Estimating growth requirements for reducing working poverty: Can the world halve working poverty by 2015?

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Acknowledgements

Preface

The first ILO estimates of working poverty were published in 2000 by Nomaan Majid as background work for the 2001 World Employment Report and included the aggregate numbers of working poor in the world and by region for 1986 and 1997. In 2002, Stefan Berger and Claire Harasty produced new estimates of working poverty for the years 1990 and 2000 and also estimated the GDP growth needed to reduce by half the share of working poor in total employment between 2000 and 2010.

Using the definitions of working poverty established in these earlier articles, this current paper employs new methodologies along with a cross-sectional time series database to estimate the number of $1 and $2 working poor for the years 1980 through 2004. Extrapolating from country-level trends in GDP growth and additional variables of interest, the paper also provides working poverty forecasts for 2005 through 2015, along with estimates of the world and regional GDP growth rates required to halve the share of working poor in total employment from their 1990 levels by 2015. This change in the years under investigation aligns the working-poverty reduction target with the targets set forth in the United Nations Millennium Development Goals. This linkage was made intentionally to demonstrate that robust and sustainable poverty reduction is unattainable in the absence of growth in the number of decent and productive employment opportunities for the world's poor.

This paper shows that in 2004 an estimated 535 million working people in the world (22 per cent of the developing world's workers) are living on less than $1 per day and 1.38 billion working people (57 per cent of the developing world's workers) are living on less than $2 per day. And while the number and share of $1 working poor has fallen in the world, fostering an environment conducive to workers being able to lift themselves and their families above the $2 per day poverty line is proving an even more daunting challenge. Despite the gains made in reducing extreme $1 working poverty overall, the burden of poverty has been shifting, in particular toward sub-Saharan Africa, which is struggling with widespread low-productivity employment and underemployment, the pervasiveness of which is making life extremely difficult for the region's workers. While real GDP growth in the developing world exceeds the 4.7 per cent needed to reduce the share of $1 working poverty by half its 1990 level, this aggregate figure again masks several poor regional performances. Indeed, of the seven regions under consideration in this paper, only the three Asian regions and the Middle East and North Africa region appear on track to meet the $1 target, and East Asia is the only region on track to reduce $2 working poverty by half.

This paper does not aim at presenting policy recommendations to overcome the multitude of challenges facing the world's working poor, though additional work in this area is certainly needed. Rather the goal here is to explain the methodologies used to estimate working poverty and to provide an estimate of the magnitude and distribution of poverty among the world's workers, along with the trends that will shape this problem in the years to come.

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1. Introduction

The first of the United Nation's Millennium Development Goals (MDG) is to "eradicate extreme poverty and hunger", with the specific target of halving the share of people in the world living on less than $1 per day between 1990 and 2015.[1] Though not explicit in the statement, achieving this goal is in no small part dependent upon the ability of developing economies to generate decent and productive employment opportunities that will allow the extreme poor to lift themselves out of poverty. The United Nations' Economic and Social Council recognized this important linkage in its statement that "policies should aim to create productive and freely chosen employment as *the most effective way of reducing poverty*".[2]

While poverty in the developed world is often associated with unemployment, the extreme $1 and $2 per-day poverty that exists throughout much of the developing world is largely a problem of employed persons in these societies. For these poor workers, the problem is typically one of employment quality. Thus reducing overall poverty rates in line with the MDG necessitates fostering an enabling environment in which the employment opportunities and incomes of the working poor – those people who are working, but who are unable to lift themselves and their families above the poverty threshold – are improved. To this end, reducing poverty requires sustainable and equitable economic growth, as well as sustained productivity gains among poor workers in order to facilitate higher incomes and greater overall consumption levels.

The present paper serves two main purposes. The first is to provide an updated and expanded set of world and regional working poverty estimates, and thereby form a clearer picture of the magnitude and depth of poverty among the world's workers. These estimates include total working poverty counts and shares in employment for the years 1980 through 2004. The second function is to extrapolate from current trends to estimate working poverty until 2015, along with world and regional estimates of the annualized GDP growth rates required to halve working poverty shares (from their 1990 levels) by 2015. The results of this exercise provide an indication of the extent to which the world and different regions are on or off track to achieve the MDG on poverty. The overarching goal is to provide estimates as to the scope and regional distribution of working poverty and to forecast the magnitude of the problem in the years to come.

The paper proceeds as follows: section 2 explains the definitions of working poverty and the data used to generate the estimates produced in this paper. Section 3 outlines the methodology adopted to produce country-level poverty estimates and discusses the model utilized to forecast growth requirements for reducing working poverty. Section 4 gives the world and regional working poverty results, highlighting the trends in working poverty over the last 25 years. Section 4 also extrapolates from country-level and regional trends to produce working poverty projections until 2015. Section 5 offers some concluding remarks.

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[1] See http://www.un.org/millenniumgoals/. The $1/day figure is based on the World Bank's Purchasing Power Parity-adjusted $1 poverty definition, which is in 1993 dollars. The Millennium Development Goal on poverty is expressed in terms of shares. That is, the Goal is to reduce by half the *proportion* of people living below $1 per day. Because populations tend to rise over time, a falling share of the poor population will not necessarily translate into a decline in the actual number of poor people. For this reason, it should be noted that a decline in the actual number of working poor is indicative of greater robustness vis-à-vis poverty reduction than merely a decline in the share of working poor in total employment.

[2] ECOSOC, "The role of employment and work in poverty eradication: the empowerment and advancement of women -- Report of the Secretary-General", E/2000/64.

2. Definitions of working poor

The working poor are defined as individuals who both fall below an accepted poverty line and who participate in the labour market. This definition is consequently based on poverty data, but it also takes into account countries' specific labour market characteristics, such as the size of the working age population, the labour force participation rate and the unemployment rate. By combining these labour market factors with poverty data, working poverty estimates give a clearer picture of the relationship between poverty and employment than that which is provided by using standard poverty data alone. Because of the important linkages between employment and poverty, evaluating these two components side by side also provides a more detailed view of the incidence of poverty throughout the world.

Majid (2001) produced the first estimates of the number of working people living below the $1 international poverty line. His paper showed that the number of working poor around the world declined only slightly between 1986 and 1997, and that extreme poverty among workers had actually increased in the lowest income countries. Berger and Harasty (2002) expanded on this research and provided world and regional working poverty estimates for the years 1990 and 1998, as well as projections of working poverty rates and counts until 2010. They also furthered the research with a model designed to estimate the growth in output needed to meet targeted reductions in the share of working poor around the world.

