	Balagarh	Bonga	Hasnabad
kcal (CDI)	2,247.44 (0.49)	2,655.31 (0.45)	2,535.99 (0.55)	2,397.39 (0.64)	2,313.10 (0.67)	1,929.61 (0.68)
Protein	58.04	73.78	73.78	62.53	60.72	52.39
Fat	4.87	7.43	7.43	5.33	5.26	4.74

[a]Estimation of consumption of different nutrients is based on conversion rates obtained from Appendix B of NSSO Report No. 471 (55/1.0/9)

villages separately. Table 7.7 shows, treating Memari as an outlier, there is a smooth downward trend in per capita intake of kilocalorie associated with a smooth upward trend with diversification indices across different areas. Again, among the six villages, only two can achieve the above poverty level average calorie intake. Among the less diversified villages enjoying relatively higher levels of income, Pandua and Golsi achieve higher than prescribed minimum levels of calorie and protein. The most diversified village in Hasnabad ends up with a very big shortfall from the prescribed minimum level of nutritional intake. The shortfall is much less for the other two diversified areas, namely Balagar and Bongaon. While Hasnabad farmers fail to overcome the negative impact of the irrigation and infrastructure disadvantage by diversifying the cropping pattern, the scope of achieving greater access to irrigation through private investment enables Balagar and Bongaon farmers to reach close to the prescribed minimum level of nutrition. The nutritional level achieved by Memari, on the other hand, remains much below the prescribed minimum level of nutrition, in spite of its irrigation and other advantages. This reconfirms the observation that by taking resort to more diversification towards production of fruits, jute, oilseeds and other fibre crops, all the more diversified regions except Hasnabad can increase the level of income and consumption to reach close to the prescribed minimum level of nutrition. While they achieve this condition by putting in the extremely hard labour of the family members, Hasnabad, the most diversified region of the sample, can maintain only some minimum level of nutrition, which is much below the prescribed minimum level, by putting in still harder labour of the family members.

The first row of Table 7.7 showing almost an inverse association between intake of kcal per capita and crop diversification indices (if Memari is treated as an outlier) seems to indicate that diversification towards high-value crop production is taken up by poor farming households as a survival strategy in places where lack of publicly supplied irrigation makes it impossible to survive on water-intensive traditional crops.

Table 7.8 Efficiency measures

Crops	Less diversified blocks			More diversified blocks		
	Memari	Pandua	Galsi	Balagarh	Bonga	Hasnabad
Aus and Aman	0.29	0.46	0.18	0.44	0.15	0.19
Boro	0.45	0.58	0.53	0.72	0.54	–
Vegetables	–	–	0.12	0.29	0.30	0.09

7.4.4 Viability of Crop Diversification: Impact of Crop Diversification on Farm Efficiency and Profitability

We conducted an estimation[14] of the overall efficiency score of the 360 households in the production of three crop varieties (Table 7.8). We get two contrasting pictures in Hasnabad and Balagar, the two more diversified places. Hasnabad, the most diversified place, suffering from acute irrigation problem and poverty, has a very low average efficiency score for vegetables, which is the lowest among all the places. By contrast, Balagar, another diversified place where access to irrigation is developed through private investment and efforts, contains more efficient farms in large numbers for both traditional crops and vegetables so that the average efficiency scores are high, compared to other places. Most of the inefficient farmers for cultivation of Aus and Aman rice are concentrated in Bongaon, Hasnabad and Golsi. While vegetables production, in general, is subject to inefficiency as compared to traditional crops, diversified regions, with the only exception of Balagar, are, in general, less efficient also in traditional crop production. This shows that farmers under extremely adverse conditions of production cannot maintain efficiency in input use even if they diversify their cropping pattern. Farmers can apply inputs relatively more efficiently only where they can overcome the difficulties by undertaking private investment. However, good infrastructure works as a necessary condition for achieving efficiency in the use of inputs in such cases. This leads us to conclude that poor farmers under adverse production conditions (Hasnabad and Bongaon) diversify their cropping pattern to avoid the condition of extreme destitution even if such diversification results in inefficient use of inputs.

To examine the role of crop diversification, among other factors, in influencing the relative efficiency of farms, Tobit regression with efficiency score as the dependent variable has been run (Table 7.9). It is seen that incurring excessive expenditure for irrigation is a general cause of inefficiency in the production of each of the crops considered. Apart from this, Aus and Aman production, in general, is subject to excessive expenditure incurred on other material inputs, fertilisers and pesticides; Boro is subject to excessive expenditure incurred on

[14] Using Efficiency Management System (EMS) Software developed by Holger Scheel of the University of Dormund, Germany. Tobit regression is run because the range of efficiency score obtained from the DEA model is censored.

Table 7.9 Results of Tobit regression with efficiency score for 360 households for Aus and Aman, Boro, vegetables as dependent variable

	Aus and Aman	Boro	Vegetables
Constant	0.5941539 (9.45)	0.8142483 (11.35)	0.3897623 (2.50)
Fertiliser	−0.0000119 (−2.82)	−0.0000318 (−4.21)	1.68e−07 (1.05)
Pesticide	−0.000037 (−3.07)	−1.13e−06 (−0.08)	−2.20e−07 (−0.33)
Seed	1.37e−06 (0.16)	−9.63e−06 (−1.17)	−2.66e−06 (−2.26)
Water	−0.0000222 (−1.74)	−0.0000207 (−4.05)	−5.23e−06 (−3.08)
Labour days	−0.0000219 (−0.83)	−0.0001463 (−2.08)	−0.000024 (−2.52)
CDI	−0.1498135 (−1.51)	0.220851 (2.22)	−0.196185 (−1.17)
Farm size	0.0329643 (1.80)	−0.0459162 (−1.98)	0.0350221 (1.06)
Dummy Galsi	−0.1706402 (−2.95)	0.0334298 (0.52)	–
Dummy Memari	−0.087933 (−1.59)	−0.0920167 (−1.28)	–
Dummy Balagarh	−0.003884 (−0.07)	0.0831096 (1.51)	0.1403117 (1.71)

fertilisers and labour; vegetables are subject to excessive expenditure incurred on seed and labour. While large-sized farms are more efficient in the production of Aus and Aman, smaller farms are more efficient producers of Boro; farm size has no impact on efficiency of vegetable production. The degree of crop diversification has no significant impact on the efficiency of either traditional rice (Aus and Aman) or vegetables.

Diversification, in general, and high-value crop production, in particular, are not positively associated with the efficiency of crop production.

We estimate farm business income and profits from cultivation of traditional crops and high-value crops to examine further the viability of the strategy of crop diversification.

It is seen that (Table 7.10) farm business income from the production of traditional crops is higher for the less diversified traditional crop producing zones as compared to the more diversified zones. For vegetables, while two of the more diversified villages obtain considerably higher levels of farm business income as

Table 7.10 Farm business income and rate of profit

		Burdwan		Hooghly		North 24 Paragana	
		Memari	Galsi	Pandua	Balagarh	Bonga	Hasnabad
Farm business income from	Aus and Aman	29,436.10	39,305.68	28,337.86	19,828.1	20,489.30	17,157.14
	Boro	34,819.98	33,229.08	23,660.19	24,330.42	23,350.50	38,515.00
	Vegetables	20,524.14	129,412.91	−18,606.71	29,449.02	38,822.38	−36,086.54
Profit per unit of investment of	Aus and Aman	1.41	0.25	0.77	1.08	0.96	2.02
	Boro	1.95	1.58	0.80	0.82	0.98	4.35
	Vegetables	1.39	0.33	1.24	0.71	0.37	0.35
Per capita net earning		4,010.77	4,489.11	5,841.18	3,227.40	1,949.54	1,960.79

compared to the less diversified ones, the village in Hasnabad, the most diversified village with a relatively high proportion of land under vegetables, obtains a negative level of farm business income from vegetable production. This seems quite understandable when we consider the fact that in Hasnabad, the imputed value of family labour is too high. We estimate profit per unit of investment (taking into account actual cost incurred and actual value of output received by the farmers) to get an idea about actual returns. It is seen that Memari, with its assured supply of water and comparatively developed infrastructure, earns a comparatively higher rate of profit not only for traditional crops but also for vegetables. While vegetable-producing villages earn high rates of profit for Aus and Aman rice, the rate of profit from vegetable production in these most diversified vegetable-producing villages is not only very low but also lower than the two least diversified villages falling under Pandua and Memary. However, the less diversified Golsi [with higher CDI (0.55) compared to Pandua and Memary] has the lowest profit rate for vegetables. In fact, what seems to emerge from the observations is that higher profit rates from vegetable production is not associated with diversification in favour of vegetables in vegetable-producing areas. Not only does a one rupee expenditure on cultivation gives less returns in the case of vegetables as compared to other crops in more diversified areas but it also gives less returns as compared to vegetables in less diversified areas. Among the three more diversified villages, Balagar is most advanced in infrastructure, which ensures its farmers a higher average price for their product, compared to other villages within the 'more diversified' group. Bongaon has a much lower rate of profit (0.37) compared to Balagar (0.71) due to its extremely backward infrastructure. The two less diversified villages, Memary and Pandua, endowed with not only good irrigation facilities but also the best infrastructure among the survey villages, end up with the highest rates of profit.

Coming to aggregate per capita net earnings from cultivation, we see that it is higher for all the less diversified villages compared to any of the more diversified ones. Farmers in the more diversified villages end up with considerably less income compared to farmers in the less diversified villages.

7.5 Concluding Observations and Policy Implications

Increasing diversification is associated with falling average size of farms and deteriorating access to public irrigation across the survey areas. This gives rise to almost an inverse association between crop diversification indices, on the one hand, and per capita intake of kilocalorie (Table 7.7), on the other. While the small and marginal farmers practise diversification and production of high-value crops in greater proportion, under extremely adverse soil and water conditions, they find it very hard to avoid extreme poverty and malnutrition by taking resort to diversification. In such cases, high-value crop production is particularly associated with inefficiency, low profit and negative farm business income. The other case of diversification is where farmers become capable of averting risk only by undertaking investment for development of access to irrigation. In such cases, diversification and high-value crop production are induced by the motivation of increasing income only in the presence of good infrastructure, resulting in relative efficiency and profitability. In such cases, farmers can increase their income and consumption level to reach close to the minimum specified level of nutrition. In both cases, farmers have to put in a huge amount of labour of the family members to maintain a certain minimum level of income and avoid the situation of extreme poverty and vulnerability.

Effectiveness of diversification as a strategy for reducing rural poverty depends, to a great extent, on the presence of good infrastructure with better linkages with markets (Appendix 3), which can ensure remunerative product prices as well as farmers' access to an improved variety of inputs at reasonable prices. Direct policy intervention is needed for improving rural infrastructure, increasing access to institutional credit and promoting research and innovation in the field of development of low-cost plant nutrients, rainwater conservation, surface irrigation development and soil science.

Appendix 1

Sample Design:
A three-stage stratified random sampling procedure has been followed to construct the sample through the following: first, selection of administrative blocks; second, selection of villages, with the help of basic information and data from the BDO and Revenue Inspectors' Office, so as to represent the required variation in infrastructure and irrigation in both cases; finally, selection of households belonging to different size classes.

District	Block	Gram Panchayat	Village (no. of farms)
Burdwan	Memari	Gope-gantar 1	Sankarpur (60)
	Golsi	Bhuri	Jujuti, Ketna (60)
Hooghly	Pandua	Berela-Konchmali	Boragori (60)
	Balagarh	Somra 1	Paigachhi, Abdulpur, Natagarh (60)
North 24 Parganas	Bongaon	Chouberia	Gopinathpur (60)
	Hasnabad	Amlani	Haripur (60)

Appendix 2

DEA is a linear programming technique for constructing a non-parametric piecewise linear envelop to a set of observed output and input data. Efficiency is defined as a measure of how efficiently inputs are employed to produce a given level of output. The score of the most efficient farms being one, with minimum level of inputs applied to a given level of output, the score of each farm will lie between zero and one.

Overall technical efficiency (OTE) of the ith farm is obtained from following input-oriented DEA model.

$$\min_{\theta_i^{\mathrm{CRS}},\lambda,} \theta_i^{\mathrm{CRS}}$$

Subject to

$$\begin{aligned} &-y_i + Y\lambda \geq 0, \\ &\theta_i^{\mathrm{CRS}} x_i - X\lambda \geq 0, \\ &\lambda \geq 0 \end{aligned}$$

where θ_i^{CRS} is a OTE measure of the ith farm under CRS, X is a $n \times r$ input matrix with columns x_i, Y is $m \times r$ output matrix with columns y_i, and λ is a $r \times 1$ vector, where r is the number of farms. The problem has to be solved r times to get r farmers' efficiency score, which is evaluated under different sets of observations as envelope. The imposition of constraint on the intensity vector λ guarantees that θ_i^{CRS} lies between zero and one. The CRS linear programming problem can be modified to account for VRS by incorporating the convexity constraint.

Appendix 3

Code for pattern of irrigation

Pattern	Code
Public irrigation system with canal and deep tube well along with all other types	1
No canal, no deep tube well, but availability of enough surface water due to proximity to river	2
No canal, no deep tube well, only shallow tube well, tank, etc.	3
No canal, no deep tube well, and use of underground water is not always possible in sufficient quantity due to high salinity	$2 \times 3 = 6$[a]

[a]In Hasnabad block of North 24 Parganas district, dry season crops such as Boro paddy can hardly be produced without incurring excessive expenditure on irrigation; the level of productivity remains very low for other crops due to high salinity. This negative impact of the absence of a public irrigation system is highly intensified, and hence, we have multiplied the code 2 by 3 in order to catch this irrigational disadvantage

District	Block	Gram Panchayat	Village	Code for type of irrigation
Burdwan	Memari	Gope-gantar 1	Sankarpur	Canal, deep tube well and others (shallow tube well, tank and river lift): Code 1
Burdwan	Golsi	Bhuri	Jujuti, Ketna	No canal, no deep tube well, but availability of enough surface water due to proximity to river: Code 2
Hooghly	Pandua	Berela-Konchmali	Boragori	Canal, deep tube well and others (shallow tube well, tank and river lift): Code 1
Hooghly	Balagarh	Somra 1	Paigachhi, Abdulpur, Natagarh	No canal, no deep tube well, but availability of enough surface water due to proximity to river: Code 2
North 24 Parganas	Bongaon	Chouberia	Gopinathpur	No canal, no deep tube well, only shallow tube well, tank, etc.: Code 3
North 24 Parganas	Hasnabad	Amlani	Haripur	No canal, no deep tube well and high salinity: Code 6[a]

[a]Refer to last table for codification

Code for distance and road type	
Distance Code	Code for type of road
0 to <5 km: 1 5 to <10 km: 2 10 to <15 km: 3 15 and above: 4	Metal road: 1 Mud road: 2 No road: 3

Codification of survey villages for infrastructure								
Village	Distance from							
	Cold storage	Road type connect-ing cold storage	Market	Road type con-necting market	High way	Road type connect-ing high way	Rail station	Road type connecting rail station
Sankarpur	4 km	Metal	1 km	Mud	10 km	Metal	6 km	Metal
Code	1	1	1	2	3	1	2	1
Jujuti, Ketna	10 km	Mud	8 km	Mud	8 km	Mud	14 km	Mud
Code	3	2	2	2	2	2	3	2
Boragori	1 km	Metal	1.5 km	Metal	0.5 km	Mud	1.5 km	Metal
Code	1	1	1	1	1	2	1	1
Paigachhi, Abdulpur, Natagarh	4.5 km	Mud	3 km	Mud	1 km	Mud	3 km	Mud
Code	1	2	1	2	1	2	1	2
Gopinathpur	7 km	Mud	3 km	Mud	7 km	Mud	25 km	Mud
Code	2	2	1	2	2	2	4	2
Haripur	25 km	Mud	3 km	Metal	0.5 km	Metal	1 km	Mud
Code	4	2	1	1	1	1	1	2

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Chapter 8
Conflict and Livelihood Decisions in the Chittagong Hill Tracts of Bangladesh

Muhammad Badiuzzaman and Syed Mansoob Murshed

Abstract We analyse rural household livelihood and child school enrolment decisions in the post-conflict setting of the Chittagong Hill Tracts (CHT) region of Bangladesh. What makes this paper innovative is the use of current subjective perceptions regarding the possibility of violence in the future and past actual experiences of violence in explaining household economic decision-making. Preferences are endogenous in line with behavioural economics. Regression results show that heightened subjective perceptions of future violence and past actual experiences of conflict influence current consumption and child enrolment and could encourage risky mixed crop cultivation. The trauma emanating from past experiences combined with current high perceptions of risk of violence may induce bolder and riskier behaviour in line with prospect theories of risk. Furthermore, a post-conflict household-level Phoenix or economic revival factor may be in operation, based partially on greater within-group trust.

Keywords Perceptions of violence · Post-conflict reconstruction · Risk · Livelihood decision-making

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_8

8.1 Introduction

The object of this paper is to analyse rural household livelihood decisions, including educational investment for future generations, in the post-conflict setting of the Chittagong Hill Tracts (CHT) region of Bangladesh. This is a region in the south-eastern part of the country where a low-level insurgency took place between 1976 and 1997, officially terminating after a peace accord in December, 1997.[1] The armed struggle was between the state's security forces, mainly the Bangladesh army, and the ethnically distinct local population (indigenous), in an otherwise fairly homogenous nation in terms of language and religion. The insurgency was aimed at regional autonomy rather than independence, but the principal local grievance was against officially sponsored land encroachment and grabbing by outsiders (Bengali population) who posed a threat to not only local livelihoods but also a distinct local way of life; see Chakma (2006) and Roy (2000). This happened in the land-hungry context of the world's most densely populated country, which is also a low-income developing country where agriculture continues to be the main source of the population's livelihood. Thus, while neo-Malthusian factors may be at work, land hunger is principally caused by poverty and the paucity of alternative livelihoods to agriculture. Population growth adds to land scarcity, exacerbated by environmental degradation, fuelling conflict over land and environmental resources (Homer-Dixon 1999), as is the case in the CHT between the indigenous population and settler Bengalis.

There is now a substantial literature on the causes of large-scale internal conflict in the rational choice tradition. These explanations tend to centre on either the grievance hypothesis (mainly linked to inequalities between distinct groups delineated by ethnicity, religion, or some other marker) or the greed motivation (reflecting competition over capturable rents); see Murshed (2010, Chap. 3) for a review. A great deal of empirical work has also been conducted to test the empirical validity of these allegedly competing theories. The results are inconclusive, mainly due to data paucity on inter-group inequality (also known as horizontal inequality). Be that as it may, there is a consensus that violent internal conflict serves to perpetuate poverty in developing countries, and equally, poverty increases the risk of violent conflict breaking out. This is referred to as the conflict-poverty trap; see Collier (2007).

Many of the quantitative studies on civil war are cross-country in nature, where the experiences of civil war in different and far-flung countries are lumped together in one single statistical (econometric) exercise. One can, therefore, be sceptical about the results of such regression analyses, as the various conflicts under scrutiny are not necessarily drawn from a homogenous population. There

[1] The conflict in the CHT of Bangladesh is coded as a minor armed conflict, according to the PRIO-Uppsala methodology; see http://www.prio.no/CSCW/Datasets/Armed-Conflict/UCDP-PRIO/Armed-Conflicts-Version-X-2009/ (accessed November 05, 2010).

is also a need to conduct more systematic quantitative studies of the drivers and consequences of conflict at a more local level within nation states, a research area that is still relatively neglected.

Armed conflict may have far-reaching consequences for rural livelihood strategies, including investment decisions and cropping patterns. This may contribute to an analysis of poverty as well as development in general, particularly rural development. Lacunae associated with localised conflict become even more acute when it comes to the economic analyses of the short- and long-term impacts of conflict on households' decision-making. The first innovation of this paper is that it is able to make a contribution in this connection based on a unique data set compiled during a socio-economic survey of households in this area in 2008 (Barkat et al. 2009).

The rural farming household is no stranger to risky outlays, as returns to cropping or animal husbandry are subject to a number of risks and uncertainties. We will utilise the livelihood framework to explain household decisions under uncertainty. This approach acknowledges an inherent inseparability between production and consumption decisions for rural households (Bardhan and Udry 1999, Chap. 2), which affects labour allocation between farm and off-farm (including education) activities, as well as cropping (and animal husbandry activities) for own consumption and the market.

The nature of these risks and uncertainties can be altered by armed conflict of a sufficiently long duration. This affects the livelihood and investment decisions of households. We will relate our findings to prospect theory (Kahneman and Tversky 1979) to explain greater risk-taking behaviour following the traumas of war, where a strong desire to retrieve a valued past state may help explain increased risk-taking. This is the second innovation of the paper. Additionally, the survey employed in the paper contains information about subjective perceptions regarding the future prospects of violence after the conflict ended as well as past actual experiences of violence, both of which impact household economic decision-making. Thus, we are dealing with preferences that are endogenous to not only economic, political and social institutions (Bowles 1998; Fehr and Hoff 2011) but also personal histories of trauma and expectations of future conflict. Along with standard socioeconomic characteristics, our household survey data contain both subjective (psychological) information regarding trust, current perceptions about the risk of future conflict and objective data on past conflict experience. We relate these to observed livelihood decision-making. This is in line with contemporary behavioural economics as well as earlier thinking (for instance, Boulding 1956), about individual self-image and the effect of various stimuli in framing one's image.

Our analysis is conducted in the post-accord era, a decade after the peace treaty which allegedly ended the war. An important policy consideration in post-conflict societies is the resumption of economic activity and growth. On the one hand, post-conflict growth can be lopsided, favouring infrastructure reconstruction over agriculture or manufacturing, due to wartime collateral damage as well as the perceived riskiness of investment in productive sectors which take a long time to yield dividends (Addison and Murshed 2005). On the other hand, other authors emphasise a more general ‘Phoenix’ factor (Koubi 2005). In other words, rapid economic growth (in the macroeconomic sense) follows the cessation of intense and prolonged conflict, resembling the fable of the Phoenix rising from the ashes. There can, however, be differences across various economic sectors. Our third innovation is that we examine whether there can be such a local Phoenix factor given the impact of subjective perceptions on household cropping decisions.

8.2 The Chittagong Hill Tracts of Bangladesh

Bangladesh is in the Ganges delta and is one of the most densely (1,229/km^2) populated countries in the world where the amount of per capita arable land was only 0.1 ha in 2007. It is a low-income developing country, where about 50 % of the population lives in poverty (using the international poverty line of below $1.25 per day; World Bank 2010). Over the last two decades, Bangladesh’s economy experienced growth rates of around 5.5 % per annum, but a large segment of employment still relates to traditional agriculture (World development indicators, The World Bank, Washington DC http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG, Accessed 11 Jan 2011). This makes land the scarcest and most competed over resource in Bangladesh. Land issues have been seen to underpin a variety of Maoist uprisings in neighbouring India and Nepal, and the literature on these is copious; for example, Murshed and Gates (2005) find a statistically significant relationship between conflict intensity (district-wise fatalities) and landlessness in the context of the Maoist insurgency in Nepal. Few studies, however, have a similar methodology to the one in this paper based upon detailed household surveys, and household level responses to risk and uncertainty in a post-conflict setting.

Bangladesh is mostly ethnically homogenous, with the vast majority of the population being Bengali speaking and Muslim. There are a few distinct ethnicities that differ in both language and religion. These groups are mainly concentrated in the CHT region. This region is situated in the south-eastern part of the country and is covered with lush green hills, with a relatively larger proportion of afforested areas. From a strategic point of view, CHT is important as it adjoins two Indian states (Tripura and Mizoram) and Myanmar. Insurgency in the Indian north-eastern states and Myanmar raises the military importance of this region (Roy 2000; Barkat et al. 2009; Mohsin 2003). The various ethnic groups in CHT are closer, in appearance and culture, to their neighbours in north-eastern India, Myanmar and Thailand, than to the rest of Bangladesh. Buddhism, Hinduism and Christianity are prevalent among these ethnicities. They have their own languages in both oral and written form. The indigenous peoples of CHT are often identified as *Jumma* people, derived from the word *jum* (swidden or slash and burn shifting cultivation). The proportion of the non-indigenous (Bengali speaking) population in CHT has been increasing over time. According to the

1991 population census of Bangladesh, indigenous groups constitute 51.4 % of the CHT total population of about one million (Mohsin 2003; Roy 2000). It is important to note that the indigenous inhabitants of CHT also exhibit a degree of diversity based on eleven different (tribal) identities.

Despite its lower population density compared to the rest of Bangladesh, the CHT region is actually land-scarce in terms of availability of land for cultivation (only 23 % of the land is arable). In 1974, the amount of per capita arable land was about 0.45 ha, which declined to about 0.24 ha in 1991. Most of the land is either uninhabitable due to its topography or its usage is restricted by law (reserve or protected forests). The land ownership patterns as well as types of land in CHT also differ from that of plain regions. Customary (common) ownership of land exists here, and at the same time, private property rights are recognised by the state, making ownership issues more complex (Roy 2000; Barkat et al. 2009).

The CHT region enjoyed an autonomous status until 1860 when the British took it over under their direct administration. The CHT regulation of 1900 put an embargo on ‘outsiders’ settling or purchasing land in the territory. This ‘excluded area’ status of CHT was replaced by a ‘tribal area’ classification in 1962.[2] Due to the construction of an artificial reservoir by damming the River Karnafuli at Kaptai in the 1960s for the purposes of power generation, approximately 1,036 km^2 was submerged and 54,000 acres of highly prized arable land was lost in the river valleys. After the independence of Bangladesh from Pakistan in 1971, the indigenous people of CHT demanded recognition of their ethnic identity and regional autonomy in the constitution, which has not happened. Given the population transfer policies of non-indigenous people into this region by successive Bangladesh governments, the demand for indigenous rights transformed into armed rebellion by different indigenous groups.

Successive Bangladeshi governments of both a military and democratic complexion adopted mixed strategies of using military force to quell rebellion, while, at the same time, encouraging, or colluding with, a population transfer programme. In 1976, armed forces were deployed in CHT in a classic ‘Aid to Civil Power’ operation, which triggered tensions in the region. A few indigenous political groups [Parbatya Chattagram Jana Samhiti Samiti (PCJSS)] engaged in an armed insurgency against the intrusion by the authorities. Under the counter-insurgency strategy, demographic engineering interventions aimed at settling a large number of Bengali-speaking households in CHT were seen as enhancing the size of population loyal to the state, and these fresh settlements acted as a counterweight to indigenous peoples’ demands for rights and regional autonomy. Due to the state-sponsored settlement programme, a considerable number of indigenous people were uprooted from their homesteads, further intensifying the armed

[2] A well-known paper by Banerjee and Iyer (2005) relates colonial land tenure systems in India to agriculture productivity, demonstrating lower productivity in areas where landlordism prevailed compared to regions where the state directly taxed the peasant farmer. In our case, the colonial period legacy is one of landlordism.

struggle. About 54,000 indigenous people took refuge in the neighbouring Tripura state of India and another 50,000 became internally displaced persons.

In the post-cold war era, and after the restoration of democracy in Bangladesh, pressure for a political solution mounted. This led to an accord between the PCJSS and the Bangladesh Government on 2 December 1997, known as 'The CHT accord 1997'. The accord was incomplete; the United Peoples Democratic Front (UPDF) continues the struggle for full autonomy (Mohsin 2003). Continuing land disputes, the non-restitution of land to indigenous peoples, the presence of the Bangladesh army, the poor rehabilitation of refugees and internally displaced persons, and the non-implementation of a special status in the country's constitution make the post-conflict situation of CHT fragile. Indigenous people living in this area continue experiencing various types of violence and face restrictions on their mobility (Barkat et al. 2009).

8.3 Data and Methodology

The 'Socio-economic Baseline Survey of CHT' is the source of our quantitative data; see Barkat et al. (2009). The data were collected in 2008 from a cross section of households (both migrant Bengalis and indigenous people) living in CHT. The sample design of the survey captured the whole region of CHT, especially the ethnic diversity among the indigenous population. The representative sample is comprised of 3,238 households, where the number of indigenous and migrant Bengali households was 1,786 and 1,452, respectively. Although the main focus of the survey was collecting data on the socio-economic status of the CHT population, it also gathered information on peace-confidence building issues. In particular, what is noteworthy is that data on current post-conflict subjective perceptions about the degree of violence, and the chance of its occurring in future, were collected from households for the year 2008. These pertain to their threat perceptions about the extent of armed conflict, the possibility of attacks from the other community, the fear of forcible eviction as well as other variables at the time of the survey. These variables amount to expectations about the future prospects of conflict.

In addition, data on households' actual experience of violence, or their participation in conflict, during the years of the insurgency (1976–1997) were also collected. These refer to past experiences of violence and were related to displacement or eviction, loss of land and armed conflict, among others. Not surprisingly, there are missing observations, both at the level of perception and in the actual past experiences of conflict, as not all households were able to reveal this sensitive information, not least because of the continued presence of the Bangladesh army in this area. Furthermore, we have data on the degree of trust (social capital) between the two communities, including between the different tribes that make up the indigenous segment of the population in CHT.

8.3.1 Descriptive Statistics

Perceptual data on the threat of violence pertain to the year of the survey (2008). This allows the researcher to analyse the nexus between perceptions of violence and various livelihood decisions in a post-conflict setting. In Table 8.1, perceptions about the threat of violence relate to three variables: (i) perceptions about armed conflict, (ii) perceptions about communal violence occurring and (iii) the fear of eviction. In the survey, 14–16 % households perceived a threat of armed conflict, while a third (32–34 %) felt a danger of communal violence, and 37–38 % of households were apprehensive about possible eviction from their land.

Data on real-life experiences of conflict for the period of the insurgency (1976–1997) were collected from households (with at least one family member experiencing violence) chiefly in the form of three broad categories: (i) displacement from home, (ii) dispossession of land (either farmland or homestead) and (iii) participation in and/or victim of armed conflict; see Table 8.1. Estimates indicate that 13–14 % of the households experienced displacement from their own home or land and 18–20 % were dispossessed of their farmland before the peace accord in 1997. All in all, various types of armed conflict were experienced by 17–20 % of the households.

Additionally, some 91 % of indigenous households felt that their group relations were good, implying the presence of trust within the eleven different tribes which comprise the community. It has to be borne in mind that the indigenous peoples' antagonists (settler Bengalis) are ethnically homogenous, and we would expect a high level of trust within that group. Only about 11 % of the responses pointed to good relations between the settler and indigenous communities.

Three household livelihood decisions—consumption expenditure, decisions with regard to children's schooling and production (cropping) decisions—were analysed. Data on consumption incorporated a separate format for food and non-food expenditure (Table 8.1). We may regard the decision to enrol children in school as an investment (human capital accumulating) decision. Data on total number of children enrolled in both primary and secondary school were analysed at the household level, within the age bracket of 6–18 years. Estimates show that 44 % children of the CHT were enrolled in schools. The type of crop produced is a proxy for production decisions. Some 42–43 % of households produced only food crops, an insignificantly small proportion of households produced only cash crops, and there were a good number of households (50–51 %) producing both cash and food crops.

8.3.2 Empirical Model Specification and Strategy

Our quantitative analysis primarily focuses on the relation between either the perceived threat of violence after the peace accord or the past experience of conflict before the peace accord on various livelihood decision-making by households

Table 8.1 Descriptive statistics: conflict and livelihood

Variables	Indigenous household			Bengali household		
	Mean	Standard deviation	Number of observations	Mean	Standard deviation	Number of observations
Current perception of violence						
Fear of armed conflict	0.16	0.3709	1,786	0.14	0.3498	1,367
Fear of communal violence	0.32	0.4680	1,786	0.34	0.4741	1,367
Fear of eviction from land	0.38	0.4847	1,786	0.37	0.4845	1,367
Previous experience of violence						
Displacement	0.13	0.3320	1,786	0.14	0.3483	1,367
Land dispossession	0.18	0.3830	1,786	0.20	0.3988	1,367
Armed conflict	0.20	0.4016	1,786	0.17	0.3787	1,367
Social capital	0.91	0.2795	1,183	0.11	0.3160	881
Consumption decision						
Per capita annual consumption expenditure (in Tk.)	11,857	4,331.67	1,786	11,862	4,731.07	1,452
Per capita annual food consumption expenditure (in Tk.)	11,095	4,152.20	1,786	11,113	4,535.11	1,452
Per capita annual non-food consumption expenditure (in Tk.)	762	445.07	1,786	749	409.15	1,452
Investment decision						
Child enrolment in primary and secondary school	0.44	0.4961	2,345	0.44	0.4965	1,625
Production decision: *type of cropping*						
Only food crop	0.43	0.4952	1,206	0.42	0.4946	899
Only cash crop	0.07	0.2574	1,206	0.06	0.2397	899
Mixed crop (both food and cash)	0.50	0.5002	1,206	0.51	0.5001	899

living in the CHT.[3] For consumption decisions, an OLS model was used. But for investment in children's education and production (cropping) decisions, a logit or probit model was specified, as these two cases measure the probability or chance of an event occurring. We control for household demographic and socio-economic characteristics including those for children, type of school, facilities at the school and agricultural techniques.

[3] Full details of the estimations, as well as the descriptive statistics, can be found in Badiuzzaman et al. (2013).

The standard regression equation followed in this paper is as follows:

$$Y_i = \alpha + \beta_1 \mathrm{HSE}_{ij} + \beta_2 H_{ij} + \beta_3 C_{ij} + \beta_4 S_{ij} + \beta_5 (V_{ij}, \mathrm{PV}_{ij}, \mathrm{SC}_{ij*} \mathrm{PV}_{ij}) + \varepsilon_i, \tag{8.1}$$

where the dependent variable Y_i refers to various livelihood decision-making variables, consisting of consumption expenditure (continuous variable in logarithmic form), child enrolment in either primary or secondary school (dummy variable), and type of crop produced (dummy variable) for household i measured at the survey. The explanatory variables are as follows: HSE_{ij} are household-level demographic and socio-economic variables, C_{ij} is a set of child characteristics (age and sex), H_{ij} describes household head characteristics (age, sex and education), S_{ij} denotes schooling variables, SC_{ij} indicates social capital or trust, V_{ij} stands for threat perceptions at the time of the survey, PV_{ij} indicates pre-peace accord experiences of violence, and ε_i is a random error term.

Moreover, we use interaction variables for experiences of violence along with trust in three regression models. Trust (social capital) is not entered as a separate explanatory variable as current perceptions of violence approximate the converse of between-group (indigenous versus settler) social capital. Trust between the various (11) indigenous ethnicities is more relevant and constitutes a key factor in how the impact of previous experiences of violence has evolved into present-day decision-making and preferences. Hence, we only use trust as an interaction term with past conflict experience. For Bengalis, the social capital variable reflects trust between indigenous and Bengali peoples, while for the indigenous people, it is trust between the eleven indigenous tribal groups.

8.4 Results and Discussions

This section analyses the determinants of household consumption decisions, followed by two other important livelihood decisions—investment in children's education and cropping (production) decisions—in relation to subjective perceptions of varying degrees of the threat of violence, within indigenous group trust factors and pre-peace accord experiences of violence. We believe this to be a major innovation of our study because we attempt to gauge the impact of subjective perceptions on economic decision-making with regard to consumption, output (cropping) and investment decisions after an uneasy peace accord that only imperfectly ended the conflict. Within the context we are studying, land dispossession is a key factor, and the continuing fear of intimidation with a view to further land alienation is likely to impact on indigenous households' decision-making under uncertainty. To this end, and to sharpen our focus and analysis, we classify individual households' fears of future violence into different variables: armed conflict, communal violence and fear of eviction from land.

8.4.1 Consumption Expenditure

We endogenise preferences about consumption to past conflict experiences and expectations about future conflict. We do this separately for the indigenous people and settler Bengalis (Table 8.2). Specification 1 relates to current perceptions about violence. Among these, the fear of armed conflict negatively and significantly affects consumption, both food and non-food, for both indigenous and Bengali peoples. The fear of communal violence is less significant. It adversely effects non-food consumption for both communities. As far as the fear of eviction is concerned, it significantly raises consumption for Bengali settlers, but not for the indigenous inhabitants of CHT, although the signs are in a positive direction.

It may be argued that there are endogeneity issues between current perceptions of violence and consumption because households with greater economic capacity may feel more threatened. To get consistent coefficient estimates for consumption expenditure regression, we attempted a two-stage least squares (2SLS) estimation approach where at the first stage we require instrumental variables. There are a few variables in our data set that are potential candidates for instruments. For overall consumption and food consumption regressions, we used three variables: good relationship between Bengali and indigenous communities, perceptions about the oppressiveness of the security forces and previous land dispossession which are uncorrelated with consumption, but correlated with our three variables of interest under current perceptions of violence. For non-food consumption, we used three variables: satisfaction about inter-community interaction, attendance in the other group's festivals and festivals celebrated jointly which are effective instruments. Results from 2SLS estimates found current perceptions of violence insignificant in determining overall consumption expenditure, and for food and non-food consumption separately. However, since alternative Hausman tests of exogeneity indicate no endogeneity between current perceptions of violence and consumption expenditure, when we compare OLS and 2SLS estimates, we can be confident about the reliability of our OLS estimates. Details may be found in Badiuzzaman et al. (2013).

The regression results under specification 2 relate to past experiences of violence. Displacement discouraged consumption, but significantly only for Bengali settlers. Land dispossession encouraged non-food consumption significantly for both communities. Personal experiences of armed conflict (in the past) discourage consumption, but more strongly for Bengali settlers.

We also attempted to investigate the role of trust (social capital) in the form of good relations among the various indigenous communities on consumption (specification 3, in Table 8.2). Arguably, intra-group trust has an important role on livelihoods in post-conflict settings, especially for the indigenous inhabitants of the region. Accordingly, we interacted three variables on previous experiences of violence: displacement, land dispossession and actual experiences of armed conflict with current good relations among the indigenous communities (trust) as a proxy of social capital. Specification 3 indicates that among the three interaction

Table 8.2 Determinant of consumption expenditure: OLS estimation

Independent variable	Dependent variable		
	All consumption expenditure	Food consumption expenditure	Non-food consumption expenditure
Indigenous household			
Specification 1: *Current perception of violence*			
Fear of armed conflict	−0.07*** (0.025)	−0.07*** (0.026)	−0.13*** (0.033)
Fear of communal violence	0.03 (0.025)	0.04 (0.026)	−0.06* (0.034)
Fear of eviction from land	0.03 (0.026)	0.03 (0.027)	0.05 (0.03)
Specification 2: *Previous experience of violence*			
Displacement	−0.03 (0.037)	−0.04 (0.034)	0.03 (0.039)
Land dispossession	−0.03 (0.023)	−0.04* (0.024)	0.06* (0.035)
Past armed conflict	−0.005(0.022)	0.01 (0.023)	−0.13*** (0.033)
Specification 3: *Interaction of previous experience of violence and social capital*			
Displacement* trust	−0.09 (0.096)	−0.097 (0.0982)	−0.035 (0.148)
Land dispossession* trust	0.10 (0.076)	0.092 (0.0780)	0.19** (0.143)
Past armed conflict* trust	0.11*** (0.084)	0.12*** (0.084)	−0.10 (0.130)
Bengali household			
Specification 1: Current perception of violence			
Fear of armed conflict	−0.16*** (0.040)	−0.16*** (0.041)	−0.135*** (0.0433)
Fear of communal violence	0.01 (0.033)	0.02 (0.034)	−0.101** (0.0393)
Fear of eviction from land	0.07** (0.035)	0.07* (0.037)	0.07* (0.041)
Specification 2: *Previous experience of violence*			
Displacement	−0.08** (0.039)	−0.087** (0.0412)	−0.02 (0.045)
Land dispossession	0.04 (0.028)	0.040 (0.0289)	0.07*(0.039)
Past armed conflict	−0.10*** (0.030)	−0.09*** (0.031)	−0.14***(0.039)
Specification 3: *Interaction of previous experience of violence and social capital*			
Displacement* trust	0.09 (0.143)	0.10 (0.1558)	−0.05 (0.1395)
Land dispossession* trust	0.06 (0.095)	0.05 (0.1012)	0.04 (0.1081)
Past armed conflict* trust	−0.06 (0.074)	−0.07 (0.077)	0.10 (0.1146)

Note Estimation controls for variables: household size, per capita asset, age of household head, sex of household head, educational status of household head, household electrification status, enrolment of children and log amount of cultivated land. Social capital is used as control variable in specification 2 only

Robust standard errors in parentheses. *** $p < 0.01$,** $p < 0.05$,* $p < 0.1$

variables, previous experience of armed conflict along with good relations among indigenous communities is highly statistically significant in increasing overall consumption (Table 8.2). A similar positive effect for non-food consumption exists for indigenous communities when land dispossession is interacted with intra-group trust.

Greater trust appears to effect household preferences about consumption. Moreover, the past actual experience of conflict is salient in this regard. In line with the arguments of Fehr and Hoff (2011), social institutions impact on individual preferences, implying that preferences are endogenous to social institutions and interactions. Conflict changes the nature of social interactions, local institutions and the constraints (social rules) that individuals face. The previous experience of conflict when combined with trust between different indigenous tribes appears to encourage consumption within that group. On the other hand, when trust factors are not taken into account, greater saving and less consumption is induced when there are apprehensions about future conflict, as well as previous experiences of armed conflict among both communities. Future fears of eviction raise consumption (significantly for Bengalis).

8.4.2 School Enrolment

Decisions to enrol children in school can be a proxy of investment decisions for the future, and because children are potentially suppliers of household labour, it entails an opportunity cost.

