# *Contents*

Foreword ix

Preface xi

1. Introduction 1
    - The rise of health equity research 1
    - The aim of the volume and the audience 3
    - Focal variables, research questions, and tools 4
    - Organization of the volume 6
    - References 10

2. Data for Health Equity Analysis: Requirements, Sources, and Sample Design 13
    - Data requirements for health equity analysis 13
    - Data sources and their limitations 16
    - Examples of survey data 20
    - Sample design and the analysis of survey data 24
    - The importance of taking sample design into account: an illustration 25
    - References 26

3. Health Outcome #1: Child Survival 29
    - Complete fertility history and direct mortality estimation 30
    - Incomplete fertility history and indirect mortality estimation 34
    - References 38

4. Health Outcome #2: Anthropometrics 39
    - Overview of anthropometric indicators 39
    - Computation of anthropometric indicators 44
    - Analyzing anthropometric data 50
    - Useful sources of further information 55
    - References 55

5. Health Outcome #3: Adult Health 57
    - Describing health inequalities with categorical data 58
    - Demographic standardization of the health distribution 60
    - Conclusion 65
    - References 66

6. Measurement of Living Standards 69
    - An overview of living standards measures 69
    - Some practical issues in constructing living standards variables 72
    - Does the choice of the measure of living standards matter? 80
    - References 81

7. Concentration Curves 83
    - The concentration curve defined 83
    - Graphing concentration curves—the grouped-data case 84

Graphing concentration curves—the microdata case 86
Testing concentration curve dominance 88
References 92

8. The Concentration Index 95
Definition and properties 95
Estimation and inference for grouped data 98
Estimation and inference for microdata 100
Demographic standardization of the concentration index 104
Sensitivity of the concentration index to the living standards measure 105
References 106

9. Extensions to the Concentration Index: Inequality Aversion and the Health Achievement Index 109
The extended concentration index 109
Achievement—trading off inequality and the mean 112
Computing the achievement index 113
References 114

10. Multivariate Analysis of Health Survey Data 115
Descriptive versus causal analysis 115
Estimation and inference with complex survey data 117
Further reading 128
References 129

11. Nonlinear Models for Health and Medical Expenditure Data 131
Binary dependent variables 131
Limited dependent variables 136
Count dependent variables 142
Further reading 145
References 145

12. Explaining Differences between Groups: Oaxaca Decomposition 147
Oaxaca-type decompositions 148
Illustration: decomposing poor–nonpoor differences in child malnutrition in Vietnam 151
Extensions 155
References 156

13. Explaining Socioeconomic-Related Health Inequality: Decomposition of the Concentration Index 159
Decomposition of the concentration index 159
Decomposition of change in the concentration index 161
Extensions 163
References 164

14. Who Benefits from Health Sector Subsidies? Benefit Incidence Analysis 165
Distribution of public health care utilization 166
Calculation of the public health subsidy 166
Evaluating the distribution of the health subsidy 171
Computation 174
References 175

15. Measuring and Explaining Inequity in Health Service Delivery 177
Measuring horizontal inequity 178
Explaining horizontal inequity 181
Further reading 184
References 185

16. Who Pays for Health Care? Progressivity of Health Finance 187
Definition and measurement of variables 187
Assessing progressivity 189
Measuring progressivity 193
Progressivity of overall health financing 193
Computation 196
References 196

17. Redistributive Effect of Health Finance 197
Decomposing the redistributive effect 197
Computation 200
References 202

18. Catastrophic Payments for Health Care 203
Catastrophic payments—a definition 204
Measuring incidence and intensity of catastrophic payments 205
Distribution-sensitive measures of catastrophic payments 208
Computation 209
Further reading 211
References 212

19. Health Care Payments and Poverty 213
Health payments–adjusted poverty measures 214
Defining the poverty line 215
Computation 219
References 220

## *Boxes*

2.1 Sampling and Nonsampling Bias in Survey Data 17
4.1 Example Computation of Anthropometric Indices 42
6.1 Brief Definitions of Direct Measures of Living Standards 70
7.1 Example of a Concentration Curve Derived from Grouped Data 85
10.1 Standard Error Adjustment for Stratification Regression Analysis of Child Nutritional Status in Vietnam 119
10.2 Taking Cluster Sampling into Account in Regression Analysis of Child Nutritional Status in Vietnam 121
10.3 Explaining Community-Level Variation in Child Nutritional Status in Vietnam 125
10.4 Applying Sample Weights in Regression Analysis of Child Nutritional Status in Vietnam 128
11.1 Example of Binary Response Models—Child Malnutrition in Vietnam, 1998 133
11.2 Example of Limited Dependent Variable Models—Medical Expenditure in Vietnam, 1998 139
11.3 Example of Count Data Models—Pharmacy Visits in Vietnam, 1998 143