The definitions of the working poor used in this current research are taken from these two papers. It is important to state at the outset that the definitions are based on several simplifying assumptions, which are at this point necessitated due to data limitations. While it will be shown that these definitions of working poor are sub-optimal, they are the best available in the continued absence of the following key data points:

- The poverty rate of working age population
- The labour force participation rate of the poor
- The unemployment rate of the poor

If these variables were known, the preferred estimate of the number of working poor in a given country would be calculated as:

$$WP = POP_{poor} * LFPR_{poor} * (1 - U_{poor}) \tag{1}$$

where,

POP_{poor} Working age population of the poor
$LFPR_{poor}$ Labour force participation rate of the poor
U_{poor} Unemployment rate of the poor

However, because the joint distributions of poverty with population shares, labour force participation rates, and unemployment rates are not known, we instead use the following definitions, making clear the assumptions underlying each:

$$WP_m = PovertyRate * LabourForce \tag{2}$$

This definition is taken from Majid (2001), and assumes that 1) the poverty rate of working age people is equal to that of the population as a whole; 2) the labour force participation rate of the poor is equal to that of the population as a whole; and 3) all poor individuals in the

labour force are counted as working poor. The assumption is that members of poor households who are in the labour force are counted as working poor. This definition provides a "lower" estimate of working poverty, as it assumes a low correlation between poverty and employment.[3]

Berger and Harasty's (2002) estimate of the working poor is calculated as follows:

$$WP_h = PovertyRate * WorkingAgePopulation \qquad\qquad (3)$$

This definition provides an "upper bound" on working poverty estimates, as it assumes unit correlation between poverty and employment – that all of the poor who are of working age work.[4]

Data Used

To construct the working poverty estimates (total counts and shares in employment) based on Equations 2 and 3, the following data were used:

- **Poverty rates** come from the World Bank's PovcalNet and use reference lines of $1 and $2 per day in 1993 Purchasing Power Parity (PPP) terms.[5] The years for the poverty figures range from 1978 to 2002.[6]
- **Labour force figures** come from the ILO LABPROJ database.[7] Labour force estimates for 2015 are derived from the ILO's Global Employment Trends Model and are based on UN population forecasts and labour force participation rates in the most recent available year from LABPROJ.[8]
- **Employment figures** are taken from the Global Employment Trends Model, which gives employment rates and counts by age and sex from 1992 to 2015.

Labour force and employment figures are essentially "complete", as coverage in all years exceeds 99.9 per cent of total world population. All values in the above databases, whether real or imputed, are taken as given. The World Bank's poverty data, on the other hand, is incomplete. The PovcalNet database contains 406 total observed poverty rates within the years under consideration. There is substantial regional and temporal heterogeneity in terms of population coverage, with yearly coverage ranging from 0 per cent to 57.9 per cent of the world's population and with regional population coverage ranging from 0 per cent to 95.2 per cent (See appendix 1 for a full listing of countries used in the analysis. Population

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[3] The Berger and Harasty paper includes an even lower bound, in which the correlation between employment and poverty is zero. In this definition, working poverty is simply calculated as the poverty rate times the number of employed persons. Since extremely poor individuals by definition must work to survive, this paper takes the more conservative definition set forth in Majid (2001) for the lower bound estimate.

[4] In reality this provides an upper bound only on the estimates of working poverty among working age individuals, aged 15+. This definition, along with the previous one, ignores the presence of child labourers belonging to poor households. To this end, all working poverty estimates to date may understate the true figure, with the degree of understatement being a positive function of the size of the child labour force.

[5] See: http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp

[6] The poverty rates generated in the PovCal database reflect the number of people living in households with consumption *per capita* below the poverty line.

[7] ILO, LABORSTA 2003. LABPROJ, *Economically active population 1950-2010, ILO database on estimates and projections of the economically active population (5th edition) for all countries and territories with a population of over 100,000 at mid-year 2000.* Geneva, ILO. http://laborsta.ilo.org

[8] For more information see ILO. 2004. *Global Employment Trends,* Geneva, ILO. www.ilo.org/trends

Also see: Crespi, G. 2004. "Imputation, estimation and prediction of unemployment rates using the Key Indicators of the Labour Market (KILM) data set: Methodology and results". Employment Paper, Geneva, ILO.

coverage by year and region for each of the major variables used are provided in appendix 2, tables A2.1-A2.5). As a result of the incompleteness of the data, the following additional data were required to generate a more complete series of poverty estimates:

- **Life expectancy** figures are taken from the UN Population Division.[9]
- *Per capita* **GDP figures** in constant $1995 are taken from the World Bank's World Development Indicators 2003 Database, which contains data for the period 1980 to 2002.
- **Real GDP growth rates** come from the International Monetary Fund's (IMF) World Economic Outlook 2004 Database, which provides country-level real *per capita* GDP growth rates until 2005. GDP *per capita* is forecasted until 2015 by extrapolating from country-level trends during the preceding decade.[10] The lowest permitted average annual *per capita* GDP growth rate between 2004 and 2015 is 0 per cent.

3. Methodology

Generating Working Poverty Estimates

Step 1. Estimating Poverty
　　Before examining the methodology used to generate poverty estimates for this paper, it is important to acknowledge the great difficulty in reliably estimating poverty rates across countries and over time. Poverty is a multi-dimensional phenomenon, and a given country's poverty rate indeed cannot be explained fully by simple econometric models. Nevertheless, while the model developed in this paper does not claim to fully explain and capture all of the various determinants of $1 and $2 per day poverty, the methods employed and explained below were developed with two primary goals in mind. First, to estimate as accurately as possible world and regional rates and trends in $1 and $2 poverty; and second, to maximize the coverage of the world's population to which the poverty estimates apply.
　　Chen and Ravallion (2004) provide background on the methodologies employed to generate the World Bank's poverty data that form the basis of the poverty estimates generated in this paper. The World Bank's world and regional poverty aggregates, which provide coverage for nearly 90 per cent of the developing world's population, are not formed on the basis of "modelling" poverty as is done in the present context. Rather, the estimates are generated by applying average regional poverty rates to countries for which no known poverty data exist. Ravallion (2001) gives a clear discussion of the correlates of poverty and provides some justification for using income rather than consumption expenditure data as a primary correlate. Deaton (2000, 2004) provides an excellent discussion of many of the key issues related to poverty estimation and modelling, from choosing between national and international poverty lines, to using national accounts versus survey data, to some of the advantages and problems of using PPP indices.[11] Finally, the aggregate poverty estimates

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[9] United Nations Population Division. *Life expectancy at birth by sex, estimates and projections, 1950-2050.*

[10] For the years 2006-2015, country-level *per capita* GDP figures are estimated using the median growth rate from the period 1995-2005 (inclusive of the IMF's estimates for 2004 and 2005). For the Transition Economies, because of high volatility in GDP growth over the past decade, median growth rates from 2000-2005 are used for the forecasts.

[11] See also Karshenas (2004) who provides an alternative approach for addressing inconsistencies between national accounts and survey data.

presented in Sala-i-Martin (2002) show that different methodologies (particularly the use of national accounts data versus household survey-based data) can have a dramatic impact on world and regional estimates of poverty. The use of the World Bank's household survey-based poverty data in this analysis is consistent with the methodologies employed in previous estimates of the working poor and also with the ongoing monitoring of the MDG on poverty by the United Nations.

It is important to note that simple linear estimation techniques do not work very well in the case of variables such as poverty rates, in which the range of plausible values is fixed within a certain range (in this case, [0,1]), because they can produce out of range predictions. In order to avoid these, the known poverty rates were transformed logistically in the following manner prior to the estimation procedure:[12]

$$Y_{it}^T = \ln\left(\frac{y_{it}}{1 - y_{it}}\right) \tag{4}$$

where y_{it} is the observed poverty rate for country i in period t. This transformation ensures within-range poverty predictions, and applying the inverse transformation produces the original poverty rates. Following this transformation, estimates of poverty were generated for the countries and years for which no data exist. A panel was assembled with 177 countries covering the period from 1980 to 2015 with data on poverty, *per capita* GDP, and life expectancy.

The first procedure taken up in the estimation process was to fill in poverty estimates for the years in between those for which there are known poverty rates. For each country with two or more poverty observations, poverty values for the years in between the first and last known poverty rate were interpolated using the country-level elasticity of poverty to life expectancy. Since life expectancy is relatively stable over time within countries, and since it is furthermore positively and significantly correlated with the poverty indicators, using this elasticity provides consistent, within-trend poverty estimates for a range of years in which known poverty rates are interspersed (See appendix 3 for the results and full descriptions of the regressions used in the poverty estimates).