Our probit regression results of specification 1 in Table 8.3 indicate that current perceptions of violence fail to explain variations in the likelihood of children's enrolment as the coefficients are statistically insignificant. Although their relation is insignificant, households from both communities perceiving a danger of eviction have a greater chance of sending children to school compared to those households who do not have this perception, while apprehensions about armed conflict and communal violence recurring reduce the chance of child enrolment among the indigenous.

Past experiences of land dispossession have a deep-seated influence on current livelihood decision-making processes, which is evident in specification 2 in Table 8.3, particularly for the indigenous peoples. It shows that indigenous households having a previous experience of land dispossession have a higher probability of sending children to school as compared to those households who did not encounter this form of violence. The positive and statistically significant determining role of the experience of land dispossession is found robust across various estimation procedures (LPM, logit and probit). The experience of land dispossession is traumatic and creates long-standing vulnerabilities, as land is the most productive asset. This may raise the likelihood of sending their children to school, possibly with a view to overcoming the challenge of earning livelihoods from an ever-decreasing amount of cultivable land. But the primary

Table 8.3 Determinants of child enrolment in school: probit estimation

Independent variables	Dependent variable: school enrolment	
	Indigenous household	Bengali household
Specification 1: *Current perception of violence*		
Fear of armed conflict	−0.01 (0.040)	0.01 (0.051)
Fear of communal violence	−0.05 (0.035)	0.01 (0.042)
Fear of eviction from land	0.003 (0.034)	0.02 (0.042)
Specification 2: *Previous experience of violence*		
Displacement from own home	−0.05 (0.045)	0.05 (0.054)
Land dispossession	0.09**(0.038)	0.04 (0.042)
Past armed conflict	−0.02 (0.034)	0.05 (0.046)

Note Estimation controls for variables: age of child, age square of child, sex of child, household size, per capita asset, age of household head, sex of household head, educational status of household head, type of educational institutions, language of book and language of instruction. Social capital is used as control variable in specification 2 only
Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

'investment' motivation for schooling children is to allow future generations to acquire qualifications so that they may escape the conflict and are less dependent on agriculture.

8.4.3 Production Decisions: Cropping Patterns

Our regression results regarding determinants of cropping decisions are reported in Table 8.4.[4] In the first specification, fear of communal violence has a positive and statistically significant role in raising the probability of mixed cropping (both food and cash crops) for both communities, which is statistically significant. There is a possible endogeneity between fear of communal violence and cropping decisions because households producing mixed crops might be more apprehensive, as this requires more fertile land in terms of location and other factors, and land is central to the conflict. We have used a variable describing overall satisfaction in social interactions in the community as a whole as an instrument since it is related to fears of future communal violence and not correlated to mixed cropping decisions. Durbin-Wu-Hausman tests of exogeneity show that there is no endogeneity problem, and it implies that the coefficient of the probit model is preferable to the IV probit. We also found our estimates robust across various models: LPM, logit and probit. The details can be found in Badiuzzaman et al. Cameron (2013).

[4] We do not have data on access to or distance from the market for each household in the survey, but because of the locations, the same distance from the market will apply to a large subsets of households surveyed.

Table 8.4 Determinant of cropping decisions (mixed crop): probit estimation

Independent variables	Dependent variable: mixed crop production	
	Indigenous household	Bengali household
Specification 1: *Current perception of violence*		
Fear of armed conflict	−0.03 (0.057)	0.07 (0.074)
Fear of communal violence	0.14** (0.054)	0.16** (0.063)
Fear of eviction from own land	0. 00023 (0.056)	0.002 (0.068)
Specification 2: *Previous experience of violence*		
Displacement from own home	−0.06 (0.055)	0.04 (0.069)
Land dispossession	−0.09* (0.048)	−0.03 (0.056)
Past armed conflict	0.04 (0.049)	0.15** (0.062)
Specification 3: *Interaction of previous experience of violence and social capital*		
Displacement* trust	−0.12 (0.271)	−0.64 (0.5647)
Land dispossession* trust	0.27* (0.132)	−0.05 (0.4564)
Past armed conflict* trust	0.27* (0.147)	0.71 (0.5897)

Note Estimation controls for variables: household size, per capita asset, age of household head, sex of household head, educational status of household head, amount of cultivated land and type of cultivation techniques (*jum*, plough and both). Social capital is used as control variable in specification 2 only

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As per specification 1 of the probit estimation (Table 8.4), both indigenous and Bengali households perceiving fear of communal violence are found more likely to produce mixed crop and the result is robust across the linear probability, logit and probit models. Probit results under specification 2 show that previous experiences of armed conflict motivated Bengali households to engage in greater mixed cropping, and it is robust across linear probability and logit estimates. Earlier experiences of land dispossession lower the chances of mixed cropping among the indigenous population. The presence of trust (specification 3) significantly increases the probability of mixed cropping among the indigenous peoples when interacted with land dispossession and past armed conflict, but the same is found insignificant for Bengali settlers. A study on the conflict-affected parts of Northern Uganda by Rockmore (2012) suggests that conflict alters the composition of assets held towards less risky assets. Our findings are qualitatively similar to that of Nillesen and Verwimp (2010) for post-conflict rural Burundi, where the cultivation of cash crops also increased. In our case, the past experience of conflict and a fear of communal violence igniting in the future raise the probability of mixed crop production.

Our apparently anomalous results, with respect to rising risk-taking in cropping patterns following greater subjective feelings of violent experiences, can only be explained by less well-known theories about risky behaviour. Conventional wisdom would suggest that individuals become more risk averse after an adverse shock, such as conflict and the fear of violence. This is also the prediction of the expected utility theory in conjunction with the concavity property of standard utility functions leading to the properties of diminishing marginal utility of income, as well as absolute risk aversion. The standard precepts of expected utility do not, however, hold in many contexts. In our case, we can argue that both experience and subjective perceptions of violence amount to ‘trauma’, which has a pecuniary counterpart that may be characterised as one where the concerned individual or household has sustained a financial loss. Markowitz (1952) indicated that starting from a state of loss, individuals want to engage in more risk-taking to regain their previous valued position than when their wealth portfolio is exhibiting positive growth and their expectations are over-fulfilled. Second, he also pointed out that what may matter more for decisions to engage in risky projects is the distribution of the possible profit or loss it may entail rather than the absolute (expected) value of risky prospect. In other words, the *direction* of *change* in the household’s asset position and the possibility of regaining a highly valued asset in monetary or social terms are more salient than its level in our case.

Following Kahneman and Tversky (1979), we may apply prospect theory to explain our empirical findings with regard to cropping patterns, bearing in mind that cash crop cultivation is more risky, as it does not guarantee the household’s subsistence and is more subject to market fluctuations. Prospect theory represents a departure from expected utility in that it is a two-stage process, and risky ventures are weighted by not only (subjective) probability of the different risky states but also a more complicated ‘decision weighting’ process. The first stage of the decision involves an editing phase where a reference point is chosen to evaluate the likely effect of the actual risky investment framed in terms of specific aspects of the highly valued by the decision maker. This is akin to the framing decisions currently emphasised by behavioural economists and individual self-image stated much earlier by Boulding (1956). Following the trauma of eviction and/or violence, individuals may feel that the key value of assets has diminished and must be replaced as a priority. In the second stage of evaluation, when the household decides on its type of crop cultivation, it may take more risks, if the risky project has a high enough decision weight compared to the less risky alternative. Decision weighting is related to the probability of an uncertain project bearing fruition, but it also includes the subjective desirability of the outcome, a property that alters less readily in the mind than the pure probability of success. The point is that taking on more risks is understandable if there is a substantial chance that more risky investments will lead to recuperation of particular erstwhile losses. This may explain why households with a greater past experience of violence (and in some cases a fear of future conflict) are more likely to invest in the more risky cash crops along with food crops.[5] Moreover, prospect theory also suggests that the

[5] Following Kahneman and Tversky (1979), let the value (V) of the household’s risky prospect be $V(x, y, p, L) = \pi(p, L)v(x) + [1 - \pi(p, L)]v(y) \cdots \pi_1, \pi_2 > 0$. Here, $v(x)$ is the value of the risky project, $v(y)$ is the value of the less risky project, p refers to the probability of success of x, and π is the decision weight which is a positive function of both the probability of success and losses (L) previously sustained. It is immediately apparent that an increase in losses due to perceptions of violence will raise the attractiveness of the risky project by weighing the decision more heavily in favour of x.

decision weight given to a desirable outcome may be greater than its objective probability in the expected utility framework. In other words, individuals overweight the likelihood of a more desirable outcome.

Our results also have qualitatively similarities to the findings of Voors et al. (2012) in their field experiment in post-conflict Burundi, which indicate greater risk-taking and trust after conflict. While we only have data on trust for the survey period and are unable to infer any increase in trust, social capital in the form of trust could have a possible role in determining livelihood decisions, especially when it comes to certain consumption and cropping decisions among the indigenous peoples of CHT. In our case, the application of prospect theory to individual decision-making by households appears more salient when it comes to cropping decisions, especially among settler Bengali households, and seems better at explaining household risk-taking.

8.5 Conclusions

Our object has been to analyse household livelihood decision-making processes under the shadow of violence in the post-conflict CHT region of Bangladesh. As with other developing country internal conflicts, the accord ending the insurgency is imperfect in nature, and the central grievance concerning land encroachment is yet to be addressed. Violence between settlers who have encroached on the land of the ethnically distinct local population is still prevalent, and the Bangladesh army is still present in the region in substantial numbers to deal with any potential insurgency. Land, in the context of the densely populated and agriculturally dependent country, is the principal bone of contention. Thus, neo-Malthusian factors play a role in this conflict, as the shortage of land necessitates encroachment by settlers, which along with grievances induced by land grabbing and threats to the distinct way of life of the indigenous people produces conflict.

The main innovation of the analysis is the incorporation of psycho-social factors, specifically the trauma of past violence and also current perceptions of the likelihood of future conflict into the analysis of economic decision-making. We also include some information on trust between the different identities that make up the indigenous group in the region. In that sense, we endogenise preferences with regard to consumption, cropping and the decision to school children to these phenomena, in line with the tenets of current behavioural economics. Our research suggests that under certain circumstances, heightened subjective perceptions about violence reigniting in the future as well as past experiences of conflict may lower consumption expenditure as a risk-reducing tactic. The propensity to send children to school and engage in risky mixed crop cultivation may also increase with certain types of past experiences and future expectations of violence.

The endogenous determination of preferences is one aspect of the explanation for the phenomena we are observing. It cannot by itself adequately explain greater risk-taking. We go on to discover that certain types of risky behaviour are best explained by prospect theory, which under certain circumstances predicts a certain degree of risk-taking as a response to loss. While preferences may be endogenous to past experiences, current perceptions and social capital in the form of trust (behavioural economics), risk-taking can be better explained by prospect theory. Conflict (experienced or anticipated) may make some people bolder and more risk-taking in order to enhance their long-term future. Prospect theory is apposite in understanding this reaction, as people frame their decisions in the light of personal priorities that dominate the expected objective value of greater risk-taking.

Poverty and conflict are inextricably intertwined. The widespread presence of poverty enhances conflict risk; conflict equally inhibits poverty reduction; see Murshed (2010, Chaps. 2 and 3) for a literature review. Thus, it is important to diminish conflict risk in any strategy of poverty reduction, and conflict abatement also requires poverty reduction. An important policy consideration is, therefore, to reduce poverty in post-conflict settings, in particular; otherwise, conflict may reignite and poverty rise even further. A crucial corollary, at the local level, of this conclusion involves enhancing household-level economic activity immediately after the cessation of conflict. In addition to the standard poverty reduction prescriptions involving service provision (health, education and social services), skill acquisition and access to credit, an important facet of post-conflict reconstruction and poverty reduction is enhancing trust and confidence. This is the main policy conclusion of our study.

An extensive review of the literature on livelihoods in fragile and conflict-affected regions can be found in Malett and Slater (2012), suggesting a wide taxonomy of outcomes and mixed policy intervention success. Our results do suggest the possibility of a post-conflict Phoenix or rapid economic recovery factor at the household level in the CHT region of Bangladesh. Its presence or absence has a lot to do with individual household behaviour, and the manner in which past experiences of violence and current perceptions about future conflict are processed in the mind. If it makes individuals bolder so they aim at recovering past losses, or local institutional settings induce a preference for greater investment, a Phoenix factor may ensue, and rapid growth may follow. In this connection, the presence or absence of positive social capital may assist in greater investment for the future and enhanced poverty reduction. In addition to the standard prescriptions for poverty reduction, involving increased access to credit and skill acquisition and micro-credit, our study demonstrates the salience of confidence building. Ultimately, much hinges on confidence. Here, local factors in decision-making are salient, but a lot will still depend on the macropolitical and economic framework for large-scale recovery to take place.

Acknowledgments We are grateful to the European Union FP 6 MICROCON research project for financial help, and the CHTDF-UNDP in Bangladesh who funded the household survey analysed in this paper and gave us permission to use the same data set.

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Part V
Dimensions of Poverty and Its Reductions

Chapter 9
Decomposing Spatial Inequality in Sri Lanka: A Quantile Regression Approach

Thusitha Kumara

Abstract This paper uses the Blinder and Oaxaca decomposition method and its recent expansion (Machado and Mata) to examine whether well-being gaps between urban (richer regions) and rural (poorer regions) areas are the result of (i) regional/spatial differences in household characteristics or (ii) differences in location-specific returns to these characteristics. The data used in this study are from the Household Income and Expenditure Surveys for 2006/2007 and 2009/2010. The analysis suggests that the existence of barriers, such as remoteness and poor access to markets, that prevents lagging regions from being absorbed into the modern sector or growing region plays a larger role in perpetuating spatial inequality, especially for the poor, than disparities in household characteristics (endowments) between regions and sectors.

Keywords Spatial inequality · Quantile regression · Inequality decomposition · Sri Lanka

9.1 Introduction

Inequality increased during the last decade of the twentieth century in both developing and developed countries (World Bank 2005a). In the People's Republic of China, the Russian Federation, India, Mexico, South Africa, and Viet Nam, as in many other developing and transition countries, this increase in inequality was accompanied by spatial and regional disparities in economic activities, and income and social indicators (Kanbur and Venables 2005). This rising trend in overall

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_9

inequality was also evident in South Asia which had long been characterized by relatively low and stable levels of inequality. Recent evidence shows that there was a sizeable increase in inequality in Bangladesh, India, Nepal, and Sri Lanka in the late 1980s and 1990s (World Bank 2005a). For example, inequality in consumption expenditure in Sri Lanka rose from a Gini coefficient of 0.32 in 1990 to 0.40 in 2009/2010, possibly the sharpest increase in inequality in its recent history, making its distribution more unequal than many of its East Asian neighbors, and on par with Bangladesh and Nepal.[1]

Rising inequality has two components. The first is within the fast-growing modern industrial sector and region. This is to a large extent vertical inequality, driven by asset and skill differences.[2] The second is between the fast-growing modern industrial sectors and regions, on the one hand, and the traditional agricultural sectors and regions, on the other. What is striking about the latter component of inequality is that two individuals with identical productive characteristics (schooling, skills, training, experience) could face differential returns to their endowments, depending on where they live. These differentials encourage individuals in the low-returns sector or region to move or migrate into the high-returns sector, eventually equalizing returns in both sectors. Cheaper labor in the low-returns regions may also attract capital (firms and entrepreneurs) to move to these areas. But if these differentials persist over time, it suggests that there are barriers (failures) that prevent the traditional sector or lagging region from being absorbed into the modern sector. This argument is well presented in the World Development Report 2009: Reshaping *Economic Geography* (World Bank 2008) which argues that higher densities, shorter distances, and lower divisions are essential for the development of an economy. Economic geography suggests that this growth will be initially unbalanced and lead to widening disparities. However, spatial transformations that reduce distance and divisions, and calibrate densities of economic growth with densities of poverty, may lead to inclusive growth and lower inequality. Hence, policies to reduce inequality need to identify the sources of spatial disparities—if there are gaps in characteristics, it is important to improve endowments of the households; if barriers exist between lagging and leading regions, these barriers need to be removed.

Although Sri Lanka recorded moderate economic growth during the last decade, the regions that are far away from its economic capital, Colombo, tend to be significantly poorer than the areas closer to Colombo. Though a number of regional development programs have been implemented by successive governments, living standards of the people in the remote areas continue to fall significantly behind their urban counterparts. This suggests that a better understanding of the causes of inequality is essential for effective policy formulation.

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[1] The Gini coefficient of per capita consumption expenditure of Bangladesh was 0.41 in 2000 as compared to 0.30 in 1991; in Nepal, it increased from 0.34 in 1995/1996 to 0.39 in 2003/2004.

[2] This does not preclude the existence of groups within the fast-growing sector (women, minorities) who experience horizontal inequality.

Programmes and policies in Sri Lanka's current development strategy may be divided into three categories. The first includes the improvement of facilities in schools, establishment of new universities in poor areas, and the spread of information technology facilities (provision of an IT center to each district secretariat), all of which pertain to improving household and community human capital endowments. The second category includes the improvement of roads (primarily rural roads), irrigation systems (small-scale tanks), and promotion of rural industries (primarily via small-, large-, and medium-scale enterprises). These could be considered as efforts to improve location-specific returns, but keep the focus at the community or regional level. The last set of programs which is expected to have an impact on reducing disparities in location-specific returns focuses primarily on transport infrastructure, such as the Colombo–Kandy expressway and the Southern Highway, which improves access to and mobility between regions, and is likely to reduce regional gaps in location-specific returns.

This paper uses a standard methodology and its recent expansion to examine whether well-being gaps between urban (richer regions) and rural (poorer regions) areas are the result of (i) regional/spatial differences in household characteristics or (ii) differences in location-specific returns to these characteristics. The purpose of the paper is to examine the role of location-specific returns to households' productive characteristics, and the extent to which they contribute to the gaps in consumption across the distribution of consumption.

9.2 Analytical Framework

This study employs a conventional decomposition method of measuring discrimination and its quantile regression extension to analyze spatial inequality in Sri Lanka. In this section, we (1) explain the decomposition as it applies to average gaps between locations, (2) describe quantile regression, and (3) present the extension of the decomposition to quantile regression estimates.

Wan (2007) discusses that inequality between urban and rural areas cannot be totally explained by the geographical division between the urban and rural areas of a particular economy as assumed by the conventional inequality decomposition techniques. Many other factors such as differences in human capital and differences in demographic factors also affect the determination of urban and rural inequalities. But the traditional inequality decomposition techniques do not include control variables for these factors. The decomposition of inequality using regression provides a neat solution for this (Wan 2007). The regression-based decomposition allows for the inclusion of control variables as well as other socioeconomic determinants of inequality rather than the geographical location (Gunatilaka and Chotikapanich 2009). Furthermore, regression-based decomposition analysis enables identification and quantification of the determinants of inequality (Wan 2002) which are important and of interest to economists and policy makers.

The seminal works of Blinder (1973) and Oaxaca (1973) provide the basic roots for regression-based decomposition techniques. The Blinder–Oaxaca decomposition is extensively applied in decomposition analysis, and several extensions have been developed recently (Fortin et al. 2011). The intuition behind the conventional method of measuring discrimination, developed independently by Blinder (1973) and Oaxaca (1973), is that in the absence of discrimination, the estimated effects of individuals' observed characteristics on their wages are identical for groups of individuals. Similarly, in the absence of location-specific returns, the estimated effects of a household's observed characteristics on some measure of household well-being (such as income or consumption) are identical for each location. The estimated income gap can be decomposed as follows:

$$\mathrm{In}y^{*\mathrm{urban}} - \mathrm{In}y^{*\mathrm{rural}} = X^{*\mathrm{rural}}(\beta^{\mathrm{urban}} - \beta^{\mathrm{rural}}) + (X^{*\mathrm{urban}} - X^{*\mathrm{rural}})\beta^{\mathrm{urban}} \quad (9.1)$$

where $\ln y$ is a measure of household income or consumption, X is a vector of income-generating characteristics for the ith household, and β is a vector of coefficients. The asterisks denote mean or average. The first term on the right-hand side is the portion due to differences in coefficients$(\beta^{\mathrm{urban}} - \beta^{\mathrm{rural}})$, evaluated at the same set of average income-generating characteristics $X^{*\mathrm{rural}}$, in this case the rural (poorer region). The second term is the portion of the gap attributed to differences in average earnings-generating characteristics $(X^{*\mathrm{urban}} - X^{*\mathrm{rural}})$, weighted by the urban (richer region) returns structure.[3]

If there were no location-specific effects, $\beta^{\mathrm{urban}} = \beta^{\mathrm{rural}}$, i.e., endowments in both locations yield similar returns, the first term would be zero, and any regional disparities would be completely explained by differences in characteristics of households in the two locations, $X^{*\mathrm{urban}} - X^{*\mathrm{rural}}$. With no disparity in returns, migration would be low or zero.

The Blinder–Oaxaca decomposition is based on ordinary least squares (OLS) regression which assumes that the effect of the regressors does not vary along the conditional distribution of the dependent variable. For example, the effect of schooling on household welfare is assumed to be the same at the bottom of the welfare distribution as it is at the top. If, however, these effects do vary along the distribution of household welfare, quantile regressions, which yield models for different percentiles of the distribution, provide a parsimonious way of describing the whole distribution (Martins and Pereira 2004). The θth quantile of y_i conditional on $\boldsymbol{X}_i$ is given by

$$Q_\theta(y_i|\boldsymbol{X_i}) = \boldsymbol{X_i}\beta_\theta, \theta \in (0, 1) \quad (i = 1, \ldots, I) \quad (9.2)$$

where the coefficient β_θ is the slope of the quantile line, giving the effect of changes in X on the θth conditional quantile of y. As shown by Koenker and Basset (1978), the quantile regression estimator of β_θ solves the following minimization problem.

[3] The decomposition may also be expressed in terms of average urban endowment $X^{*\mathrm{urban}}$ and rural (poorer regions) returns structure β^{rural}.

$$\beta_\theta = \arg\min\left[\sum_{i:y_i \geq X_i\beta} \theta|y_i - X_i\beta| + \sum_{i:y_i \geq X_i\beta} 1-\theta|y_i - X_i\beta|\right] \tag{9.3}$$

It is easily seen that for the median [$\theta = 0.5$], the quantile regression minimizes the sum of absolute deviations.

Machado and Mata (2005) combine quantile regression with a bootstrap approach and derive the following decomposition, which is analogous to the Blinder–Oaxaca decomposition in Eq. 9.1:

$$Q_\theta\left(y^{\text{urban}}\right) - Q_\theta\left(y^{\text{rural}}\right) = \left[Q_\theta\left(X_i^{\text{rural}}\beta^{\text{urban}}\right) - Q_\theta\left(X_i^{\text{rural}}\beta^{\text{rural}}\right)\right] + [Q_\theta(X_i^{urban}\beta^{\text{urban}} - Q_\theta(X_i^{\text{rural}}\beta^{\text{urban}})] + \text{residual} \tag{9.4}$$

The first term on the right-hand side is the contribution of the coefficients (returns effect), and the second term is the contribution of the covariates (covariate effect) to the difference between the θth quantile of the urban (rich region) distribution of consumption and the θth quantile of the rural (poor region) consumption distribution. The residual term comprises the simulation errors which disappear with more simulations, the sampling errors which disappear with more observations, and the specification error induced by estimating linear quantile regression (Melly 2005). It is assumed that the linear quantile model is correctly specified.

The Machado-Mata (2005) decomposition is interpreted similar to the Blinder-Oaxaca decomposition. Since the decomposition can be conducted at any percentile of the consumption distribution, it reveals whether the relative importance of covariates and coefficients varies along the distribution.

9.3 Data and Variables

The data used in this study are from the Household Income and Expenditure Surveys (HIES) for 2006/2007 and 2009/2010. These national surveys, however, do not cover the Northern and Eastern Provinces of Sri Lanka.[4] The primary sampling unit is the household, and the sample size ranges from 17,037 households in 2006/2007 to 19,958 households in 2009/2010.[5] Both surveys comprise 12 monthly rounds that capture seasonal variations. The sample design allows for

[4] These two provinces are the two most severely affected by the armed conflict with the separatist LTTE movement. However, these two provinces were excluded from the study due to non-availability of comparable data.

[5] The sample size of the HIES (DCS) was around 20,100 households in both the survey years. The sample size of this study was reduced to the above numbers due to data cleaning.

subgroup analysis at the province and district levels. In the urban–rural analysis, the estate sector was subsumed under the rural sector for the purpose of decomposition. These data sets have been used in poverty analysis and exhibit no major problems in terms of inconsistency and inaccuracy (World Bank 2005b, 2007a, b).

The primary measure of well-being in this paper is real household consumption expenditure per capita. Consumption data are used in preference to income data for several reasons. Consumption is a direct measure of achieving or fulfilling basic needs and a better measure of current welfare, incorporating consumption smoothing by households within a given period of time and over the life cycle (Duclos and Araar 2006; Deaton 1997). Consumption data are more easily observable than income data. The latter are vulnerable to underreporting due to the innate features of income reporting, that is, fewer formal income receivers, seasonal and unrecorded income sources, and the diversified nature of earnings (Heltberg 2003). For these reasons, consumption is typically used in the analysis of poverty and inequality.

The measure of consumption expenditure includes over 400 items of household consumption. Food consumption is reported in calendar style, for a week, while non-food consumption is reported for the past month, 6 or 12 months. Consumption on all items is converted to monthly consumption. Reported values are of the amount consumed, which includes goods and services purchased as well as home-produced goods and services. Although the latter comprises a substantial proportion of household consumption, and problems of using imputed values are well known (Deaton 1997), the values used are consistent over time, unlike the problems raised by the use of different (and possibly inconsistent) values in transition countries (Benjamin et al. 2005; Ravallion 2005). The rental value of owned housing is also imputed in the data set. The household is defined as 'one or more persons living together and having common arrangements for food and other essentials of living' (Department of Census and Statistics 1987).

Spatial and temporal price indices are computed using district-level nominal poverty lines published by the DCS[6] and are constructed at the district level. These are constructed for each data set, allowing spatial prices to vary (as they do) over time, and are later adjusted with regard to temporal variations.

Two categorizations of spatial location are used in the decompositions derived in this paper. The first is the conventional urban and rural (the estate sector is subsumed into the rural) distinction. The second categorization classifies the economically better-off Western Province (WP), which has all the characteristics of a leading region, as the richer region, and includes all other regions in the poorer region category. While this classification ignores the variation among other regions, it is adopted because the methodology requires a binary classification. The gap in consumption between the WP and the other regions is sufficiently large to justify such a classification.

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[6] http://www.statistics.gov.lk/poverty/OfficialPovertyLineBuletin.pdf (*accessed on* 23 *January* 2008).

Table 9.1 List of variables

Variable	Description
PCE	Log real expenditure per capita
AEM	Dummy for engaged in agricultural work (No = 0)
EMP	Number of employed members in the family
HAG	Household head's age
he	Household head's sex
his	Household size
DEP	Number of dependants in the family
	Dummies for household head's race (Sinhala = 0)
HRD1	Tamil
HRD2	Muslim or other
	Dummies for the most educated member (No/primary education = 0)
HED1	Junior secondary (Grade 7–9)
HED2	GCE O/L
HED3	GCE A/L
HED4	Tertiary (graduate or vocational)
	Dummies for the province (Western Province = 0)
PRD1	Dummy for province: Central Province
PRD2	Dummy for province: Southern Province
PRD3	Dummy for province: North Western Province
PRD4	Dummy for province: North Central Province
PRD5	Dummy for province: Uva Province
PRD6	Dummy for province: Sabaragamuwa Province

Regressors used in the model (Table 9.1) include (1) factors that influence the household's earning ability, such as the number of employed members in the household, the sector of employment (whether any household members were engaged in agricultural work), the household head's age, and household human capital (the highest level of education attained by any member of the household)[7]; (2) demographic features of the household that influence the level of consumption per capita such as the number of dependents (number of household members aged below 15 years and above 65 years); (3) other demographic features such as the household head's gender and ethnicity; and (4) location variables to control for regional variation within urban and rural sectors (only in the urban and rural specification).

[7] Ministry of Education of Sri Lanka categorizes the education system in Sri Lanka as Primary: Year 1–5, Junior Secondary: Year 6–9, Senior Secondary: Year 10–11 (GCE O/L), College: Year 12–13(GCE A/L) and Tertiary: University and Vocational (http://www.moe.gov.lk/modules.php?name=Contentandpa=showpageandpid=7).

Table 9.2 Descriptive statistics, 2009/2010

2009/2010	Urban		Rural		Western Province		Other Provinces		National	
	Mean	St. De.	Mean	St. De.	Mean	St. De.	Mean	St. De.	Mean	St. De.
Real expenditure per capita	9,041	11,656	6,545	5,799	8,738	8,835	6,539	7,184	7,184	7,807
Engaged in agricultural work[a]	8.00	–	35.93	–	12.07	–	34.88	–	28.55	–
Number of employed in the family	1.31	0.88	1.41	0.90	1.45	0.91	1.36	0.88	1.39	0.89
Head's age	51.00	14.00	50.68	14.08	51.76	14.13	50.39	14.01	51.76	14.06
Male household head[a]	72.67	–	77.11	–	76.27	–	75.81	–	75.94	–
Head's race: Sinhala[a]	57.90	–	74.90	–	81.27	–	66.29	–	70.41	–
Head's race: Tamil[a]	22.61	–	17.43	–	10.49	–	21.95	–	18.80	–
Head's race: Muslim or other[a]	19.50	–	7.66	–	8.23	–	11.76	–	10.29	–
Household size	4.22	1.83	3.4	1.6	4.14	1.7	4.02	1.69	4.05	1.7
Number of dependents in the family	1.31	1.18	1.25	1.13	1.24	1.13	1.28	1.15	1.27	0.43
Most educated member: no schooling/primary[a]	4.19	–	8.25	–	3.52	–	8.56	–	7.18	–
Most educated member: junior secondary[a]	13.22	–	16.89	–	12.77	–	17.11	–	15.92	–
Most educated member: GCE O/L[a]	38.06	–	41.63	–	40.50	–	40.76	–	40.69	–
Most educated member: GCE A/L[a]	36.03	–	28.05	–	36.02	–	27.94	–	30.16	–
Most educated member: Tertiary[a]	8.42	–	5.07	–	7.18	–	5.49	–	5.95	–

Source Author calculations from HIES 2009/2010 data. *Note* [a] percentages, education is categorized as primary education (Grades 1–5), junior secondary (Grades 6–9), GCE O/L (Grades 10 and 11), GCE A/L (Grades 12 and 13), and tertiary (graduate or postgraduate). The estate sector is subsumed under rural sector

A clear difference in consumption expenditure between urban and rural sectors as well as between the WP and the rest of Sri Lanka (OP) is indicated by the mean calculations of consumption expenditure per capita as shown in Tables 9.2

Table 9.3 Descriptive statistics, 2006/2007

2006/2007	Urban		Rural		Western Pro.		Other Pro.		National	
	Mean	St. De.	Mean	St. De.	Mean	St. De.	Mean	St. De.	Mean	St. De.
Real expenditure per capita	6,226	5,368	4,438	4,621	5,978	6,217	4,465	4,186	4,885	4,883
Engaged in agricultural work[a]	8.89	–	36.61	–	13.05	–	35.76	–	29.46	–
Number of employed in the family	1.42	0.94	1.49	0.91	1.53	0.95	1.45	0.91	1.47	0.92
Head's age	50.28	13.71	50.54	13.91	50.97	13.80	50.29	13.87	50.47	13.86
Male household head[a]	74.27	–	76.82	–	77.15	–	75.82	–	76.18	–
Head's race: Sinhala[a]	63.26	–	78.94	–	82.34	–	72.22	–	75.03	–
Head's race: Tamil[a]	15.50	–	15.23	–	9.25	–	17.62	–	15.30	–
Head's race: Muslim or other[a]	21.24	–	5.82	–	4.41	–	10.16	–	9.67	–
Household size	4.38	1.89	4.06	1.64	4.23	1.71	4.10	1.71	4.18	1.71
Number of dependents in the family	1.41	1.22	1.33	1.17	1.32	1.61	1.36	1.19	1.35	1.18
Most educated member: no schooling/primary[a]	4.10	–	9.32	–	4.18	–	9.49	–	8.01	–
Most educated member: junior secondary[a]	14.16	–	18.83	–	13.99	–	19.08	–	17.67	–
Most educated member: GCE O/L[a]	38.16	–	40.33	–	41.04	–	39.31	–	39.79	–
Most educated member: GCE A/L[a]	35.36	–	27.14	–	34.01	–	27.34	–	29.19	–
Most educated member: tertiary[a]	8.22	–	4.38	–	6.78	–	4.78	–	5.34	–

Source Author calculations from HIES 2006/2007 data. *Note* [a] percentages, education is categorized as primary education (Grades 1–5), junior secondary (Grades 6–9), GCE O/L (Grades 10 and 11), GCE A/L (Grades 12 and 13), and tertiary (graduate or postgraduate). The estate sector is subsumed under rural sector

and 9.3. Rural consumption was around 70 % of the urban consumption in both the survey years. Figure 9.1 illustrates the difference in log real expenditure per capita (LREPC) distributions with kernel density curves for urban, rural, Western, and other provinces for 2006/2007 and 2009/2010. Urban and WP consumption densities lie to the right of the rural and other province densities (respectively),

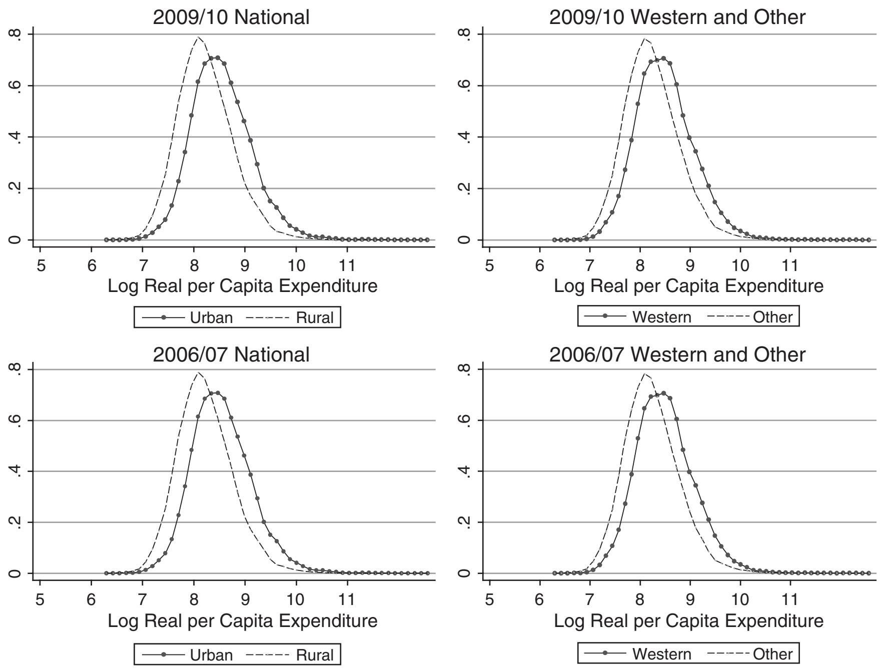

Fig. 9.1 Kernel density curves

indicating higher consumption for urban and WP populations throughout the distribution. The urban–rural consumption gap is greater in 2006/2007 relative to 2009/2010, suggesting that recent regional development programs of the country are delivering the expected results. The consumption expenditure gap is wider in the upper consumption percentiles. This result is comparable to that found in Viet Nam using a similar analysis (Nguyen et al. 2006).

Descriptive statistics (Tables 9.2 and 9.3) give an indication of the differences in endowments between urban and rural areas and the WP and other provinces. Urban areas and the WP have more educated households, greater ethnic diversity, as is to be expected, and a much smaller proportion of households employed in agricultural work.

Table 9.3 indicates that educational endowments beyond junior secondary level have increased in the population as a whole between 2006/2007 and 2009/2010.

The percentage of those employed in the agricultural sector in rural and urban areas continued to decline over the period, while changes (decline) in the number of dependents and household size were marginal. The age and gender of household heads did not change significantly over the period.

9.4 Discussion of Results and Conclusions

In this section, we first present the OLS and quantile regression results on which the decompositions are based. We then present the results of decomposing the consumption gap between urban and rural Sri Lanka, and between the WP and other provinces in two segments: the consumption gap (difference) due to the differences in household endowments (characteristics) and the difference due to location (area of residence).[8] These decompositions are derived by applying the methodology described in Sect. 9.2.

9.4.1 Regression Results

A detailed discussion of OLS and quantile regression estimates on which the decompositions were based is presented in Kumara (2009, 2012).[9] A brief summary is given here (and in table form in appendix Tables 9.5, 9.6, 9.7, and 9.8). OLS and QR estimates suggest that household consumption increases monotonically with the level of education. An additional finding of the QR analysis is that the impact of education on consumption is significantly higher in the upper consumption quantiles for all education levels but the junior secondary level. Impact of education on consumption expenditure is relatively high for the lower consumption groups.

An additional employed member in the family increases the household consumption level to a greater extent in the urban sector (WP) than in the rural (OP) sector, while engagement in agricultural work reduces household consumption irrespective of the area of living. This is consistent with previous findings (World Bank 2004, 2005b).[10] A male-headed household consumes more compared to a female-headed household, and the result is stronger in the urban sector and in the WP.

The negative relationship between the number of household members engaged in agricultural work and household consumption persists in the QR analysis, and the impact is higher in the upper expenditure quantiles. QR analysis indicates that additional employment in the family generates more positive impacts on consumption in the upper expenditure quantiles, whereas the effect is weaker in the lower quantiles. Agricultural employment reduces consumption of upper quantile

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[8] The latter component could include the effect of any variable not included among the regressors correlated with location.

[9] These can be obtained from the author on request.

[10] The incidence of poverty in the households working in agriculture, forestry, and fishing industries is about 40 %.

households more than the lower quantiles irrespective of the area of living. This finding holds for both the survey years.

The consumption advantage of male-headed households becomes weaker in the upper expenditure quantiles and in the urban sector in both the periods.[11] This suggests that the gender of the household head is irrelevant for the upper consumption groups and for the urban sector. Most formal jobs that pay equal wages for both males and females are concentrated in urban areas, whereas most informal jobs that discriminate against females are concentrated in rural areas. This may explain the equal benefits in urban areas and the differences in rural areas. An additional member in the household generates negative results for all the quantiles, and the impact is significantly higher in upper expenditure groups and urban areas.

As suggested by the OLS estimation, Muslim and other ethnic groups have a higher consumption expenditure compared to their Sinhala counterparts in all the consumption quantiles. Furthermore, the percentage increase is higher in the upper consumption groups. Analogous to the OLS results, QR estimates also show that there is a negative correlation between the household consumption expenditure and households headed by persons of Tamil ethnic origin, as compared to households headed by Sinhala counterparts.

9.4.2 Inequality Decomposition

In this section, mean regression (Oaxaca 1973; Blinder 1973) and quantile regression (Machado and Mata 2005) methods are applied in decomposing consumption inequalities in Sri Lanka into two components: (1) a component that is due to the differences in the distribution of household endowments (covariate effect) between urban and rural sectors in Sri Lanka and (2) another component that is due to the location-specific returns (returns effect) to these covariates.

The mean regression decomposition method considers the means of two distributions. Adding value to the analysis, quantile regression decomposes the gap according to the differences at each quantile. In decomposing urban–rural (Western–other province) inequality, it compares rural household LREPC with a simulated (counterfactual) LREPC derived from rural characteristics (endowments) and urban (coefficients) returns. This estimates the difference in consumption between an urban household and a rural household that are identically endowed, where the only difference between them is the location. In other words, if the level of average urban (WP) household endowments was suddenly replaced by the level of endowments of average rural (other provinces) households, how large would the spatial consumption gap (i.e., the returns effect) be? If rural (OP) households were to move instantaneously (and without cost) to urban (WP) areas, what would the consumption gap between them and identical households in rural

[11] This relationship holds for most of the rural households and lower consumption groups.

Table 9.4 Total gap and unexplained gap (returns effect) 2009/2010 and 2006/2007

	Percentile					
	Mean	5th	25th	50th	75th	95th
			2009/2010			
Total gap						
Urban–rural	0.320 (0.009)	0.285 (0.016)	0.294 (0.005)	0.316 (0.011)	0.346 (0.013)	0.383 (0.025)
Western and other	0.266 (0.009)	0.229 (0.016)	0.238 (0.011)	0.270 (0.010)	0.279 (0.013)	0.317 (0.022)
Returns effect						
Urban–rural	0.243 (0.008)	0.237 (0.021)	0.240 (0.014)	0.238 (0.015)	0.248 (0.017)	0.265 (0.022)
Western and other	0.193 (0.008)	0.176 (0.018)	0.187 (0.014)	0.189 (0.013)	0.202 (0.015)	0.216 (0.030)
Returns effect as a percentage of total gap						
Urban–rural	75.94	83.16	81.63	75.32	71.68	69.19
Western and other	72.56	76.86	78.57	70.00	72.40	68.14
			2006/2007			
Total gap						
Urban–rural	0.330 (0.010)	0.267 (0.017)	0.302 (0.012)	0.336 (0.010)	0.375 (0.014)	0.385 (0.027)
Western and other	0.275 (0.010)	0.259 (0.012)	0.269 (0.012)	0.282 (0.012)	0.276 (0.015)	0.288 (0.025)
Returns effect						
Urban–rural	0.256 (0.009)	0.239 (0.021)	0.251 (0.013)	0.256 (0.014)	0.271 (0.015)	0.266 (0.026)
Western and other	0.196 (0.009)	0.198 (0.020)	0.197 (0.014)	0.195 (0.012)	0.205 (0.015)	0.203 (0.023)
Returns effect as a percentage of total gap						
Urban–rural	77.58	89.51	83.11	76.19	72.27	69.09
Western and other	71.27	76.45	73.23	69.15	74.28	70.49
% Change 2009/2010–2006/2007						
Urban–rural	−2.11	−7.10	−1.78	−1.15	−0.82	0.14
Western and other	1.80	0.53	7.29	1.23	−2.52	−3.33

Source Author's calculations using HIES 2009/2010 and 2006/2007. Standard errors are in parentheses and all the coefficients are significant at 1 % level

(OP) areas be? This component captures location-specific effects on consumption. With markets working perfectly, and no barriers to mobility (and a well-specified model), this gap would in the long term be zero. The entirety of the consumption gap would then be due to differences in characteristics between urban and rural (Western and other) households, captured by the covariates effect.