14.1 Distribution of Public Health Care Utilization in Vietnam, 1998 167
14.2 Derivation of Unit Subsidies—Vietnam, 1998 170
14.3 Distribution of Health Sector Subsidies in Vietnam, 1998 172
15.1 Distribution of Preventive Health Care Utilization and Need in Jamaica 180
15.2 Decomposition of Inequality in Utilization of Preventive Care in Jamaica, 1989 183
16.1 Progressivity of Health Care Finance in Egypt, 1997 190
16.2 Measurement of Progressivity of Health Financing in Egypt 194
16.3 Derivation of Macroweights and Kakwani Index for Total Health Finance, Egypt, 1997 194
17.1 Redistributive Effect of Public Finance of Health Care in the Netherlands, the United Kingdom, and the United States 199
18.1 Catastrophic Health Care Payments in Vietnam, 1993 206
18.2 Distribution-Sensitive Measures of Catastrophic Payments in Vietnam, 1998 209
19.1 Health Payments–Adjusted Poverty Measures in Vietnam, 1998 216
19.2 Illustration of the Effect of Health Payments on Pen's Parade, Vietnam, 1998 218

## *Figures*

1.1 Equity Articles in Medline, 1980–2005 2
3.1 Survival Function with 95 Percent Confidence Intervals, Vietnam, 1988–98 34
3.2 Indirect Estimates of U5MR, South Africa 38
4.1 BMI for Adults in Vietnam, 1998 44
4.2 Distribution of z-Scores in Mozambique, 1996/97 51
4.3 Correlation between Different Anthropometric Indicators in Mozambique 52
4.4 Mean z-Score (weight-for-age) by Age in Months 53
4.5 Prevalence Rates of Stunting, Underweight, and Wasting for Different Consumption Quintiles in Mozambique and a Disaggregation by Sex for Stunting 54
4.5a By Quintile 54
4.5b By Quintile, disaggregated by Sex 54
6.1 The Relationship between Income and Consumption 70
7.1 Concentration Curve for Child Malnutrition in Vietnam, 1992/93 and 1997/98 87
7.2 Concentration Curves of Public Subsidy to Inpatient Care and Subsidy to Nonhospital Care, India, 1995–96 90
9.1 Weighting Scheme for Extended Concentration Index 110
12.1 Oaxaca Decomposition 148
12.2 Malnutrition Gaps between Poor and Nonpoor Children, Vietnam, 1998 152
12.3 Contributions of Differences in Means and in Coefficients to Poor–Nonpoor Difference in Mean Height-for-Age z-Scores, Vietnam, 1998 155
16.1 Out-of-Pocket Payments as a Percentage of Total Household Expenditure—Average by Expenditure Quintile, Egypt, 1997 190
18.1 Health Payments Budget Share against Cumulative Percent of Households Ranked by Decreasing Budget Share 206
19.1 Pen's Parade for Household Expenditure Gross and Net of OOP Health Payments 214

## Tables

2.1 A Classification of Morbidity Measures 14
2.2 Data Requirements for Health Equity Analysis 16
2.3 Data Sources and Their Limitations 19
2.4 Child Immunization Rates by Household Consumption Quintile, Mozambique, 1997 27
3.1 Life Table, Vietnam, 1988–98 33
3.2 QFIVE's Reproduction of Input Data for South Africa 36
3.3 Indirect Estimates of Child Mortality, South Africa 37
4.1 WHO Classification Scheme for Degree of Population Malnutrition 43
4.2 BMI Cutoffs for Adults over 20 (proposed by WHO expert committee) 43
4.3 Variables That Can Be Used in EPI-INFO 46
4.4 Key Variables Calculated by EPI-INFO 48
4.5 Exclusion Ranges for "Implausible" z-Scores 49
4.6 Descriptive Statistics for Child Anthropometric Indicators in Mozambique, 1996/97 51
4.7 Stunting, Underweight, Wasting by Age and Gender in Mozambique 53
5.1 Indicators of Adult Health, Jamaica, 1989: Population and Household Expenditure Quintile Means 60
5.2 Direct and Indirect Standardized Distributions of Self-Assessed Health: Household Expenditure Quintile Means of SAH Index (HUI) 62
6.1 Percentage of Township Population and Users of HIV/AIDS Voluntary Counseling and Testing Services by Urban Wealth Quintile, South Africa 79
8.1 Under-Five Deaths in India, 1982–92 98
8.2 Under-Five Deaths in Vietnam, 1989–98 (within-group variance unknown) 99
8.3 Under-Five Deaths in Vietnam, 1989–98 (within-group variance known) 100
8.4 Concentration Indices for Health Service Utilization with Household Ranked by Consumption and an Assets Index, Mozambique 1996/97 106
9.1 Inequality in Under-Five Deaths in Bangladesh 113
12.1 First Block of Output from decompose 153
12.2 Second Block of Output from decompose 153
12.3 Third Block of Output from decompose 154
12.4 Fourth Block of Output from decompose 154
13.1 Decomposition of Concentration Index for Height-for-Age z-Scores of Children <10 Years, Vietnam, 1993 and 1998 160
13.2 Decomposition of Change in Concentration Index for Height-for-Age z-Scores of Children <10 Years, Vietnam, 1992–98 162