Once this complete "block" of poverty data was assembled, the remaining missing poverty rates were estimated using the following linear OLS model, estimated separately for each region under consideration:

$$Y_{it}^T = \ln\left(\frac{y_{it}}{1 - y_{it}}\right) = \alpha_i + x_{it}'\beta + e_{it} \tag{5}$$

where y_{it} is the logistically transformed observed poverty rate in country i and period t and x_{it} is the set of covariates explaining the poverty rate. In the present context, this set of covariates includes *per capita* GDP (measured in constant $1995) and a country dummy variable to capture the level of poverty in country i.[13] The constant term brings in the poverty

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[12] See Crespi (2004) for a further discussion.

[13] Much of the earlier poverty modelling undertaken at the World Bank used *per capita* consumption in favour of *per capita* GDP as an explanatory variable for poverty. This current paper uses the latter figure primarily because of better data availability, which is important in terms of producing world and regional estimates. Furthermore, the differences in the world and regional poverty estimates generated using the two different regressors are, in general, not large. This is shown for comparative purposes in appendix 4, in which total poverty headcounts are estimated instead using *per capita* consumption as an explanatory variable (tables A4.1-6).

characteristics of the region in which country i is located.[14] The eight regional definitions utilized in this paper are taken from the ILO's Key Indicators of the Labour Market Database, and include Developed (Industrialized) Economies, Transition Economies, East Asia, South-East Asia, South Asia, Latin America, Middle East and North Africa, and Sub-Saharan Africa.[15]

The panel data techniques used in this paper yield two main improvements over the previous methodologies used to estimate working poverty, both of which are related to a better temporal alignment of poverty data with macroeconomic data. First, whereas previous estimates of the working poor grouped together poverty data from different years in order to provide estimates of working poverty for two points in time, the current methodology aligns poverty data from a given year with the macroeconomic conditions *in the same year* in order to predict poverty in countries for which poverty data do not exist. Because poverty rates tend to decline over time, this has potentially important implications, and previous estimates could have over- or underestimated the number of working poor due to misalignments in the years for which poverty and other macroeconomic data are used. Section 4 shows that differences in the estimates presented in this paper vis-à-vis prior estimates can indeed be well explained along these lines. The second relative advantage of the current estimates is simply that they provide year over year changes in working poverty rather than estimates over only two points in time. To this end, the present work provides a clearer picture of short-run changes in working poverty due to economic shocks than information previously available.

Step 2. *Estimating Missing Unemployment Rates*

The Global Employment Trends database provides employment and unemployment rates and counts for all countries under consideration over the period 1992 to 2015. Since we are also interested in working poverty estimates for 1980 through 1991, it is necessary to generate employment estimates for these years. This is done as follows: For the years 1980 through 1989, it is assumed that the unemployment rate in a given country is equal to the median unemployment rate between 1992 and 2003. For the years 1990 and 1991, it is assumed that the unemployment rate is equal to the 1992 rate.[16]

Once the poverty and unemployment rates were estimated, the lower- and upper-bound working poverty estimates were generated using Equations 2 and 3.[17] The panel provides working poverty estimates from 1980 to 2004 as well as projections from 2005 to 2015. These results are reported in section 4.

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[14] This approach admittedly ignores several important control variables, most notably country-level inequality. Inequality was not added due to the variable's relatively poor data coverage.

[15] See KILM. 2003. *"Key Indicators of the Labour Market, 3rd edition"* Geneva, ILO. www.ilo.org/trends

[16] While this is an admittedly imprecise method of calculating unemployment rates, for the purpose of this exercise, the unemployment rate is used solely to generate total headcount employment from which working poor shares in total employment are generated. Any discrepancies due to incorrect unemployment estimates will not affect the total working poverty estimates. Furthermore, given that aggregate unemployment rates remain reasonably steady over time, it is not expected that unemployment rate-related discrepancies will have a large effect on the estimate of working poverty shares in employment.

[17] Appendix 4 tests the accuracy of the poverty estimates generated for this paper.

Estimating Growth Requirements to Reduce Working Poverty

The model utilized to estimate the GDP growth required to reduce working poverty over time is adapted from Berger and Harasty (2002). In the model, GDP growth is a function of "productive employment" growth, where productive employment is simply the difference between total employment and the number of working poor. This makes intuitive sense: the working poor are often underemployed, wanting to work more but yet unable to find additional employment, or they are fully employed, but in low-productivity jobs because of their lack of skills, poor health, or deficiencies in other components of decent work. This definition does not intend to imply that adding additional working poor will not have an impact on overall GDP growth, but rather that the overall effect of increased productive employment will be greater. This is shown algebraically in Equation 6.

The Basic Model
u Unemployment rate
w Share of working poor in total employment
LF   Total labour force
TE   Total employment
PE   Total number of "productively employed" workers
GDP   Aggregate Gross Domestic Product
α Elasticity of productive employment growth to GDP growth

$$PE = (1-u)LF - WP \tag{6}$$

Using the fact that WP=w*TE, Equation 7 can be rewritten as follows:

$$PE = (1-u)(1-w)LF \tag{7}$$

Noting that the growth rate of x from period zero to period one, or $\dot{x}$, can be represented as follows:

$$\dot{x} = \ln\left(\frac{x_1}{x_0}\right) \tag{8}$$

Equation 9 shows that a given change in GDP is equal to the change in productive employment, divided by the productive employment elasticity (α).

$$\dot{GDP} = \frac{\dot{PE}}{\alpha} \tag{9}$$

The above equations then appear as:

$$\ln\left(\frac{GDP_1}{GDP_0}\right)^\alpha = \ln\left(\frac{PE_1}{PE_0}\right), \text{ or:} \tag{10}$$

$$\ln\left(\frac{GDP_1}{GDP_0}\right)^\alpha = \ln\left(\frac{(1-u_1)(1-w_1)LF_1}{(1-u_0)(1-w_0)LF_0}\right) \tag{11}$$

Solving this last equation for GDP_1 gives the aggregate GDP needed to meet various unemployment and working poor objectives set out in the paper.[18]

$$GDP_1 = GDP_0 \left(\frac{(1-u_1)(1-w_1)LF_1}{(1-u_0)(1-w_0)LF_0} \right)^{\frac{1}{\alpha}} \tag{12}$$

For the purposes of the present analysis, we are concerned with the GDP growth needed to halve the share of working poverty from its 1990 level. This results in the following specification of Equation 13:

$$GDP_{2015} = GDP_{2003} \left(\frac{(1-w_{2015})LF_{2015}}{(1-w_{1990})LF_{2003}} \right)^{\frac{1}{\alpha}} \tag{13}$$

Where:

GDP_{2015} is the aggregate GDP needed in 2015
GDP_{2003} is the aggregate GDP in 2003
W_{2015} is the target share of working poor for 2015 (set at half the 1990 share)
W_{1990} is the working poor share in 1990
LF_{2015} is the projected labour force in 2015
LF_{2003} is the labour force in 2003
α is the productive employment elasticity

The equation is solved for the level of GDP in 2015. After obtaining this value, the annual GDP growth required is calculated as follows:

$$Average\ Annual\ GDP\ growth = \left(\left(\frac{GDP_{2015}}{GDP_t} \right)^{\frac{1}{(2015-t)}} \right) - 1 \tag{14}$$

The average annual GDP growth required to halve working poverty in this model is an increasing function of both the working poverty and projected labour force growth rates and a decreasing function of the productive employment elasticity. The discussion now turns to the definition and methodology used for calculating the productive employment elasticity.