Both mean regression and quantile regression decomposition results are presented in Table 9.4 and Fig. 9.2. The second column of the table represents the decomposition results based on the mean regression analysis, and the 3rd to 7th columns represent the 5th, 25th, 50th, 75th, and 95th quantiles of the quantile

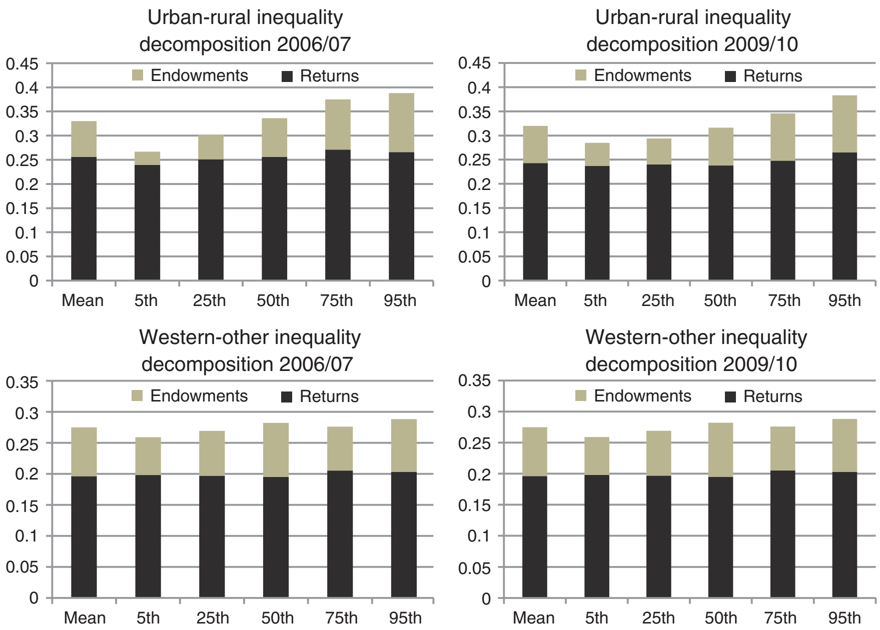

Fig. 9.2 Inequality decomposition: returns effect and endowment effect

regression analysis. The first panel illustrates the total consumption gap between the urban and rural sectors in Sri Lanka, and the second panel shows the decomposition results.

Mean regression analysis suggests that consumption inequality in Sri Lanka slightly decreased during the study period (second column in Table 9.4). This may be due to the recent regional development projects carried in Sri Lanka, discussed in Sect. 9.1.[12]

The urban–rural and WP–OP gaps that remain after controlling for household characteristics (evaluating urban consumption using rural household endowments) are positive. This signifies that even after adjusting urban consumption for rural endowment (characteristics), urban consumption is higher than rural consumption. This component is defined as the location-specific returns to household endowments. The major portion of the mean urban–rural consumption gap in Sri Lanka is explained by the returns effect, and its dominance is the same in both the surveys.

[12] A new sea port, an airport, a film village, and a cricket ground in Hambantota; a new expressway between Galle and Colombo; *Maga Neguma* (Road improvement) and *Divi Neguma* (life improvement) in rural provinces; and special development projects for the war-affected North and Eastern Provinces are some of the regional development programs carried out recently.

The dominance of the returns effect is observed in the quantile regression decomposition for all quantiles. For any quantile, for both survey years, the urban–rural (WO) consumption gap was recorded as positive, implying that the urban–rural (WO) gap favors the urban sector (WP) even after evaluating urban (WP) consumption with rural (OP) characteristics. This suggests that even though the consumption inequalities declined between the two survey years in Sri Lanka, the returns effect is still dominant.

Three major policy conclusions can be drawn from the quantile regression decomposition analysis. First, the urban–rural (total or unadjusted) consumption gap is smaller in the lower consumption quantiles and significantly higher in the upper quantiles. The difference in consumption expenditure gaps between the 95th percentile and 5th percentile is around 30 % in both the survey periods. This implies that the urban (WP) rich are much better off than the rural (other province) rich in terms of consumption expenditure. Second, the returns effect dominates throughout the distribution of consumption expenditure. The unexplained percentage of consumption gap is always more than 70 % of the total gap for all quantiles. Third, adding to the second conclusion, the returns effect dominates throughout the expenditure distribution, but tends to decline as it moves toward the upper consumption quantiles. This means that location-specific effects account for more than 80 % of the urban–rural total gap at the 5th quantile compared to less than 70 % of the urban–rural total gap in the 95th quantile. On the other hand, the importance of the covariate effect in explaining the urban–rural gap increases at the upper end of the expenditure quantiles. These findings are different from those of Nguyen et al. (2006) using the same analytical method for Viet Nam. They found that the covariate effect dominates in the lower quantiles, whereas the returns effect dominates in the upper quantiles.

A temporal analysis of the urban–rural inequality decomposition based on quantile regression analysis also finds that urban–rural inequality decreased over the study period, and inequality between the lower end and the upper end of the consumption distribution reduced relatively in 2009/2010. Furthermore, the dominance of the returns effect also declined in urban–rural analysis, while there was not much change in the WP and other process analysis.

The dominance of the returns effect in the lower quantiles of the consumption expenditure distribution suggests that *returns to household endowments matter more than household characteristics to poor people* in Sri Lanka. Sri Lanka is recognized as a country that has achieved extraordinary success in health and education indicators despite a lower level of income per capita (World Bank 2005b). Sri Lanka also records a relatively high rank in the UNDP ‘Human Development Index.’ Gender seems to matter less in determining household characteristics (e.g., education and health) in Sri Lanka compared to many other developing countries. This suggests that the distribution of household characteristics is relatively better in Sri Lanka as compared to Viet Nam. The lower rewards to rural households can be linked to the poor rural markets. Most formal employment is concentrated in urban areas, and rural areas are separated from the urban centers due to the poor road network, leading to poorer market access for the rural population.

The communication barriers between urban (WP) and rural (OP) areas may also contribute to lower rewards to the characteristics in the rural sector. In addition, if characteristics for which controls were not included due to lack of data, such as the quality of education, are correlated with location (for instance, richer areas have better quality education), then these would add to the location-specific effects.

The foregoing analysis suggests that the existence of barriers such as remoteness and poor access to markets prevents lagging regions from being absorbed into the modern sector or growing region. These barriers play a larger role in perpetuating spatial inequality, especially for the poor, than do disparities in household endowments between regions and sectors.

Policies that are indicated for further reduction in the urban–rural gap and higher poverty levels in the rural areas include (1) connecting lagging regions to markets in the growing regions, i.e., improvement of roads and transportation, electricity and communication infrastructure, and improving the investment climate in the rural areas; (2) improving the quality of schooling via better training and resources, especially in remote areas; and (3) removing barriers to labor mobility such as regulations in labor markets and land markets.

Appendix

See Tables 9.5, 9.6, 9.7, and 9.8

Table 9.5 OLS estimates 2009/2010

Variable	Coefficient				
	National	Urban	Rural	Western	Other
Constant	8.572*** 0.021	8.734*** 0.050	8.627*** 0.025	8.761*** 0.050	8.436*** 0.024
Agricultural employment	−0.083*** 0.008	0.108*** 0.024	−0.040*** 0.008	−0.082*** 0.020	−0.073*** 0.008
Number of employed	0.025*** 0.005	0.119*** 0.024	0.061*** 0.014	0.167*** 0.026	0.070*** 0.014
Head’s age	0.001*** 0.000	0.002*** 0.001	0.000 0.000	0.000 0.001	0.001*** 0.000
Male head	0.046*** 0.008	0.075*** 0.016	0.061*** 0.009	0.069*** 0.016	0.057*** 0.010
Household size	−0.148*** 0.003	−0.129*** 0.005	−0.137*** 0.003	−0.124*** 0.005	−0.137*** 0.003

(continued)

Table 9.5 (continued)

Variable	Coefficient				
	National	Urban	Rural	Western	Other
Number of dependants	0.007* 0.004	−0.001 0.007	−0.007* 0.004	−0.014** 0.007	−0.001 0.004
Race: Tamil	−0.090*** 0.010	−0.138*** 0.020	−0.085*** 0.011	−0.075*** 0.023	−0.058*** 0.011
Race: Muslim/other	0.117*** 0.012	−0.013 0.018	0.100*** 0.016	0.135*** 0.025	0.174*** 0.013
Education: Jun. Secondary	0.170*** 0.013	0.148*** 0.036	0.155*** 0.014	0.167*** 0.035	0.183*** 0.015
Education: GCE O/L	0.412*** 0.015	0.352*** 0.038	0.380*** 0.017	0.373*** 0.037	0.445*** 0.017
Education: GCE A/L	0.598*** 0.014	0.544*** 0.037	0.553*** 0.016	0.594*** 0.036	0.618*** 0.016
Education: Tertiary	0.935*** 0.019	0.908*** 0.042	0.850*** 0.022	0.965*** 0.042	0.954*** 0.022
Prov: Central Province	−0.182*** 0.011	−0.048** 0.024	−0.194*** 0.012	–	–
Prov: Southern Province	−0.090*** 0.010	−0.100*** 0.018	−0.088*** 0.011	–	–
Prov: North Western Province	−0.173*** 0.012	−0.044 0.030	−0.169*** 0.013	–	–
Prov: North Central	−0.184*** 0.014	0.013 0.041	−0.187*** 0.015	–	–
Prov: Uva Province	−0.293*** 0.014	−0.039 0.044	−0.296*** 0.015	–	–
Provi: Sabaragamuwa	−0.293*** 0.013	−0.259*** 0.036	−0.264*** 0.013	–	–
F Value	625.02	150.31	457.70	211.76	587.09
Prob. F.	0.00	0.00	0.00	0.00	0.00
R Squared	0.37	0.36	0.37	0.33	0.34
Adj. R Squared	0.37	0.36	0.37	0.32	0.34

Source Author's calculations using HIES 2009/2010, education is categorized as primary education (Grades 1–5), junior secondary (Grades 6–9), GCE O/L (Grades 10 and 11), GCE A/L (Grades 12 and 13), and tertiary (graduate or postgraduate). Standard errors are in parentheses; *, ** and *** indicate significance at 10, 5 and 1 % levels, respectively

Table 9.6 OLS estimates 2006/2007

Variable	Coefficient				
	National	Urban	Rural	Western	Other
Constant	8.575*** (0.022)	8.646*** (0.051)	8.579*** (0.023)	8.619*** (0.043)	8.381*** (0.024)
Agricultural employment	−0.073*** (0.008)	−0.097*** (0.026)	−0.038*** (0.008)	−0.103*** (0.020)	−0.081*** (0.009)
Number of employed	0.017*** (0.005)	0.024** (0.009)	0.021*** (0.005)	0.006 (0.008)	0.022*** (0.006)
Head's age	0.001*** (0.000)	0.002*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)
Male head	0.043*** (0.008)	0.042*** (0.017)	0.061*** (0.009)	0.037*** (0.015)	0.050*** (0.037)
Household size	−0.147*** (0.003)	−0.151*** (0.006)	−0.150*** (0.004)	−0.140*** (0.006)	−0.150*** (0.004)
Number of dependants	0.005 (0.004)	0.013 (0.008)	0.004 (0.005)	0.000 (0.007)	0.008 (0.005)
Race: Tamil	−0.055*** (0.012)	−0.041* (0.024)	−0.066*** (0.012)	−0.080*** (0.002)	−0.097*** (0.013)
Race: Muslim/other	0.162*** (0.013)	0.057*** (0.020)	0.138*** (0.019)	0.137*** (0.023)	0.175*** (0.017)
Education: Jun. secondary	0.176*** (0.014)	0.133*** (0.040)	0.159*** (0.014)	0.167*** (0.033)	0.180*** (0.016)
Education: GCE O/L	0.423*** (0.016)	0.353*** (0.042)	0.394*** (0.017)	0.383*** (0.035)	0.451*** (0.019)
Education: GCE A/L	0.605*** (0.015)	0.544*** (0.041)	0.551*** (0.016)	0.585*** (0.034)	0.620*** (0.017)
Education: Tertiary	0.931*** (0.020)	0.871*** (0.046)	0.847*** (0.022)	0.902*** (0.040)	0.954*** (0.024)
Province: Central	−0.189*** (0.011)	−0.065*** (0.045)0)	−0.192*** (0.012)	–	–
Province: Southern	−0.097*** (0.010)	−0.104*** (0.018)	−0.092*** (0.011)	–	–
Province: North Western	−0.152*** (0.012)	−0.058* (0.030)	−0.140*** (0.013)	–	–
Province: North Central	−0.155*** (0.014)	−0.039 (0.041)	−0.155*** (0.015)	–	–
Province: Uva	−0.288*** (0.014)	−0.026 (0.043)	−0.284*** (0.015)	–	–
Province: Sabaragamuwa	−0.312*** (0.013)	−0.289*** (0.036)	−0.279*** (0.014)	–	–
F Value	589.12	134.20	436.04	212.53	536.05
Prob. F.	0.00	0.00	0.00	0.00	0.00
R Squared	0.38	0.38	0.38	0.33	0.35
Adj. R Squared	0.38	0.37	0.37	0.33	0.35

Source Author's calculations using HIES 2006/2007, education is categorized as primary education (Grades 1–5), junior secondary (Grades 6–9), GCE O/L (Grades 10 and 11), GCE A/L (Grades 12 and 13), and tertiary (graduate or postgraduate). Standard errors are in parentheses; *, ** and *** indicate significance at 10, 5 and 1 % levels, respectively

Table 9.7 QR estimates 2009/2010 national sample

Variable	Quantile				
	5th	25th	50th	75th	95th
Constant	7.856*** 0.038	8.302*** 0.026	8.635*** 0.029	8.947*** 0.030	9.416*** 0.067
Agricultural employment	−0.034** 0.014	−0.055*** 0.009	−0.075*** 0.10	−0.085*** 0.010	−0.041* 0.023
Number of employed	0.014 0.021	0.051*** 0.014	0.082*** 0.016	0.117*** 0.016	0.169*** 0.036
Head's age	−0.001 0.000	0.000 0.000	0.001** 0.000	0.001*** 0.000	0.002** 0.001
Male head	0.091*** 0.014	0.061*** 0.009	0.060*** 0.011	0.047*** 0.011	0.035 0.024
Household size	−0.116*** 0.004	−0.126*** 0.003	−0.133*** 0.003	−0.136*** 0.004	−0.125*** 0.011
Number of dependants	−0.004 0.006	−0.007 0.004	−0.004 0.005	−0.007 0.005	−0.024** 0.010
Race: Tamil	−0.019 0.018	−0.034 0.012	−0.081*** 0.013	−0.128*** 0.013	−0.168*** 0.029
Race: Muslim/other	0.164*** 0.020	0.137*** 0.014	0.103*** 0.015	0.061*** 0.016	0.077** 0.035
Education: Jun. secondary	0.199*** 0.023	0.182*** 0.015	0.149*** 0.017	0.152*** 0.018	0.164*** 0.039
Education: GCE O/L	0.383*** 0.027	0.395*** 0.018	0.381*** 0.020	0.408*** 0.021	0.440*** 0.046
Education: GCE A/L	0.516*** 0.025	0.541*** 0.016	0.573*** 0.018	0.609*** 0.019	0.707*** 0.043
Education: Tertiary	0.843*** 0.013	0.863*** 0.022	0.912*** 0.025	0.959*** 0.026	1.088*** 0.056
Province: Central	−0.211*** 0.019	−0.192*** 0.013	−0.172*** 0.014	−0.179*** 0.015	−0.214*** 0.032
Province: Southern	−0.063*** 0.016	−0.078*** 0.011	−0.082*** 0.012	−0.090*** 0.013	−0.146*** 0.028
Province: North Western	−0.179*** 0.021	−0.179*** 0.014	−0.170*** 0.015	−0.153*** 0.016	−0.167*** 0.035
Province North Central	−0.193*** 0.025	−0.178*** 0.016	−0.174*** 0.018	−0.191*** 0.019	−0.236*** 0.042
Province: Uva	−0.307*** 0.025	−0.306*** 0.016	−0.297*** 0.018	−0.273*** 0.019	−0.334*** 0.041
Province: Sabaragamuwa	−0.250*** 0.022	−0.288*** 0.015	−0.295*** 0.016	−0.291*** 0.017	−0.340*** 0.037
Pseudo R Squared	0.18	0.21	0.22	0.23	0.23

Source Author's calculations using HIES 2009/2010, education is categorized as primary education (Grades 1–5), junior secondary (Grades 6–9), GCE O/L (Grades 10 and 11), GCE A/L (Grades 12 and 13), and tertiary (graduate or postgraduate). Standard errors are in parentheses; *, ** and *** indicate significance at 10, 5 and 1 % levels, respectively

Table 9.8 QR estimates 2006/2007 national sample

Variable	Quantile				
	5th	25th	50th	75th	95th
Constant	7.824*** (0.039)	8.251*** (0.028)	8.551*** (0.027)	8.875*** (0.031)	9.318*** (0.061)
Agricultural employment	−0.042*** (0.015)	−0.049*** (0.010)	−0.078*** (0.010)	−0.092*** (0.001)	−0.059*** (0.021)
Number of employed	0.026*** (0.000)	0.019*** (0.006)	0.020*** (0.005)	0.011 (0.006)	−0.003 (0.013)
Head's age	0.001 (0.000)	0.001 (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.002** (0.001)
Male head	0.085*** (0.015)	0.046*** (0.010)	0.047*** (0.010)	0.026** (0.002)	0.002 (0.022)
Household size	−0.126*** (0.006)	−0.139*** (0.004)	−0.148*** (0.004)	−0.152*** (0.005)	−0.141*** (0.011)
Number of dependants	0.007 (0.007)	0.001 (0.005)	0.005 (0.005)	0.005 (0.005)	0.006 (0.010)
Race: Tamil	−0.018 (0.022)	−0.007 (0.015)	−0.049*** (0.014)	−0.095*** (0.095)	−0.097*** (0.030)
Race: Muslim/other	0.179*** (0.026)	0.180*** (0.018)	0.143*** (0.017)	0.149*** (0.019)	0.194*** (0.035)
Education: Jun. secondary	0.198*** (0.026)	0.196*** (0.018)	0.170*** (0.017)	0.165*** (0.020)	0.190*** (0.036)
Education: GCE O/L	0.383*** (0.030)	0.417*** (0.021)	0.423*** (0.021)	0.440*** (0.023)	0.463*** (0.043)
Education: GCE A/L	0.530*** (0.028)	0.574*** (0.120)	0.604*** (0.019)	0.621*** (0.021)	0.724*** (0.041)
Education: Tertiary	0.871*** (0.037)	0.884*** (0.026)	0.945*** (0.025)	0.963*** (0.029)	1.055*** (0.052)
Province:* Central	−0.186*** (0.022)	−0.192*** (0.015)	−0.188*** (0.014)	−0.189*** (0.016)	−0.236*** (0.029)
Province: Southern	−0.054*** (0.018)	−0.082*** (0.013)	−0.101*** (0.012)	−0.103*** (0.014)	−0.169*** (0.025)
Province: North Western	−0.138*** (0.023)	−0.152*** (0.016)	−0.157*** (0.016)	−0.149*** (0.017)	−0.151*** (0.031)
Province: North Central	−0.142*** (0.027)	−0.144*** (0.018)	−0.153*** (0.018)	−0.178*** (0.020)	−0.218*** (0.037)
Province: Uva	−0.276*** (0.027)	−0.293*** (0.018)	−0.287*** (0.018)	−0.273*** (0.020)	0.362*** (0.037)
Province: Sabaragamuwa	−0.250*** (0.024)	−0.310*** (0.016)	−0.322*** (0.016)	−0.321*** (0.018)	0.377*** (0.032)
Pseudo R Squared	0.178	0.207	0.223	0.235	0.288

Source Author's calculations using HIES 2006/2007, education is categorized as primary education (Grades 1–5), junior secondary (Grades 6–9), GCE O/L (Grades 10 and 11), GCE A/L (Grades 12 and 13), and tertiary (graduate or postgraduate). Standard errors are in parentheses; ** and *** indicate significance at 5 and 1 % levels, respectively

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Chapter 10
Non-income Dimensions, Prevalence, Depth and Severity of Poverty: Spatial Estimation with Household-Level Data in India

Panchanan Das

Abstract This chapter examines the incidence, depth and severity of poverty and the effects of the major non-income dimensions on poverty in India after more than a decade of the initiation of the process of integration by using an independently pooled cross section from the 61st and 66th round household-level unit data provided by the National Sample Survey Office (NSSO). Poverty estimates are based on relative poverty lines at 75 and 50 % of the median value of the distribution of per capita expenditure of the respective population groups. The chapter focuses on education, type of employment, land rights, social and religious factors, and gender-related issues among the non-income dimensions of poverty. The rising poverty incidence on the basis of relative poverty line in urban areas, as evidenced in this study, supports the hypothesis that urban inequality increased significantly during the post-reforms period in India. Per capita consumption expenditure on monthly basis in logarithmic terms is used in this study as a proxy for well-being or poverty. The study observes that land as a productive asset had very little positive effect on poverty. But the effect of education on the level of well-being was positive and increased with the level of education in every state in India. Technical education, a component of workers' skill, improved consumption per capita in all states except Chhattisgarh and Kerala. Scheduled Tribes and Scheduled Castes among the social groups and Muslims among religious groups are mostly deprived in terms of consumption per capita.

Keywords Poverty analysis · Distribution · Non-income dimension · India

JEL Classification I32 · O15 · O53

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_10

10.1 Introduction

Absolute poverty has reduced during the phase of growth success that followed economic liberalisation in many Asian countries, notably in the People's Republic of China and India. However, there is growing evidence that inequality has been rising through the integration process in many parts of Asia (Chen and Ravallion 2004). In India, openness contributes to higher growth with more inequality not only between regions but also within a region, and the poor benefit disproportionately less from high growth (Das 2010). This widespread rise in inequality has been detrimental to the objective of poverty reduction.

While the process of integration of many Asian economies into the global economy has generated a significant growth impact on poverty, the poor in those countries are much more vulnerable to large shocks emanating from this process of integration. A detailed country-specific analysis is required to enhance our understanding of the depth of poverty during the process of deeper integration into the global economy by taking into account different counteracting forces and threshold effects. While the definition of international poverty line with countrywise purchasing power parity (PPP) adjustments seems to have little acceptance, figures generated by official estimates leave no room for doubt that India is the largest dwelling place for the income-poor in the world. The level of living as reflected in purchasing power of an average Indian was roughly one-third of the world average and one-tenth of the developed high-income countries in 2004 (Radhakrishna and Panda 2006).

The reliability of official estimates has, however, been the focal point of the debate that raged over the question of whether the post-reforms growth in India has been pro-poor. The main contestants in the debate focused entirely on the income dimension of poverty, ignoring non-income criteria such as health, education and employment. Obviously, they have bypassed the relevance and significance of linkages between income and non-income dimensions of poverty.

Against this backdrop, this chapter attempts to analyse the incidence, depth and severity of poverty, and the effects of the major non-income dimensions on poverty in India after more than a decade of the initiation of the process of integration, by using household-level unit data provided by the National Sample Survey Office (NSSO). The paper focuses mainly on education, type of employment, land rights, social and religious factors, and gender-related issues among the non-income dimensions of poverty. In rural areas, age-old institutions like land relations raise the inequality effect of per capita GDP growth and perpetuate chronic poverty, especially among landless agricultural labourers and marginal farmers (Sanyal and Das 2008). The rural–urban migration of labourers contributes to urban poverty with higher inequality by preventing real wages to rise in the informal sector. In this paper, we hypothesise that while absolute poverty has declined, relative poverty or inequality has been increasing significantly, particularly in the urban economy, in India through the process of deregulation and openness of the economy since the early 1990s.

Poverty is treated as an outcome of multidimensional factors that include not only income and calorie intake but also different social, economic and demographic factors. Access to land and credit, nutrition, health and longevity, literacy and education, safe drinking water, sanitation and other infrastructural facilities has a crucial impact on poverty at the household level as well as the country level. In this chapter, we examine the impacts of non-income dimensions—mostly related to the demographic and social characteristics of the households, and the highest level of education within the family—on poverty. Demographic and other characteristics of households have a direct and indirect impact on household income and consumption. Changes in household size, age and gender composition of household members influence the extent of poverty at the household level.

10.2 Pooled Data and Construction of Variables

We have constructed an independently pooled cross section[1] from randomly selected households as recorded in the NSS 61st and 66th quinquennial rounds survey for 2004–2005 and 2009–2010, respectively.[2] From statistical standpoint, this kind of data set consists of independently sampled observations. By pooling random samples drawn from the same population, but at different points in time, we can get more precise estimators and test statistics with more power (Wooldridge 2009). To capture the change in sampling distributions of a single random sample over time, we allow the intercept to differ over periods by introducing year dummy variables in the estimating model. The year dummy can be interpreted as the change in the effect of control variables on the dependent variable. We can also make a year dummy interact with key explanatory variables to see whether the effect of those variables has changed over a certain time period. We have taken the logarithmic values of per capita consumption expenditure on monthly basis (mpce), a proxy for the level of well-being, as the dependent variable, and household size and amount of land owned as the control variables.

Different dummy variables are used to represent different levels of education among the households. Technical education and vocational training with appropriate dummies are used as a proxy for skill. Type of employment has been distinguished between agricultural or land-based activities and non-farm activities among different types as recorded in the survey schedule. A gender dummy, 1 for

[1] If a random sample is drawn at different time periods, pooling of the random samples forms an independently pooled cross section.

[2] The sample consists of 165,434 and 100,957 households in the 61st and 66th rounds respectively. The survey in each round of this type is based on stratified multi-stage sampling. The census villages in the rural sector and urban frame survey blocks in the urban sector are the first-stage sample units. The final-stage ultimate sample units are households selected by simple random sample without replacement (SRSWOR) in both the sectors.

women-headed households and 0 otherwise, and a sector dummy, 1 for rural and 0 for urban areas, have been constructed. Muslims, the religious minorities, are conventionally regarded as more deprived than Hindus and other religious communities. To capture the effect of relative deprivation of this religious group, we have incorporated a religion dummy, 1 for Muslims and 0 for others. It has been well established in the poverty literature on India that Scheduled Castes and Scheduled Tribes are the most deprived among different social groups as defined by the NSSO. To look at the extent of deprivation of these disadvantaged groups compared to other social groups, separate group dummies for Scheduled Tribes and Scheduled Castes have been constructed.

10.3 Methodology

(a) Estimating prevalence, depth and severity of relative poverty

The estimates of poverty in India are mainly based on the consumer expenditure surveys of the NSSO, and there has been a vast literature on poverty in India discussing different issues at both the conceptual and empirical levels. In most of the studies, estimates of poverty have been computed on the basis of the official poverty line at the all-India and state levels for the rural and urban sectors. The Tendulkar Committee recommended the use of implicit prices derived from quantity and value data collected in household consumer expenditure surveys for computing and updating the official poverty lines for the first time. The state-wise urban poverty lines of 2004–2005 are updated for 2009–2010, based on price rise during this period using Fisher's implicit price indices. The state-specific rural poverty lines are obtained from the urban poverty lines by adjusting the rural–urban price differential (GOI 2012). The recent debate on official poverty line suggested by the Planning Commission of India has mostly concentrated on the arbitrariness in fixing minimal requirements (Krishnaji 2012).

In this chapter, the incidence of poverty has been estimated by using the relative poverty line at different thresholds, namely 75 and 50 % of the median mpce[3] of the distribution of per capita expenditure of the respective population groups. People whose incomes fall below this line are considered to be at the risk of poverty. Households with income below the relative poverty line are not necessarily poor by the conventional calorie norms, but they are in the lower-income group compared with the population at large. The relative poverty focuses more on the disparities between the rich and the poor. The estimate of poverty at the lower threshold level provides a measure of chronic poverty with higher poverty risk. Thus, the poverty risk at 50 % of the median expenditure

[3] A threshold fixed at a certain percentage of median expenditure is known as the relative poverty line.

per capita as a threshold is higher than the risk at 75 % of the median value of it. The chronically poor are at the margin of society and suffer from extreme deprivation.

This paper uses the most widely used poverty index of Foster, Greer and Thorbecke (1984), popularly known as FGT index, to find out the prevalence, depth and severity of poverty in India. The FGT index in one dimension (y_i) is defined as

$$\hat{P}(z,\alpha) = \frac{\sum_{i=1}^{n} w_i (z - y_i)_{+}^{\alpha}}{\sum_{i=1}^{n} w_i} \tag{10.1}$$

where z is the poverty line and $x_+ = \max(x,0)$

$$w_i = hw_i * hs_i$$

hw_i is sampling weight for observation i
hs_i is size of observation i (for example the size of household i)

The usual normalised FGT index is estimated as

$$\widehat{\dddot{P}}(z,\alpha) = \frac{\hat{P}(z,\alpha)}{z^{\alpha}} \tag{10.2}$$

The parameter α is non-negative. When $\alpha = 0$, the FGT index gives the simplest and most commonly used poverty headcount ratio. Although it is easy to interpret, the head count ratio is not sensitive to how far below the poverty line poor people are. For $\alpha = 1$, it measures the average poverty gap, showing the shortfall of the poor's expenditure from the poverty line, expressed as an average of all people in the population. It can be used as an indicator of the minimum cost of eliminating poverty through targeted transfers. When α is set equal to 2, the FGT is the poverty severity index which is sensitive to the distribution of living standards among the poor. It takes into account the variations in distribution of welfare among the poor. An increase in poverty gap increases the FGT index, and an equalising Pigou–Dalton transfer would often decrease the poverty index. When α is larger, the index puts more weight on the position of the poorest. These three poverty measures have the useful property of being additively decomposable.

(b) Estimating the contributions of non-income parameters to poverty

A simple way to look at the relationship between the level of well-being and its major non-income parameters is to estimate a linear multiple regression model. The logarithmic value of mpce is taken as a proxy for well-being. Higher the value of mpce, lower will be the probability of a household being poor. The regression equation in the frame of pooled data from two independent random samples is specified as

$$\ln y = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 D^{y09} + \sum_{i=1}^{4} \beta_i D_i^{tech} + \gamma_1 D^{tech} + \gamma_2 D^{tr}$$
$$+ \theta_1 D^r + \theta_2 D^m + \theta_3 D^{st} + \theta_4 D^{sc} + \theta_5 D^f + \theta_6 D^{agri} + \eta_1 D^r D^{y09} + \eta_2 D^m D^{y09}$$
$$+ \eta_3 D^{st} D^{y09} + \eta_4 D^{sc} D^{y09} + \eta_5 D^f D^{y09} + \eta_6 D^{agri} D^{y09}$$
$$+ \sum_{i=1}^{4} \delta_i D_i^{edu} D^{y09} + \lambda_1 D^{tech} D^{y09} + \lambda_2 D^{tr} D^{y09} + \varepsilon \quad (10.3)$$

Here, log of mpce (y) is taken as a dependant variable measuring approximately the level of well-being of the household. Household size (x_1) and land owned (x_2) are the quantitative variables used as regressors. The inter-temporal effect of different non-income dimensions are measured by the year dummy D^{y09}, equal to 1 if the sample household comes from the 66th round (2009–2010) and 0 if it comes from the 61st round (2004–2005). Education, perhaps, is the most important factor affecting poverty. We have incorporated four dummy variables D_i^{edu}, i = 1 to 4 representing 4 levels of education, namely primary, middle school, graduate and postgraduate. To look into the contribution of skill, two more dummy variables relating to skill, D^{tech} for households with technical education and D^{tr} for households with vocational training have been considered in our econometric model specified in Eq. (10.3). The variable D^r is a dummy variable with its value equal to 1 if the household lives in a rural area and 0 for otherwise.

Social factors are important in determining the capacity of the household to maintain minimum standard of living. The minority community, particularly Muslims, in India have been more deprived compared to Hindus and other communities for historical reasons. Similarly, Scheduled Tribes and Scheduled Castes are relatively more backward than other social groups in the country. The levels of poverty among these backward communities have been differentiated by using appropriate dummy variables. We define D^m as a religion dummy with its value equal to 1 representing Muslims and 0 for all other religions; the social group dummy D^{st} captures Scheduled Tribes, and D^{sc} captures Scheduled Castes. Gender is an important issue in analysing the economic condition of the vulnerable sections of society. The relative position of the female-headed household is looked at by incorporating gender dummy. The variable D^f is a gender dummy variable equal to 1 for women-headed households and 0 for men-headed households. A household's occupation is also an important determinant affecting the level of poverty. In our empirical exercise, we have distinguished between two different types of employment by introducing a dummy variable D^{agri} that equals unity for agricultural households and zero for others. ε is an i.i.d. idiosyncratic error term with mean zero and constant variance σ_ε^2, measuring the effects of unobservable factors.

The intercept term (α_0) measures the effect of the factors on well-being not included in the model. The intercept, for example, is α_0 for urban households in 2004–2005 and ($\alpha_0 + \theta_1$) for rural households. The intercept for urban households is ($\alpha_0 + \alpha_3$) in 2009–2010 and ($\alpha_0 + \theta_1 + \alpha_3$) for rural households.

We can interpret the other coefficients in a similar manner. To estimate the differential effects of the household-specific factors on poverty level in two different time periods, we have used interacted dummy variables. The year dummy can be interpreted as the change in the effect of control variables on the dependent variable due to a change in the time period. We have interacted year dummy with key explanatory variables to see whether the effect of those variables has changed over the period 2004–2005 to 2009–2010. The coefficients β is act as the effects of schooling at different levels in 2004–2005, and the inter-temporal change in the effects of education on poverty during the period 2004–2005 to 2009–2010 will be $(\beta_i + \delta_i)$.

10.4 Empirical Results

The 66th round (2009–2010) survey on household consumer expenditure brings to light the prevalence of the deep urban–rural divide in terms of consumption spending. Per capita spending of urban India was almost double that of rural India.[4] The consumption inequality was high within both the rural and urban populations, but higher within the urban population. The top 10 % of India's rural population having an average mpce of Rs. 2,517 was 5.6 times that of the poorest 10 % (Rs. 453). In urban areas, on the other hand, average mpce (Rs. 5,863) of the top 10 % was 9.8 times higher than average mpce (Rs. 599) of the bottom 10 %. This disparity is further accentuated by the significant inequalities between states, as evidenced by the survey. The rural average mpce in Kerala, for example, was Rs. 1,835, while that in Bihar was only Rs. 780. One of the major factors contributing to widening regional disparities is the variation in performance of the government's social safety net programs after reforms.

(a) Measuring FGT index

By utilising household-level information on monthly consumption expenditure per capita from schedule 10 of the 61st and 66th round quinquennial surveys for the period 2004–2005 and 2009–2010, the FGT index at $\alpha = 0$, 1 and 2 has been estimated separately for rural and urban locations in India by taking poverty lines at 75 and 50 % median expenditure of the respective population groups. The poverty line at 50 % of the median of the expenditure distribution is used in estimating chronic poverty. The estimates are shown in Table 10.1. The incidence of relative poverty was higher in urban locations than in the countryside, and the rural–urban gap increased in terms of prevalence, depth and severity of poverty in India during the period 2004–2009. While the estimate of poverty risk remained at the same level, or even declined in the rural economy, the poverty incidence increased in urban centres at both thresholds and at different values of α during this period.

[4] In 2009–2010, the average mpce was Rs. 1,054 and 1,984 in rural and urban India respectively.

Table 10.1 FGT index of prevalence, depth and severity of poverty in India: 2004–2009

	Year	75 % median mpce		50 % median mpce	
		Rural	Urban	Rural	Urban
$\alpha = 0$	2004–2005	0.23	0.29	0.03	0.08
	2009–2010	0.25	0.32	0.05	0.11
$\alpha = 1$	2004–2005	0.04	0.07	0.005	0.013
	2009–2010	0.05	0.09	0.01	0.02
$\alpha = 2$	2004–2005	0.01	0.02	0.002	0.004
	2009–2010	0.02	0.03	0.002	0.006

Source Author's estimation based on 61st and 66th round NSS unit-level data

In official estimates, the incidence of rural poverty was higher than urban poverty in 2009–2010, and the poverty incidence declined in both rural and urban areas, although at a slower rate in urban India than in the countryside.[5] The head count measure as obtained in this study, although apparently contrasting with the official estimates, may not be surprising because our estimates are based on the distributional characteristics of monthly expenditure per capita. While the official estimates provide information about absolute poverty, our estimates highlight the relative poverty or risk of poverty. In this study, the higher incidence of poverty in urban locations implies higher poverty risk with higher inequality as compared to the countryside. The rising poverty incidence, as displayed in Table 10.1, on the basis of relative poverty line in urban areas supports the hypothesis that urban inequality increased significantly during the post-reforms period in India.

If we fix poverty line at 75 % of the median expenditure per capita of the population groups, one-fourth of the rural population and roughly one-third of the urban population still remained below the poverty line during 2009–2010. The incidence of chronic poverty at 50 % of the median expenditure as threshold was 5 and 11 %, respectively, in rural and urban areas during the same period. In order to look at the shortfall of the poor's expenditure from the poverty line, we have estimated the poverty gap index (FGT at $\alpha = 1$) measuring the intensity or depth of poverty. According to this estimate, the depth of poverty in the countryside was 5 and 1 %, respectively, in 2009–2010 at the two poverty thresholds used in this study. The respective figures in the urban economy were 9 and 2 % at that time, revealing that the depth of poverty, even chronic poverty, was significantly higher at any threshold in the urban areas than in rural areas. The severity of poverty measured by FGT at $\alpha = 2$ was at 1 and 3 % in the rural and urban economy, respectively, while the index was negligible among the chronically poor in both rural and urban sectors in 2009–2010. Although we are not looking at

[5] According to the official estimates based on the Tendulkar methodology, the poverty ratio declined from 41.8 to 33.8 % in rural areas and from 25.7 to 20.9 % in urban areas during 2004–2009.

Table 10.2 Estimated poverty risk at different threshold by states in 2009–2010

Threshold level states	Rural		Urban	
	75 % median mpce	50 % median mpce	75 % median mpce	50 % median mpce
Andhra Pradesh	0.14	0.02	0.26	0.08
Assam	0.23	0.02	0.41	0.18
Bihar	0.44	0.09	0.60	0.34
Chhattisgarh	0.46	0.13	0.41	0.20
Gujarat	0.17	0.02	0.29	0.10
Haryana	0.07	0.01	0.23	0.07
Himachal Pradesh	0.04	0.001	0.20	0.03
Jharkhand	0.50	0.07	0.45	0.23
Karnataka	0.24	0.03	0.33	0.14
Kerala	0.04	0.001	0.24	0.09
Madhya Pradesh	0.44	0.15	0.46	0.22
Maharashtra	0.13	0.01	0.24	0.08
Odisha	0.47	0.16	0.47	0.26
Punjab	0.04	0.001	0.24	0.06
Rajasthan	0.13	0.01	0.30	0.10
Tamil Nadu	0.15	0.02	0.32	0.13
Uttar Pradesh	0.34	0.05	0.53	0.26
Uttaranchal	0.06	0.001	0.30	0.09
West Bengal	0.24	0.04	0.33	0.13

Source Author's estimation based on 66th round NSS unit-level data

inter-group differences in poverty incidence in detail in this paper, it may be quite natural that the higher poverty incidence in the urban locations has further been disproportionately high among historically marginalised groups such as Scheduled Castes, Scheduled Tribes, the elderly, women and the disabled. This is because people belonging to the Scheduled Castes and Other Backward Classes, and the Scheduled Tribes in particular, are lagging far behind the general category population in terms of the depth of poverty (Das 2012).

The rural–urban gap in relative deprivation varied widely across the major states in India. The estimates of poverty risk in terms of FGT poverty index at $\alpha = 0$ representing the poverty headcount ratio for different states during 2009–2010 are shown in Table 10.2. The incidence of poverty was significantly higher in urban areas than in rural areas at both threshold levels of consumption everywhere in India. But the prevalence of poverty was not distributed uniformly across the states in India, both in rural and urban locations, at any threshold level for obvious reasons. In the rural economy, the prevalence of relative poverty was the highest in Jharkhand, followed by Odisha, Chhattisgarh, Bihar and Madhya Pradesh in 2009–2010. These states are traditionally lagging behind in terms of any parameter of growth, displaying a higher incidence of poverty. The distribution-sensitive rural poverty was lower in Punjab, Kerala, and Uttaranchal at that time. The chronic poverty in the countryside was severe in Odisha, Madhya Pradesh and Chhattisgarh during this period. In urban locations, the poverty risk was significantly higher in Bihar, Uttar Pradesh, Madhya Pradesh and Jharkhand among the major states of the country in 2009–2010. The extent of poverty risk at 75 % of median expenditure was lower than the national average in Himachal Pradesh, Haryana, Punjab, Maharashtra and Kerala. The prevalence of urban poverty in a chronic sense was the most severe in Bihar, followed by Uttar Pradesh, Odisha and Jharkhand. The chronic poverty among the people living in urban areas was lower in Himachal Pradesh, Punjab and Haryana.

(b) OLS estimates of contributions of non-income parameters

Per capita consumption expenditure on monthly basis in logarithmic terms is used in this study as a proxy for well-being or poverty. The higher the value of expenditure per capita, the lower will be the probability of a household being poor. In finding out the inter-temporal effect of non-income dimensions of poverty on the level of well-being, we used household-level pooled data from a random sample of households as recorded in NSS 61st and 66th rounds survey for the period 2004–2005 and 2009–2010, respectively. Total sample observations of 165,434 and 100,957 households have been used from these two rounds to form the pooled data set covering all most all regions in India.

The OLS estimation of the coefficients of the relationship as specified in Eq. (10.3) is shown in Table 10.3. The Breusch–Pagan test suggests that there is no heteroscedasticity problem in the model.[6] The lower panel of Table 10.3 provides some statistics on goodness of fit. Most of the estimated coefficients are significant at less than 1 % level. The intercept term is positive, implying that all the other observable factors not included in the model had a positive effect on well-being. Household size had a significant negative effect on well-being of the household as measured by consumption per capita in logarithmic terms. The higher the household size, the lower will be the per capita expenditure only when total expenditure or income increases at a lower proportional rate than the rise in family size. It may be a gross indication of lower job opportunities even in the informal sector. Land as a productive asset had very little positive effect on well-being. In Table 10.3, the coefficient of land owned is zero even at two decimal points. Thus, non-farm activities are more significant than land-based activities in reducing household poverty in India, even during the post-liberalisation era. The positive coefficient of the time dummy variable reveals that the effects of non-income parameters on poverty improved in 2009 as compared to the effects in 2004.

[6] The Breusch-Pagan (1979) test is designed to detect any linear form of heteroscedasticity. It tests the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables.

Table 10.3 Estimated coefficients of non-income dimensions of poverty in India

Variables	Estimated coefficient	*t*-statistic	$P > t$
Intercept	6.745	1,615.88	0.000
Household size	−0.062	−148.58	0.000
Land owned	0.000	19.44	0.000
D^{agr}	−0.002	−0.53	0.594
D^{f}	0.079	19.13	0.000
$D^{edu\_primary}$	0.155	46.82	0.000
D^{edu_middle}	0.362	111.3	0.000
$D^{edu\_graduate}$	0.714	120.98	0.000
D^{edu_pg}	0.885	87.24	0.000
D^{edu_tech}	0.131	17.26	0.000
$D^{training}$	0.019	3.06	0.002
D^{muslim}	−0.044	−11.01	0.000
D^{st}	−0.010	−2.68	0.007
D^{sc}	−0.174	−49.35	0.000
D^{year}	0.464	78.77	0.000
D^{rural}	−0.225	−69.46	0.000
$D^{agr} * D^{year}$	0.024	4.65	0.000
$D^{f} * D^{year}$	0.026	3.86	0.000
$D^{edu\_primary} * D^{year}$	−0.020	−3.45	0.001
$D^{edu\_middle} * D^{year}$	−0.007	−1.27	0.206
$D^{edu\_graduate} * D^{year}$	−0.027	−3.01	0.003
$D^{edu\_pg} * D^{year}$	−0.026	−1.76	0.078
$D^{edu\_tech} * D^{year}$	0.005	0.36	0.718
$D^{muslim} * D^{year}$	−0.035	−5.38	0.000
$D^{st} * D^{year}$	−0.102	−16.67	0.000
$D^{sc} * D^{year}$	0.017	2.92	0.004
$D^{rural} * D^{year}$	−0.002	−0.36	0.718
$F(26, 232, 678) = 7,390.48$		$R^2 = 0.4523$	
Prob $> F = 0.0000$		Adj $R^2 = 0.4522$	

Source As for Table 10.1

The positive coefficient on the year dummy, D^{y09}, also indicates an inflationary factor for nominal values of mpce in 2009–2010.[7]

We have taken the level of highest education among the family members within a household as one of the major non-income factors of poverty. The estimated results as displayed in Table 10.3 suggest that the households with educated members were better off than those without education. The poverty-reducing effect of

[7] Let P^{09} be the inflationary factor for nominal mpce in 2009–2010. Then the log of the real mpce for each household in the sample in 2009–2010 is $\log(\text{mpce}/P^{09}) = \log(\text{mpce})—\log(P^{09})$. While mpce differs across households, P^{09} does not and $\log(P^{09})$ will be absorbed into the intercept for the year 2009–2010. Thus, the positive coefficient on the year dummy, y09, measures the inflationary effect on mpce in 2009–2010.

education increased roughly proportionately with the level of education. The positive effect of education on living standards was the highest among the households with postgraduation as the highest level of education within the family. This was followed by the households with graduation, higher secondary and primary as the highest education. But the poverty-reducing effects of education at any level were reduced significantly and at the highest rate for households with graduation as the highest level of education in 2009–2010. Workers' skill, both in terms of technical education and vocational training, had a significant positive effect on well-being, but there had been no significant change of this effect over time.

The differential effect of non-income criteria on poverty was statistically insignificant. But the differences in prevalence of poverty because of non-income parameters between the households performing farm activities and non-farm activities declined in 2009–2010. The rural dummy is incorporated into the estimating equation to find out the differential effects of non-income parameters on poverty between rural and urban households. This is because structural determinants of poverty are different for rural and urban areas. While the rural economy is mostly agriculture dominated, the majority of the workers in the urban economy are absorbed in the informal manufacturing and tertiary sectors. As the rural dummy has a negative coefficient, the poverty-reducing effect of non-income parameters was lower in the rural areas as compared to urban areas in 2004–2005. There had been no significant change in the rural–urban disparity in the incidence of poverty due to the major non-income factors in India during 2004–2009.

As shown in Table 10.3, the dummy variable for female-headed households has a positive coefficient, implying that they were relatively better off than the male-headed ones, perhaps because of more job opportunities through the process of feminisation of labour during the post-reforms phase in India. The positive effects of non-income dimensions on the economic well-being of the female-headed households improved further during 2009–2010. Scheduled Tribes and Scheduled Castes among the social groups, and Muslims among the religious groups are mostly deprived in terms of poverty. The level of well-being affected by non-income criteria was significantly low among the religious minorities compared to Hindus and other religious communities. The economic well-being of this religious group deteriorated further in 2009–2010 as compared to 2004–2005 in India. Both Scheduled Tribes and Scheduled Castes in the country were worse off than the upper caste households, but the latter social group was more badly affected than the former. While the relative deprivation among Scheduled Caste households improved in 2009–2010, it worsened further for the tribal people over time.

The impact of the major non-income dimensions of poverty varied widely across the major states in India mostly because of the differences in structural determinants of poverty, including the growth rates of per capita state GDP and its sectoral components (Das 2009). The governance of the respective state governments in creating infrastructure, attracting private investment and implementing pro-poor measures has also been different. To find out the differential impact of the major non-income parameters across the major states in India, we have estimated a multiple linear regression model as specified in Eq. (10.3) separately for each state without incorporating the time-interactive dummy variables. The estimated results are displayed in Table 10.4.[8] The other observable factors not included in the econometric model have favourable effects on per capita consumption expenditure in every state following the national trend, but at a different scale. Positive and significant coefficients of the time dummy suggest that the level of well-being improved in every state in the country in 2009–2010 as compared to the level in 2004–2005. The negative impact of household size on per capita consumption expenditure was the highest in the southern states of Kerala and Tamil Nadu, and the lowest in Chhattisgarh.

Landownership had no effect on well-being, even in agricultural states like Punjab and West Bengal, while the position of the agricultural households in terms of poverty or well-being was not similar across the states. In Punjab, Haryana and Rajasthan, the households engaged in agricultural activities, both cultivators and agricultural workers taken together, were better off as compared to the non-agricultural households. In West Bengal, on the other hand, along with many other states, the agricultural households were significantly worse off than the non-agricultural households. West Bengal has the largest proportion of land-poor farmers, partly because of historical factors such as the land tenancy system and the land reforms adopted by the government of West Bengal during the late 1970s. Agriculture in the states turns out to be non-profitable probably because of non-economic land size and other constraints including institutional credit and agricultural marketing. Perhaps, for these reasons, agricultural households were not in better living conditions as compared to those relating to non-farm activities in many states in India. In the rural economy, the households, irrespective of their occupational type, were lagging behind those in urban locations in terms of per capita expenditure everywhere in the country.

The effect of education on the level of well-being was positive and increased with the level of education in every state in India. The poverty-reducing effect of primary education was the highest in Chhattisgarh, followed by West Bengal and Maharashtra. The effect of education at middle school level was also the highest in Chhattisgarh. West Bengal and Tamil Nadu jointly ranked second in terms of the contribution of education at this level to reduce poverty. Kerala led in the poverty reduction effect of education at the graduate and postgraduate levels, followed by West Bengal. This effect was the least in Uttaranchal.

Technical education, a component of workers' skill, improved consumption per capita in all states except Chhattisgarh and Kerala. The contribution of technical education to households' well-being was the highest in Andhra Pradesh and the least in Tamil Nadu. The states exhibiting a higher contribution of technical education include Assam, Odisha and Karnataka.

Attainment of vocational training by the members of the household had mixed effects on poverty. In Andhra Pradesh, Haryana, Uttaranchal and West Bengal, the

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[8] As the number of variables is large, we have shown Table 10.4 in two parts.

Table 10.4 Estimated coefficients of non-income variables by states in India

	Intercept	Household size	Land owned	D^{agr}	D^{f}	D^{edu_pri}	D^{edu_middle}	$D^{edu\_graduate}$	D^{edu_pg}
Andhra Pradesh	6.86*	−0.09*	0.00*	−0.04*	−0.01	0.14*	0.33*	0.64*	0.82*
Assam	6.78*	−0.07*	0.00*	−0.05*	0.06*	0.07*	0.26*	0.53*	0.74*
Bihar	6.51*	−0.07*	0.00*	0.00	0.00	0.11*	0.28*	0.53*	0.67*
Chhattisgarh	6.43*	−0.04*	0.00*	−0.04*	0.07*	0.16*	0.37*	0.74*	0.89*
Gujarat	7.01*	−0.08*	0.00*	−0.05*	0.04**	0.11*	0.28*	0.62*	0.79*
Haryana	6.97*	−0.06*	0.00*	0.06*	0.05*	0.05*	0.25*	0.59*	0.84*
Himachal Pradesh	7.17*	−0.09*	0.00*	−0.02	0.08*	0.05*	0.25*	0.52*	0.75*
Jharkhand	6.66*	−0.07*	0.00*	−0.03*	0.07*	0.09*	0.25*	0.57*	0.86*
Karnataka	6.71*	−0.06*	0.00*	0.01	0.05*	0.12*	0.34*	0.69*	0.91*
Kerala	7.04*	−0.11*	0.00*	−0.03**	0.01	0.12*	0.33*	0.77*	1.03*
Madhya Pradesh	6.59*	−0.06*	0.00*	0.01	0.07*	0.09*	0.23*	0.60*	0.74*
Maharashtra	6.94*	−0.07*	0.00*	−0.08*	0.05*	0.13*	0.30*	0.70*	0.88*
Odisha	6.44*	−0.06*	0.00*	−0.09*	0.08*	0.12*	0.33*	0.61*	0.81*
Punjab	7.04*	−0.06*	0.00*	0.04*	0.09*	0.08*	0.27*	0.62*	0.83*
Rajasthan	6.88*	−0.06*	0.00*	0.04*	0.07*	0.10*	0.21*	0.53*	0.67*
Tamil Nadu	6.88*	−0.11*	0.00*	−0.07*	−0.03*	0.11*	0.36*	0.73*	0.94*
Uttar Pradesh	6.63*	−0.06*	0.00*	0.01**	0.02**	0.08*	0.23*	0.55*	0.67*
Uttaranchal	6.90*	−0.07*	0.00*	−0.06*	0.11*	0.06*	0.16*	0.44*	0.56*
West Bengal	6.79*	−0.07*	0.00*	−0.08*	0.05*	0.13*	0.36*	0.76*	1.02*

	D^{edu_tech}	$D^{training}$	D^{muslim}	D^{st}	D^{sc}	D^{yr}	D^{r}
Andhra Pradesh	0.20*	−0.09*	−0.06*	−0.29*	−0.11*	0.57*	−0.25*
Assam	0.19*	0.08*	−0.11*	−0.09*	−0.12*	0.38*	−0.25*
Bihar	0.12*	0.00	−0.01	−0.12*	−0.13*	0.45*	−0.17*
Chhattisgarh	−0.05	0.08	0.07	−0.18*	−0.04*	0.38*	−0.25*
Gujarat	0.11*	−0.04	−0.09*	−0.16*	−0.16*	0.45*	−0.30*
Haryana	0.16*	−0.10*	−0.24*	−0.05	−0.27*	0.55*	−0.16*
Himachal Pradesh	0.12*	0.03	−0.01	−0.02	−0.11*	0.46*	−0.26*
Jharkhand	0.12*	0.00	−0.07*	−0.15*	−0.13*	0.41*	−0.26*
Karnataka	0.17*	0.14*	−0.12*	−0.12*	−0.17*	0.46*	−0.26*
Kerala	0.00	−0.04	0.07*	−0.38*	−0.21*	0.49*	−0.03*
Madhya Pradesh	0.13*	0.10*	−0.02	−0.20*	−0.15*	0.44*	−0.24*
Maharashtra	0.09*	−0.02	−0.15*	−0.20*	−0.20*	0.50*	−0.38*
Odisha	0.19*	−0.03	−0.07***	−0.32*	−0.12*	0.51*	−0.24*
Punjab	0.07**	−0.05	−0.13*	−0.16**	−0.31*	0.52*	−0.09*
Rajasthan	0.13*	0.00	−0.07*	−0.18*	−0.17*	0.51*	−0.24*
Tamil Nadu	0.05*	0.01	0.11*	−0.16*	−0.12*	0.44*	−0.25*
Uttar Pradesh	0.12*	−0.02	−0.02*	−0.14*	−0.14*	0.44*	−0.18*
Uttaranchal	0.11*	−0.11*	−0.06*	0.01	−0.17*	0.48*	−0.26*
West Bengal	0.13*	−0.04*	−0.10*	−0.12*	−0.13*	0.39*	−0.27*

Note * Significant at 1 % level
**Significant at 5 % level
*** Significant at 10 % level
Source As for Table 10.1

effect was negative, while in Assam, Karnataka and Madhya Pradesh, the effect was positive. In the majority of the states in India, the effect was insignificant.

The effects of non-income parameters on poverty were higher for female-headed households than for the male-headed ones in most of the states, but at different scales. In Uttaranchal, the effect was the highest, followed by Punjab, and it was the lowest in Uttar Pradesh. In a few states like Bihar, Andhra Pradesh and Kerala, there had been no significant difference in the impact of those factors by gender. In Tamil Nadu, on the other hand, the poverty-reducing effect of gender was significantly less.

The poverty-reducing effect of the non-income parameters like land and education was significantly less for the Muslims as compared to Hindus and other religious groups in almost every state in India, though unevenly. The gap between Muslims and other religions was the highest in Haryana, in terms of the impact of these factors on poverty. The gap was the least in Uttar Pradesh. In Tamil Nadu, on the other hand, the effect of non-income variables was more for Muslims than other religious groups. Traditionally, Scheduled Tribes have been more deprived among the different social groups in India. However, in some states, the poverty-reducing effect was low among Scheduled Castes as compared to the tribal people. The difference in the effect on poverty among Dalits was the highest in Kerala and the least in Assam. In some states like Haryana, Himachal Pradesh, and Uttaranchal, however, the gap was not statistically significant. The gap in the poverty-reducing effect for Scheduled Caste households as compared to the households in other social groups was the highest in Haryana and the lowest in Chhattisgarh.

10.5 Conclusions

There is no doubt that GDP growth has improved during the post-reforms period in India, but attempts to quantify change in poverty levels have not led to a general agreement on the magnitude of poverty reduction during this period. In this study, we have mostly used the notion of relative poverty to look into the effects of non-income dimensions on the incidence of poverty. The macroeconomics of poverty can be looked at mainly through the growth and distribution effects. An increase in mean income would reduce poverty, provided that the distribution factor was insignificant. When mean income growth is accompanied by more unequal income distribution, the poverty effect depends on which of the two effects dominate. If mean income grows with a drop in inequality, both growth and distribution factors are favourable to the poor and poverty reduces at a faster pace.

This study concentrates mainly on relative poverty, which can be estimated by taking the distribution of income or consumption into account. The incidence, depth and severity of poverty and the effects of the major non-income dimensions on poverty have been examined after more than one decade of the initiation of the process of integration in India by using household-level unit data provided by the NSSO. Incidence of poverty has been looked at by using the relative poverty line at different thresholds, namely 75 and 50 % of the median of the distribution of per capita expenditure of the respective population groups. The poverty line at 50 % of the median of the expenditure distribution is used in estimating chronic poverty. The paper focuses mainly on education, type of employment, land rights, social and religious factors, and gender-related issues among the non-income dimensions of poverty. Estimation of the contributions of non-income parameters to poverty is based on an independently pooled cross section constructed from randomly selected sample households as recorded in the NSS 61st and 66th rounds survey in India.

The evidence discussed in this paper suggests an increase in urban–rural disparity in terms of prevalence, depth and severity of poverty during the post-liberalisation period. While the relative poverty within rural areas remained roughly at the same level, in urban areas, it increased noticeably during this period. The rural–urban gap in relative deprivation varied widely across the major states in India. The rising poverty incidence on the basis of relative poverty line in urban areas supports the hypothesis that urban inequality has increased significantly during the post-reforms period in India.

The effects of non-income parameters on poverty improved in 2009–2010 as compared to the effects in 2004–2005. Land as a productive asset had very little positive effect on well-being. Landownership had no effect on well-being even in agricultural states like Punjab and West Bengal. The poverty-reducing effect of non-income parameters was lower in the rural areas as compared to urban areas, and there was no significant improvement over time. The households with education at any level were better off compared to others, and the poverty-reducing effect of education increased roughly proportionately with the level of education. The level of skill, both in terms of technical education and vocational training, had a significant positive effect on well-being, but there was no significant change of this effect over time. Scheduled Tribes and Scheduled Castes among the social groups, and Muslims among religious groups are mostly deprived in terms of poverty.

Some states have made substantial progress in poverty reduction, while others have not performed well, causing significant regional differences in the concentration of poor people. The incidence of poverty has also been unevenly distributed across locations within a state and among different groups of people. Poverty, particularly chronic poverty, has traditionally been concentrated mainly in dry land regions characterised by frequent failure of crops and in hilly regions with limited access to means of living. Dalits and religious minorities have been deprived socially and economically because of historical discrimination. In this context, the role of subnational governments assumes significance because the state governments have a major responsibility for agricultural development and provision of services in social sectors like health and education.

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Chapter 11
Is Poverty Comparable Across Varying Size of Population Among Indian States?

Balakrushna Padhi, U.S. Mishra and Mohammad Kashif Khan

Abstract The most popular measure of poverty, i.e. the head count ratio is undoubtedly a simple measure with inadequacies of comparison. It also suffers from the mismatched contradiction between the count of the poor and their share in the population. Such inadequacies point towards the limitation in comparing poverty head count ratio across varying population sizes. The comparison of this measure between not only varying population sizes but also varying shares of the poor and the non-poor is worth contemplating in case it derives upon the ill-fare of poverty. Given these concerns, the measure of poverty accounting for its absolute count, intensity as well as inequality is proposed here as a modified version of the Sen, Shorrocks and Thorn (SST) measure of poverty. Further, a decomposition exercise is carried out to comprehend the share of each of its components in the changing level of poverty which is illustrated using the Indian data set. The salient observation made here relates to declining poverty levels in Indian states being in disagreement with reduced ill-fare as the poverty gap is on a rise along with the count of the poor. This raises apprehensions as to whether poverty reduction has to less to the do with the changing state of the poor rather than the changing state of the non-poor.

Keywords Poverty · SST index · Head count · Poverty gap · Poverty intensity

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_11

11.1 Introduction

The characterization and causes of poverty are vital for designing strategies for poverty alleviation in most of the developing countries in the world (Shan and Stifel 2000). Given that poverty alleviation remains a global priority, it is essential to know the dimensions of poverty and the mechanisms for its mitigation (Chakravarty et al. 2006). Its priority is reflected in being at the top of the MDGs list, which lays stress on halving the levels of poverty by 2015 (the poor identified as those with an income less than a dollar a day). This too is based on a simplistic measure of head count ratio of the poor in the population. Despite the development of a whole host of sensitive measures of poverty, head count ratio prevails as the most commonly acceptable measure of poverty, notwithstanding its limitation of temporal as well as cross-sectional comparability.

The various debates regarding poverty measurement hinge around how many poor are there in the world and what constitutes poverty. The first and foremost exercise in the case of poverty measurement is that of identification and aggregation of poverty. Some of the methods which have evolved over last few decades to measure the magnitude and severity of poverty are head count index, poverty gap index, Sen's index, the Sen–Shorrocks–Thon index (SST) and the FGT index. The identification exercise involves setting a poverty norm by considering a cut-off point to split the poor from the non-poor. A ratio of the count of poor to the total population gives rise to a head count measure of poverty.[1] Such a ratio has the virtue of simplicity, but sacrifices on adequacy as regard its robustness in comparison. Compromise on robustness is due to the measure not accounting for the amount by which the income of the poor falls below the poverty line (Osberg and Xu 1998). Moreover, such a measure cannot show the depth of poverty. The poverty gap index for the total population (I) takes the total aggregate shortfall from the poverty line divided by the number of people below the poverty line. But it ignores the number of poor people and the degree of inequality among them. As a result of such limitations, for a comprehensive measurement of poverty, a couple of measures were developed over last few decades such as the FGT index, SST index, Sen's index and Sen's square index. Sen's index seeks to combine the effect of the number of the poor, the depth of their poverty and the distribution of poverty within the group. Since Sen's index is not replication invariant, not continuous in individual incomes and fails to satisfy the transfer axioms, Shorrocks (1995) proposed a modified Sen's index, which was further modified by Thon (known as the SST index). The resultant SST index of poverty measures the depth, incidence and inequality in poverty.

Some recent developments in the measurement of poverty echo problems concerning the comparison of the extent of poverty with a varying population size. While calculating the head count ratio of poverty across the population, we have two figures at hand, i.e. the number of the poor and the number of non-poor, which can increase or decrease proportionately to render the level of poverty to

[1] One such likelihood measure.

be stagnant. Alternatively, if the number of poor is multiplied 10 times and the total population is also equally multiplied, then we have to conclude that poverty remains unchanged. Such anomalies bring to the fore the issue of poverty comparison across varying population sizes. Recent initiatives to consider poverty measure in varying population contexts has been made by a host of authors (Kundu and Smith 1983; Bossert 1990; Subramanian 2002, 2005a, b; Chakravarty et al. 2006; Kanbur and Mukherjee 2007; Hassoun and Subramanian 2010).

Most of the studies on measurement of poverty indices consider a set of axioms to be qualified by a poverty measure when computed for fixed and variable population. This is primarily due to change in poverty being reflective of the state of the poor rather than owing to varying population size. Not only the ratio-based measure such as the HCR but also most of the likelihood principle-based measures have the same folly when it comes to comparison over time or across the population. In this current exercise, we assess poverty on the basis of the SST index as an alternative to the simple measure of head count ratio. Choice of this alternative is motivated by the appreciation of the mere addition paradox framework, wherein change in poverty could very well be due to mere addition of rich or poor people in the total population. While such a change does not convey any change in the state of poverty, it can always be the case while comparing the level of poverty indices with variable population. Therefore, there is every need for a poverty measure that accommodates all possible aspects of poverty such as its count, base and intensity as well. In this regard, objection according to "mere addition paradox" relates to no change in the state of poverty with the addition of a rich individual to the total population (Hassoun 2010). Such a proposition becomes much more relevant in assessing the changing magnitude of poverty with a variable population base. When changing poverty levels could be in either direction with addition of the rich or the poor or proportionate addition of both, there is undoubtedly no implication for the state of poverty. As regards reduction in poverty, there needs to be either a reduced number of the poor or a reduced average gap of their income/expenditure against a given norm. In sum, there is every need for a poverty measure that reflects the state of poverty more than the share or ratio of the poor which is due to change without any change in the state of poverty.

The analysis of poverty indices through mere addition can be shown through an example given by (Hassoun and Subramanian 2010) where we have two sets of conditions—in the first case, there are only a few rich people, while in the second case, there is some addition to the rich people in the total population. So the second population has a larger number of rich people as compared to the first population, as a result of which the addition of the extra rich person may not lead to a decrease in the level of poverty. It means that a change that does not affect the poor may not lead to a reduction in the level of poverty. This follows Sen's principle which shows that "poverty is a characteristics of the poor, and the reduction of the income of the poor must increase the measure of poverty, no matter how much the income of the non-poor go up at the same time" (Sen 1981: 190). So it is important to know how much poverty there is in a population and what is the best way to deal with that. In our study, we will use the SST index to measure the incidence and depth of poverty. The SST index has been used by (Xu and Osberg 1999) to compare poverty in the USA and Canada over time. One of the benefits of the SST index is that it gives a good sense of sources of chance of poverty over time. The SST index also shows the poverty declines with the mere addition of a rich person to a population that contains some poverty (Hassoun 2010). In our present analysis, we will first analyse the likelihood principles of poverty through the SST index and subsequently, we will discuss the lacunas of this principle by taking the Indian data sets on consumer expenditure.

11.2 Data and Methodology

The present study is based on secondary data. To analyse the level of poverty, this study uses two major thick NSSO quinquennial rounds of the consumption expenditure survey (Unit-level data on dietary patterns and consumer expenditure, NSSO-CES). The present analysis is based on the two rounds of NSSO-CES (61st and 66th rounds). Due to the unavailability of income data, the per capita expenditure of sample households was used as a proxy for per capita income. We took the official poverty norm for measuring the poor and the non-poor. We included 15 major states in our analysis. These states are Andhra Pradesh (AP), Assam (AS), Bihar (BR), Gujarat (GR), Haryana (HR), Karnataka (KR), Kerala (KE), Madhya Pradesh (MP), Maharashtra (MR), Odisha (OR), Punjab (PN), Rajasthan (RJ), Tamil Nadu (TN), Uttar Pradesh (UR) and West Bengal (WB). As per the Tendulkar estimates, we took the MRP instead of URP to calculate the official poverty line from the NSSO unit-level data. In this study, we used the SST index to calculate the incidence, depth and inequality of poverty.

11.2.1 SST Index for Poverty Measurement

The SST index is an index of poverty intensity. It measures the depth, incidence and inequality of poverty. So it is a comprehensive measure of poverty index. The SST index can be regarded as a weighted "average" of individual poverty gap ratios of the poor.

This is an improvement over Sen's index because Sen's index does not satisfy the strong upward transfer and continuity axiom, but the SST index does this. It is also desirable because as examined by Xu (1998, p. 5), "it is symmetric, replication invariant, monotonic, homogeneous of degree zero in individual incomes and the corresponding poverty line and normalized to take values in the range [0, 1]". According to Xu and Osberg (2002), the SST index of poverty intensity can be calculated as the product of three poverty measures during a certain period of time: (1) poverty rate, (2) average poverty gap and (3) 1 + Gini coefficient of poverty gaps for the population. This can be shown as

SST index = (poverty rate) × (average poverty gap) × (1 + Gini coefficient of poverty gaps for the population),

where the poverty head count can be shown as $H = n^p/\mathrm{p}$, n is the total number of population and n^p is the number of poor individuals in the population.[2]

The second-term average poverty gap can be shown as

$$I^P = 1/n^P \sum_{i=1}^{n^p} x_i^P$$

where x_i^P is the individuals i's poverty gap $(z - y_i)/z$ and all i's in this case are below the poverty line (indicated by the superscript p). The last term can be shown as the Gini coefficient for the whole population as

$$G = \frac{\sum_{I=1}^{n} \sum_{j=1}^{n} \left| x_i - x_j \right|}{2n^2 I}$$

where G is the Gini of the poverty ratios for the whole population. Here, all individual gaps are taken into account including the gaps of the rich.[3]

The three measures show the number of people in poverty, size of the gap per poor person and the distribution of poverty among the poor (Xu 2011).

ΔSST index = Δ (poverty rate) + Δ (average poverty gap) + Δ (1 + gini coefficient of poverty gaps for the population).

The above equation is also useful for decomposing the percentage differences in poverty intensity between two populations into percentage differences in poverty rate, poverty gap and inequality of poverty. The overall percentage change in poverty intensity overtime can be expressed as sum of the percentage change in poverty rate, average poverty gap ratio and Gini inequality in the poverty gap ratios (among all poor).

11.2.2 Rural and Urban Poverty Comparison Through SST Index

India's level of poverty has always remained contentious owing to its simplistic measurement, on the one hand, and disagreements with alternative dimensions of ill-fare, on the other. As a result, there have been attempts at revising the methodology of poverty measurement from time to time. Regardless, the magnitude of decline in poverty still remains questionable primarily because the reported levels

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[2] Number of people who have an amount of good y_i less than the amount necessary to reach the poverty line z (Hassoun 2010).

[3] For details, look at the Hasssoun (2010), Kundu and Smith (1983), Osberg and Xu (1998).

of poverty do not match the real state of deprivation. Further, when poverty levels are compared over time and across populations, one wonders whether these changes owe to the realistic change in the state of the poor of a mere statistical artefact. In this context, the mere addition paradox comes into play as a change in simplistic measure of poverty could very well be due to the addition of the population in the denominator or also due to a change in the count of the rich in the population. Hence, the present analysis situates an alternative in the SST index to accommodate the headcount, depth and intensity of poverty.

It is very clear from Table 11.1 that there is a stark difference between rural and urban poverty intensity among Indian states. The three components of the SST index (poverty rate, average poverty gap ratio and inequality in poverty gaps shown by Gini) represent an interesting pattern across the states and over time. At the all India level, both in rural and urban areas, the intensity of poverty measured in terms of the SST index seems to decline during 61st and 66th NSSO rounds. In rural areas, all the states exhibit a decline in poverty intensity measured in terms of the SST index. The result indicates that the SST index of poverty intensity in Odisha was 0.277 (three times higher than Punjab (0.070)) in 2004–2005 in rural areas. In urban India (2004–2005), the poverty intensity was highest in Bihar (0.194) and lowest in Punjab (0.060). Though as compared to 2004–2005, the intensity of poverty is declining in 2009–2010, but it is still higher in Odisha (0.082), followed by Bihar (0.062) and Madhya Pradesh (0.065) in rural areas, and in Bihar (0.064), Madhya Pradesh (0.046) and Odisha (0.044) in urban areas. But the components of the SST index are not showing the same pattern across the states, both in rural and urban areas.

First, the poverty rate is showing a declining trend in all states except Assam, both in rural and urban area. The decline is highest in Tamil Nadu (from 0.375 to 0.212), followed by Maharashtra and Kerala and lowest in Bihar (from 0.557 to 0.553) in rural areas, whereas for urban areas, it is highest in Tamil Nadu, Kerala and Rajasthan and lowest in Punjab followed by Uttar Pradesh. In 2009–2010, almost one-third of the population in rural India was in poverty.

Second, the poverty gap index measured in terms of total aggregate shortfall from the poverty line divided by the number of people below the poverty line showing most of the Indian states indicates a decline in the poverty gap except in a few states. In rural India, all states except Bihar, Haryana and Karnataka show a declining trend in poverty gap rates, whereas for urban areas, it is Andhra Pradesh, Assam, Bihar, Karnataka, Punjab and Uttar Pradesh. At the all India level, the poverty gap has declined from 0.230 to 0.205 in rural areas and from 0.236 to 0.217 in urban areas between 2004 and 2005 and 2009 and 2010. But the third component of the SST index, i.e. Gini portrays some different pictures as compared to the other two measures of poverty rate and poverty gap. It clearly shows that there is an increasing trend in the Gini coefficient—both at the all India level and across the states in rural (except Assam) and urban (except Assam and Haryana) areas. The poverty gap index applied to the poor stood at only 0.205, and the Gini coefficient of the poverty gap ratio was 0.795 % which generates an SST index value of 0.122 in rural areas in the 66th round.

Table 11.1 Decomposition of SST index for rural and urban households

State	Rural								Urban							
	61st round				66th round				61st round				66th round			
	Decomposition of level			SST index	Decomposition of level			SST index	Decomposition of level			SST index	Decomposition of level			SST index
	Rate	Gap	Gini		Rate	Gap	Gini		Rate	Gap	Gini		Rate	Gap	Gini	
AP	0.323	0.216	0.803	0.126	0.227	0.207	0.865	0.032	0.234	0.206	0.855	0.089	0.177	0.216	0.891	0.023
AS	0.364	0.193	0.777	0.125	0.399	0.183	0.751	0.027	0.218	0.195	0.857	0.079	0.259	0.229	0.840	0.022
BR	0.557	0.228	0.633	0.207	0.553	0.243	0.642	0.062	0.437	0.261	0.697	0.194	0.394	0.263	0.743	0.064
GR	0.391	0.239	0.751	0.164	0.266	0.174	0.836	0.035	0.201	0.196	0.878	0.074	0.177	0.205	0.888	0.018
HR	0.248	0.191	0.847	0.087	0.186	0.201	0.886	0.021	0.224	0.220	0.864	0.092	0.230	0.199	0.848	0.022
KR	0.375	0.174	0.771	0.115	0.261	0.183	0.837	0.025	0.259	0.239	0.838	0.114	0.195	0.223	0.879	0.031
KE	0.202	0.216	0.881	0.082	0.120	0.188	0.931	0.019	0.184	0.220	0.888	0.076	0.121	0.178	0.929	0.017
MP	0.536	0.235	0.659	0.209	0.420	0.253	0.728	0.065	0.351	0.245	0.774	0.152	0.229	0.243	0.851	0.046
MH	0.479	0.249	0.700	0.203	0.295	0.193	0.811	0.049	0.256	0.253	0.836	0.119	0.183	0.217	0.889	0.032
OR	0.608	0.286	0.594	0.277	0.392	0.230	0.757	0.082	0.376	0.255	0.763	0.169	0.259	0.205	0.850	0.044
PN	0.221	0.170	0.867	0.070	0.146	0.132	0.916	0.011	0.187	0.170	0.881	0.060	0.180	0.208	0.884	0.015
RJ	0.358	0.196	0.778	0.125	0.264	0.164	0.838	0.025	0.297	0.194	0.821	0.105	0.199	0.190	0.883	0.024
TN	0.375	0.198	0.766	0.131	0.212	0.175	0.872	0.028	0.197	0.207	0.879	0.077	0.128	0.168	0.928	0.016
UP	0.427	0.215	0.727	0.158	0.394	0.193	0.757	0.037	0.341	0.229	0.784	0.139	0.317	0.231	0.799	0.039
WB	0.382	0.207	0.759	0.139	0.288	0.183	0.824	0.031	0.244	0.216	0.847	0.098	0.219	0.207	0.870	0.025
India	0.418	0.230	0.735	0.167	0.333	0.205	0.795	0.042	0.257	0.236	0.838	0.112	0.209	0.217	0.872	0.030

Source Authors' own calculation using unit-level NSSO 61st and 66th rounds

Table 11.2 Change in SST index in rural and urban areas

State	Rural				Urban			
	Rate	Gap	Gini	SST index	Rate	Gap	Gini	SST index
AP	−0.297	−0.041	0.076	−0.748	−0.244	0.051	0.043	−0.739
AS	0.096	−0.053	−0.034	−0.782	0.188	0.173	−0.019	−0.727
BR	−0.007	0.068	0.014	−0.702	−0.100	0.005	0.067	−0.669
GR	−0.319	−0.274	0.113	−0.785	−0.119	0.046	0.012	−0.755
HR	−0.253	0.055	0.046	−0.761	0.027	−0.097	−0.018	−0.757
KR	−0.303	0.056	0.086	−0.785	−0.245	−0.066	0.049	−0.723
KE	−0.407	−0.131	0.058	−0.771	−0.344	−0.189	0.046	−0.783
MP	−0.217	0.079	0.106	−0.687	−0.347	−0.008	0.099	−0.697
MH	−0.384	−0.227	0.159	−0.759	−0.287	−0.141	0.063	−0.728
OR	−0.355	−0.197	0.274	−0.705	−0.311	−0.197	0.113	−0.742
PN	−0.340	−0.222	0.056	−0.846	−0.036	0.229	0.003	−0.756
RJ	−0.264	−0.159	0.076	−0.803	−0.329	−0.020	0.075	−0.774
TN	−0.436	−0.115	0.139	−0.790	−0.354	−0.190	0.056	−0.797
UP	−0.079	−0.100	0.041	−0.766	−0.070	0.007	0.019	−0.716
WB	−0.247	−0.117	0.085	−0.779	−0.102	−0.045	0.027	−0.749
India	−0.205	−0.110	0.081	−0.748	−0.190	−0.079	0.041	−0.731

Source Authors' own calculation using unit-level NSSO 61st and 66th rounds

It is discernible from Table 11.2 that between the two time periods, the change in poverty level is mostly due to the count of the poor and the size of the poverty gap when compared with the variation in the distribution of the poor. It is quite evident that the states across India are showing an increase in distribution of the poor in both rural and urban areas. States such as Bihar, Haryana, Karnataka and Madhya Pradesh show an increase in the poverty gap in rural areas, despite the decline in head count poverty.

This evidence undoubtedly informs the disagreement between head count poverty and poverty gaps in most of the states of rural and urban India. The alternative proposed here in the form of the SST index undoubtedly overcomes the limitation of poverty head count which is based on the likelihood principle. This index accommodates the absolute change in the count of the poor and the non-poor which adds strength to its representing state of poverty. A clear pattern emerges in the computation that there is a decrease in poverty due to mere addition of the non-poor instead of decrease of the poor in rural Gujarat, Haryana, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and India. On the other hand, Andhra Pradesh, Karnataka, Kerala, Odisha and West Bengal poverty have witnessed a decrease in poverty along with a decrease in the number of the poor (see Table 11.3). However, this is not completely true for urban India.

The percentage changes in poor population depict that the decline in the percentage of the poor is highest in Kerala, followed by Tamil Nadu, Maharashtra and Odisha in rural India, whereas the decline is highest in Odisha and Madhya

Table 11.3 Changes in poor and non-poor population in rural and urban India

State	Rural			Urban			Rural			Urban		
	Absolute difference between 2009–2010 and 2004–2005						Percentage change in poor and non-poor					
	Poor	Non-poor	Total	Poor	Non-poor	Total	Poor	Non-poor	Total	Poor	Non-poor	Total
AP	−53,031	48,741	−4,290	−5,549	34,281	28,732	−30.3	13.3	−0.8	−12.7	24.0	15.4
AS	14,555	1,895	16,450	2,226	2,685	4,911	17.5	1.3	7.2	43.8	14.7	21.0
BR	36,273	33,869	70,142	4,960	15,225	20,185	9.8	11.5	10.5	16.7	39.7	29.6
GR	−34,880	48,646	13,766	4,469	42,877	47,346	−28.8	25.8	4.4	13.7	32.9	29.1
HR	−9,065	13,672	4,607	2,395	6,497	8,892	−23.1	11.5	2.9	18.6	14.6	15.5
KR	−40,536	33,577	−6,959	−2,947	37,172	34,225	−31.7	15.7	−2.0	−7.5	33.1	22.6
KE	−20,234	12,848	−7,386	−3,569	11,923	8,354	−42.5	6.8	−3.1	−26.8	20.2	11.6
MP	−47,106	62,278	15,172	−15,479	22,663	7,184	−19.1	29.2	3.3	−31.4	24.8	5.1
MH	−100,323	103,493	3,170	−21,165	55,047	33,882	−38.0	36.0	0.6	−22.2	19.9	9.1
OR	−71,762	65,454	−6,308	−6,154	5,315	−839	−36.8	52.0	−2.0	−32.2	16.8	−1.7
PN	−11,579	13,172	1,593	610	5,538	6,148	−33.3	10.8	1.0	4.4	9.1	8.3
RJ	−32,795	62,769	29,974	−6,587	33,865	27,278	−21.3	22.8	7.0	−18.0	39.1	22.1
TN	−53,081	69,186	16,105	−6,346	74,794	68,448	−41.0	32.1	4.7	−14.9	43.2	31.7
UP	−17,667	86,275	68,608	−548	23,280	22,732	−3.1	11.4	5.2	−0.5	10.9	7.0
WB	−61,549	43,242	−18,307	−6,092	251	−5,841	−27.0	11.7	−3.1	−12.9	0.2	−3.0
India	−549,947	783,164	233,217	−51,785	386,242	334,457	−17.9	18.4	3.2	−8.1	20.9	13.5

Source Authors' own calculation using unit-level NSSO 61st and 66th rounds

Pradesh in urban India. Nevertheless, it is worth noting that there is a rising change in the percentage of the poor in both rural and urban areas in Assam. The above analysis shows the poverty intensity measurement through the SST index. The three indicators of the SST index depict that although the first two components are declining, the third component is showing an increasing trend among the states. The result affirms that the decrease in poverty is due to mere addition of the non-poor instead of a decrease in the poor.

11.3 Conclusion

This study made an attempt to investigate one of the most contested debates in poverty measurement. The Sen–Shorrocks–Thon index of poverty intensity effectively summarized the extent of poverty, partly because it can be decomposed into the poverty rate, the average poverty gap ratio and the degree of inequality in poverty gaps in the population. The result affirms that although the headcount poverty is declining, inequality has been increasing as indicated by rising values of Gini. This paper has put forward the argument that mere addition of the non-poor need not be considered as poverty reducing unless these people provide financial assistance to the non-poor. But in the conventional measurement of head count of poverty, mere addition of the non-poor results in reduced levels of poverty. Hence, this illustration is a definite improvement over the simplistic head count of poverty which is inadequate to describe the state of poverty.