Generating Productive Employment Elasticities

All of the terms in Equation 13, except the productive employment elasticity, are either taken as given from the data sources mentioned above or generated using the aforementioned poverty estimation methodology. The productive employment elasticity, defined as the percentage point change in productive employment given a change in aggregate GDP, was calculated as follows:

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[18] It is important to note that this model does not work in the extreme case that the working poor rate is equal to 1.

A second panel dataset was assembled with $1 and $2 working poverty rates, employment counts, and aggregate GDP figures. Country elasticities were calculated by running the following regression on data for each country i in year t.[19]

$$\log(\textit{Productive Employment}_{it}) = \alpha + \beta_1 \log(\textit{GDP}_{it}) + \varepsilon_{it} \tag{15}$$

This was done separately for $1 and $2 working poverty rates. The coefficient β_1 gives the productive employment elasticity. In cases where this elasticity could not be calculated due to data deficiencies, the sub-regional elasticities, which were generated using the same regression equation by KILM sub-region, were substituted for country elasticites. The same procedure was applied in cases in which the elasticity was negative. This is a reflection of an assumption built into this analysis that positive GDP growth will be associated with a reduction in working poverty between 2004 and 2015.[20]

Taken together, these methodologies were used to generate a panel of working poverty estimates from 1980 to 2015, which includes the total number of $1 and $2 working poor, the shares of these working poor in total employment, and the real GDP growth rates required to halve the share of working poor by 2015. The next section discusses the aggregate world and regional working poverty results derived from this exercise.

4. Results

Global Trends in Working Poverty[21]

Table 4.1 provides counts for the numbers of both $1 and $2 working poor over time. Included in the table are both the lower and upper estimates as well as a weighted average of the two, calculated to provide a single estimate of the level and trend in working poverty over time.[22] This weighted average is also used to calculate the approximate share of the working poor in total employment.

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[19] The lower bound working poverty estimate is used for the purpose of calculating the productive employment elasticity.
[20] The elasticity was calculated for the years 1995 through 2015, except in the case of the transition economies, for which the range of years was 1998 through 2015.
[21] The methodology used to produce these world and regional working poverty estimates is explained in appendix 5.
[22] The ILO Trends Team estimated the global number of working poor for 2003 in the *Global Employment Trends 2004* Report. This estimate was used to generate the world and regional weighted average working poverty estimate used in this paper.

Table 4.1. $1 and $2 Working Poverty, 1980-2015 [23]

Year	Total World Employ-ment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	1,831,597	644,875	882,404	738,541	40.3%	1,040,929	1,177,101	1,094,626	59.8%
1990	2,271,328	537,206	760,059	625,085	27.5%	1,191,073	1,463,079	1,298,334	57.2%
1995	2,445,080	525,147	767,446	620,694	25.4%	1,189,515	1,469,365	1,299,870	53.2%
1996	2,483,853	466,736	680,139	550,888	22.2%	1,173,438	1,466,099	1,288,844	51.9%
1997	2,530,061	481,707	702,968	568,958	22.5%	1,182,044	1,477,372	1,298,502	51.3%
1998	2,566,736	492,504	716,628	580,884	22.6%	1,218,396	1,521,292	1,337,838	52.1%
1999	2,611,759	484,714	697,275	568,534	21.8%	1,238,025	1,566,419	1,367,522	52.4%
2000	2,661,167	478,684	687,834	561,159	21.1%	1,233,667	1,564,936	1,364,298	51.3%
2001	2,703,609	480,018	690,724	563,107	20.8%	1,239,971	1,575,996	1,372,477	50.8%
2002	2,743,975	478,073	688,201	560,934	20.4%	1,247,567	1,589,121	1,382,254	50.4%
2003	2,791,603	468,736	674,815	550,000	19.7%	1,248,172	1,599,501	1,386,713	49.7%
2004	2,839,210	455,699	655,814	534,611	18.8%	1,240,198	1,599,510	1,381,887	48.7%
2005	2,885,537	444,150	639,350	521,124	18.1%	1,232,375	1,600,776	1,377,648	47.7%
2015	3,284,710	368,580	527,267	431,156	13.1%	1,157,207	1,623,583	1,341,115	40.8%

Currently in 2004, there are an estimated 535 million $1 working poor, with lower and upper estimates of 455 million and 655 million respectively. These figures imply that around 19 per cent of the employed persons in the world (and therefore over 22 per cent of the developing world's workers) are currently living on less than $1 per day. There are an estimated 1.38 billion $2 per day working poor in 2004, with lower and upper estimates of 1.24 and 1.6 billion. This means that over 48 per cent of the world's workers (and over 57 per cent of the developing world's workers) are not earning enough to lift themselves and their families above the $2 per day poverty line.

Looking at the historical trends leading up to these present-day figures, in 1980, around 40 per cent of the world's workers lived on less than $1 per day (in 1993 dollars), and nearly 60 per cent lived on less than $2 per day (the share among developing countries was 49.6 and 73.5 per cent, respectively). The 1980s were marked by robust poverty reduction for the extreme $1 working poor, but the number of $2 working poor continued to rise throughout the decade. Over the course of the 1980s, the number of $1 working poor fell by around 114 million, or 15 per cent. Yet the number of $2 working poor climbed by around 200 million, or 18.5 per cent. This trend implies that, at least on a global level during the 1980s, there was a general shift from more extreme to somewhat less extreme working poverty. It seems likely that many of the $1 working poor that were able to lift themselves above the lower poverty line were unable to climb above the $2 per day mark, which contributed to the rise in $2 working poverty. By the end of the 1980s, the share of the $1 working poor had declined to 27.5 per cent of the world's employed (and one-third of the total employed in the developing world), while the share of $2 working poverty declined slightly to around 57 per cent of the world's total number of employed.

The world's count of working poor has been somewhat more volatile throughout the 1990s and the early part of the new millennium than during the 1980s. The number of $1 working poor fell by over 14 per cent, or 90 million, between 1990 and 2004. $2 working poverty increased by around 84 million, or about 6.5 per cent over the same period. Events

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[23] For data in this table, and subsequent tables, see section 2.

such as the East Asian, Russian and Latin American financial crises as well as the global economic downturn that took place in the aftermath of the September 11th terrorist attacks and the bursting of world and particularly US equities bubbles in 2001 and 2002, appear to have caused substantial short-term upswings in the number of the working poor around the world. From 1996 to 1998, the period inclusive of the Asian financial crisis, the number of $1 working poor increased by around 30 million, and the number of $2 working poor increased by 9 million. Between 2000 and 2001, the number of $1 working poor increased by about 2 million, while the number of $2 working poor increased by 8 million. While $1 working poverty again began to decline in 2002, $2 working poverty increased by around 10 million during this year of continued global economic instability.

These estimates do differ somewhat from those produced by Majid (2001), which is likely mainly a result of the introduction of panel data techniques discussed in section 3. Whereas Majid (2001) estimated that there were 537 million working poor in 1986 and 534 million in 1997, the comparable current estimates for these years are 550 million and 482 million, respectively. The direction of these differences makes intuitive sense given the introduction of panel techniques and the tendency of poverty rates to decline over time. The current estimate for 1986 is higher than Majid's and the current estimate for 1997 is lower. This is probably because in the present context the poverty rates are aligned with the macroeconomic variables from their respective years, rather than using earlier-year poverty rates to estimate working poverty in a later year and later year poverty rates to estimate working poverty in an earlier year.