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Part VI
Sustainability in Poverty Reduction

Chapter 12
The Significance of Foreign Labour Migration and Land for Poverty Reduction in Nepal

Ramesh Sunam

Abstract Nepal has witnessed a decline in poverty in the last decade, although GDP growth is low and stagnant at around 4 %. What explains this decline is little researched. Descent poverty, or how some households tend to fall into poverty, is another important facet of poverty dynamics, which has also received little scholarly attention. This paper, therefore, examines pathways leading to poverty dynamics in rural Nepal. Employing the 'Stages of Progress' methodology, this paper shows that nearly one-third of the total 386 households studied have escaped poverty, while 7 % have fallen into poverty over the last two decades. Foreign labour migration, small business and access to land define the movement of most households out of poverty, whereas loss of land, cultural burdens and health costs are the main factors associated with descent into poverty. This paper suggests two distinct sets of policies for promoting escape from poverty and for preventing descent into poverty. Such policies need to consider the situation of the poor who are unable to pursue labour migration, and the left behind household members, enabling their access to land and creating local employment.

Keywords Agriculture · Foreign migration · Land · Nepal · Poverty

12.1 Introduction

Economic growth is often considered as the pathway out of poverty as many cross-country studies show that economic growth strongly correlates with poverty reduction. However, this relationship does not explain how it works out in a particular context. In Nepal, as in many developing countries, while GDP growth is low and stagnant at around 4 % in the last decade, poverty in absolute terms has declined in the same

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_12

period from 41.76 to 25.16 % (ADB 2009; CBS 2011). An explanation of this decline in the Nepali context in terms of the rural people's own understanding is an area that has not been studied. Further, descent poverty—some households having the tendency to fall into poverty—is little understood. This dimension of poverty dynamics, 'becoming poor', is often neglected in research and the development discourse. Factors associated with escape differ from that attributed to descent (Barrett et al. 2006; Krishna et al. 2006). Even in a country witnessing an economic miracle, there might be a huge number of households slipping into poverty, alongside many households escape from the poverty trap (Ravallion 2001). Controlling households' decline into poverty is, thus, as important as promoting other households' escape from poverty.

Many studies, based on panel data, have examined poverty dynamics—the extent to which households fall into and escape from poverty. Some examples of such studies include the work by Lawson et al. (2006), Barrett et al. (2001), Christiaensen and Subbarao (2005), Davis and Baulch (2011), Moser and Felton (2007), and Quisumbing (2007). However, these studies put little emphasis on the factors and strategies that poor households utilise to deal with their impoverishment. Contrary to the wider assumption that poor households just wait for benefits from non-governmental organizations (NGOs) or the government to come their way, they rather try on their part to improve their status through different livelihood strategies. But there is a considerable gap in understanding the strategies and processes leading to poverty outcomes (Ellis 2000). For understanding factors and processes that drive mobility at the community and household levels, participatory research methods have been advocated. This study employs one such methodology—'Stages of Progress'—developed by A. Krishna (2005)[1] and later adapted with modification by other researchers for unravelling the factors associated with escaping from and falling into poverty.

Results are presented from fieldwork conducted in 11 hamlets from the Tarai region of Nepal between January 2012 and February 2013. Of the total of 386 households, 29.5 % have escaped from poverty in the last 22 years, but 7 % have also fallen into poverty during the same period, and these numbers vary considerably from hamlet to hamlet. One set of factors is linked with escape from poverty, while a different set of factors is associated with falling into poverty. It, thus, suggests that two different sets of public policies are required: one set to save households from falling into poverty and another set to help them escape from poverty. While foreign labour migration, farming and small businesses constitute major reasons for households escaping poverty, the most important reasons associated with the households' decline into poverty include loss of land, and cultural and social expenses.

12.2 Methodology

This paper draws on the fieldwork conducted in 11 hamlets, called *Tole* in a local language, from Sunsari district of the Tarai region, Nepal. Altogether 386 households are resident in these hamlets. The selected hamlets closely represent the

[1] http://www.sanford.duke.edu/krishna/index.html.

considerable diversity that exists within the Tarai in terms of caste/indigenous peoples, economic activities and migration patterns since carefully selected and rich cases can potentially yield valid and useful findings (Flyvbjerg 2002). The economy of these hamlets is predominantly based on farming, although other non-farm income sources are increasingly available. Rice is the main cereal crop, but wheat, maize and potato are also grown.

This study has employed mixed research methods to enrich findings through creating ‘synergy’ between quantitative and qualitative techniques (White 2002). To examine poverty dynamics and identify factors associated with escaping poverty or otherwise, a community-based, participatory, retrospective methodology called ‘Stages of Progress’ has been employed (see Krishna 2010). This methodology has been advanced as an important tool for understanding rural poverty as opposed to imposing poverty indicators on local communities. As the residents in the selected hamlets are longstanding in close-knit communities, this methodology has been advocated for such cases. The suggested steps have been briefly described here since an extended illustration of this methodology can be found elsewhere (Krishna 2010; Kristjanson et al. 2010).

Step 1 *Forming a representative community group.* In each hamlet, a community group of five to seven people was assembled. This group consisted of members belonging to diverse social groups along caste, gender and age lines. It was ensured that at least three members belonged to older members of the community and/or were women since they are believed to be more knowledgeable about households’ situations over a long period of time.

Step 2 *Presenting the objectives of study.* The objectives of the exercise were clarified to the community group. In addition, key issues were made clear which could act as sources for manipulating or misrepresenting their response. In this regard, it was informed that no benefits would be given to any participants or households under consideration and that no development program was in the offing.

Step 3 *Defining what it means to be a poor household.* This is the most crucial step because we identified the local understanding of poverty at a community meeting. We asked community groups to explore the stages of progress in terms of assets and capabilities that poor households pass through to move out of poverty. The following stages were identified after rigorous discussions at a community meeting (Table 12.1).

These first five stages reflect the local understanding of poverty. When a household has no worries about these stages, such a household is considered non-poor in the definition of the local people. The fifth stage is a socially constructed poverty cut-off, equivalent to poverty line (e.g. one dollar a day). A surprising agreement was reached among community groups for the first five stages, but it recedes when identifying the successive stages in the ladder of upward mobility. Each movement upward along the stages of progress represents a gradual improvement in the material and social status of households.

Table 12.1 Stages of progress with poverty cut-off

Stages of progress		
1	Food for the family	
2	Some clothes for family while going to towns or social functions	
3	Sending children to school	
4	Repairing the existing shelter (roof with iron sheets)	
5	Covering basic medical expenses	Poverty cut-off

Step 4 *Inquiring about households' poverty status today and 22 years ago.* Community groups were then asked to categorise households in the present time and 22 years ago along the stages identified in the previous exercise. Before doing this, a complete list of all households in each hamlet was prepared. A reference point was made to a significant event—the reinstatement of democracy in Nepal in 1990—which is easily and commonly remembered. This was a shared point for recounting the past.

Step 5 *Assigning households to particular categories*. After identifying the stages of households, we assigned each household into one of the following four categories:

Category *A*	Poor now and poor earlier (Remained poor)
Category *B*	Poor earlier, but not poor now (Escaped poverty)
Category *C*	Nor poor earlier, but poor now (Became poor); and
Category *D*	Not poor earlier and not poor now (Remained non-poor)

The unit of analysis is households of the present time, but in the case of households younger than 22 years old, we asked about the conditions in their parents' households.

Step 6 *Inquiring about reasons for escape and reasons for descent with respect to a random sample of households*. Approximately 40 % of all households in each of the four categories were randomly chosen for eliciting the reasons behind escape and descent. The members of community groups were inquired about the reasons, processes and events (the causes and contributing factors) associated with each household's trajectory.

Step 7 *Following up by interviewing household members*. We surveyed 170 households drawn through random sampling to further collect information about their household trajectories and to cross-check the information provided by the community group. In the meantime, we collected basic socio-economic and demographic data such as landholding, education and asset ownership. For smoother data analysis, the reasons, processes and events recorded in each case were coded using a code sheet.

Prior to implementing this methodology, two research assistants who can speak local languages were recruited and trained. The principal researcher closely supervised the research assistants during the study period.

12.3 Poverty Trends: Moving Out, Moving In

Results from the analysis of data obtained through the Stages of Progress methodology show that about 73.3 % of the 386 households were poor 22 years ago and 50.8 % are poor today (Table 12.2). Nearly one-third of total households have changed their status from being poor to non-poor over the last two decades. However, 43.8 % of all households have remained poor, and in the meantime, 7 % have slipped into poverty. The poverty escape rate is 29.5 %, while the decline rate is 7 %, showing a net improvement of 22.5 %.

The official figure for poverty (headcount) in Nepal is 25.16 % (CBS 2011). Our estimate is doubly higher (50.8 %). Perhaps this higher figure is due to a large proportion of Dalits (the so called low-caste peoples) and indigenous peoples (both social groups are largely impoverished people across the country), who reside in the study area. Moreover, since the local definition of poverty as used here involves very basic needs such as food, clothing and shelter, those who are identified here as poor by community groups are unlikely to be non-poor in terms of any plausible criteria of poverty. We have also observed miserable conditions of many households during the fieldwork.

Now it is useful to see the relationship between the four categories and some other widely used indicators of poverty in the academic and policy discourse. In fact, other indicators also provide support to our poverty categories. Of those who have remained poor (Category *A*), 71 % are landless and 47 % are daily labourers. The average land ownership for this category is 0.10 bighas (1 bigha = 0.68 ha). In contrast, average ownership for Category *D* is 1.42 bighas; that is, households in this category possess more than fourteen times as much land as those in Category *A*. Average landownership for Category *B* and Category *C* is 0.36 and 0.40, respectively (Table 12.3).

Livestock size also varies substantially between households identified as being poor and non-poor (see Table 12.4). Category *A* households possess just 8.9 animals on an average, while Category *D* households own almost double (17.2 animals).

Ownership of other assets is also similarly distributed along these four poverty categories as shown in Table 12.5. Households were asked about ownership of five types of assets—radio, TV, mobile, bicycle and motorbike. On an average,

Table 12.2 Trends in household poverty (poor households %, $n = 386$)

At present	22 years ago	
	Poor	Not poor
Poor	43.8 %	7 %
	Remained poor (*A*)	Became poor (*C*)
Not poor	29.5 %	19.7 %
	Escaped poverty (*B*)	Remained non-poor (*D*)

Poor today $(A + C) = 50.8$ %
Poor 22 years ago $(A + B) = 73.3$ %

Table 12.3 Land-related parameters and poverty

	Remained poor (*A*)	Escaped poverty (*B*)	Became poor (*C*)	Remained non-poor (*D*)
Landownership (in bigha[a])	0.10	0.36	0.40	1.42
Rented in (% of households in each category)	47	35	36	18
Rented out (% of households in each category)	0	3	0	20

[a]1 bigha = 0.68 ha

Table 12.4 Livestock possession and poverty

Type of animals	Animal possession for each category (average)			
	Remained poor (*A*)	Escaped poverty (*B*)	Became poor (*C*)	Remained non-poor (*D*)
Cattle	1.4	2.1	1.5	2.2
Buffalo	0.3	0.3	0.2	0.6
Goats	1.8	2.4	1.9	2.6
Pigs	0.1	0.5	0.2	0.7
Chicken	3.3	5.4	1.7	9.1
Ducks	1.9	1.9	3.0	2.1
Total	8.9	12.6	8.5	17.2

Table 12.5 Asset possession and poverty

Type of asset	Asset possession for each category (average)			
	Remained poor (*A*)	Escaped poverty (*B*)	Became poor (*C*)	Remained non-poor (*D*)
Radio	0.3	0.5	0.4	0.6
TV	0.4	0.9	0.5	0.9
Mobile	1.0	1.9	1.5	1.9
Bicycle	0.8	1.1	0.9	1.1
Motorbike	0.1	0.2	0.0	0.1
Total	2.7	4.7	3.2	4.5

households of Category *A* (remained poor) possess 2.7 of these five assets, while households of Category *D* (remained non-poor) possess nearly double (4.5).

To sum up, households identified as poor through the Stages of Progress methodology are equally poor, in terms of other indicators of relative wealth relevant to rural agrarian context. Next section identifies and explains common reasons associated with households moving out and moving into poverty, the prime focus of this paper.

12.4 Explaining the Movement of People in and Out of Poverty

This section explains factors that are associated with households moving out and staying in poverty. Initially, community groups—the key informants—were asked about reasons behind the movement of households and the responses obtained were then verified and complemented through household interviews in a randomly selected sample of 40 % of the total households.

12.4.1 Pathways Out of Poverty

Of the total 386 households, 29.5 % have escaped poverty in the last two decades. Not a single factor is telling in explaining this movement of households out of poverty in the study area. Rather, different factors seem to be working alone or in combination (Table 12.6). Temporary labour migration of households abroad is the first major reason behind escape. About 60 % of the households that became non-poor over the last 22 years reported that they could utilise labour migration opportunities to the Gulf countries such as Qatar, UAE, and Saudi Arabia and to Malaysia for improving their livelihoods. During the interviews, the poor households said that they have utilised remittances received from foreign migration in buying food, clothes and land, and repairing or building new houses. They have also been able to afford their children's education to private schools, where the quality of education is perceived to be better than in public schools. Importantly, foreign labour migration is different from seasonal or rural–urban migration in which migrants leave home for some months during the lean season and return

Table 12.6 Principal reasons for escaping poverty ($n = 114$)

Reasons	% of poverty escaping households
Foreign labour migration	60
Own farming	22
Sharecropping	42
Small business	41
Government job	21
Private job including labouring	25

Note The numbers in each column add up to more than 100 because multiple causes are usually associated with each case home when farming season starts. But foreign labour migration, in which migrants spend a longer period, usually more than a year, away from their home country can potentially remit more money than seasonal migrants (De Haas 2005).

In the recent years, foreign labour migration has been quite phenomenal and on a dramatic rise in Nepal. Nepal is one of the largest labour-sending countries (Poertner et al. 2011). Across Nepal, about one-third of total households have at least one family member abroad, and over 55.8 % households receive remittances (CBS 2011), which amount to about 22 % of the total GDP of the country (GON 2011). As foreign migration has been considered in analysing poverty for Nepal, some studies have attributed poverty reduction to remittances from both internal and international migration (Lokshin et al. 2007). However, this factor—migration—has not been discussed in similar studies conducted in India, although the importance of rural–urban migration for poor households even in India, particularly for lower castes and *adivasi* (tribal peoples), has been widely cited (Mosse et al. 2005).

Farming is another important factor for rural households to reduce their poverty. Some households have worked their own land, while others have rented in land on a sharecropping basis, a kind of tenancy where the cultivator provides half of the grains to the land owner. Some 35 % of the households that escaped poverty have rented in land for tenancy. Basically, farming or sharecropping alone has not worked to lift the poor out of poverty. However, it provides subsistence living, a basis for upward mobility, as the poverty escaped households reported. Then, these households can accumulate some money earned from wage labouring or migration. So access to land is important. The households that remained in poverty are mostly those without land ownership or no access to land. This finding, therefore, does not support the argument that land is no longer important as a pathway out of rural poverty (Rigg 2006). Access to land on virtuous terms still defines the movement of poor households out of impoverishment. The importance of the land tenure system for economic performance has been well analysed by Banerjee and Iyer (2005) in the context of India.

Not only farming but also small business has helped rural households to fight poverty. Small business includes local kiosks, local bars, groceries, bottle shops, dairy, and poultry. Land is necessary for operating some business such as dairy, swine/pig farming and goat keeping. Similarly, about 21 % of the poverty escaped households mentioned that government jobs—permanent salaried jobs—constitute a key factor in crushing their impoverishment. However, only one-fifth of total households have been able to access government jobs. In addition, those who are in the government jobs are from high-caste households, while very few indigenous and Dalit households hold such jobs. This relates to historical discrimination and injustice inflicted upon these backward castes by the state.

As indicated earlier, labouring opportunities beyond farming have also been increasingly important for rural households. In the study sites, 25 % of the households that escaped poverty gave credit to wage labouring. Labouring opportunities may be available in construction activities or in local industries at local towns. What is disappointing here is that although this part of Nepal has many industries,

Table 12.7 Results of binary logistic regression for escaping from poverty

	Odds ratio	95 % confidence interval
Intercept	0.12	
Foreign migration	3.83[b]	1.96–7.51
Farming	4.06	1.20–13.66
Sharecropping	1.22	0.60–2.55
Agribusiness gain	3.27[a]	1.31–8.15
Diversification of incomes	1.73	0.62–4.83
Dalit caste	0.51	0.08–3.19
Labouring	0.23	0.06–0.97
Land	3.33[b]	1.69–6.58
Log likelihood	−123.22	
Likelihood ratio Chi-square	135.11	
Pr > Chi-square	0.0000	
N	283	

Notes The population considered in this model is households who were poor in the earlier period (i.e. Category *A* and Category *B* households). The dependent variable is specified as escaping from poverty = 1

[a] Statistically significant at 0.05 level

[b] Statistically significant at 0.01 level

very few households have got employment. Instead, there have been cases of labourers being abused by petty contractors. It seems that industrial growth has not always produced jobs in numbers large enough to make a significant dent in poverty.

Table 12.7 reports the results from logistic regression that compare the experiences of households that escape poverty and that remain in poverty. The focus is to investigate why some poor households became non-poor, while other households remained poor. Results indicate that the likelihood of becoming non-poor is substantially higher for households that are involved in foreign labour migration, run businesses or own some land. The odds of a poor household escaping poverty increase by a factor of 3.83 in cases where a household member is engaged in foreign migration, and by 3.33 times and 3.27 times in cases where households owned some land and pursued agriculture related business, respectively.

12.4.2 Pathways Leading into Poverty

About 7 % of total households have fallen into poverty in the study area. Even some well off households have become impoverished in the last two decades. Health-related causes are important reasons for falling into poverty. These reasons were reported as important factors in some 20 % of all households that have

Table 12.8 Principal reasons for falling into poverty

Reasons	% of households falling into poverty
Poor health and health-related expenses	19
Cultural costs (marriage, dowry, death rituals)	48
Land loss	62
Others (alcoholism, laziness, etc.)	28

Note The numbers in each column add up to more than 100 because multiple causes are usually associated with each case

slipped into poverty (see Table 12.8). Ill health and the medical expenses constitute health causes.

Social and cultural expenses represent a dominant factor, and nearly half of the households that fell into poverty reported it. Such costs entail costs associated with marriage ceremonies, dowries, feasts and death rituals. A huge amount of expenditure is made for these events. Although these events do not occur every year, they tend to absorb a huge sum of money, according to the accounts of many households that were surveyed. In some cases, they even result in indebtedness. Indigenous peoples, *Tharus*, organise lavish parties during weddings and also offer dowries—a social obligation and a matter of prestige in the village. Some households have become landless because they sold their land to cover costs of their daughters' weddings and dowries. Social reform movements will require attention for addressing such causes.

Land loss constitutes another dominant factor associated with pushing a large number of households into poverty. About 60 % of the households cited loss of their land as a reason for their fall into enervating poverty. Apart from social and cultural reasons of losing land, some households have also sold land to cover their basic living expenses and costs associated with foreign migration. When they fail to earn sizable remittances through foreign migration, some households have plunged into poverty. So households may even fall into poverty due to migration processes if they fail to generate remittances in the end.

Unlike the findings of Krishna (2006), debt burden is not an important factor in this case. Very few poor households cite debt as an important reason for falling into poverty. A handful of reasons may explain this. First, poor households who have migrated aspired to repay debt from remittances. Among those who have not migrated, most of them do not take loans, instead relying on daily labouring to cover the costs of living. Another reason could be that farming is just subsistence-oriented in the study area, so farmers do not intend to purchase fertilisers and pesticides which could have otherwise rendered them indebted. On the contrary, in many parts of India, commercial farming is likely to squeeze farmers into immiseration. This could be a reason that studies from India have indicated agricultural debt as a major factor.

The results of logistic regression presented in Table 12.9 further confirm these findings. Here, the main focus is to examine why some previously non-poor households became poor, while other non-poor households have maintained their

Table 12.9 Results of binary logistic regression for falling into poverty

	Odds ratio	95 % confidence Interval
Intercept	2.21	
Ill health	0.94	0.07–12.71
Marriage and other social expenses	1.14[a]	0.01–2.0
Alcohol	2.36	0.23–23.53
Land loss	21.70[a]	1.53–307.07
Foreign migration	0.10	0.01–1.03
Farming	0.01	0.00–0.21
Government job	0.12	0.00–2.30
Diversification of income sources	0.21	0.03–1.43
Indigenous peoples	3.47	0.48–24.70
Log likelihood	−21.06	
Likelihood ratio Chi-square	76.37	
Pr > Chi-square	0.0000	
N	103	

Notes The population considered in this model is households who were not poor in the earlier period (i.e. Category *C* and Category *D* households). The dependent variable is specified as falling into poverty = 1

[a] Statistically significant at 0.05 level

status as non-poor. As seen in Table 12.9, mainly two factors, namely loss of land, and marriage and social expenses are significantly associated with falling into poverty. For variables that are significant, an odds ratio greater than one indicates that the related factor tends to accelerate descent, while an odds ratio lower than 1 indicates that the related factor tends to control descents into poverty. For instance, the odds ratios of land loss, and marriage and other social expenses are 21.70 and 1.14, respectively, implying that the odds of falling into poverty were enhanced by roughly 20 times and 1.14 times for households that have lost land and made marriage and other social expenses.

12.5 Conclusion: Connecting Pathways Out of Poverty

This paper has examined rural poverty dynamics in the Tarai region of Nepal to identify the extent of households moving in and out of poverty and the reasons associated with the mobility. The methodology employed here—the Stages of Progress—is useful for understanding poverty in the poor people's own terms. In the study area, community groups used local poverty indicators for dividing households into different categories: remained poor, poverty escaped, fell into poverty and remained non-poor. These categories of households were then verified by the data about the possession of different assets, including land and livestock, collected through the household surveys. The possession of different assets also confirmed the reliability of poverty categories. Such an asset-based approach to poverty measurement has several advantages over income-based measures (Carter and Barrett 2006). Barrett et al. (2006) offer empirical evidence that household welfare dynamics differ significantly as to whether an asset-based measure or an income-based welfare measure is used.

The results from this study reveal that over a period of 22 years, about 29.5 % of the total households escaped poverty, while 7 % fell into poverty. So the net improvement was about 22 %. A multitude of factors are associated with the mobility of households. However, the factors associated with escape from poverty differ from those associated with falling into poverty.

Major reasons behind escaping from poverty constitute foreign labour migration, farming, holding government jobs and small businesses. These different routes out of poverty are not a surprise since rural households in developing countries are engaged in multiple activities to improve their livelihoods (Ellis 2000). As the results suggest, the majority of households have pursued outmigration as a strategy to escape poverty. Increased foreign labour migration can be attributed to poor economic growth and the limited availability of job opportunities in the country. Further, the availability of land for farming has diminished because of an increasing population and other alternative land uses. Incomes from the traditional peasant mode of farming have been inadequate for rural households to improve their social and economic status (Adhikari and Hobley 2011). For these reasons, across the country, the trend of outmigration has seen a dramatic rise and over 55 % of the total households receive remittances according to the recent national survey (CBS 2011).

Not many households can access government jobs nor is it feasible for the government to create additional government jobs for all poor people. So this cannot be suggested as a plausible pathway out of poverty. The remaining routes mostly echo the three main pathways—identified by the World Bank in its flagship annual report of 2008—that lift rural households out of poverty, namely commercial farming, labour and migration (World Bank 2008). How these pathways can be accessible to the poor on favourable terms largely determine the likelihood of them exiting from poverty.

Although commercial farming has not taken roots in the study area, subsistence farming has provided a basis for households to move upward because it provides food and also creates an opportunity for them to save earnings from other non-farm activities such as labouring and migration. This suggests that no single route—farming, migration or labouring—has been effective for poverty reduction. Many households merely continuing traditional agriculture, migration or just labouring have been stuck in stagnation. The households combining these activities—for instance, a household being engaged in both farming and foreign migration—have been found to have escaped poverty. In other words, diversification of income sources has been a key factor for the vast majority of households in improving their livelihoods.

This finding is consistent with a number of similar studies. In Tanzania, the farmers who diversified livelihood activities—growing staple foods for own use in addition to farming cash crops and rearing livestock—were found to be successful in breaking poverty traps (De Weerdt 2006). In Uganda, many households have successfully escaped poverty by improving land productivity and growing commercial crops (World Bank 2008). In Rajasthan and Andhra Pradesh of India, Krishna (2004, 2006) finds that livelihood diversification is the significant determinant for households in moving out of poverty. Nevertheless, this study does not resonate what Rigg (2006) argues that detaching the poor from land, and thus, agriculture is an effective pathway out of poverty. Bryceson (1996) observes deagrarianisation[2] in sub-Sahara Africa, where rural people have become increasingly less reliant on farming as a source of their livelihood. The deagrarianisation thesis partly holds true for Nepal. The share of agricultural employment (from 83 to 64 %) and farm income (from 61 to 28 %) has declined between 1996 and 2004. Also declining is the share of agriculture in the total GDP (CBS 2011).

For effective poverty alleviation, preventing households from falling into poverty is as important as escaping from poverty as mentioned earlier. In this study, important reasons reported to be associated with households that have slipped into poverty include loss of land, health costs, and social and cultural expenses. These reasons are similar to those explored by Kristjanson et al. (2010) in Kenya, and by Krishna (2006) and Krishna et al. (2006) in India and Uganda, respectively. These studies identify poor health, high medical costs, high interest debts and huge customary and religious expenses as major factors pushing households into impoverishment.

This paper concludes that the diversification of income sources tend to be a major reason behind households moving out of poverty as many other similar studies indicate. Nevertheless, what type of diversification strategy works well for many households remains an issue to be resolved. With caution, this study suggests that a combination of farming and foreign migration seems to be working quite well for many households in the Tarai region of Nepal. In another context, foreign migration is, however, not an element of diversification (Krishna et al. 2006; Kristjanson et al. 2010). Similarly, apart from social and cultural expenses, loss of land or loss of access to land stands as a main reason associated with falling into poverty. Access to land turns out to be an important factor for explaining both facets of poverty—escape from and descent into poverty. Krishna (2004) and Krishna et al. (2006) also identify land-related factors, land improvement and commercial farming, to name a few, but the authors do not extend such findings to advocate policies for land reform or at least tenure reform. This paper also suggests that land reform including tenure reform (terms and conditions of farming

[2] Deagrarianisation is defined as 'a process of: (i) economic activity reorientation (livelihood), (ii) occupation adjustment (work activity) and (iii) spatial realignment of human settlement (residence) away from agrarian patterns. Overt and measurable manifestations of this process are as follows: a diminishing degree of rural household food and basic needs self-sufficiency, a decline in agricultural labour relative to non-agricultural labour in rural households, and in total national expenditure, a decrease in agricultural output per capita in the national economy relative to agriculture output, and a shrinking proportion of the total population residing in rural areas' (Bryceson 1996, p. 99).

that favour tenants) is much likely to benefit many poor people since most of them are still attached to land and farming, largely on adverse terms (Sugden 2009). In generic terms, the socio-economic and cultural context matters a lot for devising effective anti-poverty strategies.

Acknowledgments I am grateful to the ANU Crawford School of Public Policy for providing funding for this research. Associate Professor John F McCarthy deserves special thanks for his intellectual and scholarly guidance throughout this study. I am indebted to Sita Magar and Mohan Timsina for assisting me during the fieldwork in Sunsari, Nepal. I am also grateful to my colleagues, Mandip Rai and Binod Chapagain, for their constructive comments. The usual disclaimer applies.

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Chapter 13
Does Poverty Alone Keep Children Out of School? The Case of Children Under Kinship Care in the Philippines

Joseph J. Capuno and Xylee Javier

Abstract While the importance of child education is universally recognized, there are still millions of children who are out of school in developing countries. In these countries, many children are left in the care of their kin when their parents die or work abroad. In this paper, we examine the welfare, particularly the school attendance, of the children under kinship care in the Philippines. Culled from the last seven rounds of an official national household survey, our dataset comprises 1,485 households with at least two members who are 6–12 years old, and one of them is the household head's child or grandchild and the other is the head's kin. Applying probit regression models, we find that a child under kinship care is about 3 % points less likely than the head's own child to be attending school, other things being constant. However, there are no statistically significant differences in the likelihood of school attendance between the head's own child and grandchild. While income deprivation keeps some children out of school, ensuring their schooling participation would require more transfers than are needed to lift their households out of poverty. Targeting these children through conditional cash transfer programs could mitigate the effect of the apparent parental bias toward their own brood.

Keywords Parental preference · Child schooling · Kinship care

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The financial support from the Philippine Center for Economic Development, the comments and suggestions from an anonymous referee, and the excellent research assistance of Kate Farrales are gratefully acknowledged. The authors retain responsibility for any and all errors.

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_13

13.1 Introduction

That the importance of child education is universally recognized needs no further proof than the fact that most countries commit to meet by 2015 the Millennium Development Goal #2: *Achieving universal primary education*. In fact, this objective is not new and has been part of the global development agenda since the previous millennium (e.g., the *Education for All* initiative started in the 1990s, now incorporated as part of the MDGs). By subscribing to the MDG #2, countries, thus, do more than affirm the intrinsic and instrumental value of child education. They also implicitly concede that it would require more than merely continuing previous efforts to hurdle the remaining, persistent obstacles before 2015.

While most of previous government efforts have concentrated on the supply and delivery of education services, increasingly the focus is now shifting toward stimulating demand. For example, the school-based management programs adopted in Bangladesh, Sri Lanka, the Philippines, Honduras, Guatemala, Senegal, and Lesotho are meant to engage parents and community-level stakeholders in the policy setting and administration of local schools. The conditional cash transfer programs now implemented in many Latin American, Asian, and African countries provide financial incentives to households to send and keep their young members in schools. While significant progress has been achieved with all the various supply-side and demand-side initiatives, the goal toward universal education remains elusive.

With barely 2 years left before the deadline, a UN report concedes that MDG #2, especially in sub-Saharan Africa, is unlikely to be met despite the huge reduction in the number of out-of-school children, from 102 million in 2000 to 57 million in 2011 (Inter-Agency and Expert Group on MDG Indicators 2013). Also, the report finds that while poverty is the biggest contributory factor that keeps children out of school, girls are likelier than boys to be out of school even in richer households. In Asia, where enrollment rates at the elementary level are already above 90 %, many children, as it were, fall through the cracks not due to poverty, but perhaps because of parental preferences, armed conflict, or other structural factors.

In addition to the gender gap, parental bias is found to manifest according to the child's work opportunities, sibship size and composition, or the spouse's relative control over family income (e.g., Glick and Sahn 2000; Quisumbing and Maluccio 2000; Lee 2007; Alderman and King 1998). Concern is raised also about the well-being of orphaned, abandoned, or vulnerable children—estimated to be two million in 2009—who are placed under institutional, foster, or kinship care (e.g., Foster and Williamson 2000; UNICEF 2009). The effect of kinship care on the child's well-being is of policy interest, especially in developing countries where extended family arrangements are often seen as mutual support groups and sources of assistance in times of social or economic distress (e.g., Desai 1992; Cox and Fafchamps 2007).

However, evidence on the causes, prevalence, and consequences of kinship care is still fragmentary. According to Children on the Brink 2003 (UNAIDS et al. 2004), a vast majority of the orphans and children who lost at least one parent to HIV/AIDS live with the surviving parent and siblings or with other relatives. It is estimated that in 2003, there were about 12.3 million of these children in sub-Saharan Africa alone. In the same year, it is estimated that Asia had about 87.6 million orphaned children, who lost either one or both parents to HIV/AIDS and other causes. The same trend is noted in Eastern Europe and Central Asia, where the number of children living in formal care grew from 1,503 per 100,000 in 2000 to about 1,738 per 1,000,000 in 2007 (UNICEF Regional Office for CEE/CIS 2010).

There is some evidence that the education of the children under kinship care tends to suffer. For example, UNAIDS, UNICEF, and USAID (2004) find that 'the orphans in sub-Saharan Africa are more likely to live in households that are female-headed, larger and have more people dependent on fewer income-earners, and are less likely to attend school than children living with their parents.' In Jamaica, children under foster care, especially boys, are less likely than their foster parents' own children to attend school (Gibbison and Paul 2005). In their study of orphan enrollment using 105 nationally representative surveys, Ainsworth and Filmer (2006) find that 'Children living with kin have a higher risk of not attending school than their peers who live with parents, although they are more likely to go to school than children living with non-kin.'

In this paper, using the Philippines data, we examine the differences in the school attendance rates of young children by their affinity to the household head. Many children in the Philippines are put under kinship care due to a large number of solo parents, broken families, and parents who work overseas as migrant workers. The available evidence so far concerning the welfare of these children is mixed. Some case studies find that the children of overseas migrant workers are not necessarily worse off in terms of education (Reyes 2007; Arguillas and Williams 2010). Using household survey data, Fujii (2011) reports that the child's kinship ties to the household head matters for school attendance. We further probe this issue in the Philippines by applying the probit regression technique on a pooled survey data from the last seven rounds of an official household survey. In particular, we find that children under kinship care are less likely than the household head's own children to be attending school, possibly due to low household income. However, it would require more transfers than is needed to get and keep the household out of poverty to ensure that all children, regardless of their affinity to the household head, are kept in school.

13.2 Differential Parental Investments in Their Children

Since parents or adult household members normally decide on the investments in their children's education, their preferences and control over resources count for a lot in explaining the differences in the schooling participation and completion of the children. The exact reasons or motives for the differential investments, however, are not easily discerned from observational data. But understanding the investment motives is important since they have varying policy implications.

The motives can be broadly classified as biological or economic (Bergstrom 1997; Case et al. 2000; Plug and Vijverberg 2005). The biological argument posits that parents invest in their children to propagate their genetic line. The implication is that parents are likely to invest more in their genetic children than in their foster or adoptive children. By extension, they are likely to invest more in their own children or grandchildren, with whom they share more genes, than in their other relatives. If this is true, education policies should be targeted at households with children of varying degrees of affinity to the household head (or the spouse) to equalize the education opportunities for all children. This approach is especially pertinent in many developing countries where many households include multiple families or extended family members.

The economic motives come in two strands. The first strand posits that even altruistic parents faced with resource constraints may discriminate on the basis of their children's differences in IQ, drive, or motivation. Therefore, parents invest more in the high-ability or highly driven child since it would yield the highest payoff for the family. The second strand assumes that parents expect their children to take care of them in old age. Thus, depending on their expectations, which are also partly conditioned by social norms, parents may invest more in the education of, say, their male or elder children. Which of these motivations dominate clearly has implications on the design of not only gender-sensitive education policies but also social security programs.

Teasing out the relative contributions of these motives in observed differences in schooling participation or completion using observational data, however, is not easy due to possible endogeneity or simultaneity problems. The common approach is to use the variations in the genetic affinity to the parents (or family decision makers) of the children in the same family on whom the parents presumably have the same economic attachments. Employing this approach, Case et al. (2000) find that parents in the USA and South Africa exhibit greater preference (as manifested in differential food consumption) for their biological children than for their stepchildren. To minimize omitted variable bias, Sacerdote (2004) used data from the random assignment of Korean infants to American families that adopted them and found the health, income, and education transmissions from parents to children to be higher for non-adoptees than for adoptees. Also, using data of families with mixed children, Plug and Vijverberg (2005) found evidence that family income is a good predictor of education outcome for adopted children. Interestingly, Gibson (2009), also using data on families with both adopted and genetic children, finds no support for the biological motive; instead, she finds that parents provide more for their adopted children.

Parental investment in child education is presumed to be motivated by strong family orientation among Filipino households. This is taken to mean that parents and children are expected to take turns in caring for each other and that relatives can be counted on in times of need. However, validating these long-held assumptions is constrained by lack of suitable data. The next section describes the household survey dataset that contains information on the children's affinity to the household head that we used here to estimate an apparent bias against children under kinship care.

13.3 Household Survey Data

We culled our data from the last seven rounds of the Annual Poverty Indicators Survey (APIS) of the Philippines. Undertaken by the National Statistics Office, the APIS provides poverty-related information including household demographics, income and expenditures, assets and housing amenities, access to water and sanitation facilities and to other social welfare programs, and each member's employment, educational attainment, health and schooling status, and their relationship to the household head (Ericta and Luis 2009). It is a regular survey with nationally representative, random samples of about 37,500 households in the 1999 round, 38,000 in the 2002 round, 42,800 in the 2004 round, 40,200 in the 2007 round, 40,600 in the 2008 round, 20,000 in the 2010 round, and 42,000 in the 2011 round. While most of the household samples in each round constitute nuclear families only (i.e., husband, wife, and own children), a significant proportion of them include extended family members or non-relatives. As shown in Fig. 13.1, these extended households account for about 20 % of all the samples in the first income quintile in all survey rounds. Noticeably, the proportion rises steadily with each higher income quintile in all rounds, reaching up to 45–50 % in the richest income quintile. These figures suggest that a lot of Filipino children are living with their parents and adult kin or with their adult kin alone. Further, the children in richer households are likelier to live with other kin (and with or without their parents). This dataset, therefore, allows us to investigate the possible links between a child's school attendance and his or her relationship with the household head.

From each survey round, we selected household samples with extended family members. Specifically, we chose only those households with at least two members

Fig. 13.1 Proportion of extended households by income per capita quintile, 1999–2011. *Source of raw data* Annual Poverty Indicator Survey (various years). Authors' calculations

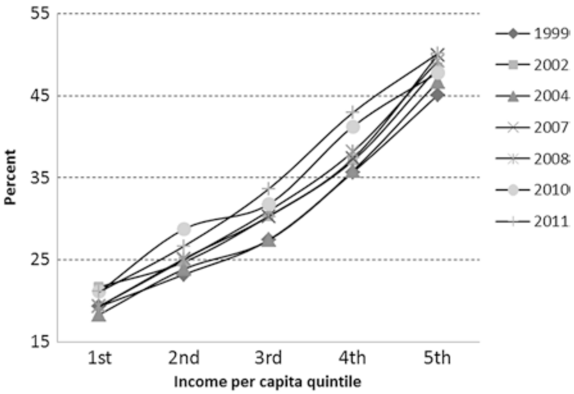

Table 13.1 Number and distribution of households with members 6–12 years old, 1999–2008

Sample	1999	2002	2004	2007	2008	2010	2011	Total
Households with members aged 6–12 years old	6,085	6,068	6,313	6,041	5,935	4,348	9,044	43,834
Of which: households with 6- to 12-year-old child or grandchild and at least one other relative of the household head	240 (3.9 %)	222 (3.7 %)	246 (3.9 %)	204 (3.4 %)	230 (3.9 %)	107 (2.5 %)	236 (2.6 %)	1,485 (3.4 %)
All children aged 6–12 years	664	644	669	533	596	292	628	4,026
Of which: child or grandchild of the household head	382 (58 %)	374 (58 %)	389 (58 %)	318 (60 %)	340 (57 %)	158 (54 %)	340 (54 %)	2,301 (57 %)
Number of 6- to 12-year-old children who are currently attending school	602 (91 %)	616 (96 %)	609 (91 %)	513 (96 %)	580 (97 %)	282 (97 %)	566 (90 %)	3,768 (94 %)

Source of raw data Annual Poverty Indicators Survey (various years). Authors' own calculations who are 6–12 years old, one of whom is the household head's child or grandchild, while the other is the head's 'other relative.' The latter may be the head's own sibling, cousin, niece or nephew, or in-law. The APIS does not distinguish whether the reported child or grandchild is the household head's biological or adopted progeny. Also, it does not distinguish the exact relationships between and among the head's other relatives in the household. Thus, it is possible that the child reported to be the head's other relative and the child's own parent(s) live in the same household. So, in this paper, a child under kinship care is defined simply as a 6- to 12-year-old kid who lives in a household whose head is the child's kin, but not parent or grandparent.

Accounting for about 3.4 % of the total APIS samples, our subsample consists of 1,485 households with 4,026 members who are 6–12 years old (Table 13.1). Of these school-age members, 2,301 (57 %) are the household head's own children or grandchildren and the rest are the head's other kin. Since our subsample is limited to extended households, most of them (99.8 %) have adult members who are the head's other relatives, and some of them are possibly the parents of the child under kinship care.

By government policy, each 6-year-old child is expected to commence the then required 6-year elementary education (or 7 years in some private schools). A huge majority of our sample children (91–97 %) were reported to be attending school at the time of the surveys. We exploit the variations in the child's schooling status, affinity to the head, and the household's socioeconomic status to determine if low income alone prevents households from investing in their children's education.

13.4 Empirical Framework

13.4.1 Estimating Equation

Using the aforementioned dataset, we estimate a probit regression model to tease out the differences in the probability of school attendance between the household head's own children, grandchildren, and other kin, controlling for household income and other factors (Wooldridge 2002). Specifically, our estimating equation is

$$\begin{aligned} S_i &= \alpha + \beta\,\mathrm{grandchild}_i + \gamma\,\mathrm{other\,kin}_i + \delta\,\log\mathrm{income}_i + \varphi\,\mathrm{remittance} \\ &\quad + \sigma\,\mathrm{adult\,relatives} + \boldsymbol{X}_{\boldsymbol{i}}^{'}\boldsymbol{\theta} + \varepsilon_i, \\ S_i &= \begin{cases} 1 & \text{if}\, S^* > 0 \\ 0 & \text{if}\, S^* \leq 0, \end{cases} \end{aligned}$$

where S_{i} is the observed binary indicator of school attendance of the ith child member (aged 6–12 years old), the dummy variable *grandchild* indicates whether the member is the head's own grandchild, *other kin* indicates whether the member is the head's other relation (e.g., sibling, cousin, nephew/niece, in-law), *log income* is the natural logarithm of household income per capita, *remittance* indicates whether the household receives transfers from abroad, *adult relatives* is the number of adult relatives of the household head who are not the head's spouse or own children, $\boldsymbol{X}$ is a vector of control variables, ε is the error term, the terms α, β, δ, φ, and $\boldsymbol{\theta}$ are regression coefficients, and S^* is a latent variable. In the equation above, the member is the head's own child if she is neither the head's grandchild nor other kin.

To test if the probability of schooling for a child who is the head's relative (but not direct descendant) improves with income, receipt of transfers from abroad, or the number of adult relatives of the household head, we estimated alternative specifications of the regression equation to include serially among the regressors three interaction terms: *other kin* × *log income*, *other kin* × *remittance*, *and other kin* × *adult relatives*. The last interaction term is used to ascertain if the child under kinship care is perhaps also living with his or her parent in the same household. Then, we use the model with the statistically significant interaction term to determine the marginal effect on the likelihood of schooling of a child placed under kinship care in a household with a given income level. By setting the income at different levels, we can then determine the changes in the marginal effects of the child so placed. At some level of income where the marginal effect becomes statistically insignificant, we are then able to identify the threshold at which the likelihood of school attendance is the same for all children, regardless of their relationship to the household head. While the same tests can be applied in the case of grandchildren, this is deemed unnecessary (as will be shown in the next section) since they are found to be no more or less likely to be in school as the head's own children.

Possibly, there are unobserved factors that influence the probability of school attendance and the presence of grandchildren or other kin in the same household. Ideally, this omitted variable problem should be addressed using a family-fixed-effect panel model or instrumental variables (to account for the presence of extended family members). However, using a family-fixed-effect panel model will result in dropping off many of the household-level variables, including income, remittance, and the head's and spouse's characteristics. Without these variables, however, we cannot determine the independent effects of income and parental preferences. To partially account for the unobserved household-level factors, we obtained robust standard errors adjusted for household-level clustering of our sample children (same approach as Case et al. 2000). Further, by restricting our sample households to those with extended family members, we mitigate the selection problem and avoid the need for an instrumental variable. We note, nonetheless, our estimates and their implications apply only for a select type of households and not to the general household population.

13.4.2 Regression Variables

Table 13.2 shows the definitions and descriptive statistics of the child-level variables for the 4,026 children in our regression dataset. The dependent variable is

Table 13.2 Variable definitions and summary statistics ($N = 4{,}026$)

Variable	Definition	Mean	S.D.	Min	Max
In school	=1 if child is currently attending school, 0 otherwise	0.936	0.245	0	1
Grandchild	=1 if grandchild of household head, 0 otherwise	0.053	0.223	0	1
Other kin	=1 if child is other relative of household head, 0 otherwise	0.428	0.495	0	1
Log income	Natural logarithm of annual household income per capita	9.098	0.843	6.589	12.567
Remittance	1 = if household received remittance from abroad, 0 otherwise	0.202	0.402	0	1
Adult relatives	Number of adult relatives of the household head who are not the head's spouse or own children and who are each at least 25 years old	5.447	1.696	0	12
Child is male	=1 if child is male, 0 otherwise	0.509	0.50	0	1
Age of child	Age of child in years	9.17	2.00	6	12
Age of child squared	Square of the child's age in years	88.09	36.47	36	144
Child is ill or injured	=1 if child is ill or injured, 0 otherwise	0.197	0.398	0	1
Head is male	=1 if household head is male, 0 otherwise	0.844	0.362	0	1
Age of head	Age of household head in years	42.98	10.75	21	87
Head has job (1999)	=1 if household head (in 1999) has a job, 0 otherwise	0.144	0.351	0	1
Head has job (2002)	=1 if household head (in 2002) has a job, 0 otherwise	0.129	0.336	0	1
Head has job (2004–2011)	=1 if household head (in 2004, 2007, 2008, 2010, or 2011) has a job, 0 otherwise	0.618	0.486	0	1
Head attended college	=1 if household head has some college education, 0 otherwise	0.258	0.438	0	1
Spouse has job	=1 if spouse has a job, 0 otherwise	0.474	0.499	0	1
Spouse attended college	=1 if spouse has some college education, 0 otherwise	0.127	0.333	0	1
Head in union	=1 if household head is married or living together with partner, 0 otherwise, 0 otherwise	0.884	0.320	0	1
Owner	=1 if household owns house and lot currently living in, 0 otherwise	0.656	0.475	0	1
Ilocos	=1 if Ilocos region, 0 otherwise	0.034	0.181	0	1
Cagayan	=1 if Cagayan region, 0 otherwise	0.032	0.177	0	1
Central Luzon	=1 if Central Luzon region, 0 otherwise	0.072	0.259	0	1
Southern Tagalog	=1 if Southern Luzon region, 0 otherwise	0.131	0.337	0	1
Bicol	=1 if Bicol region, 0 otherwise	0.069	0.254	0	1
Western Visayas	=1 if Western Visayas region, 0 otherwise	0.051	0.219	0	1

(continued)

Table 13.2 (continued)

Variable	Definition	Mean	S.D.	Min	Max
Central Visayas	=1 if Central Visayas region, 0 otherwise	0.063	0.242	0	1
Eastern Visayas	=1 if Eastern Visayas region, 0 otherwise	0.079	0.271	0	1
Zamboanga Peninsula	=1 if Zamboanga Peninsula region, 0 otherwise	0.061	0.240	0	1
Northern Mindanao	=1 if Northern Mindanao region, 0 otherwise	0.054	0.226	0	1
Davao	=1 if Davao region, 0 otherwise	0.070	0.254	0	1
Soccsksargen	=1 if region of South Cotabato, Sultan Kudarat, Sarangani, and General Santos City, 0 otherwise	0.053	0.224	0	1
Cordillera	=1 if Cordillera Administrative Region, 0 otherwise	0.038	0.191	0	1
ARMM	=1 if Autonomous Region of Muslim Mindanao, 0 otherwise	0.025	0.156	0	1
Caraga	=1 if Caraga region, 0 otherwise	0.073	0.260	0	1
Year 2002	=1 if year is 2002, 0 otherwise	0.160	0.367	0	1
Year 2004	=1 if year is 2004, 0 otherwise	0.166	0.372	0	1
Year 2007	=1 if year is 2007, 0 otherwise	0.132	0.339	0	1
Year 2008	=1 if year 2008, 0 otherwise	0.148	0.355	0	1
Year 2010	=1 if year is 2010, 0 otherwise	0.073	0.259	0	1
Year 2011	=1 if year is 2011, 0 otherwise	0.156	0.363	0	1

in school whose value is 1 if the child member is currently attending school (during the survey reference period) and 0 if not. Its mean value and standard deviation are 0.936 and 0.245, respectively. The main independent variables are the binary indicators *grandchild* and *other kin* that denote whether the member is the household head's own grandchild and other relation, respectively. Their respective mean values are 0.053 and 0.428. The other principal independent variables are natural logarithm of annual household income per capita (*log income*) and a binary indicator of whether the household receives transfers from abroad (*remittance*). The respective mean values of these variables are 9.098 and 0.202. We also include the number of adult relatives of the household head (*adult relatives*) who are neither the head's spouse nor own children and are each at least 25 years old. On the average, there are about 5.5 adult relatives living in the same household.

Further, we characterize each child member by gender (*child is male*), health status (*child is ill or injured*), and age in years (*age of child*). Roughly, 51 % are male, 20 % had illness or injury, and the average age is 9 years old. To see if older children are more likely to drop out from school as is commonly noted in the Philippines, we also include the squared value of the child's age in years (*age of child squared*).

To account for parental preferences, we include indicators of the head's and spouse's characteristics, such as gender (*head is male*), age (*age of head*), employment status (*head has job* and *spouse has job*), level of education (*head attended college*, *spouse attended college*), and civil status (*head in union*). Note that the head's employment status is tagged to a survey round to account for the different reference periods used in the 1999, 2002, and 2004–2011 rounds. Of the total child samples, about 84 % live in households headed by males, and less than 15 % have household heads with a job in 1999 or in 2002, although 61 % have household heads that were employed during each of the later survey years. About a fourth (26 %) live in households with heads that had at least some college education. A huge majority (89 %) has household heads who were either married or living together with a partner. Nearly half (47.4 %) belong to households where the spouse of the head had a job. However, only around 13 % live in households where the spouse had at least some college education. Around 66 % live in family-owned houses and lots.

To account for other unobserved location-specific or year-specific factors, we included dummy variables for the country's 17 administrative regions and for the seven survey years. For instance, the regional dummy variables should account for, among other things, the spatial variations in prices or costs of living, and the relative accessibility and quality of local public and private school facilities. The year dummy variables would partly account for the differences in the policies and provisions of education services of the past four Philippine Presidents (Ramos, Estrada, Macapagal-Arroyo, Aquino) and the global economic trends (and crises) that affected the Philippines economy during the 1997–2011 period. The default region is the National Capital Region (Metro Manila) and the base year is 1999.

13.5 Analysis of Results

13.5.1 Likelihood of School Attendance of Children, Grandchildren, and Other Kin

Table 13.3 presents four sets of probit regression results. Not including any interaction term among the regressors, our base model simply tests for the independent effects of grandchild, other kin, log of income per capita, remittance, and the number of adult relatives on the likelihood of school attendance. The next three models further test if our key independent variables have also indirect or joint effects on the same. The estimated joint effect will indicate the extent to which an increase in income, a receipt of transfers from abroad, or the number of adult relatives can together improve the schooling status of the other kin relative to that of the head's own child.

Consistently in all four models, the grandchild is found to be negative, but not statistically significant. This implies that the head's own child and grandchild of the same age cohort (6–12 years) are equally likely to be attending school, other things being the same. Put differently, households do not systematically discriminate between the head's direct descendants in their schooling decisions.

Table 13.3 Marginal effects: determinants of school attendance [a]

Explanatory variables	Model 1 (no interaction)		Model 2 (other kin × log income)		Model 3 (other kin × remittance)		Model 4 (other kin × adult relatives)	
	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors
Grandchild	−0.025	0.020	−0.024	0.020	−0.023	0.019	−0.025	0.020
Other kin	−0.029***	0.007	−0.031***	0.008	−0.030***	0.007	−0.030***	0.007
Log income	0.014**	0.007	0.014**	0.007	0.014**	0.007	0.014**	0.007
Remittance	−0.011	0.013	−0.011	0.013	−0.012	0.014	−0.011	0.013
Adult relatives	0.006***	0.003	0.006*	0.003	0.006**	0.003	0.006**	0.003
Child is male	−0.024***	0.007	−0.024***	0.007	−0.024***	0.007	−0.024***	0.007
Age of child	0.160***	0.019	−0.016***	0.019	0.161***	0.019	0.160***	0.019
Age of child squared	−0.009***	0.001	−0.009***	0.001	−0.009***	0.001	−0.009***	0.001
Child is ill or injured	−0.006	0.010	−0.006	0.010	−0.006	0.010	−0.006	0.010
Head is male	0.023	0.019	0.023	0.019	0.023	0.019	0.023	0.019
Age of head	−9.11e−06	0.0004	−0.00002	0.0004	−0.00001	0.0004	−0.00001	0.0004
Head has job (1999)	0.027	0.035	0.027	0.035	0.027	0.035	0.027	0.035
Head has job (2002)	0.026	0.026	0.026	0.026	0.027	0.023	0.026	0.026
Head has job (2004–2011)	−0.006	0.020	−0.006	0.020	−0.006	0.020	−0.006	0.020
Head attended college	−0.018	0.018	−0.019	0.018	−0.019	0.018	−0.019	0.018

(continued)

Table 13.3 (continued)

Explanatory variables	Model 1 (no interaction)		Model 2 (other kin × log income)		Model 3 (other kin × remittance)		Model 4 (other kin × adult relatives)	
	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors
Spouse has job	−0.017*	0.010	−0.017*	0.010	−0.018*	0.010	−0.017*	0.010
Spouse attended college	0.012	0.015	0.012	0.015	0.011	0.015	0.012	0.015
Head in union	−0.014	0.021	−0.014	0.021	−0.014	0.021	−0.014	0.021
Owner	0.005	0.010	0.004	0.010	0.005	0.010	0.005	0.010
Ilocos	−0.017	0.030	−0.017	0.030	−0.017	0.030	−0.017	0.030
Cagayan	−0.028	0.029	−0.028	0.029	−0.028	0.029	−0.028	0.029
Central Luzon	0.031	0.027	0.031	0.027	0.031	0.027	0.031	0.027
Southern Tagalog	−0.007	0.021	−0.006	0.021	−0.006	0.021	−0.007	0.021
Bicol	0.0004	0.025	0.0005	0.024	0.0005	0.024	0.0004	0.025
Western Visayas	0.030	0.029	0.030	0.029	0.030	0.029	0.030	0.029
Central Visayas	0.001	0.027	0.001	0.027	0.002	0.026	0.001	0.027
Eastern Visayas	−0.009	0.023	−0.009	0.024	−0.009	0.023	−0.009	0.023
Zamboanga Peninsula	−0.007***	0.026	−0.071***	0.026	−0.071***	0.026	−0.071***	0.026
Northern Mindanao	−0.016	0.024	−0.016	0.024	−0.016	0.024	−0.016	0.024
Davao	−0.030	0.023	−0.030	0.023	−0.029	0.023	−0.029	0.023
SOCCSKARGEN	−0.004	0.024	−0.004	0.024	−0.004	0.025	−0.004	0.025
Cordillera	−0.019	0.032	−0.018	0.032	−0.018	0.032	−0.019	0.032
ARMM	−0.071**	0.031	−0.071**	0.031	−0.071**	0.031	−0.071**	0.031
CARAGA	−0.011	0.023	−0.011	0.024	−0.011	0.023	−0.011	0.024

(continued)

Table 13.3 (continued)

Explanatory variables	Model 1 (no interaction)		Model 2 (other kin × log income)		Model 3 (other kin × remittance)		Model 4 (other kin × adult relatives)	
	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors	Marginal effects	Delta-method Std. errors
Year 2002	0.027	0.042	0.027	0.042	0.026	0.041	0.027	0.042
Year 2004	0.020	0.040	0.020	0.040	0.019	0.040	0.020	0.040
Year 2007	0.068	0.042	0.069	0.042	0.068	0.042	0.068	0.042
Year 2008	0.076**	0.041	0.076*	0.041	0.076*	0.041	0.076*	0.041
Year 2010	0.059	0.043	0.059	0.043	0.059	0.043	0.059	0.043
Year 2011	0.002	0.040	0.002	0.040	0.001	0.040	0.002	0.040
No. of observations	4026		4,026		4,026		4,026	
Wald χ^2 statistic	236.24		239.34		238.35		239.27	
Prob > χ^2	0.000		0.000		0.000		0.000	
Pseudo-R^2	0.1285		0.1289		0.1249		0.1286	

Note Robust standard errors adjusted for household-level clustering

[a]The marginal effects are the marginal probabilities of a unit change in one explanatory variable, holding other variables constant. The reported marginal effects of other kin, log income, remittance, and adult relatives in Models 2–3 already include the effects of the interaction variable (evaluated at means)

*Significant at 10 % level

**Significant at 5 % level

***Significant at 1 % level

Apparently, however, they tend to invest less in the education of the other type of children. Specifically, the other kin is about 3 % points less likely to be in school than the head's own child, other things held constant. Further, the lower likelihood is highly statistically significant ($p < 0.01$). This does not appear to be greatly mitigated by higher income (Model 2), remittance from abroad (Model 3), or the number of adult relatives (Model 4). The average marginal effect of other kin in Models 2–4, which already capture the interaction effects, is still around 3 % points and highly statistically significant ($p < 0.01$).

In addition to its direct impact on other kin (Model 2), income also has its own direct, independent effect (Model 1, Model 3, and Model 4). In all specifications, we find that a unit increase in log income raises by about 1.5 % points the probability of schooling. In contrast, remittance has neither a statistically significant direct effect of child schooling nor a special impact on other kin's (Model 3). These results imply that it is the size rather than the source (i.e., from abroad) of the household income that influences schooling decisions in Filipino households. Put differently, the receipt of external transfers, which may indicate that the member's parent(s) is abroad, per se does not necessarily lead to children quitting school, a finding consistent with those in Fujii (2011).

In all models, we also find the number of adult relatives to have direct, positive (0.006), and statistically significant marginal effects ($p < 0.05$). Its effect is not washed out when interacted with other kin. It could mean that these senior household members provide adult supervision on the younger members who are then encouraged to attend school or that, in fact, at least some of them provide parental care to the child under kinship care. Unfortunately, the child's relationship with the adult relatives cannot be established from the data.

13.5.2 Other Factors Affecting the Probability of School Attendance

Table 13.3 shows the other significant factors affecting school attendance. Among the child-level characteristics, a boy is found to be 2.4 % points less likely than a girl to be attending school. An older child is likelier than a younger one to be in school, but less and less so as he or she becomes older. Further, their schooling status is not adversely affected by illness or injury.

None of the head's characteristics seem to have any differential impact on a member's schooling status. Moreover, a child's school attendance does not appear to be particularly sensitive to the head's employment status, education, or marital status. Also, the household's ownership over the house and lot it currently occupies does not have a statistically significant differential impact. Further, the spouse's educational attainment also does not seem to matter. However, school attendance is less likely among children where the spouse is working, other things being constant. This suggests that the time spouses spend working outside the home may have reduced the time for parental care or adult supervision over young children.

In general, we also find that the probability of school attendance is the same across regions, except in two. Relative to the children in the National Capital Region, those in Zamboanga Peninsula or in the Autonomous Region of Muslim Mindanao (ARMM) are about 7 % points less likely to be in school. The lower school attendance in these regions is partly because of their relatively lower economic conditions and high incidence of armed conflicts (Human Development Network 2005). Finally, the likelihood of schooling is the same across years, except in 2008 when it was nearly 8 % points greater than in 1999.

13.5.3 Improving the School Attendance of Children Under Kinship Care

We use the results of Model 2 in Table 13.3 to estimate the increase in the probability of school attendance of a child under kinship care relative to that of the head's own child at various income levels. Put differently, we wish to find the level of income at which both types of children are equally likely to be in school, controlling for other factors.

Table 13.4 presents the predicted marginal effects of other kin at various levels of annual household income per capita. At the average level of income (8,955 pesos), the resulting marginal probability is −0.029, which is near the estimate in Model 2. Setting the income to the equivalent of the annual poverty thresholds in 2009 (16,815 pesos) or 2012 (18,770 pesos) will improve the marginal probability to −0.022 or −0.021, respectively. So, in households that are just at the threshold

Table 13.4 Marginal effects: children under kinship care on school attendance by level of annual household income per capita (in pesos)

Annual household income per capita	Remarks	Marginal effect of other kin	
		Estimate	Delta-method standard errors
8,955	Mean	−0.029**	0.007
16,815	2009 poverty threshold	−0.022**	0.009
18,770	2012 poverty threshold (est.)	−0.021**	0.009
20,744	1 std. deviation above the mean	−0.020**	0.009
28,001	Estimated threshold income[1]	−0.017	0.010
48,050	2 std. deviations above the mean	−0.012	0.012
111,302	3 std. deviations above the mean	−0.006	0.014
286,932	Maximum	−0.002	0.015

**Significant at 5 % level

[1]The lowest income level when the marginal effect becomes statistically insignificant

of being poor, a child who is the head's other kin is still less likely than the head's own to be in school.

Raising the household income further to 20,744 pesos (i.e., by one standard deviation above the mean) will only marginally improve the likelihood of schooling and not totally eliminate the relative disadvantage of children under kinship care. These children will attain parity with the head's own children only when the income reaches 28,001 pesos. In these relatively well-off households, the apparent differences in the likelihood of schooling are just random errors and not statistically significant. These results indicate that while poverty keeps children under kinship care out of school, extended households would need a big increase in income—by approximately three times the mean income per capita—to send and keep them in school.

13.6 Conclusion and Policy Implications

Controlling for household income and other factors, we find that not all school-age children in a typical extended Filipino family are equally likely to be attending school. In this paper, we find only a few factors that lead to lower probability of schooling. That only a few are significant provides some comfort: it means that, for the select households in our sample where most of the children are attending school, policies can be directed at these few factors to close the schooling gap.

First, we corroborate previous findings that the likelihood of schooling is higher for female children than male children and for younger children than for older children in Filipino households. The differential school attendance rates across gender are possible consequences of inheritance practices previously observed among rural families who prefer to bequeath their lands to male children and make their female children complete schooling (Quisumbing et al. 2004). Household poverty and the high costs of education have been cited as possible reasons for high dropout rates among older children (Capuno and Kraft 2011; Tan et al. 2011; Albert et al. 2012).

Second, and perhaps just as worrisome, we also find that children who are the head's relatives, but not as direct descendants, are on the average about 3 % points less likely than the head's own child to be attending school, a finding consistent with those found in other countries (Ainsworth and Filmer 2006; Gibbison and Paul 2005). While this apparent bias against children under kinship care can be overcome with income transfers, the high amount of required transfers suggest, however, that it is more than poverty that keeps these children out of school.

The reasons for the apparent parental bias against children under kinship care warrant further investigation. One plausible explanation is that parents invest less in their young relatives because they expect to receive less transfers from them in old age than from their own children. Another possibility is that their young relatives have less innate abilities or motivation than their own children. Still another, which is perhaps particularly pertinent in the Philippines, is that kinship care is disguised child labor or that the child lives with a parent who lives with and works for the household head. The possibility of child labor is somewhat mitigated in our sample since children under kinship care are still young (average age is 9.5 years) to be productive. However, the second arrangement—that the child's parent works for the household head—seems more plausible, and if so, then the parent who has paid work should be able to send his or her child to school. We find a consistent, but not definitive result to support this hypothesis.

Notwithstanding our data limitations, what can be done to help these children to achieve their full human development? Since these children are not out in the streets, in foster homes or welfare institutions, it is easy to take for granted that their adult relatives will treat them like their own children. That this is not necessarily the case demands a reassessment of social welfare programs. In the Philippines, the government's conditional cash transfers program must ensure that the list of child beneficiaries includes all qualified extended members and not only the head's own. But since the required transfers will be more than the usual amount of cash transfers, the conditions must be stringent to avoid moral hazard (i.e., leaving one's child under kinship care) and prevent abuse.

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Part VII
Alleviation of Poverty in Asia and the Pacific

Chapter 14
Economic Class and Labour Market Segregation: Poor and Middle-Class Workers in Developing Asia and the Pacific

Phu Huynh and Steven Kapsos

Abstract Using an absolute definition of poverty and economic classes, this paper presents trends and estimates of the poor, near-poor and middle-class working population in developing Asia and the Pacific. It finds that since 1991, working poverty has fallen remarkably, while middle-class jobs now account for nearly two-fifths of all employment in the region (671 million middle-class workers). However, a sizeable share of workers (around 28 % or 497 million) still lives just above the poverty line and remains highly vulnerable to falling into poverty. This paper also applies a class-based framework for assessing inequality in the labour market, with a special focus on Cambodia, India, Indonesia and Viet Nam. It provides empirical evidence that economic participation is inversely related to affluence, while educational attainment and access to better quality jobs both increase with higher economic class status. In addition, it presents sex- and age-disaggregated analysis to highlight particular gaps for poor women and youth, and the measures that can help strengthen their position in the labour market.

Keywords Working poverty · Middle class · Labour markets

14.1 Introduction and Background

Since the onset of the global financial crisis in 2008, economic prospects around the world have been tenuous and have spurred policy-makers in developing Asia to re-examine the current model of economic growth. With the slow recovery in

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_14

external markets, policy focus in many countries of the region has shifted towards fostering domestic consumption and investment, and increasing intra-regional exports.

Domestic markets and intra-regional trade in Asia could be bolstered significantly by a growing and thriving middle class. Evidence suggests that being middle class is associated with better access to jobs, with regular wages and greater investment in health and education (Banerjee and Duflo 2008). In recent decades, the expansion of the middle class in developing Asia has been remarkable, rising from 21 % of the total population in 1990 to 56 % in 2008 (Chun 2010).[1]

While existing research studies have provided estimates of the size of the middle class and others have examined trends in working poverty, less is known about the specific job-related features of different economic classes.[2] To that end, this paper presents new measurements of workers by economic class in developing Asia and the Pacific and their distinguishing employment characteristics. It aims to shed light on some decent work challenges that must be addressed in order to eradicate working poverty and foster growth of middle-class jobs.

14.2 Data and Methodology

A critical starting point in defining economic classes is whether the measurement should be relative or absolute. Defining economic classes in relative terms, for instance, by setting the threshold for the middle class between 75 and 125 % of the median national income or consumption level is useful for assessing social exclusion, particularly in middle- and upper-income economies, where the vast majority of the population is living above the subsistence level. However, relative measures of economic class have distinct disadvantages, particularly in the context of this paper. First, relative class definitions would result in varying class thresholds across countries and hinder cross-country comparisons and the production of regional and global estimates. Second, relative measures may not be appropriate for the least developed economies, in which significant portions of the population may be living below or near poverty levels (Kapsos and Bourmpoula 2013).

Thus, this paper follows the economic class definitions using absolute terms set forth in Kapsos and Bourmpoula (2013), classifying workers living in households with per capita consumption or income below US$1.25 per day (at purchasing power parity) as “extreme working poor” (class 1), those living in households with per capita consumption or income between US$1.25 and US$2 per day as “moderate working poor” (class 2), and between US$2 and US$4 as “near-poor workers” (class 3). Given the relatively small cohort of workers above US$13 per day in

[1] Estimates are based on an absolute definition of consumption expenditures equalling US$2–US$20 per person per day (in 2005 purchasing power parity US dollars).

[2] For further discussion on working poverty, see, for example, Kapsos (2004).

our sample of countries, we have opted to combine the two middle-class cohorts defined by Kapsos and Bourmpoula (2013), corresponding to US$4–US$13 and US$13 and above, into one group covering the "developing middle class and above" (class 4).

Class 1 follows the definition of extreme poverty utilized for the Millennium Development Goals (MDGs) as set forth by Chen and Ravallion (2008). Class 2 is consistent with the widely used international measurement of moderate poverty. The US$2 per day upper threshold for this class is equivalent to the median poverty line among a sample of national poverty lines for developing and transition economies. This measure is intended to provide an indication of those households whose members are poor, but do not fail to meet basic human needs such as an acceptable daily caloric intake.

Class 3 is established as a measure of workers who are not poor, but are highly vulnerable to slipping into poverty. The choice of US$4 as an upper bound for this group follows the findings of Banerjee and Duflo (2008) and Kapsos and Bourmpoula (2013) related to key demographic, health, education and labour market characteristics for this group. Across a sample of 39 developing countries, Kapsos and Bourmpoula (2013) find that a substantially higher share of the near-poor class of workers is in wage employment (35.3 %) than the two working poor classes. However, they find that the near-poor segment clearly differs from the middle-class segments, which have more than 60 % of workers in wage employment. Thus, workers in the "near-poor" class are much more likely than their middle-class counterparts to be in informal, vulnerable jobs.

Class 4 encompasses the "developing middle class and above" or those workers living in households with per capita consumption of US$4 and above. As a point of reference, Ravallion (2008) notes that the US poverty line in 2005 is equal to approximately US$13 per person per day. Many of the workers in this class are, therefore, poor based on a developed world absolute standard, but living above the threshold of poverty or near poverty of the lower three classes. Most workers in this class are a nascent consumer class and are able to afford non-essential goods and services, including some international consumer goods. They are more likely to have higher levels of education and to have access to quality health care than the lower classes. Workers at the upper end of this class are likely to be able to afford a wide range of international consumer products and would be considered middle class based on a developed world standard.

It should be noted that there is little consensus in the literature as to an appropriate absolute definition of the middle class in developing countries. The definitions utilized in this paper are similar to Ravallion (2009), who defines the middle class in developing countries as those living in households with per capita consumption between US$2 and US$13 per day at PPP. In a comparable vein, Banerjee and Duflo (2008) define the middle class as those living between US$2 and US$10 per day. Focusing on developing countries in Asia, Chun (2010) defines the middle class as those with per capita consumption between US$2 and US$20 and notes that a large share of people in the US$2–US$4 range have high degrees of vulnerability to poverty, while those in the range of US$4 to US$10 per day are able to live beyond the subsistence level, consuming non-essential goods and having the ability to save.

Definitions of the middle class that differ substantially from that used in the present analysis include Ferreira et al. (2013), who define middle-class households in Latin American countries as those with between US$10 and US$50 in per capita income. The lower bound is based on a 10 % probability of falling into poverty over a 5-year period. The authors argue that this definition is primarily applicable for middle-income countries. Kharas (2010) defines the middle class as individuals living in households with per capita daily consumption between US$10 and US$100 at PPP. The lower bound is set at the average poverty line of Portugal and Italy, while the upper bound is equal to twice the median income in Luxembourg. The Kharas definition sets a high bar for "middle class", consistent with a focus on a "consumer class", akin to consumers in the developed world. Similarly, Loayza et al. (2012) define the middle class as those households with per capita incomes above US$10 at PPP.

Following past practice for defining the working poor, the estimates of employment by economic class presented here are based on a cross-tabulation of employment status and economic class status, whereby employment status is defined at the individual level (whether or not an individual is employed), while economic class status is determined by per capita household consumption in the household in which the individual lives. The estimate of total employment in a given class is equal to the number of persons of working age that (1) are employed and (2) are living in a household with per capita consumption between the upper and lower limits of per capita consumption for the economic class. The regional and sub-regional estimates and projections in Sect. 14.3 are based on an econometric model that utilizes a database covering 62 household surveys worldwide, of which 12 countries are from the developing Asia–Pacific region (Kapsos and Bourmpoula 2013).

In Sect. 14.4, a sample of four developing Asian countries was selected in order to highlight detailed labour market characteristics of the various economic classes. The selected countries are Cambodia, India, Indonesia and Viet Nam, and these were chosen with the aim of having broad regional coverage, diversity in population size and national per capita income levels, and the requirement of available, nationally representative surveys that allow for cross-tabulations of household consumption variables with employment indicators. The primary data sources used for each country were the Cambodia Socio-Economic Survey 2004, Indonesia Socio-Economic Survey (SUSENAS) 2002, India National Sample Survey of Employment and Unemployment 2009–2010, and Viet Nam Household Living Standard Survey 2006.[3] It is important to acknowledge that the analysis in Sect. 14.4 is primarily descriptive and does not examine longitudinal trends or assess causality. In other words, it does not attempt to determine, for example,

[3] Given variances in survey years and design, strict cross-country comparisons were not always feasible.

whether higher economic class leads to better access to wage employment or conversely whether holding a salaried job leads to more affluent class status. These other approaches to understanding class-based inequalities in the labour market are critical, but beyond the scope of that section.

14.3 Employment and Economic Class in Asia and the Pacific: Regional Trends and Projections

14.3.1 Estimates, 1991–2012

Over the past two decades, the Asia–Pacific region has undergone a dramatic shift in the distribution of workers across economic classes (see Fig. 14.1). In 1991, around 55 % of the region's workers were living in extreme poverty, with a further 25 % living in moderate poverty and nearly 14 % in the near-poor category. Eighty per cent of the region's workforce was poor and only 5 % of the workforce was living with their families on more than US$4 per person per day in the middle class and above category.

By 2012, the share of the extreme working poor decreased to around 13 %, while the share of the moderate working poor declined to just over 20 %, for a total of 34 % of the workforce living in poverty—a remarkable decline of 46 percentage points over two decades. The share of the near poor over this period rose to around 28 % of the workforce. This increase in workers above but near the poverty line is not surprising, as many workers have escaped poverty, but have not increased their productivity to such an extent as to join the middle class. Yet, many workers are clearly productive enough for a middle-class standard of living—nearly 38 % of the region's workforce was middle class in 2012, an increase of 33 percentage points since 1991. Moreover, in every year since 1998, the largest growth in absolute employment in Asia and the Pacific has been middle-class employment. Most new jobs in the region are middle-class jobs, which is a remarkable development given the extremely small base from which the region's middle class has grown. Viewed in this light, Asia's development over the past two decades has been a tremendous success.

Analysis of sub-regional data indicates that this rapid development in Asia and the Pacific as a whole has been driven largely by the extraordinary growth in middle-class employment in the East Asia sub-region, growing from less than 5 % in 1991 to more than 60 % of total employment in 2012. The Southeast Asia and the Pacific sub-region also experienced rapid growth in middle-class employment—an increase from 12 to 33 % of the total workforce over the same period. In contrast, the middle class in South Asia still comprises only a very small segment of the sub-region's workforce—less than 9 % in 2012, though this is a notable increase from 2 % in 1991. As of 2012, over 61 % of South Asia's workforce remains poor and a further 30 % is near poor.

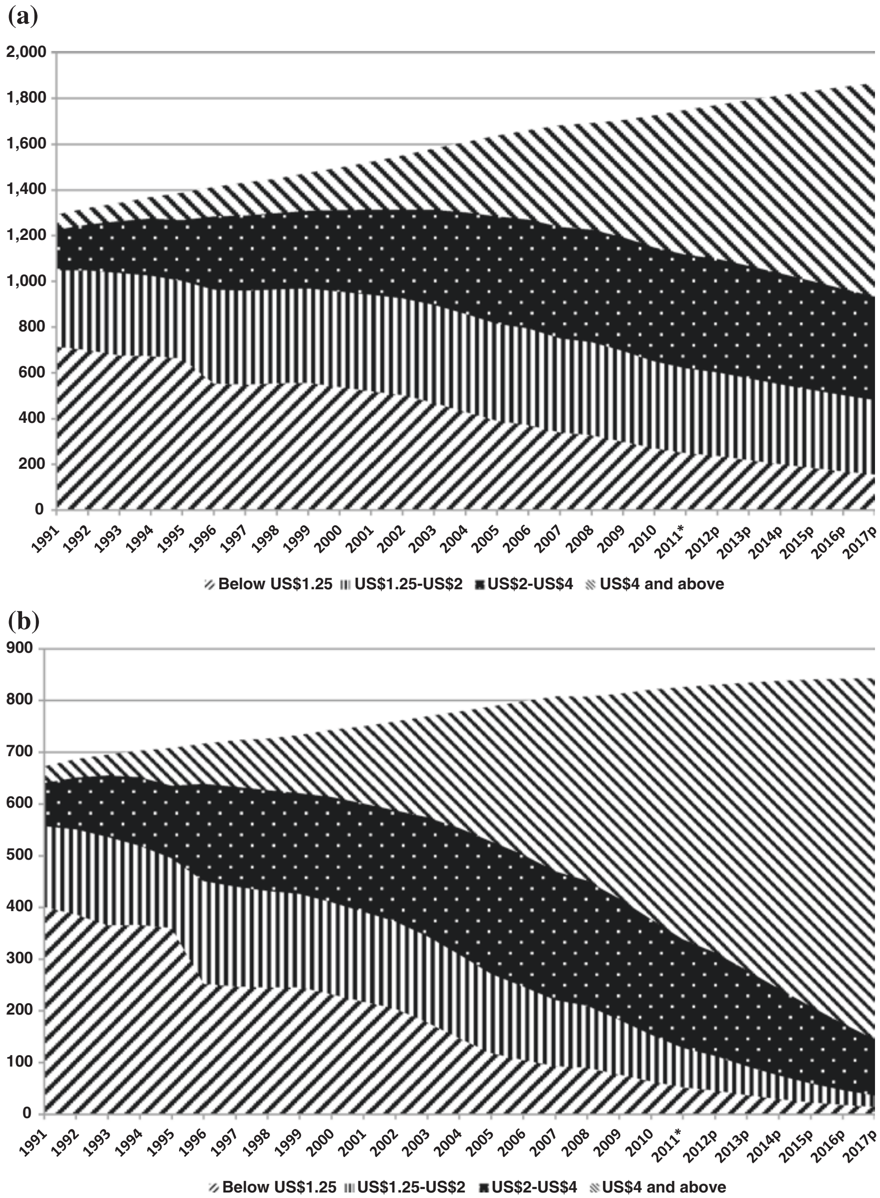

Fig. 14.1 Employment by economic class, 1991–2017, Asia and the Pacific and Asia–Pacific sub-regions (millions). **a** Asia and the Pacific. **b** East Asia. **c** Southeast Asia and the Pacific. **d** South Asia. *Note* "p" indicates projections; 2011 are preliminary estimates. *Source* Kapsos and Bourmpoula (2013)

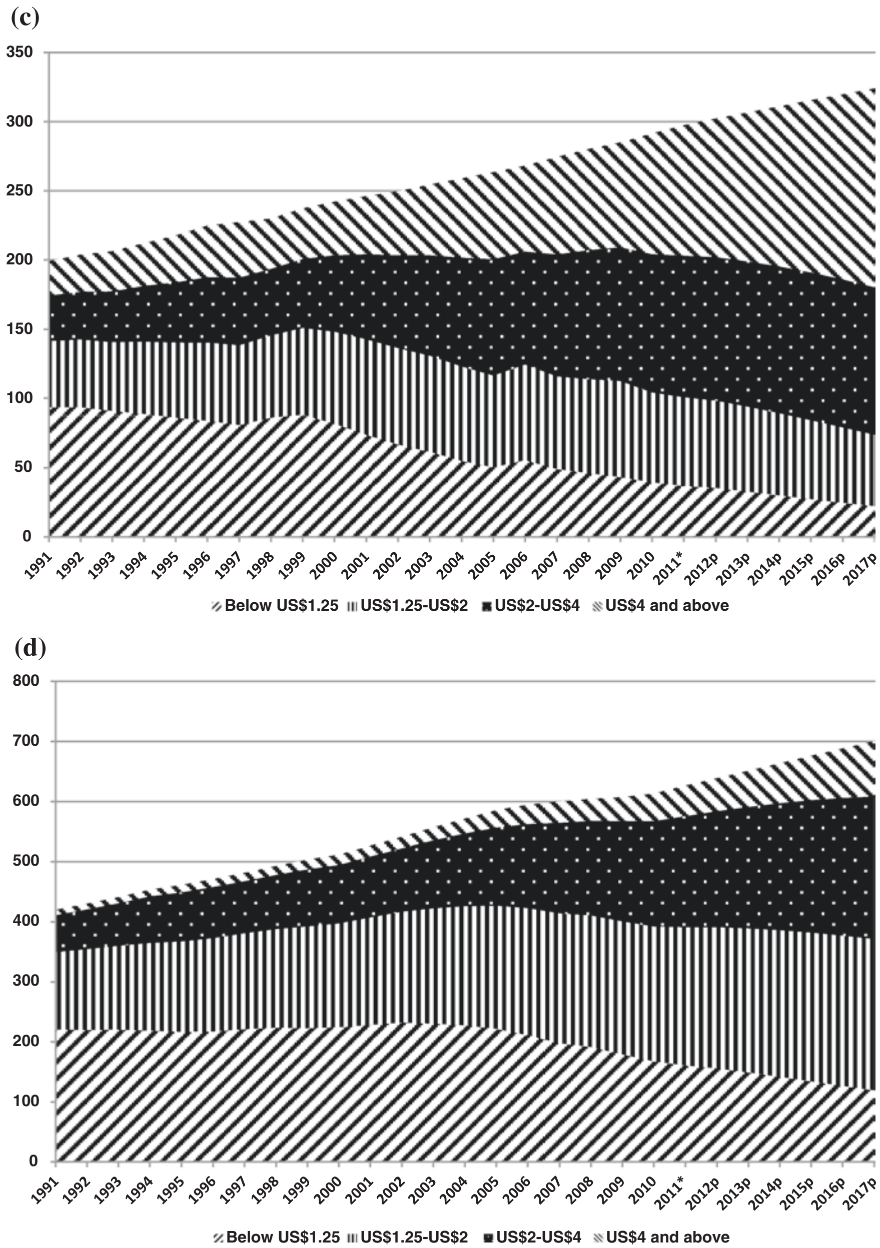

Fig. 14.1 (continued)

14.3.2 Projections, 2012–2017

In the next several years, projections indicate continued rapid growth in Asia's middle class, which could grow to one-half of the total workforce in the region by 2017. This is based on a projected acceleration in middle-class employment growth in East Asia (which is expected to see 180 million additional middle-class workers between 2012 and 2017). The overall regional projection for Asia and the Pacific is, therefore, heavily dependent upon the growth and employment performance in the People's Republic of China. The shares of the poor and near-poor workers are expected to decline in the region as a whole. In Southeast Asia and the Pacific, the share of workers in the extreme and moderate working poverty classes is expected to continue to decline substantially (less than 23 % of the workers are projected to be poor in 2017, a decline of 10 percentage points as compared with 2012), while the share of the near-poor workers is projected to change little, comprising around one-third of the sub-region's workforce in 2017.

The vast majority of workers in South Asia are projected to remain either poor or near poor in 2017, with around 87 % of workers in the sub-region projected to be in the three lower economic classes. Lagging far behind the East Asia and Southeast Asia and the Pacific sub-regions, South Asia is likely to be home to more than three-quarters of Asia's working poor in 2017, but for only 10 % of the region's middle-class workers. Nevertheless, middle-class employment growth is accelerating in South Asia: middle-class employment is projected to equal 60 % of all employment growth between 2012 and 2017 versus 33.5 % of employment growth between 2001 and 2011. However, given the projected increase in the number of moderately poor and near-poor workers, poverty and vulnerability will remain widespread in South Asia.