In terms of projections of the working poor in relation to the Millennium Development Goals, figure 4.1 shows $1 and $2 working poverty shares in total employment over time, and this represents the working poverty equivalent to the MDG on poverty. The solid lines are drawn between the share of working poor in employment in 1990 and half of that share in 2015 and thus represent the average rate of working poverty reduction needed to halve the share of working poor by 2015. The dotted lines represent the progress to date, and the solid lines projected from the dotted lines give the forecasted progress that will be made between 2005 and 2015, as estimated by the econometric model described above. The lines corresponding to $2 working poverty are in all cases above those corresponding to $1 working poverty, as the $2 working poverty rates also include the $1 working poor.

Figure 4.1. Share of $1 and $2 Working Poor in Employment, 1990-2015, World

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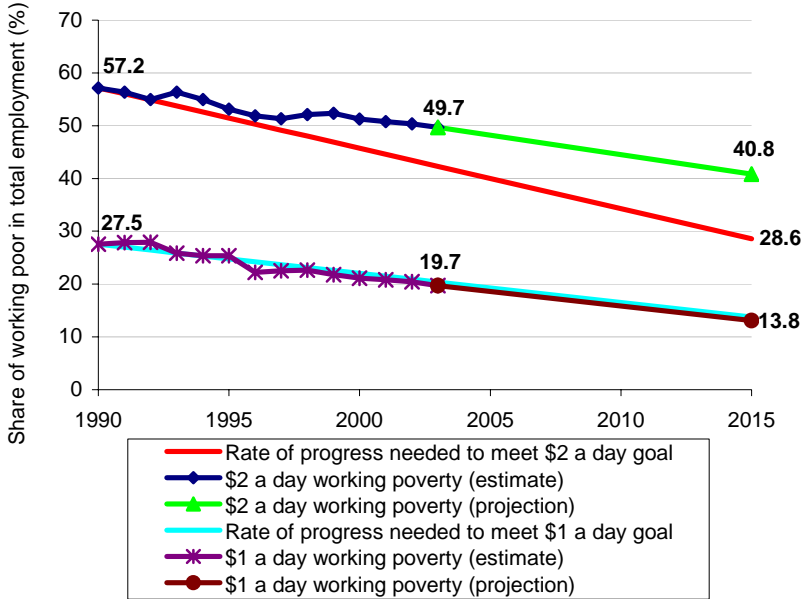
Figure 4.1 shows that the world is indeed on track to halve $1 working poverty by 2015. The model developed for this paper forecasts that 13.1 per cent of the world's workers will be living on less than $1 a day in 2015, down from 27.5 per cent in 1990. The $2 figures on the other hand paint a far less optimistic picture. The model forecasts that in 2015 over 40 per cent of the world's workers will still be living on less than $2 per day. This reflects the gradual movement of poor workers from $1 to $2 working poverty.

Table 4.2. Annual GDP Growth Required to Achieve Targets, World

	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
World ex-Industrialized	4.7%	10.4%	5.0%	5.4%
World ex-East Asia and Industrialized	5.3%	12.2%	3.8%	4.3%

Table 4.2 provides the corresponding growth requirements for these working poverty projections, as estimated from the modified Berger and Harasty model. The world's developing countries would need to grow at a 4.7 per cent annual rate to halve $1 working poverty and by 10.4 per cent to halve $2 working poverty. Given the 5- and 10-year historical growth rates of 5.4 and 5 per cent respectively, it is clear that the world is well on track to achieve the former but not the latter objective.

One picture that becomes much clearer after looking closer at the regional projections, however, is that East Asia's exceptionally strong poverty-reducing performance is driving much of this positive forecast. Indeed, if East Asia is taken out of the picture, the remainder of the developing world does not appear to be on track to reduce working poverty by half. The growth needed to halve $1 working poverty in the world excluding the developed economies and East Asia is 5.3 per cent, while over the last decade GDP growth in this group of economies was only 3.8 per cent, and it is projected to be only 4.3 per cent between 2000 and 2005. Halving $2 working poverty appears even less feasible if East Asia is removed from the picture, with a gap between GDP growth required and historical growth of around 8 percentage points. Given the strong impact that East Asia has on the overall global estimates, it is clear that forming a precise understanding of the forces driving changes in aggregate working poverty figures requires at the very least a regional analysis. The paper now turns to this.

Regional Trends in Working Poverty

East Asia

Among all regions under consideration, the East Asian region, in which China comprises over 94 per cent of the labour force, has been by far the most successful in terms of reducing working poverty. A comparison of earlier working poverty rates with the situation today, in which just over 15 per cent of the region's workers are $1 working poor and now less than half are $2 working poor, and the poverty reduction aspects of the "East Asian Miracle" become clear, as table 4.3 shows.

Table 4.3. $1 and $2 Working Poverty 1980-2015, East Asia

Year	Total Employment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	517522	332952	421838	368003	71.1%	459993	500894	476121	92.0%
1990	673787	218878	276485	241594	35.9%	482627	609997	532853	79.1%
1995	744210	155928	194740	171233	23.0%	404190	505056	443965	59.7%
1996	753202	125482	156629	137764	18.3%	388961	485723	427117	56.7%
1997	761866	122656	153115	134667	17.7%	365547	456509	401416	52.7%
1998	768145	124230	155198	136442	17.8%	370954	463567	407475	53.0%
1999	776802	136381	170497	149834	19.3%	385241	481524	423209	54.5%
2000	787523	134725	168993	148238	18.8%	378924	475218	416896	52.9%
2001	796646	133403	167642	146904	18.4%	373365	469112	411121	51.6%
2002	808389	129807	163529	143105	17.7%	369231	465104	407037	50.4%
2003	817743	126050	159251	139142	17.0%	364806	460863	402685	49.2%
2004	827786	117642	149021	130016	15.7%	351460	445207	388428	46.9%
2005	839011	110048	139716	121747	14.5%	338600	429884	374597	44.6%
2015	892859	51995	67985	58300	6.5%	205420	268600	230334	25.8%

The largest bulk of the region's headcount poverty reduction took place during the 1980s, during which time the share of $1 working poor in employment was reduced on average by over 3.5 percentage points annually. In 1990, there were 126 million fewer $1 working poor than a decade earlier, despite the fact that the region's working age population grew by over 200 million over the period. Many workers failed to climb above the $2 poverty mark, however, as the number of $2 working poor grew by nearly 57 million during the 1980s (though the share of $2 working poor declined by an impressive 13 percentage points).

The 1990s and early part of the new millennium have been equally as impressive. The $1 working poverty declined by 111 million and at the same time $2 working poverty fell by over 144 million, indicating substantial improvements in the well-being of the region's poor workers.

Figure 4.2. Share of $1 and $2 Working Poor in Employment, 1990-2015, East Asia

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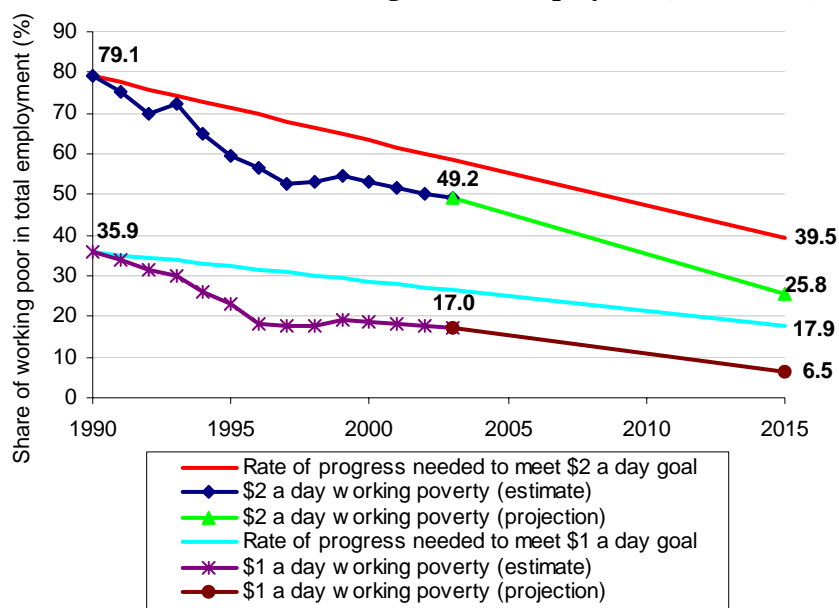
Not surprisingly, East Asia is forecast to substantially exceed halving both shares of $1 and $2 working poor by 2015. As figure 4.2 shows, as of 2004, the target for the $1 working poor had already been met, and on current trends only 6.5 per cent of the region's workers will be living on less than $1 per day in 2015. The share of $2 working poor still stands at around 47 per cent, but this is projected to fall to just over 25 per cent by 2015.

Table 4.4. Annual GDP Growth Required to Achieve Targets, East Asia

Region	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
East Asia	**3.5%**	**6.6%**	**7.9%**	**7.8%**

Compared with the historical GDP growth rates achieved in the region, the GDP growth requirements for meeting the $1 and $2 working poverty reduction objectives, respectively at 3.5 and 6.6 per cent, are quite modest (see table 4.4). Yet despite all of these very positive signs, given current indications by the Chinese government that efforts may be undertaken to slow the country's phenomenal growth to a less inflationary pace, emphasis must be reinforced as to the need to translate growth into poverty reduction. Nevertheless, the prospect for continued progress toward reducing working poverty in the region remains bright.

South-East Asia

South-East Asia has also made impressive strides in the way of reducing poverty among its workers. During the 1980s, $1 working poverty was reduced by 14 million, with the share of the region's workers living in extreme $1 poverty falling from 37.6 per cent to less than 20 per cent in 1990. Table 4.5 makes clear how hard the region was hit by the Asian financial crisis. Over 10 million working people fell below the $1 per day poverty line and over 8 million fell below the $2 per day line over the period of the crisis, with the share of $1 working poor rising from 16 to 22.4 per cent and the share of $2 working poor rising from 61.9 to 67.9 per cent. These figures provide clear evidence of the vulnerability of poor workers to economic shocks.

Table 4.5. $1 and $2 Working Poverty 1980-2015, South-East Asia

Year	Total Employ-ment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	138481	42002	67617	52103	37.6%	93571	113905	101589	73.4%
1990	191961	32631	46638	38154	19.9%	117381	156184	132682	69.1%
1995	214953	29471	41982	34405	16.0%	116489	166660	136273	63.4%
1996	220810	29006	40983	33729	15.3%	117267	166635	136735	61.9%
1997	224833	34186	49100	40067	17.8%	126663	174153	145390	64.7%
1998	226188	42791	62526	50573	22.4%	138092	177319	153560	67.9%
1999	232568	32064	45424	37333	16.1%	133777	185629	154224	66.3%
2000	239860	24564	34167	28351	11.8%	126928	178546	147283	61.4%
2001	243932	24948	34532	28727	11.8%	127920	179141	148118	60.7%
2002	246804	25192	34859	29004	11.8%	128353	179498	148522	60.2%
2003	254334	24976	34532	28744	11.3%	129388	180805	149664	58.8%
2004	259950	24671	34081	28382	10.9%	130329	181980	150697	58.0%
2005	265588	24262	33462	27890	10.5%	130675	182267	151020	56.9%
2015	317963	20283	27585	23163	7.3%	131877	182303	151762	47.7%

As of 2004, just over 10.9 per cent of the region's workers live on less than $1 per day, and 58 per cent of workers live on $2 or less. While these shares have fallen considerably from earlier years, the total number of $2 working poor has risen over time and is forecast to rise further between 2005 and 2015. This implies that while the picture remains reasonably bright in the region overall, the challenges related to creating decent and productive employment for the region's expanding workforce will remain.

Figure 4.3. Share of $1 and $2 Working Poor in Employment, 1990-2015, South-East Asia
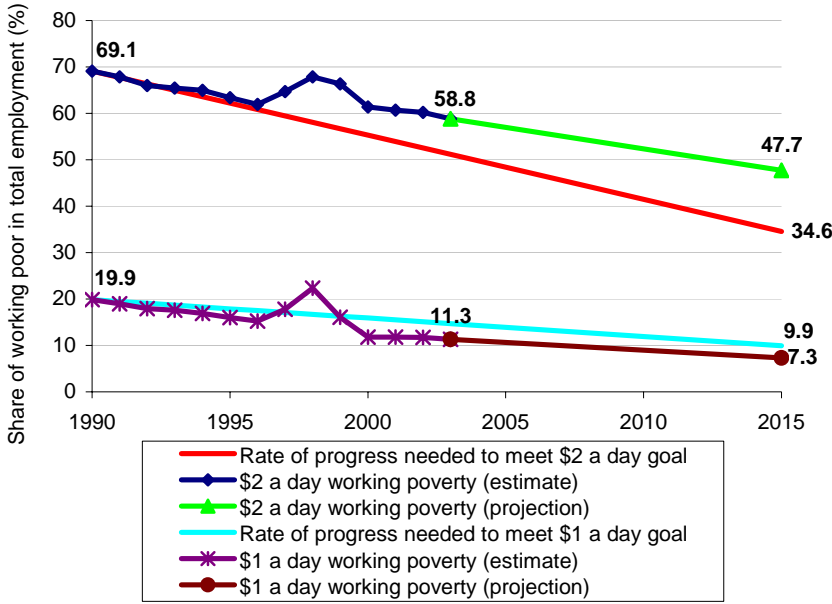
South-East Asia is currently on track to halve the share of $1 working poor, and the region is forecast to have a $1 working poverty rate of just over 7 per cent in 2015. The trend decline in $2 working poverty is projected to be far more modest and, as a result, on present trends the share of $2 working poor will remain just below 50 per cent in 2015, as figure 4.3 shows.

Table 4.6. Annual GDP Growth Required to Achieve Targets, South-East Asia

Region	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
South-East Asia	**4.3%**	**11.2%**	**4.1%**	**4.8%**

The growth rates shown in table 4.6 reflect this: while historical growth rates of 4.1 to 4.8 per cent are roughly sufficient to reduce $1 working poverty by half, a reduction of $2 working poverty by half would require a significant acceleration in overall growth.

South Asia

   With over 36 per cent of the world's $1 working poor, 34 per cent of the world's $2 working poor, and yet only around 23 percent of the world's workers, South Asia faces daunting challenges in terms of poverty reduction. Coupled with the rapid growth of the working age population – forecast to grow by over 25 per cent between 2004 and 2015 – it is clear that there is an urgent need for the region to generate productive and decent employment opportunities for its most vulnerable workers.