14.4 Distinguishing Class-Based Characteristics of the Labour Market

Having presented an overview of the regional trends and medium-term outlook for reducing working poverty and fostering middle-class jobs, this section narrows in on four developing Asian countries, namely Cambodia, India, Indonesia and Viet Nam. It analyses the links between economic class, gender and different labour market variables related to economic participation and employment. It highlights the features that distinguish the poor from the middle class in terms of education, access to better quality jobs, working conditions and opportunities for young people.

14.4.1 Economic Participation

Figure 14.2 shows the distribution of the working age population (aged 15 and above) by labour force status for the different economic classes. In all four

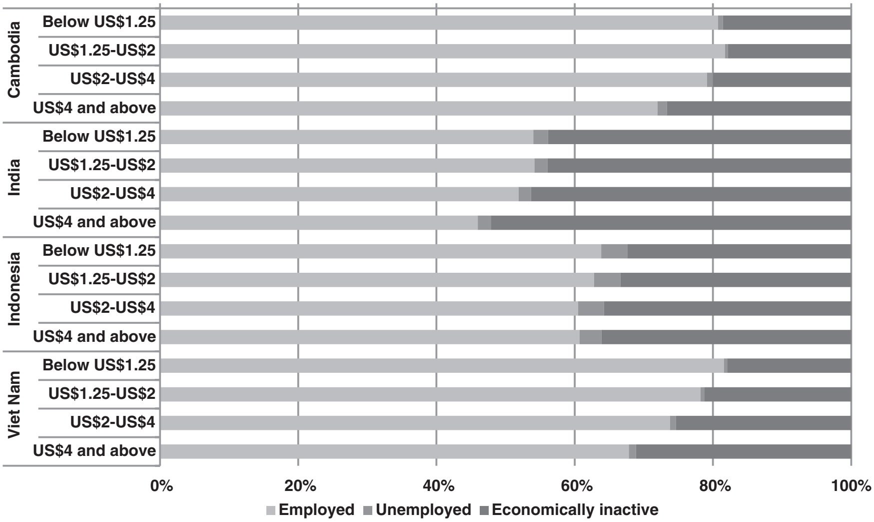

Fig. 14.2 Distribution of employed, unemployed and economically inactive in total population aged 15+ by economic class, various years (%). *Source* Authors' calculations from official national household surveys

countries, a majority of the poor and near poor were active in the labour market, with participation rates among these two economic classes around 55 % in India, 66 % in Indonesia, 78 % in Viet Nam and 81 % in Cambodia. Moreover, activity rates were consistently higher for the poor as compared to the middle class. This corroborates the widely accepted notion that in developing Asia, the poor are more likely to seek economic opportunities in the labour market given limited household income and material assets and gaps in formal social assistance mechanisms.

In India and Indonesia, the overall lower economic activity rates regardless of economic class can be attributed to the notable deficits in female participation in the labour force (see Fig. 14.3). The male–female gap in labour force participation was around 50 percentage points in India and 36 percentage points in Indonesia. Notably, in India, the gender gap in participation was around 53 percentage points for the poor, but was more than 10 percentage points lower (about 42 percentage points) for the middle class. A similar albeit less pronounced difference in gender gaps across economic classes was evident in Indonesia and Cambodia. This trend could be attributed to better sharing of household duties between men and women in middle-class families or the ability of more affluent families to hire domestic help which would allow more middle-class women the option to pursue career opportunities. Importantly, it points to the potential that a growing middle class can have in promoting women's economic participation and gender equality in the labour market.

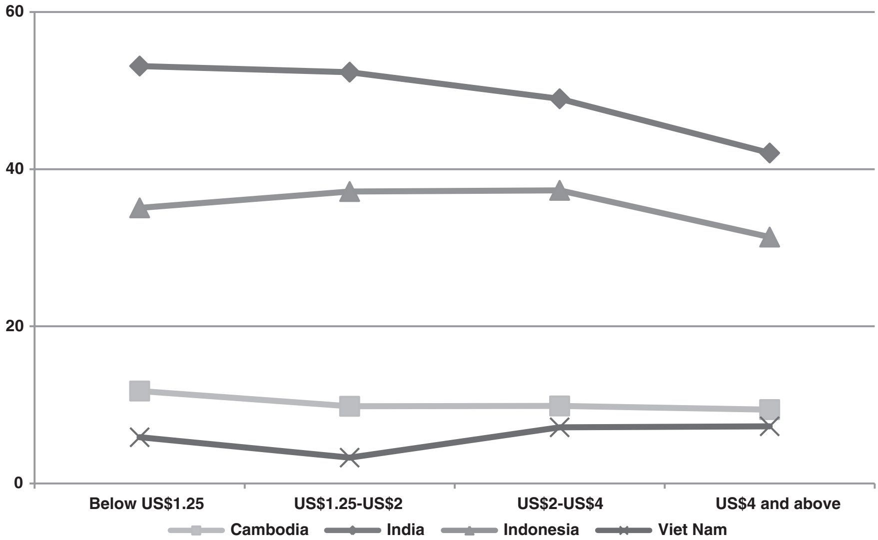

Fig. 14.3 Male–female gap in labour force participation rates aged 15+ by economic class, various years (percentage points). *Source* Authors' calculations from official national household surveys

14.4.2 Education Gaps and Middle-Class Opportunities

The conceptual link between education and poverty reduction is well established, but how extensive is the class-based education gap and what distinct patterns emerge when comparing the poor, near-poor and middle-class workforces in our sample? First, as would be expected, educational attainment is consistently higher as household economic class increases (see Fig. 14.4). A majority of the economically active poor as well as the near poor had only a primary education or less. Moreover, tertiary education was almost non-existent among the extremely poor in all four countries and was still rare among the near poor.

Comparatively, education deficits among the economically active poor and near poor were most pronounced in Cambodia where the majority still lacked even primary education. However, among the middle class, around half of the economically active had a primary education. With regard to higher education, only a small minority of the labour force had attained a secondary or tertiary diploma. Even among the middle class, the proportion was only 14 %.

Viet Nam provides a stark contrast to Cambodia. Around 1 % or less of the economically active across all economic classes had less than a primary education. However, while primary education completion rates were high, secondary and tertiary education remained elusive among the poor and near poor. By contrast, one salient characteristic of the economically active middle class in Viet Nam was their

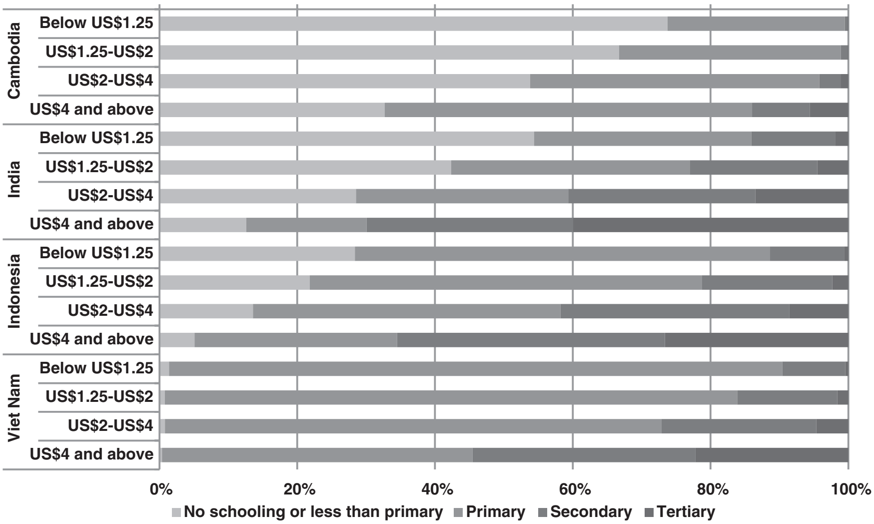

Fig. 14.4 Distribution of labour force aged 15+ by education and economic class, various years (%). *Source* Authors' calculations from official national household surveys

higher education attainment: more than half had completed secondary education and a further one-fifth held a tertiary degree. Noteworthy also was the near gender parity in education achievement of the Vietnamese labour force regardless of poor or middle-class status.

India stands out for the sharp disparity in educational attainment across the different economic classes, and the linkages between poverty and education attainment are most evident here. Around 86 and 77 % of the extremely and moderately poor, respectively, had only primary education or less. This percentage was considerably lower for the near poor (59 %) and the middle class (30 %). Interestingly, there was a sizeable male–female gap in primary education achievement (15 percentage points higher for men than women) among the extremely poor, but the disparity diminished gradually before reaching near parity among the middle class. Looking at tertiary education achievement alone, the share was around 40 % for the middle class, but less than 2 % among the extremely poor.

Indonesia shows similar although less pronounced education patterns as India. Nine-tenths of the extremely poor had only a primary education or less, and the share was four-fifths among the moderately poor and three-fifths for the near poor. By contrast, a majority (around two-thirds) of the middle-class workforce had completed at least secondary school, with a further one-quarter holding a tertiary degree. Conversely, tertiary education was almost absent among the poor; less than 1 % of the extremely poor and around 2 % of the moderately poor labour force had a tertiary degree.

In sum, the main findings with regard to education of the labour force across the different economic classes include the following:

- Educational attainment of the labour force was highly related to economic class, with higher school achievement consistently associated with more affluent economic status.
- With the exception of Cambodia where education was generally lower across all economic classes, a prominent majority of the near-poor labour force in the other three countries had at least basic education at the primary level. For the economically active middle class, a majority in India, Indonesia and Viet Nam had at least a secondary degree.
- Tertiary education was nearly non-existent among the poor and accessible predominantly to the middle class in the four-country sample.
- In two of the four countries (Cambodia and India), gender-related deficits in education achievement were prevalent particularly among the poor and near poor, with considerable disadvantages for women. However, these male–female education gaps were notably lower among the middle class.

14.4.3 Working Poverty and Middle-Class Jobs

Having looked at economic participation and education, this section focuses on the distinct employment characteristics that differentiate the poor, near-poor and middle-class workers in the four-country sample.

Table 14.1 shows the distribution of the employed population by economic class and sex, revealing a number of prominent features. First, working poverty was pervasive in all four countries. Based on the US$1.25 per day poverty line, the working poverty rate was 28 % overall and ranged from 20 % in Viet Nam to 37 % in Cambodia. The share of workers living in moderate poverty (less than US$2 per day) was also alarming—around half of all workers in Viet Nam and two-thirds of all workers in Cambodia, India and Indonesia. Regarding gender differences, working poverty rates (including both the extremely and moderately poor) for women were only marginally higher than for men in all four countries.

Second, comparatively small portions of the employed population were classified as middle class or above in the four countries. This ranged from approximately 7 % in India and Indonesia to 16 % in Viet Nam. In all four countries, male workers were more likely than women workers to be middle class, with the exception of Indonesia. Reflecting the sizeable male–female gap in labour force participation in India and Indonesia, as discussed in Sect. 14.4.1, the total population of middle-class working men outnumbered middle-class working women by 3 times in India and by nearly 2 times in Indonesia.

Moreover, an important distinction is that nearly three in ten workers in the four countries remained near poor and had not yet reached middle-class status. These workers were particularly vulnerable to falling back into poverty. In addition to the

Table 14.1 Employed population aged 15+ by sex and economic class, various years

	Distribution of employed population (%)				Total employed population (000s)
	Below US$1.25	US$1.25–US$2	US$2–US$4	US$4 and above	
Cambodia	36.5	29.0	24.9	9.6	6,622
Male	36.7	28.6	24.7	9.9	3,339
Female	36.3	29.4	25.1	9.2	3,283
India	29.3	37.0	27.2	6.5	374,286
Male	29.0	37.0	27.3	6.6	278,050
Female	30.2	37.0	26.8	6.0	96,236
Indonesia	27.4	37.8	27.7	7.1	91,057
Male	26.7	38.3	28.1	6.9	57,904
Female	28.5	37.0	26.9	7.6	33,153
Viet Nam	20.2	27.5	36.3	16.0	47,161
Male	19.6	27.1	36.9	16.5	23,701
Female	20.8	27.9	35.7	15.6	23,459
Total	28.3	36.2	28.1	7.5	519,125
Male	28.1	36.5	28.0	7.3	362,994
Female	28.6	35.4	28.1	7.9	156,131

Note Total figures represent the distribution of the aggregated employed population across the four-country sample
Source Authors' calculations from official national household surveys

working poor, this group should not be overlooked by policy-makers, given the potential of an unexpected economic, social or environmental shock that could detrimentally impact household income and consumption levels and push families into poverty.[4] These findings have profound implications, in particular, for social protection measures, including basic health and income support systems, in developing Asia.

14.4.3.1 The Challenge of Vulnerable and Casual Employment

Analysis of workers by employment status is instrumental in providing insights into the conditions and security of employment and the extent that workers are engaged in vulnerable jobs. Applying the widely accepted international definition, the vulnerable employment rate in our analysis is defined as the proportion of own account and contributing family workers in total employment. In contrast to wage or salaried

[4] Research indicates that both the 1997–98 Asian financial crisis and the 2004 Indian Ocean Tsunami, for example, exacerbated the poverty situation in a number of developing countries in the region. See Jonas and Marsden (2010) and Hagiwara and Sugiyarto (2005).

employees, workers in these categories are employed in relatively precarious circumstances, are less likely to have formal work arrangements, access to benefits or social protection systems and are more at risk during an economic downturn.[5]

Across the four-country sample, 267.7 million workers (more than one in two) were in vulnerable employment as an own account or contributing family worker, reflecting the poor quality of jobs overall. Nearly half of all workers in India were classified as holding a vulnerable job, while the comparable ratios were nearly three-fifths in both Indonesia and Viet Nam and three-fourths in Cambodia. The relatively lower vulnerable employment rate in India, however, should not overshadow another group in that country that faced significant labour market deficits—casual wage earners employed on a temporary or short-term basis (as discussed below).

When assessing differences among the economic classes, however, a paramount characteristic emerges: vulnerable employment rates were significantly higher among the poor and near poor in all four countries and notably less common among the middle class. In Indonesia, for example, the class-based difference in vulnerable employment rates was the most glaring, at 34 percentage points higher for the extremely poor than for middle-class workers. From a different perspective, the poor and near poor accounted for 96 % of all own account and contributing family workers in Indonesia, 95 % in India, 92 % in Cambodia and 87 % in Viet Nam. Clearly, having middle-class status is categorically linked to a worker's ability to access non-vulnerable forms of employment with greater stability and security.

Another important and common distinction in all four countries was the higher rate of vulnerable jobs among women than men (see Fig. 14.5). The gender gap was particularly pronounced in Viet Nam (18 percentage points) and Indonesia (10 percentage points). Moreover, in Viet Nam, the male–female difference in the vulnerable employment rate was lowest among the middle class (12 percentage points), but gradually increased as economic class status declined, reaching 23 percentage points among the extremely poor. By contrast, the opposite pattern emerged in Cambodia and India—the gender discrepancy in the vulnerable employment rate was lowest among poor workers, but highest among the middle class. While the correlation between gender disparity in vulnerable jobs and economic class is not uniform, what is clear is that women consistently faced greater difficulty than men within the same economic class in accessing better quality, non-vulnerable jobs.

While working on one's own account or contributing to a family-based establishment is often indicative of poor job quality, regular salaried employment is commonly assumed to provide better working conditions and security, and higher earnings and greater benefits. In all four countries, the percentage of the workforce engaged in regular wage employment was considerably low, at around one-fifth in India and Cambodia and approximately two-fifths in Indonesia and Viet Nam.[6]

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[5] For further discussion on the vulnerable employment indicator, see ILO (2013a).

[6] It should be noted that the Cambodia and Viet Nam survey data do not have a separate distinction for regular versus casual wage earners, and therefore, indicators on wage employment for both countries are not strictly comparable with India and Indonesia.

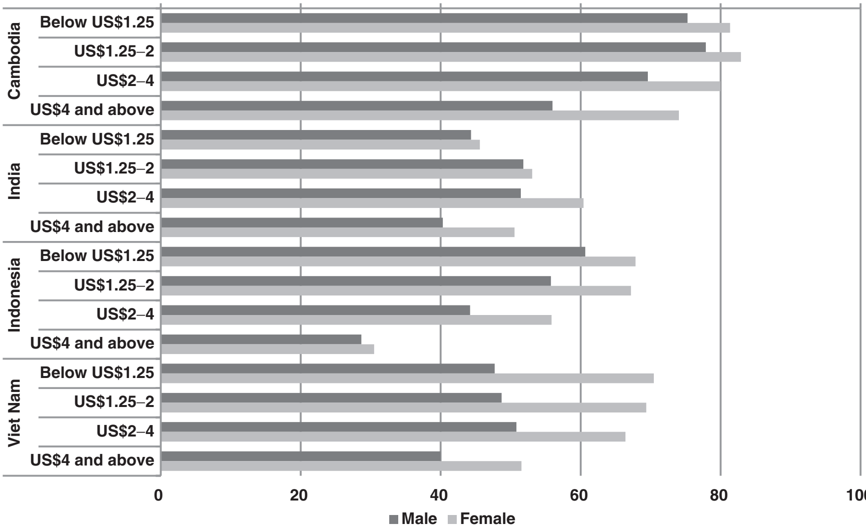

Fig. 14.5 Share of vulnerable employment (own account and contributing family workers) in total employed population aged 15+ by sex and economic class, various years (%). *Note* Viet Nam survey data do not include a separate classification for contributing family workers. *Source* Authors' calculations from official national household surveys

Looking at wage employment rates and economic class in each country, a prominent pattern is evident: regular wage employment was atypical among the poor, more common among the near poor and a defining feature of the middle class (see Fig. 14.6). In Cambodia and Viet Nam, the share of regular wage employment among the middle class was 14 percentage points higher than for the extremely poor, while the comparable difference was nearly 40 percentage points in both India and Indonesia. These findings about better access to wage employment among the middle class are consistent with Banerjee and Duflo (2008).

Working conditions for wage employees can also be insecure and precarious when these workers are employed casually on a temporary, seasonal or short-term basis.[7] In both India and Indonesia, the share of casual wage workers notably declined as economic class status increased. More than 46 % of all extremely poor Indian workers were engaged in casual wage employment, but the share was

[7] In India, a casual worker is defined as "a person casually engaged in other's farm or non-farm enterprises (both household and non-household) and getting in return wage according to the terms of the daily or periodic work contract". See India Ministry of Statistics and Programme Implementation. Available at: http://164.100.34.58/index.php/catalog/18 (accessed 19 June 2013). In Indonesia, casual day workers are defined as "workers who receive a daily wage. These wages may be given weekly or monthly, depending on the work output. Included are casual workers who are paid according to the volume/output of work which they perform or are contracted for". See Badan Pusat Statistik (Statistics Indonesia). Available at http://www.bps.go.id/eng/menutab.php?tab=4&tabel=1&kat=1&id_subyek=06&ist=1&var=C (accessed 19 June 2013).

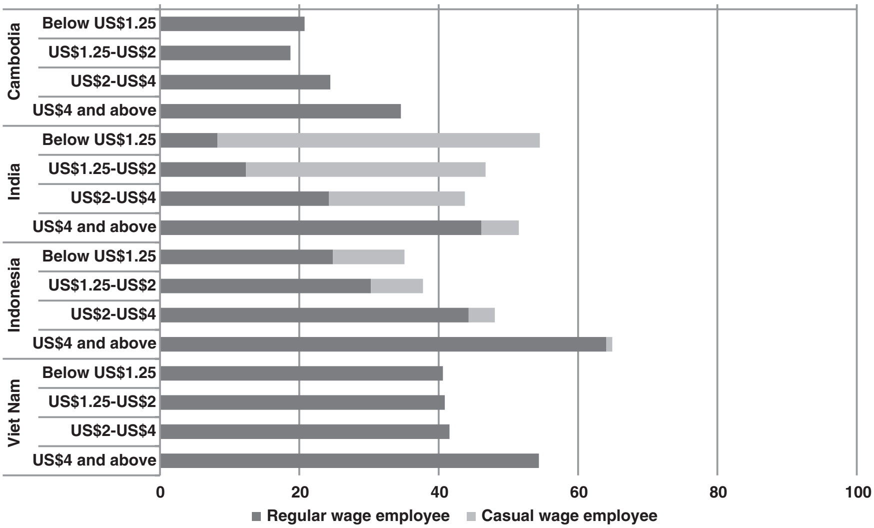

Fig. 14.6 Share of regular and casual wage employees in total employed population aged 15+ by economic class, various years (%). *Note* Cambodia and Viet Nam survey data do not include a separate classification for casual wage workers. *Source* Authors' calculations from official national household surveys

around 20 % for the moderately poor and merely 5 % for the middle class. Likewise, casual employment rates were less than 1 % for the middle-class Indonesian workers, but more than 10 % for the extremely poor. In sum, the probability of working in a casual, salaried job significantly increases with less affluent class status in both countries, and this pattern is consistent when looking separately at male and female casual wage earners.

14.4.3.2 Agricultural Poverty Trap and Opportunities in Manufacturing

This section examines whether workers from a particular economic class are more likely to be employed in a certain economic sector. Figure 14.7 reveals a stark and consistent pattern across all four countries—the likelihood of working in agriculture was drastically higher with lower economic status. Conversely, as economic class status increased, the chances of being employed in the services sector rose significantly. These findings corroborate the notion that in order to expand the middle class, rural workers must be supported by raising agricultural productivity and incomes while also facilitating the structural transition of workers out of agriculture and into better jobs in higher value-added services.[8]

[8] For further discussion on the importance of the services sector on inclusive growth, development and employment creation, see Asian Development Bank (2012).

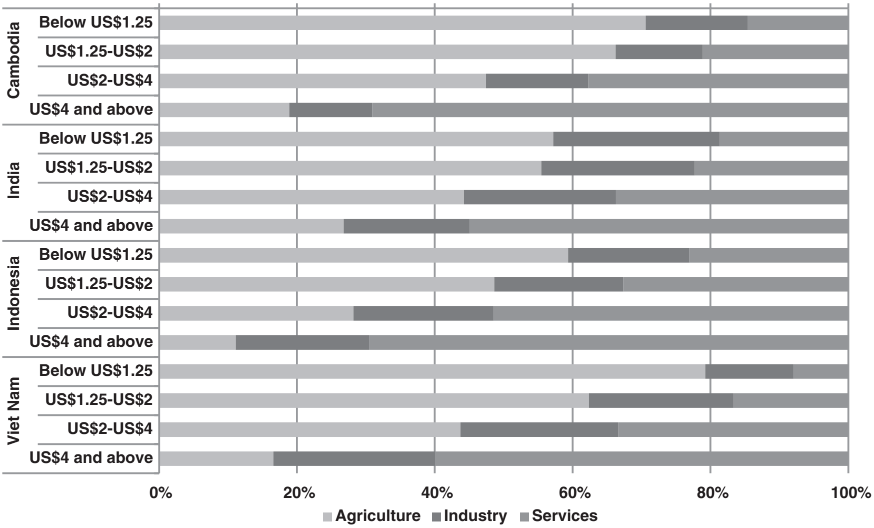

Fig. 14.7 Distribution of employed population aged 15+ by economic sector and economic class, various years (%). *Source* Authors' calculations from official national household surveys

Given the evident differences in employment in agriculture and services across economic class, are there defining traits that characterize the linkage between industrial employment and economic class? Surprisingly, with the exception of Viet Nam, the share of employment in the industrial sector was generally consistent across all economic classes in each country, at around 14 % in Cambodia, 19 % in Indonesia and 23 % in India. Overall, holding an industrial job, unlike employment in agriculture and services, appears less likely to be tied to a worker's economic class in the four-country sample.

Manufacturing is one vital sub-sector worthy of further examination considering its role in developing Asia in driving export-led growth, increasing living standards and generating salaried jobs for women.[9] When assessing the opportunities created by manufacturing jobs for different economic classes, different patterns emerge in the four countries (see Fig. 14.8). In Cambodia, the extremely poor were the most common economic class working in manufacturing (around 38 %), which could reflect the low pay and low skill nature of the country's garment manufacturing industry. In India and Indonesia, manufacturing consisted of mostly moderately poor workers (approximately 36 %) but also workers from near-poor families (about 30 %). In Viet Nam, extremely poor workers were mostly absent in manufacturing, accounting for less than 10 %, while the near poor were the most prominent class at almost 43 %. In sum, the manufacturing sector appears to have created jobs for different classes of workers in the four countries,

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[9] For example, see Felipe and Estrada (2007) and ADB and ILO (2011).

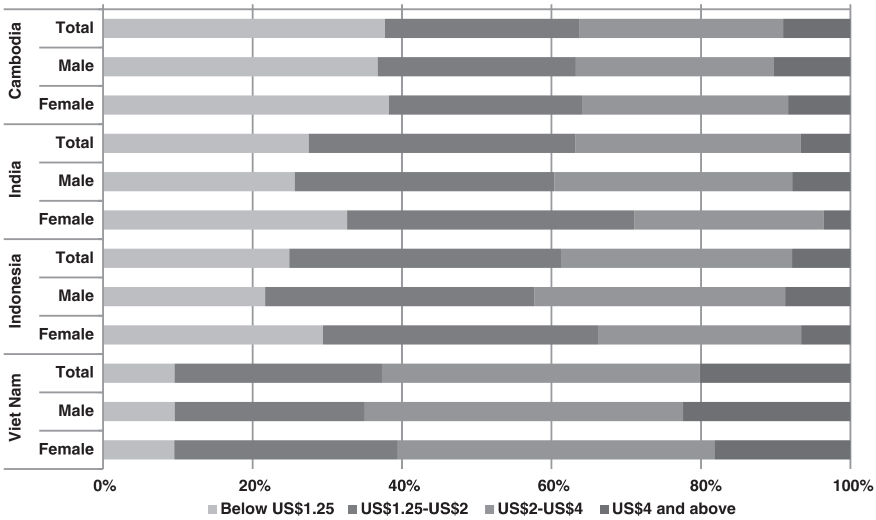

Fig. 14.8 Distribution of employed population in manufacturing aged 15+ by sex and economic class, various years (%). *Source* Authors' calculations from official national household surveys

on one hand benefiting more of the extremely poor in Cambodia, but more of the moderately poor in India and Indonesia and predominantly the near poor in Viet Nam.

14.4.3.3 Class and Occupational Segregation

Another critical dimension of job quality relates to the type of occupation and requisite skill level. High-skilled occupations often entail a significant level of creative, decision-making, technical and communication competencies and generally earn higher wages and offer better working conditions. In our analysis, we adopt the international standard approach for defining high-skilled, non-manual occupations, namely legislators, senior officials, managers, professionals, technicians and associate professionals. In terms of formal education and training levels, these high-skilled occupations correspond to the first and second stage of tertiary education, although the necessary skills can also be developed through informal training and experience.[10]

Looking at economic class and segregation in occupations that characterize these types of managerial and high-skilled professions further highlights substantial disparities in access to better jobs (see Fig. 14.9). In the four-country sample, around one in three middle-class workers had a high-skilled occupation, but the proportion was less than one in twenty among the extremely poor. Notably,

[10] For further discussion, see ILO (2012a, b, 2013b).

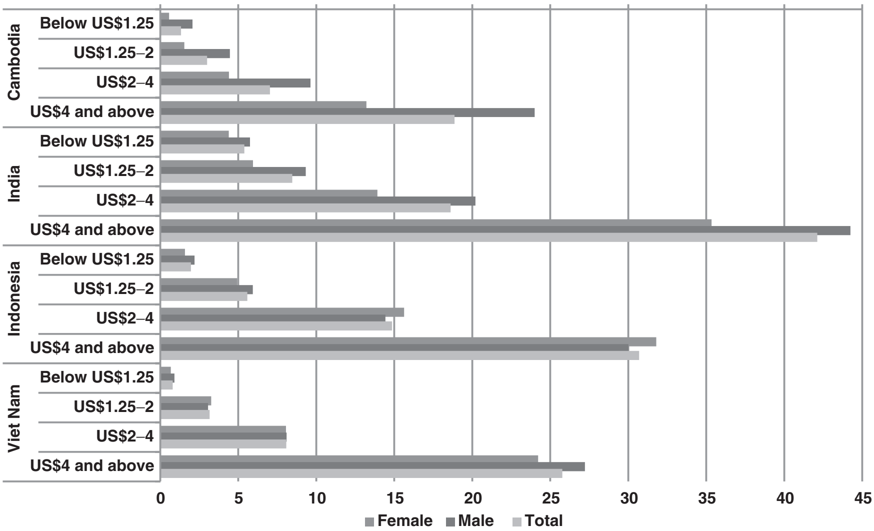

Fig. 14.9 Share of high-skilled occupations in total employed population aged 15+ by sex and economic class, various years (%). *Note* High-skill occupations are defined as International Standard Classification of Occupations (ISCO-88) Major Group 1 (legislators, senior officials and managers), Major Group 2 (professionals) and Major Group 3 (technicians and associate professionals). *Source* Authors' calculations from official national household surveys

middle-class workers were 32 times more likely to have a high-skilled occupation than extremely poor workers in Viet Nam. The comparable ratios were 16 in Indonesia, 14 in Cambodia and 8 in India. In the light of the previous discussion on inequality in educational attainment, too many poor workers, especially women, in developing Asia clearly lack the crucial education, training and professional experience to compete for these high-skilled jobs.

14.4.3.4 Sufficiency of Working Hours to Escape Poverty

Analysis of working time is useful for gaining further insights into the working conditions of developing Asia's poor, vulnerable and middle-class workers. Excessive hours of work, for example, could signify potential negative effects on workers' health and safety as well as work–life balance (ILO 2012a). However, given the alarming shares of workers self-employed on their own account or in casual salaried jobs, as discussed above, these workers in particular may seek more hours of work in order to increase total earnings and aggregate household income in spite of any related adverse consequences.

In Indonesia, workers averaged 39 h per week, with men employed for 41 h and women for 35 h. Workers in Cambodia worked, on an average, slightly more than 41 h per week, with higher working time for men (43 h) compared to women (40 h). Meanwhile, working time in Viet Nam was even higher overall: 46 h on

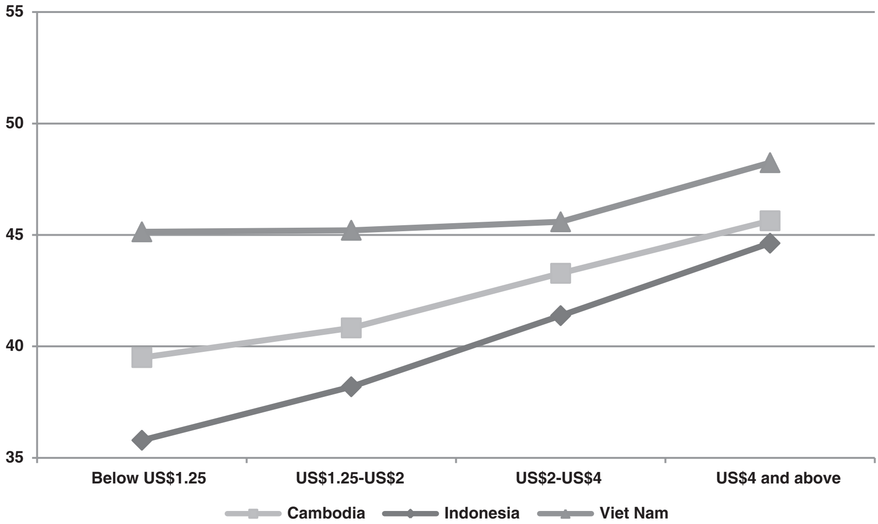

Fig. 14.10 Average weekly hours of work of employed population aged 15+ by economic class, various years. *Source* Authors' calculations from official national household surveys

average (47 h for men and 44 h for women).[11] The male–female difference in working time in these three countries most likely reflects the comparably greater engagement of women in household duties that are not reflected statistically in the system of national accounts and, therefore, not counted as hours of work.

When looking at the average working time across economic class, a distinctive pattern emerges (see Fig. 14.10). In all three countries, the average hours of work increased with economic class status, with the extremely poor averaging the fewest hours (as low as 36 h per week in Indonesia) and the middle-class working the longest hours (as many as 48 h in Viet Nam). This trend was also consistent when looking separately at men and women workers.

Because our analysis examines working time in all jobs held during the reference period, these findings could underscore the reality that in developing Asia, many workers are engaged in multiple jobs and the amount of earnings (and thus total household income and expenditure levels) will depend in part on one's ability to access additional working hours in secondary occupations. For the middle-class worker, opportunities for working extra hours to supplement income seem greater than for the working poor. Thus, while there is a common perception that the poor work long hours with little pay, the evidence points to a slightly different reality—that the poor may be earning too little and are stuck working hours insufficient to lift themselves and their families out of poverty.

[11] Information on working time in India is not available from the survey data and is, therefore, not discussed in this section.

14.5 Conclusion

Using an absolute definition of poverty and the middle class, this paper provides some important insights into the profiles of the poor, near-poor and middle-class workforce in developing Asia and the Pacific, with a special focus on Cambodia, India, Indonesia and Viet Nam. By applying a class-based framework for assessing the labour market, the paper sheds light on decent work challenges that must be addressed in order to eradicate working poverty and foster growth of the middle class in the region.

Overall, the paper presents a number of key findings. First, in recent decades, the region has achieved remarkable progress in reducing working poverty and fostering a sizeable middle class that is projected to account for half of the workforce (932 million) by 2017. However, working poverty remains pervasive. In Asia and the Pacific, 603 million workers still lived under the US$2 poverty line in 2012. Moreover, another 497 million workers lived just above the poverty line (US$2–US$4) and were vulnerable to falling back into poverty due to an unforeseen emergency or crisis.

Second, education levels of the workforce are positively linked to household affluence, with secondary and tertiary education still elusive for too many living under or just above the poverty line. In order to nurture and expand the middle class, strengthening access to and improving the relevance of higher education and vocational training for the poor and near poor is imperative. This would help them develop the higher level skills needed to compete for more productive jobs that provide better wages and earnings.

Third, the quality and security of work—as measured by the prevalence of vulnerable and casual jobs, employment in low-productivity agriculture and sufficient working hours—are measurably associated with economic class. In developing Asia, the poor and near poor face stark disadvantages in terms of access to quality jobs. To this end, increasing infrastructure investment and facilitating sectoral shifts from agriculture to higher value-added industry and services are critical. Moreover, better labour market governance could help improve working conditions and boost wages.

Fourth, gender disparities in terms of job quality are pervasive with women facing greater challenges than men regardless of economic class. However, with higher household affluence, gender gaps in education and economic participation tend to be lower. This positive finding highlights the potential impact of middle-class opportunities and values on reducing gender discrimination in society and the labour market.

While this paper provides quantitative evidence for targeted interventions that can accelerate poverty reduction and the growth of the middle class in developing Asia and the Pacific, it represents only a starting point. In this regard, the information base would benefit greatly from a similar analysis of national household data for the same four countries in our sample, but in different survey years, as well as research into other countries in developing Asia and the Pacific. The former would also provide the requisite data and analysis to track trends and progress over time. In addition, econometric analysis of the relationship between household characteristics, class status and labour market outcomes would be invaluable for designing effective labour market and social policies that can contribute to eradicating working poverty and nurturing middle-class jobs.

Acknowledgments This paper benefited from very helpful comments and contributions provided by ILO colleagues including Matthieu Cognac, Kee Beom Kim, Makiko Matsumoto, Theodoor Sparreboom, Sher Verick, Christian Viegelahn, Christina Wieser and David Williams. Special mention should be given to Andrea Silberman who supported the statistical tabulations of household survey data. Any errors are the sole responsibility of the authors.

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Chapter 15
Foreign Direct Investment and the Poverty Reduction Nexus in Southeast Asia

Nathapornpan Piyaareekul Uttama

Abstract This study attempts to empirically investigate the determinants of foreign direct investment (FDI) and related factors on Association of the Southeast Asian Nations's (ASEAN) poverty reduction, and focuses on spatial quantitative empirical evidence available on the ASEAN region. The spatial specification model is constructed and estimated by using the spatial panel data model technique. It is empirically estimated on the basis of a crucial assumption that the individual-country factors such as globalization factors, financial factors, political factors, and infrastructure factors and spatial FDI affect poverty reduction in ASEAN. Data at the country level for ASEAN-6 during the period 1995–2011 are collected from World Data Bank and International Country Risk Guide (ICRG). The analyses confirm the positive significant relationship between FDI inflows and poverty reduction in ASEAN in both individual and spatial aspects. Nevertheless, this relationship is significantly different between other factors and poverty reduction in ASEAN. For instance, while the relationship remains positive and significant for GDP growth, openness, and foreign debt in ASEAN, it is significant negative for financial and infrastructure factors, and ambiguous for political factor. Our results are also robust to alternative model specifications. The study concludes that FDI is conducive to poverty reduction. It supports the notion that regional value chain enhancement on FDI flows is beneficial for this region. Providing a poverty model of spatial FDI to researchers, the study presents results that are beneficial to business sectors and policy makers who are related to the investment in ASEAN.

Keywords Foreign direct investment · Poverty · ASEAN · Spatial panel data model

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A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7_15

15.1 Introduction

The 2003 ASEAN Economic Community (AEC) declaration outlined the key characteristics of the Association of the Southeast Asian Nations (ASEAN) to be reached by 2015. Importantly, the achievement of these goals will lead ASEAN to human development and equitable economic development. This is in accordance with the declaration of the 2000 Millennium Development Goals (MDGs) of the United Nations that aims to contribute to human development and poverty reduction in developing countries by 2015. In order to lift ASEAN's population out of poverty, one mechanism, as defined in the AEC roadmap, was to promote foreign direct investment (FDI) in this region through the 2009 ASEAN Comprehensive Investment Agreement (ACIA). At a closer look, there seems to exist a positive linkage between FDI increase and poverty reduction. This is confirmed by the ASEAN statistics and the United Nations Development Programme (UNDP) report of 2013 (Fig. 15.1). FDI inflows to ASEAN from 2009 and 2011 have increased by 143 % to $114.11 billion (ASEAN Secretariat 2013). It is believed that a large number of foreign investors to ASEAN have appeared owing to the extension of ASEAN's external relations such as the Regional Comprehensive Economic Partnership endorsed on November 2011. Poverty reduction proxied by the Human Development Index (HDI) in all ASEAN member countries improved during 2009–2012 (United Nations Conference on Trade and Development 2013). The more successful the ACIA is, the more poverty reduction there is in ASEAN. Despite this apparent linkage, some questions remain on the impacts of other factors on poverty reduction in the ASEAN region, especially globalization factors. Therefore, poverty reduction through the trade and investment liberalization policy continues to be an issue that receives considerable attention among governments and researchers, especially policy makers in the ASEAN.

Currently, the studies on FDI and poverty reduction are large and still growing. These mainly deal with three problems: whether FDI inflows tend to increase or decrease poverty over time (Tsai and Huang 2007; Reiter and Steensma 2010; Gohou and Soumaré 2012; Jalilian and Weiss 2002), the impact of FDI and related factors on poverty (Akanbi and Du Toit 2011; Nissanke and Thorbecke 2010; Wade 2004; Nissanke and Thorbecke 2006; Zaman and Khilji 2013; Adams and Page 2005; Topalova 2010; Das 2009), and the strategies for reducing poverty (Kolk and van Tulder 2006; Fritzen 2002). Most findings have indicated statistically significant effects of globalization factors on poverty reduction. Though there are a number of studies on the impact of FDI and other related factors on poverty reduction, most have investigated poverty reduction from the entry of FDI as an individual-country factor. The existing empirical work, therefore, seems to ignore the insights into the role of spatial FDI effect on poverty reduction. Spatial FDI is concerned with the outcome of FDI inflows within a geographically bounded region. The significance of the spatial factors underlying FDI flows to ASEAN is still unclear as are the strategic approaches for reducing poverty in the region.