Table 4.7. $1 and $2 Working Poverty 1980-2015, South Asia

Year	Total Employment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	349158	190386	280836	226053	64.7%	325608	345894	333607	95.5%
1990	414091	176713	284997	219413	53.0%	370743	408224	385523	93.1%
1995	441750	209910	353312	266459	60.3%	398566	437331	413852	93.7%
1996	453473	180959	303488	229276	50.6%	393885	449127	415669	91.7%
1997	467459	187670	313696	237367	50.8%	402607	463016	426428	91.2%
1998	479231	178962	297807	225827	47.1%	407092	474400	433634	90.5%
1999	490379	170347	282077	214406	43.7%	410558	485539	440126	89.8%
2000	502738	172284	284939	216708	43.1%	416448	497556	448432	89.2%
2001	513767	171940	285505	216723	42.2%	422410	508673	456426	88.8%
2002	524305	169712	282232	214083	40.8%	427513	519119	463637	88.4%
2003	536158	162139	269523	204484	38.1%	428877	530739	469045	87.5%
2004	547540	155687	258722	196317	35.9%	430584	541897	474479	86.7%
2005	561103	150300	249745	189515	33.8%	432722	555153	481001	85.7%
2015	692395	106210	175397	133493	19.3%	439147	684344	535837	77.4%

   However, particularly in recent years, South Asia has managed to make tangible gains in terms of reducing $1 working poverty. As table 4.7 shows, the total number of $1 working poor peaked in 1995, at around 266 million, and the figure now stands at less than 200 million.

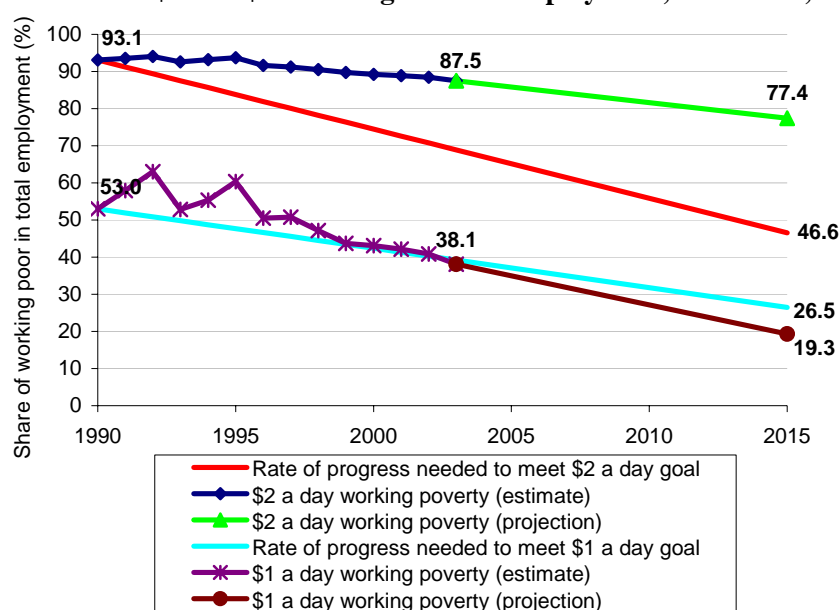**Figure 4.4. Share of $1 and $2 Working Poor in Employment, 1990-2015, South Asia**

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Figure 4.4 shows that despite a relatively poor start in the early and mid-1990s, the region does appear to be on track to halve the number of $1 working poor. Meanwhile the number of $2 working poor continues to grow, and this is projected to continue over the course of the next decade. The share of $2 working poor in total employment is estimated at still over 77 per cent in 2015.

Table 4.8. Annual GDP Growth Required to Achieve Targets, South Asia

Region	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
South Asia	**5.8%**	**16.6%**	**5.8%**	**5.6%**

Table 4.8 shows that the historical growth rates do appear sufficient to reduce $1 working poverty to half their 1990 shares, yet this is dependent on continued growth and a continued pro-poor focus among policy-makers. If instead the trends of the early 1990s resurface, the region will likely miss this goal. Finally, the exceptional tripling of GDP growth required to halve $2 working poverty reflects the region's large share of $2 working poor. In the coming years, focus will need to remain on improving the well-being of these $2 working poor.

Transition Economies[24]

The 1990s were a period of much volatility for the Transition Economies, and this volatility is clearly reflected in the region's working poverty figures, as table 4.9 shows. In 1990 there were only around 3.2 million $1 working poor and 9.2 million $2 working poor in the region. By 1998, the year of the Russian financial crisis, the number of $1 working poor had skyrocketed to over 17 million, and the number of $2 working poor reached 57 million. As the region's economies have stabilized, poverty has abated, yet one-fifth of the region's workers still live on less than $2 per day, and there are still around 8.4 million $1 working poor.

Table 4.9. $1 and $2 Working Poverty 1990-2015, Transition Economies

Year	Total Employment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1990	185047	2708	4011	3222	1.7%	8078	11094	9267	5.0%
1995	174649	7852	12982	9875	5.7%	34167	56100	42816	24.5%
1996	172383	7954	13296	10060	5.8%	31895	53212	40301	23.4%
1997	170844	9264	15595	11760	6.9%	36251	60960	45995	26.9%
1998	169046	13412	22789	17109	10.1%	44982	76345	57350	33.9%
1999	168579	11822	20209	15129	9.0%	44268	74924	56357	33.4%
2000	170928	8664	14791	11080	6.5%	40323	66379	50597	29.6%
2001	172842	8365	14268	10693	6.2%	39190	64286	49086	28.4%
2002	176444	8096	13569	10254	5.8%	37744	61188	46989	26.6%
2003	177360	7240	12170	9184	5.2%	33679	54411	41855	23.6%
2004	177963	6620	11146	8405	4.7%	30811	49873	38327	21.5%
2005	178989	6137	10339	7794	4.4%	28528	46265	35522	19.8%
2015	178258	2966	4937	3743	2.1%	13752	23014	17405	9.8%

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[24] Pre-1990 data on the Transition Economies are inadequate for the purposes of this exercise. As a result, the analysis for this region focuses on the period from 1990 onwards.

As a result of this volatility, as well as the extremely low relative starting point in terms of the share of working poor in employment, the Transition Economies are not on track to reduce working poverty to half their 1990 levels by 2015[25] (figure 4.5).

Figure 4.5. Share of $1 and $2 Working Poor in Employment, 1990-2015, Transition Economies
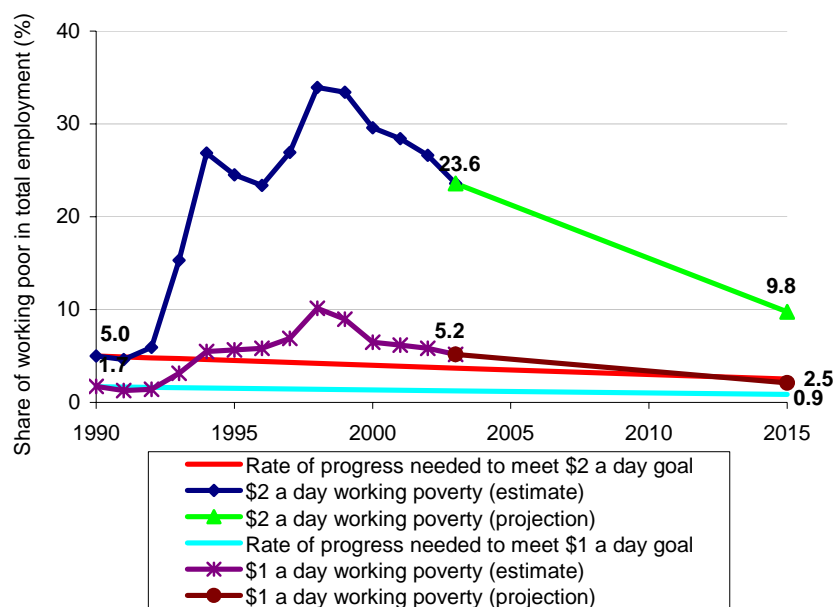
Nevertheless, as table 4.10 shows, if the region is able to grow at the pace forecast for the 2000 to 2005 period, the share of $1 working poor will be halved and significant strides will also be made vis-à-vis reducing $2 working poverty. On a sub-regional level, Central and Eastern Europe should have little difficulty reducing $1 working poverty by half, though substantially reducing $2 working poverty will be much more difficult. The Baltic States appear to have sufficient growth to halve $2 working poverty, though growth would need to accelerate to reduce poverty among the extreme poor. The biggest gap between growth required and historical growth rates is in the CIS sub-region, though growth has picked up considerably in these economies in recent years.