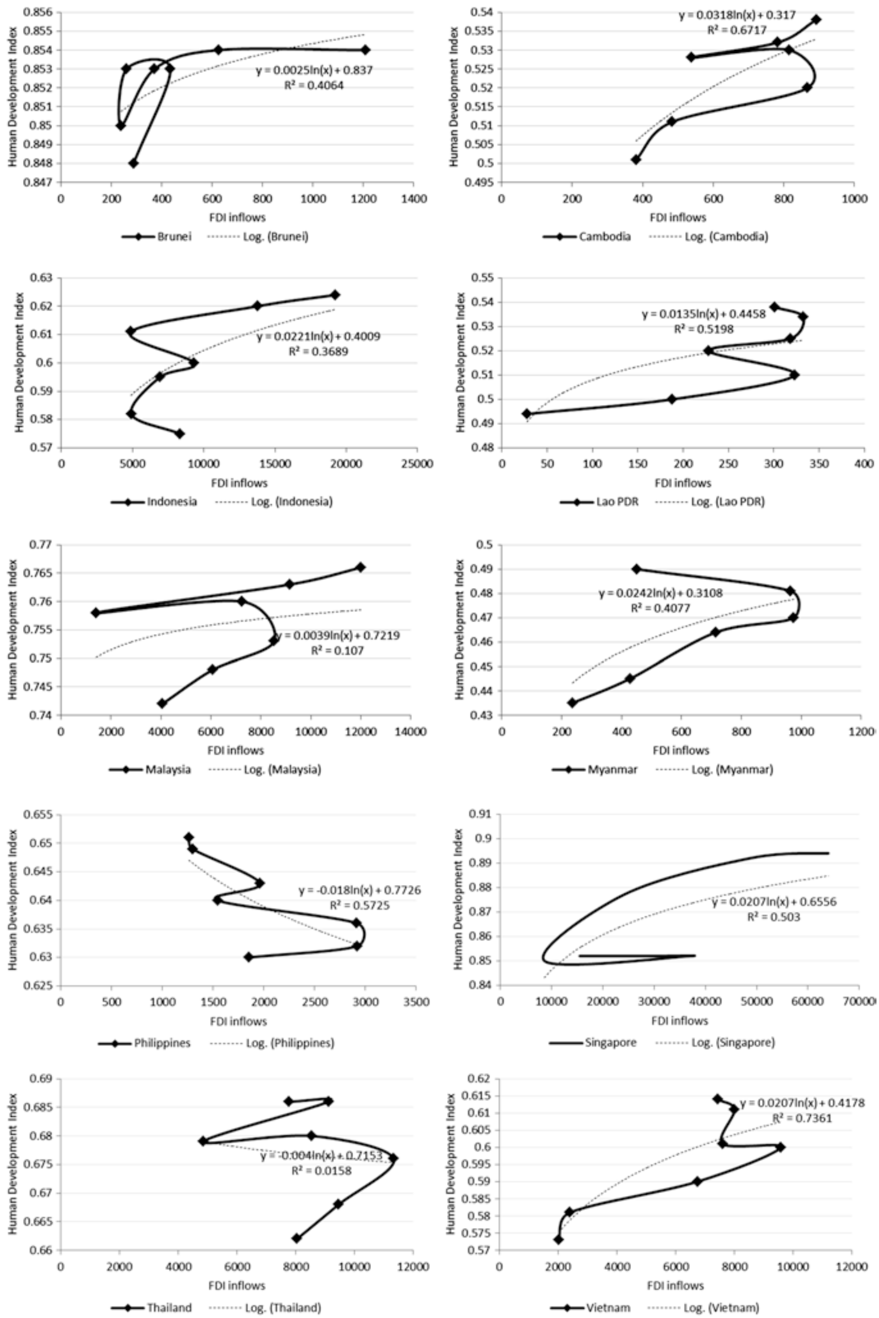

Fig. 15.1 The linkage between FDI inflows and Human development index in ASEAN, 2005–2011 (World Bank 2013; United Nations Conference on Trade and Development 2013)

This study focuses on the determinants of individual-country factors and the spatial FDI effect on poverty reduction in ASEAN. The spatial specification model will be constructed and estimated using the spatial panel data model technique. It is empirically estimated on the basis of a crucial assumption that the individual-country factors such as globalization factors, financial factors, political factors, infrastructure factors, and spatial FDI affect poverty reduction in ASEAN. Data at the country level for six ASEAN member countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Viet Nam) during the period 1995–2011 were collected from the World Data Bank and ICRG. From the estimation results, we contribute to the how public policies can be aimed at tackling poverty reduction by attracting foreign investors to ASEAN. Finally, this research will provide a poverty model of spatial FDI to researchers. The survey results and policy guidance will be beneficial to business sectors and policy makers who are related to the investment in ASEAN. Particularly, the ASEAN economic agreements and policies should be tailored, integrated, and harmonized in order to achieve the desired outcome of becoming an AEC, and to foster the sustainable and equitable economic development in ASEAN.

15.2 Overview of FDI and Poverty

This section focuses attention on the relevant linkage of FDI and poverty reduction in ASEAN through the ASEAN Comprehensive Investment Agreement and gives a brief literature review on FDI and poverty.

15.2.1 The Stylized Facts of FDI and Poverty in ASEAN

Southeast Asia is widely regarded as having sprung up as a region since the 2003 AEC declaration. The AEC blueprint outlined the four key characteristics to be reached by 2015: (a) *a single market and production base,* (b) *a highly competitive economic region*, (c) *a region of equitable economic development, and* (d) *a region fully integrated into the global economy* (ASEAN Secretariat 2008: p. 6). The success of AEC is highly dependent upon the achievement of implementing ASEAN's economic agreements. For instance, the dynamic growth effect from implementing the AEC roadmap has resulted in the growth achieved through FDI inflows to ASEAN during 2003–2010. This has been seen as highly desirable (ASEAN Secretariat 2013) and is often viewed as a model of 'inclusive growth.' Indeed, the ACIA is regarded as one of the drivers advancing inclusive growth in ASEAN. It was signed in 2009 and accredited the accession of ASEAN investors and foreign-owned ASEAN-based investors into *'a more liberal, facilitative, transparent and competitive investment destination'* (ASEAN Secretariat 2009: p. 3). Moreover, there is growing evidence that in the last decade, poverty in ASEAN economies has been substantially reducing as part and parcel of the AEC roadmap. Despite the growing investment priority given to the success of the AEC through the

ACIA, there exists a notable gap in the understanding of the distributive impacts of FDI on ASEAN's poverty reduction as a whole. Hence, it is critically important to examine the mechanisms at work in the FDI–poverty nexus in ASEAN.

Figure 15.1 depicts the relevant linkage of ASEAN's FDI inflows and human development index during the period 2005 and 2011. The *x* axis, FDI inflows, shows the ability in attracting FDI, while the y axis, human development index, measures the degree of poverty reduction. The figure indicates that an increase in FDI inflows has a statistically positive effect on poverty reduction at the same rate in almost ASEAN member countries, except for the Philippines and Thailand. Singapore dominates the scenario, having a steadily upward trend of FDI and poverty reduction. Singapore's ability in attracting FDI has improved as compared with other ASEAN members as has her ability in maintaining the quality of life represented by a higher income per capita.

Meanwhile, Indonesia, Malaysia, and Cambodia have exhibited a positive linkage between FDI and poverty reduction, except for the crisis period (2008–2009). The national economic development plan was one of the key factors for the success in poverty reduction in these countries, apart from the successful implementation of ACIA. The Malaysian New Economic Model launched in 2010, aimed at making Malaysia a high-income and quality country by 2020, played an important role in FDI inflows to Malaysia and poverty reduction. Likewise, Indonesia and Cambodia established the national economic development plan to accelerate economic growth and to reduce poverty rapidly. Even though Lao PDR and Viet Nam expressed a small positive relationship between FDI and poverty reduction, poverty reduction was improved.

After the economic reforms through the adoption of the 'Doi Moi' policy, FDI inflows to Viet Nam recorded significantly higher during 2007–2011, but the degree of poverty reduction was still quite small. This was the same situation that Lao PDR had confronted. Thus, both economies have to accelerate the implementation of the ACIA and their own national development plan, which is aimed at sustainable economic growth, social development, and poverty reduction. Finally, surprisingly, the Philippines and Thailand showed a negative linkage between FDI and poverty reduction in the recent years. It is implied that the level of poverty in the Philippines and Thailand tended to reduce owing to factors other than FDI inflows. Despite the presence of unrelated results of the implementation of the ACIA and poverty reduction, it was still believed that FDI inflows could lead to economic growth and poverty reduction, as seen by the high growth of inward FDI in the ASEAN during the last two decades. Even though the experience of the success of the ACIA in the past year can be an indication on the future of the ASEAN, ASEAN still fights hard to achieve the goals of the AEC.

15.2.2 Literature Review

The poverty perspective is a delicate subject. Currently, numerous studies have estimated the impacts on poverty reduction in many contexts, for instance, how change in poverty takes place over time; how poverty reduction is affected by economic growth, socioeconomic development, and globalization; and how poverty is reduced across countries. Most of these studies provided a solid foundation for further studies in different regions in the world. In this section, we focus on the literature on the globalization–poverty–reduction nexus.

First, let us introduce the literature on the FDI-poverty nexus. The existing studies on the linkage of FDI and poverty reduction indicate that FDI inflows tend to increase or decrease poverty over time. In fact, there are a large number of empirical studies supporting the positive linkage of FDI and poverty reduction. For instance, Gohou and Soumaré (2012) examined the impact of FDI on poverty reduction through welfare improvement in the African region. Using panel regression analysis, they found a strongly positive relationship between FDI and welfare improvement at the level of Africa as a whole. They also found that FDI has a higher impact on poverty reduction in poorer African countries than the wealthier ones. Reiter and Steensma (2010) mainly determined the impact of FDI policy and corruption on human development. They found that FDI inflow decreased HDI improvement owing to the absence of discriminatory FDI policies and the presence of corruption. Jalilian and Weiss (2002) indicated that FDI has a close relation between average income growth and growth of the income of the poor (proxy for poverty reduction) in ASEAN. They employed the panel data technique to estimate the FDI–growth–poverty relation. However, there was little evidence on the negative relation between FDI and poverty reduction. For example, Tsai and Huang (2007) analyzed the impacts of economic growth, openness, and the role of government on poverty alleviation in Taipei,China. Using the time series technique, the estimated results showed that inward FDI has no significant impact on the income of the poor in Taipei,China, whereas sustained economic growth and trade openness are the major driving forces for poverty reduction.

Second, we discuss the studies on how poverty reduction is affected by economic growth, socioeconomic development, and globalization. Akanbi and Du Toit (2011) developed a comprehensive full-sector macroeconometric model with the aim of examining how poverty reduction is affected by economic growth in Nigeria. Using the Engle–Granger two-step co-integration technique, their findings confirmed the growth–poverty divergence in Nigeria. They also suggested that the quality of government spending will lead to sustainable economic growth and that it eventually results in the improvement of people’s standard of living and poverty reduction. Likewise, Zaman and Khilji (2013) determined the interrelationship between growth–inequality–poverty and pro-poor growth policies in Pakistan at the rural, urban, and national levels. Using the Household Income and Expenditure Survey (HIES) and the Pakistan Integrated Household Survey (PIHS) data, the results showed the negative relation between growth and poverty in rural, urban, and national levels as a key factor of the poverty reduction. They also indicated that degree of employment intensity, employment opportunities, tariffs, exchange rate and taxation policies are important to poverty reduction. Employing a globalization–poverty perspective, Nissanke and Thorbecke (2006, 2010) examined the impacts of globalization (e.g., trade and technological openness, migration and mobility, and pro-poor institutions) on poverty reduction. Their findings were not conclusive, that is, the change in globalization could lead to poverty and poverty reduction. However, the studies of Topalova (2010), Das (2009), Adams and Page (2005) and Wade (2004) support the important role of globalization on poverty reduction. For instance, Topalova (2010) examined the impact of trade openness on poverty reduction in India. Using the panel data model technique, his estimated results showed that a larger reduction in tariff protection (proxy for trade openness) dramatically declines poverty in rural and urban India. The findings of Das (2009), Adams and Page (2005) and Wade (2004) pointed out that globalization, trade, and international migration and remittances significantly reduce the level of poverty.

Third, we look at the studies of Kolk and van Tulder (2006) and Fritzen (2002) that investigated the strategy for reducing poverty. The former developed a framework to analyze FDI policies, using the poverty issues outlined by international organizations. They found that the FDI policies are aimed at alleviating the poverty. Moreover, inter-regional and intra-regional investment also boost economic growth and development (Chen and Groenewold 2013; Ouyanga and Fub 2012; Fukaoa et al. 2003). The latter stated that the achievement of policy reform in Viet Nam through fostering a market-driven and pro-poor policy resulted in poverty reduction.

Apart from the studies discussed, there are many other studies on factors influencing FDI that may be indirectly related to poverty. Particularly, the pollution haven hypothesis indicates the linkage between the relocation of multinational firms and the country's level of environmental standards, which can lead to the possibility of poverty traps arising from market failure. Indeed, there is scarce evidence on the pollution havens and poverty. The empirical results of Rezza (2013) and Smarzynska and Wei (2001) confirmed that the entry of FDI is related to a country's weak environmental standards. However, Pao and Tsai (2011) determined the relation between pollution emission, energy consumption, FDI, and GDP. They found that the way to promote FDI is environmental protection through coordinated know-how and technological transfers with foreign companies.

In sum, most empirical studies indicate the statistically significant effects of globalization factors on poverty reduction. The empirical analysis in this study is conducted under the specific hypotheses based on the literature review mentioned above.

15.3 Empirical Approach

15.3.1 Empirical Model

This paper attempts to construct the specification model in the light of the literature review for investigating factors that influence poverty reduction. In fact, there are various parameters to measure poverty reduction such as poverty headcount ratio and poverty gap. However, some argue that such indexes do not reflect deprivation in human development (Fosu 2007). The UNDP constituted the human development index (HDI) to represent a more in-depth and sustainable poverty reduction perspective that takes into account life expectancy, education, and standard of living. In addition, HDI is an indicator for achieving the MDGs (United Nations Conference on Trade and Development 2013). Hence, in this study, the human development index is regarded as a proxy for poverty reduction. The well-suited model specification to capture the empirical impacts of economic factors, globalization factors, financial factors, political factors, infrastructure factors, and spatial FDI effect on ASEAN's poverty reduction is shown in the following threshold specification:

$$\begin{aligned}\mathrm{HDI}_{it} = {} & \beta_0 + \beta_1\mathrm{ECON}_{it} + \beta_2\mathrm{GLOBAL}_{it} + \beta_3\mathrm{FIN}_{it} + \beta_4\mathrm{POL}_{it} + \beta_5\mathrm{INFRA}_{it} \\ & + \alpha_1\mathrm{WHDI}_{it} + \alpha_2\mathrm{WFDI}_{it} + u_{it} \qquad (15.1)\end{aligned}$$

The dependent variable, HDI, denotes the poverty reduction in host country i at year t where i includes Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam; $t = 1, \ldots, T$ and T is 17 years (1995–2011). The independent variables are divided into six categories: economic factors (ECON), globalization factors (GLOBAL), financial factors (FIN), political factors (POL), infrastructure factors (INFRA), and spatial effects. ECON is expressed as GDP per person employed (GDPEMP), inflation (INF), real exchange rate (RER), and index of economic freedom (IEF), whereas GLOBAL is expressed as the percentage share of FDI inflows in GDP (FDI), terms of trade (TOT), and regional economic integration proxied by openness index (OPEN). FIN is expressed as the percentage share of domestic credit in the private sector (the PRC), the percentage share of market capitalization in GDP (CAP), current account balance (CA), and debt service on external debt (FDEBT). POL is expressed as government stability (GE), bureaucracy quality (RQ), and law and order (RL). INFRA is expressed as the amount of goods transported by roads (ROAD), the amount of goods transported by railways (RAIL), the number of container port traffic (PORT), and the air transport registered carrier departures worldwide (AIR). All variables are in natural logarithms.

Moreover, our model specification also allowed for a model with spatial dependence across spatial units at each point in time. In other words, the spatial-weighted independent variables are incorporated into the empirical model in order to consider the presence/absence of spatial autocorrelation. It is a so-called spatial model with spatially correlated residual (Anselin 1999). WHDI and WFDI are the spatial lagged variables of poverty reduction and FDI, which are introduced to capture the economic geographic relationship among countries (spatial units). They are represented by spatially weighted averages, based on the distance between the capitals of ASEAN member countries. This generates the spatially weighting matrix W_N which is $N_t x N_t$, where N is the number of cross-sectional units that is row-normalized with typical elements $w_{ij} = d_{ij}^{-1} / \sum_{j=1}^{N}(d_{ij}^{-1})$ if $i \neq j$ and $w_{ij} = 0$ if $i = j$ (based on Baltagi et al. 2007). The error term (u_{it}) is assumed to be $u_t = \rho W_N u_t + \varepsilon_t$ with $|\rho| < 1$, where $\varepsilon_{it} = \mu_{it} + \nu_{it}$. The term μ_{it} refers to country effects to be control for time-invariant heterogeneity effects. The term ν_{it}

is classical error assumed to be uncorrelated over all i and t. The term ρ is a coefficient on the spatially correlated errors measuring the effect of third-country observations on the dependent variable. The $|\rho| = 0$ implies that the disturbances are not spatially correlated.

In order to obtain concrete empirical results, diagnostic tests are first conducted to choose an appropriate estimator and to define the quality of the empirical model. First, the Moran's I test is used to check the spatial autocorrelation in residuals. The presence of spatial autocorrelation causes misspecification and measurement errors (Anselin 1999, 2001). Ignoring spatially correlated errors leads to a problem of efficiency that the coefficient standard error estimates are biased, but the coefficient estimates remain unbiased. Second, the Breusch–Pagan test is used to detect the misspecification in terms of heteroskedasticity. Ignoring the presence of heteroskedasticity could result in a biased variance of the estimated parameters and misleading conclusions, but it does not result in biased parameter estimates (Wooldridge 2001). Third, the Jarque–Bera test is used to check the quality of the estimated model or the normality. Fourth, the variance inflation factor test is used to check multicollinearity in order to ensure a precision of predictions in a multiple regression model. In practice, a VIF greater than 10 indicates a presence of multicollinearity, whereas a VIF greater than 30 becomes potentially problematic, requiring specific corrections (Kennedy 2003). Finally, the spatial panel data model with Maximum Likelihood estimator [both fixed effect model (FEM) and random effect model (REM) estimator] is empirically applied to indicate the impacts of FDI and related factors, and the spatial effects on poverty reduction. The estimated results are computed on a mathematical program and simultaneously interpreted with the qualitative results.

15.3.2 Data Source

The data set consists of cross-country observations for six ASEAN member countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam) during the period 1995–2011. Almost all variables are extracted from the World Development Indicators. The variables proxies for political factors, government stability, bureaucratic quality, and law and order are taken from the ICRG of the PRS Group. Table 15.1 exhibits the descriptive statistics.

15.4 Empirical Results

The empirical results of the impacts of FDI, related factors, and spatial effects on ASEAN's poverty reduction are presented in this section. In the spatial panel data estimation, the estimated results are provided in six different model aspects.

Table 15.1 Descriptive statistics

Bilateral variables	Mean	Standard deviation	Minimum	Maximum
HDI	−0.3699	0.1567	−0.5568	0.0000
GDPEMP	9.5512	0.7332	8.4765	10.8258
INF	1.4148	0.8724	−0.8554	3.1405
RER	3.8523	1.7447	0.0000	4.7333
IEF	4.1339	0.2286	3.6532	4.4750
FDI	1.2495	1.1544	−0.2870	3.3272
TOT	10.2713	13.4291	0.0000	31.4274
OPEN	4.9366	0.6640	3.8179	6.1322
The PRC	4.2022	0.6292	3.2029	4.9424
CAP	4.0343	1.0437	−0.1372	5.5466
CA	1.1364	1.6401	−3.7072	3.3037
FDEBT	2.9372	1.3512	0.0000	4.0969
GE	−0.4424	0.2716	−0.6931	0.0000
RQ	−0.3072	0.1658	−0.6061	0.0000
RL	−0.5728	0.2633	−0.8754	−0.1823
ROAD	1.5432	2.1033	0.0000	4.6051
RAIL	4.3477	4.0176	0.0000	8.8771
PORT	15.9342	0.7225	14.7466	17.2459
AIR	11.8493	0.6282	10.8364	13.1576

Note All variables are expressed in logs. The number of observations is 162 based on 6 countries over 17 time periods (1995–2011)

15.4.1 Estimated Results from Spatial Panel Data Testing: Baseline

Based on Eq. (15.1), the estimation results of the human development index as proxy for poverty reduction are shown in Table 15.2. There are six models (Model 1 to Model 6) that estimate the impacts of poverty reduction in ASEAN in the same way, but are different in the proxy explanatory variables.

The specification and diagnostic test results of all estimation models are quite similar. The Jarque–Bera test statistic indicates that the error term is normally distributed, whereas the Breusch–Pagan test statistic shows that the hypothesis of homoskedasticity is not rejected. The VIF index confirms the presence of multicollinearity in Model 1 and the absence of multicollinearity in Models 2–6. The Moran's I test statistic shows the random spatial autocorrelation in the model (very close to zero). Even though a spatial estimation model with spatially autocorrelation errors is unnecessary for estimating the model, it is still employed to examine the empirical results in this paper. In this regard, the spatial FEM and REM estimators are applied here. Moreover, Table 15.2 compares the estimated results with FEM and REM estimators for six models. In order to make better inferences, the Hausman test is taken and its statistic confirms the presence of a correlation

Table 15.2 Fixed effect model and random effect model of human development index as proxy for poverty reduction

	Model 1		Model 2		Model 3	
	FEM	REM	FEM	REM	FEM	REM
Macroeconomic factors						
GDPEMP	−0.065***	0.026*	0.135*	−0.011		
INF	0.017*	−0.084*	0.025*	0.020		
RER	−0.043*	0.214*	0.002	−0.809*		
IEF	0.131**	−0.007	0.133	0.006		
Globalization factors						
FDI	−0.007**	0.006*	−0.008	−0.003*	−0.009***	0.003*
TOT	0.004*	−0.049	0.003	0.045	0.001***	−0.068*
OPEN	0.109*	0.300*	0.056**	−0.347**	0.053**	0.057*
Financial factors						
The PRC	0.073	0.001			0.025	0.031*
CAP	−0.013**	−0.001			0.032*	0.021*
CA	0.015*	−0.081*			−0.001	−0.101*
FDEBT	−0.047*	0.818*			−0.059*	0.265*
Political factors						
GE	0.346*	−0.134**				
RQ	−0.071	−0.433*				
RL	−0.493*	0.004**				
Infrastructure factors						
ROAD	0.003**	−0.002				
RAIL	−0.002	−0.080*				
PORT	0.111*	−0.008				
AIR	−0.001	0.090**				
Spatial factors						
WHDI	0.091*	0.001	−0.126***	0.067*	−0.059*	−0.034*
WFDI	0.010**	−0.001	0.034*	0.008	−0.303*	0.005
Constant	−2.76*	−0.034	−2.618*	0.262*	−0.831*	−0.014
Spat.aut.	−0.92*	−0.835	0.645*	0.803*	0.833*	−0.714*
Goodness of fit						
Observations	42	42	42	42	42	42
Adj.R^2	0.995	0.999	0.962	0.886	0.961	0.995
Log Likelihood	126.53		83.594		78.961	
Variance σ_v^2	0.001	0.002	0.009	0.003	0.001	0.001
Dignostic tests						
Jarque–Bera	28.06*		4.15***		2.04	
VIF	70.12		8.99		5.11	
Breusch–Pagan	68.82*		9.30		13.89**	
Moran’s I	−0.042		−0.014		−0.015	
LM test	3.48***		17.24*		0.02	
Hausman test		8.00		116.01*		305.17*

(continued)

Table 15.2 (continued)

	Model 4		Model 5		Model 6	
	FEM	REM	FEM	REM	FEM	REM
Macroeconomic factors						
GDPEMP					−0.043	0.018**
INF					0.013*	0.016
RER					−0.026*	−0.114
IEF					0.062	−0.014***
Globalization factors						
FDI	0.002	−0.006*	−0.008	−0.002**	−0.008**	0.003*
TOT	−0.001	0.013***	−0.007	−0.067	0.004*	−0.086**
OPEN	0.166*	0.411*	0.069**	0.018*	0.149*	0.025*
Financial factors						
The PRC						
CAP					−0.017*	−0.014**
CA					0.018*	−0.063*
FDEBT					−0.037*	0.205*
Political factors						
GE	0.107	−0.567*			0.178*	0.043
RQ	−0.079	0.439*				
RL	−0.007	0.331*			−0.511*	−0.006***
Infrastructure factors						
ROAD			0.003	0.010**	0.002***	−0.141*
RAIL			−0.003	0.106***		
PORT			0.159*	−0.126**	0.159*	−0.150*
AIR			−0.032	0.770*		
Spatial factors						
WHDI	−0.463*	0.021***	0.055	−0.005	0.070**	0.013
WFDI	0.032**	0.002	0.002	−0.002	0.012**	0.432***
Constant	−1.381*	−0.011	−2.813*	0.001	−3.480*	0.297*
Spat.aut.	0.802*	−0.869*	0.306**	−1.035*	−0.854*	0.001
Goodness of fit						
Observations	42	42	42	42	42	42
Adj.R^2	0.915	0.992	0.952	0.990	0.994	0.991
Log Likelihood	63.171		81.218		124.608	
Variance σ_v^2	0.002	0.003	0.001	0.005	0.001	0.007
Dignostic tests						
Jarque–Bera	0.75		4.64***		15.67*	
VIF	4.71		6.24		25.58	
Breusch–Pagan	10.26***		29.81*		49.32*	
Moran's I	−0.013		−0.015		−0.045	
LM test	13.43*		0.02		3.47***	
Hausman test		410.39*		98.33*		8.12

Note *, **, and *** denote the 1, 5, and 10 % significance levels, respectively between individual effects and explanatory variables in Models 2–5, but the absence of a correlation between individual effects and explanatory variables in Models 1 and 6. The estimated results from REM are used to interpret the empirical results for Models 1 and 6.

Regarding Model 6, most estimated results are consistent with theoretical expectations and empirical findings in the poverty literature that provide support for the hypotheses of this study. In the individual-country macroeconomic parameters, the coefficient of the GDP-employment ratio is positive and significant, but the coefficient of the IEF is significant negative. It implies that an increase in *GDP* in an individual ASEAN economy is positively related to poverty reduction in ASEAN. In the individual-country globalization parameters, the coefficient of trade balance is significant negative, while the coefficients of FDI and the degree of openness are significant positive. This suggests that an increase in *FDI, trade,* and *economic integration* in the individual ASEAN economies helps to reduce the ASEAN's poverty. In the individual-country financial parameters, the coefficients of market capitalization and current account balance are significant negative, whereas the coefficient of foreign debt is significant positive. An increase in *foreign debt* in the individual ASEAN economies declines the ASEAN's poverty. The coefficient of individual-country political parameter, law and order, is significant negative, and the coefficients of individual-country infrastructure parameters are significant negative. This implies that *political and infrastructure development* do not entirely improve the level of ASEAN's poverty. Specifically, in the spatial parameter, the coefficient of FDI is significant positive. It ensures that an increase in *FDI inflows* in other ASEAN economies tends to reduce poverty in the individual ASEAN countries.

In sum, inward FDI is found to cause poverty alleviation in individual ASEAN countries and an increase in ASEAN's FDI as a whole fosters a decline in poverty in this region. In other words, poverty can reduce with the spatial distribution of FDI in favor of the ASEAN economies. Moreover, ASEAN should speed up the implementation of investment liberalization agreements and other economic agreements, and the extension of economic integration to the external region in order to move up the regional value chain in ASEAN.

15.4.2 Robustness Checks

The robustness is to check the sensitivity of our estimated results with respect to alternative spatial-weighted schemes for third-country (spatial) effects. There are two alternative weighted schemes implemented in this study: inverse-squared bilateral distance $w_{ij} = \left(1/d_{ij}\right)^2 \forall i \neq j$ representing a faster spatial effect and inverse square roots of bilateral distance $w_{ij} = \left(1/d_{ij}\right)^{1/2} \forall i \neq j$ representing a slower spatial effect (Baltagi et al. 2007).

The diagnostic tests and the estimated results with these alternative weighted schemes are illustrated in Table 15.3. Starting with the diagnostic tests for poverty reduction, the Moran's I test indicates the absence of spatial correlation of

Table 15.3 Fixed effect model and random effect model of HDI index (weighted scheme I and II)

	Weighted matrix I				Weighted matrix II			
	Model 1		Model 2		Model 3		Model 4	
	FEM	REM	FEM	REM	FEM	REM	FEM	REM
Macroeconomic factors								
GDPEMP	−0.023	0.023*	−0.006	0.026*	−0.045	0.025*	−0.010	0.028*
INF	0.013*	−0.084*	0.010**	0.005	0.014*	−0.102*	0.011**	0.004
RER	−0.039*	0.188**	−0.021*	−0.181	−0.047*	0.251*	−0.021*	−0.230**
WEF	0.098	−0.008	0.064	−0.028*	0.128***	−0.007	0.073	−0.029*
Globalization factors								
FDI	−0.007***	0.007*	−0.008**	0.004*	−0.007***	0.007*	−0.008**	0.004*
TOT	0.005*	−0.028	0.005*	−0.031	0.005*	−0.002	0.005*	−0.022
OPEN	0.085**	0.293*	0.117*	0.025**	0.089*	0.342*	0.121*	0.018**
Financial factors								
The PRC	0.074	0.005			0.101***	−0.001		
CAP	−0.010	−0.004	−0.010***	−0.001	−0.010***	−0.004	−0.011**	0.005
CA	0.008***	−0.084*	0.010*	−0.093*	0.008***	−0.081*	0.010*	−0.098*
FDEBT	−0.059*	0.842*	−0.052*	0.155*	−0.058*	0.950*	−0.049*	0.158*
Political factors								
GE	0.338*	−0.100***	0.174*	−0.100	0.395*	−0.072	0.174*	−0.142
RQ	−0.002	−0.470*			0.008	−0.556*		
RL	−0.504*	0.001	−0.468*	−0.008*	−0.532*	0.002	−0.466*	−0.008**
Infrastructure factors								
ROAD	0.001	−0.002**	0.001	−0.107*	0.001	−0.003*	0.001	−0.096*
RAIL	−0.001	−0.103*			−0.003	−0.111*		
PORT	0.083**	0.009	0.119*	−0.050	0.075***	0.022	0.121*	−0.069

(continued)

Table 15.3 (continued)

	Weighted matrix I				Weighted matrix II			
	Model 1		Model 2		Model 3		Model 4	
	FEM	REM	FEM	REM	FEM	REM	FEM	REM
AIR	−0.009	0.030			0.002	0.070		
Spatial factors								
WHDI	0.039	0.002	0.041	−0.009**	0.059*	0.004	0.048	−0.014*
WFDI	0.003	−0.007	0.002	−0.001	0.005	−0.008	0.004	−0.002
Constant	−2.451*	−0.014	−3.035*	0.248*	−2.361*	−0.069	−3.096*	0.248*
Spat.aut.	−0.213***	−0.255***	−0.219***	−0.421*	−0.976*	−1.352	−0.880*	−1.380*
Goodness of fit								
Observations	42	42	42	42	42	42	42	42
Adj.R^2	0.992	0.998	0.992	0.996	0.995	0.999	0.994	0.999
Log Likelihood	121.208		119.975		125.544		123.258	
Variance σ_v^2	0.002	0.003	0.002	0.008	0.001	0.001	0.001	0.001
Moran's I	−0.013			−0.010		−0.027		

Note *, **, and *** denote the 1, 5, and 10 % significance levels, respectively the residuals in the data as well as the baseline model. It suggests that the spatial regression model with spatially correlated residuals is not necessary to be provided. The complementary tests exhibit that the error term is normally distributed (Jarque–Bera), the hypothesis of homoscedasticity is not rejected (Breusch and Pagan), and the VIF statistic indicates no multicolinearity problems. Moreover, the empirical results illustrate that most significant explanatory variables are in line with the baseline results and the theoretical hypotheses. This implies that the estimated results are fairly robust with respect to the alternative spatial weighting schemes. In the discussion of the results, we focus on the REM estimates because the Hausman test accepts the FEM.

Specifically, in Models 2 and 4, the coefficient of individual-country FDI is significant positive, whereas the coefficient of spatial HDI parameter is significant negative. There is indeed a positive relationship between FDI and reduction poverty in ASEAN. The results also confirm that a *poverty reduction* in other ASEAN economies does not tend to alleviate the poverty in the individual ASEAN countries.

15.5 Conclusion and Policy Implications

This paper mainly focuses on the impacts of foreign FDI, related factors, and spatial effects on poverty reduction in ASEAN. The spatial panel data model techniques are employed to investigate these impacts. Data at the country level for six ASEAN economies over the period of 1995–2011 are employed. The primary estimated results reveal that bilateral FDI, economic integration, GDP, and foreign debt have significantly positive linkages with poverty reduction. In addition, the spatial effect of FDI has a positive relationship with poverty reduction. These estimated results are in line with the theoretical predictions.

Based on the results of this paper, poverty reduction in Southeast Asia is considered to be driven by FDI and economic integration. This indicates that FDI liberalization and the extension in economic integration have a significant impact on ASEAN's poverty reduction, as has been the case in other regions. To achieve the AEC goals in turning the ASEAN economies to an equitable region by 2015, regional value chain enhancement will make the difference in creating an FDI-driven economy. The partnerships between the public and private sectors in ASEAN play an essential role to interact with the innovation to build productive capacity for regional value chain and to facilitate the joint activities across ASEAN economies to improve the human capital to make the difference in the ASEAN economic fundamentals and poverty reduction. In order to achieve these goals, the implementation of the AEC agreements should be accelerated. Moreover, the formulation and enforcement of national economic development plans need to be done well. This is what is called the FDI-poverty reduction nexus. Finally, the concept of AEC—one economic community—will become a reality if international policies on trade and investment liberalization and facilitation, monetary and financial security, and transportation and communication stability are integrated and harmonized into domestic policies and national economic plans.

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Appendix

ADB Member Names

See also: Abbreviations, Capitalization, Appendix 1 (ADB Member Names and Currency Units)

Appendix 1 provides the proper presentation of names of ADB members in text, in tables, and on covers of Board documents.

Use "ADB members" when referring to the collective membership of ADB, not "ADB member countries."

Use the term "ADB member" or "economy" rather than "country" or "nation" when referring to members that are not independent political entities, e.g., Hong Kong, China.

Abbreviations

Except for the abbreviated forms for some member names given in Appendix 1, always spell out the names of ADB members. Do not identify an ADB member in text, tables, or.figures by its member code, except as part of a loan or technical assistance number.

Avoid	Prefer
Collaboration with host governments in CAM, LAO, and VIE will be essential.	Collaboration with host governments in Cambodia, the Lao People's Democratic Republic, and Viet Nam will be essential.

Lists

When two or more members appear in a sequence in a sentence, list, or table, present them in alphabetical order unless a reason is given for another order. The order should be the same as in Appendix 1, even when using an abbreviation. In alphabetical lists of countries, the People's Republic of China should always appear under "C," the Republic of Korea under "K," and the Federated States of Micronesia under "M."

A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7

Delegations from Cambodia, the People's Republic of China, Japan, the Republic of Korea, and Malaysia attended the conference.

Consultations were held with Bangladesh, the PRC, Japan, and Tuvalu.

The mission visited Uzbekistan, Kazakhstan, and Armenia, in that order.

Appendix 1: ADB Member Names and Currency Units

Short Form	Long Form[a]	Code
Afghanistan	Islamic Republic of Afghanistan	AFG
Armenia	Armenia	ARM
Australia		AUS
Austria		AUT
Azerbaijan	Republic of Azerbaijan	AZE
Bangladesh	People's Republic of Bangladesh	BAN
Belgium		BEL
Bhutan	Kingdom of Bhutan	BHU
Brunei Darussalam		BRU
Cambodia	Kingdom of Cambodia	CAM
Canada		CAN
(the) People's Republic of China, (the) PRC	People's Republic of China	PRC
(the) Cook Islands	Cook Islands	COO
Denmark		DEN
Fiji	Republic of Fiji	FIJ
Finland		FIN
France		FRA
Georgia	Georgia	GEO
Germany		GER
Hong Kong, China	Hong Kong, China	HKG
India	India	IND
Indonesia	Republic of Indonesia	INO
Ireland		IRE
Italy		ITA
Japan		JPN
Kazakhstan	Republic of Kazakhstan	KAZ
Kiribati	Republic of Kiribati	KIR
(the) Republic of Korea	Republic of Korea	KOR
(the) Kyrgyz Republic	Kyrgyz Republic	KGZ
(the) Lao People's Democratic Republic, (the) Lao PDR	Lao People's Democratic Republic	LAO
Luxembourg		LUX
Malaysia	Malaysia	MAL
(the) Maldives	Republic of the Maldives	MLD

Government Name	Currency Unit		
	Singular	Plural	Symbol
Government of Afghanistan	afghani	afghanis	AF
Government of Armenia	dram	dram	AMD
Government of Australia	Australian dollar	Australian dollars	A$
Government of Austria	euro	euros	€
Government of Azerbaijan	Azerbaijan manat	Azerbaijan manats	AZN
Government of Bangladesh	taka	taka	Tk
Government of Belgium	euro	euros	€
Government of Bhutan	ngultrum	ngultrum	Nu
Government of Brunei Darussalam	Brunei dollar	Brunei dollars	B$
Government of Cambodia	riel	riels	KR
Government of Canada	Canadian dollar	Canadian dollars	Can$
Government of the People's Republic of China	yuan	yuan	CNY
Government of the Cook Islands	New Zealand dollar	New Zealand dollars	NZ$
Government of Denmark	Danish krone	Danish kroner	DKr
Government of Fiji	Fiji dollar	Fiji dollars	F$
Government of Finland	euro	euros	€
Government of France	euro	euros	€
Government of Georgia	lari	lari	GEL
Government of Germany	euro	euros	€
Government of the Hong Kong Special Administrative Region of the People's Republic of China	Hong Kong dollar	Hong Kong dollars	HK$
Government of India	Indian rupee	Indian rupees	Re/Rs
Government of Indonesia	rupiah	rupiah	Rp
Government of Ireland	euro	euros	€
Government of Italy	euro	euros	€
Government of Japan	yen	yen	¥
Government of Kazakhstan	tenge	tenge	T
Government of Kiribati	Australian dollar	Australian dollars	A$
Government of the Republic of Korea	won	won	W
Government of the Kyrgyz Republic	som	som	Som
Government of the Lao People's Democratic Republic	kip	kip	KN
Government of Luxembourg	euro	euros	€
Government of Malaysia	ringgit	ringgit	RM
Government of the Maldives	rufiyaa	rufiyaa	Rf

Short Form	Long Form[a]	Code
(the) Marshall Islands, (the) RMI	Republic of the Marshall Islands	RMI
(the) Federated States of Micronesia, (the) FSM	Federated States of Micronesia	FSM
Mongolia	Mongolia	MON
Myanmar	Republic of the Union of Myanmar	MYA
Nauru	Nauru	NAU
Nepal	Nepal	NEP
(the) Netherlands		NET
New Zealand		NZL
Norway		NOR
Pakistan	Islamic Republic of Pakistan	PAK
Palau	Republic of Palau	PAL
Papua New Guinea, PNG	Papua New Guinea	PNG
(the) Philippines	Republic of the Philippines	PHI
Portugal		POR
Samoa	Independent State of Samoa	SAM
Singapore	Republic of Singapore	SIN
Solomon Islands	Solomon Islands	SOL
Spain		SPA
Sri Lanka	Democratic Socialist Republic of Sri Lanka	SRI
Sweden		SWE
Switzerland		SWI
Taipei,China	Taipei,China	TAP
Tajikistan	Republic of Tajikistan	TAJ
Thailand	Kingdom of Thailand	THA
Timor-Leste	Democratic Republic of Timor-Leste	TIM
Tonga	Kingdom of Tonga	TON
Turkey		TUR
Turkmenistan	Turkmenistan	TKM
Tuvalu	Tuvalu	TUV
(the) United Kingdom, (the) UK		UKG
(the) United States, (the) US		USA
Uzbekistan	Republic of Uzbekistan	UZB
Vanuatu	Republic of Vanuatu	VAN
Viet Nam	Socialist Republic of Viet Nam	VIE

ADB = Asian Development Bank, JFPR = Japan Fund for Poverty Reduction, RRP = report and recommendation of the President, TA = technical assistance.

[a] Use the long form only in sovereign RRPs (covers, proposal, and recommendation paragraphs), TA and JFPR reports (covers), and additional cofinancing reports (covers and recommendation paragraphs).

Government Name	Currency Unit		
	Singular	Plural	Symbol
Government of the Marshall Islands	US dollar	US dollars	$
Government of the Federated States of Micronesia	US dollar	US dollars	$
Government of Mongolia	togrog	togrog	MNT
Government of Myanmar	kyat	kyats	MK
Government of Nauru	Australian dollar	Australian dollars	A$
Government of Nepal	Nepalese rupee	Nepalese rupees	NRe/NRs
Government of the Netherlands	euro	euros	€
Government of New Zealand	New Zealand dollar	New Zealand dollars	NZ$
Government of Norway	Norwegian krone	Norwegian kroner	NKr
Government of Pakistan	Pakistan rupee	Pakistan rupees	PRe/PRs
Government of the Republic of Palau	US dollar	US dollars	$
Government of Papua New Guinea	kina	kina	K
Government of the Philippines	peso	pesos	P
Government of Portugal	euro	euros	€
Government of Samoa	tala	tala	ST
Government of Singapore	Singapore dollar	Singapore dollars	S$
Government of Solomon Islands	Solomon Islands dollar	Solomon Islands dollars	SI$
Government of Spain	euro	euros	€
Government of Sri Lanka	Sri Lanka rupee	Sri Lanka rupees	SLRe/SLRs
Government of Sweden	Swedish krona	Swedish kronor	SKr
Government of Switzerland	Swiss franc	Swiss francs	SwF
Government of Taipei,China	NT dollar	NT dollars	NT$
Government of Tajikistan	somoni	somoni	TJS
Government of Thailand	baht	baht	B
Government of Timor-Leste	US dollar	US dollars	$
Government of Tonga	pa'anga	pa'anga	T$
Government of Turkey	Turkish lira	Turkish lira	TL
Government of Turkmenistan	Turkmen manat	Turkmen manats	TMM
Government of Tuvalu	Australian dollar	Australian dollars	A$
Government of the United Kingdom	pound sterling	pounds sterling	£
Government of the United States	US dollar	US dollars	$
Government of Uzbekistan	sum	sum	SUM
Government of Vanuatu	vatu	vatu	Vt
Government of Viet Nam	dong	dong	D

Source: ADB member names and currencies were confirmed by a survey of member representatives conducted by the Office of the Secretary in January 2009. Some member names have been updated based on official communication between the member government and ADB.

Author Index

A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7

Subject Index

A. Heshmati et al. (eds.), *Poverty Reduction Policies and Practices in Developing Asia*, Economic Studies in Inequality, Social Exclusion and Well-Being,
DOI 10.1007/978-981-287-420-7

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