Table 4.10. Annual GDP Growth Required to Achieve Targets, Transition Economies

	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
Transition Economies	**4.9%**	**8.1%**	**3.3%**	**5.4%**
Central and Eastern Europe	1.7%	8.7%	3.6%	3.6%
Baltic States	7.0%	5.1%	5.4%	6.4%
Commonwealth of Independent States	6.7%	7.8%	3.0%	6.5%

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[25] If one takes a more recent starting point, however, the picture changes. For instance, if the starting period is changed to 1995, the region is on track to halve both $1 and $2 working poverty.

Latin America and the Caribbean

The Latin America and the Caribbean region has experienced increasing numbers of working poor throughout most of the period under examination in the paper (see table 4.11). From 1980 to 2004, the region added around 12 million $1 working poor and nearly 27 million $2 working poor, though the shares of both fell considerably during the same period.

Table 4.11. $1 and $2 Working Poverty 1980-2015, Latin America and the Caribbean

Year	Total Employ-ment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	114690	13994	23928	17911	15.6%	37031	63065	47297	41.2%
1990	158404	20465	33083	25440	16.1%	50230	80799	62285	39.3%
1995	187131	19726	30020	23785	12.7%	50477	77080	60968	32.6%
1996	189185	17388	26722	21068	11.1%	49887	76554	60402	31.9%
1997	196366	20190	30441	24232	12.3%	54083	81485	64889	33.0%
1998	200276	23385	35070	27992	14.0%	54811	82200	65611	32.8%
1999	204186	22825	34135	27285	13.4%	55955	83403	66778	32.7%
2000	207513	23483	35436	28196	13.6%	57302	85996	68617	33.1%
2001	212468	23607	35613	28341	13.3%	58278	87474	69791	32.8%
2002	216228	24566	37156	29531	13.7%	60418	90949	72458	33.5%
2003	223020	25109	37951	30173	13.5%	61486	92518	73723	33.1%
2004	229317	25112	37936	30169	13.2%	61725	92831	73991	32.3%
2005	233287	25196	38048	30264	13.0%	62120	93395	74453	31.9%
2015	275811	26396	39863	31706	11.5%	66263	99955	79549	28.8%

As a result of the region's lacklustre growth performance, based on current trends, sufficient progress will not be made toward halving $1 and $2 working poverty by 2015. For the region as a whole, the current forecast is that 11.5 per cent of workers will still live on less than $1 and nearly 30 per cent of workers will live on less than $2 by 2015, as shown in figure 4.6.

Figure 4.6. Share of $1 and $2 Working Poor in Employment, 1990-2015, Latin America and the Caribbean
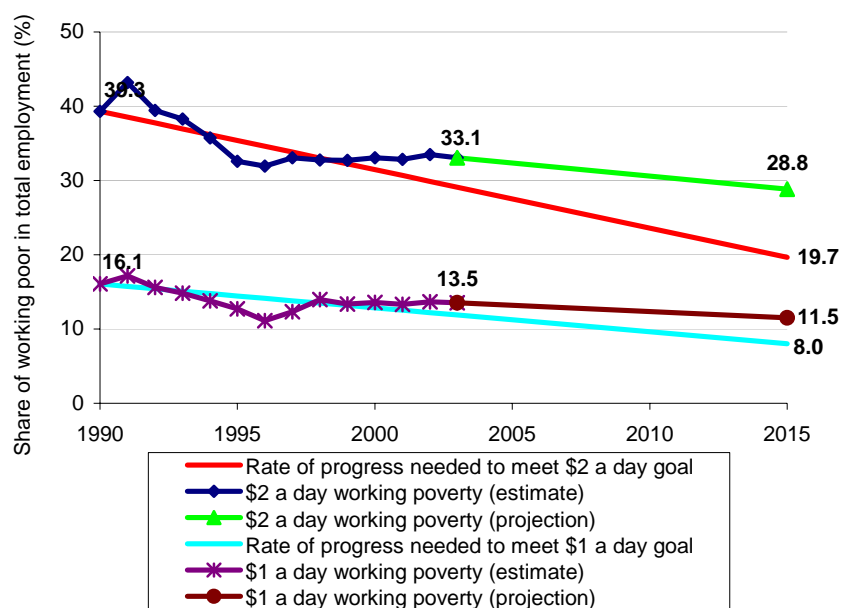
The sub-regional picture reveals contrasts. First, based on historical growth over the past 10 years, the Caribbean is on track to halve both $1 and $2 working poverty, though the economic slowdown in the region over the past five years could threaten this result. It is interesting to note that historically in the Caribbean lower growth has been needed to reduce $2 per day working poverty than $1 per day working poverty. This implies, at least for the extreme poor, the likelihood of increasing inequality in the sub-region.

Meanwhile, as table 4.12 shows, Central and South America do not appear to be on track, and the slowing of GDP growth in recent years is putting poverty reduction goals further out of reach. South and Central America would require around a 1 to 1.5 percentage-point increase in annual GDP growth to cut the share of $1 working poor by half. In both cases, the sub-regions are far closer to reaching the $1 target than to reaching the $2 target.

Table 4.12. Annual GDP Growth Required to Achieve Targets,
Latin America and the Caribbean

Region	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
Latin America and the Caribbean	**3.5%**	**4.9%**	**2.4%**	**2.2%**
Caribbean	3.6%	3.0%	3.6%	2.5%
Central America	4.1%	5.5%	2.9%	2.6%
South America	3.3%	4.7%	2.2%	2.1%

Middle East and North Africa

The Middle East and North Africa region currently has the lowest $1 working poverty rates of all of the regions under consideration, at just 2.8 per cent of total employment. $2 working poverty remains quite high, however, at 30 per cent in 2004, as table 4.13 shows. Since 1990, employment in the region has grown rapidly, rising over 55 per cent in less than 15 years. The far more modest increase in the number of working poor implies that progress is indeed being made in the region to reduce poverty and that the bulk of the new jobs created in the region have been productive enough to keep the workers in these jobs and their families above the poverty line.

Yet the current rise in political instability in the region makes forecasting poverty trends until 2015 extremely difficult. Based on current trends, the shares of both $1 and $2 working poverty will continue to fall, though they will not reach half their 1990 levels by 2015 (figure 4.7). The aggregate numbers of working poor, however, are forecast to continue to rise over the coming decade.

Table 4.13. $1 and $2 Working Poverty 1980-2015, Middle East and North Africa

Year	Total Employ- ment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	55846	2100	3816	2777	5.0%	17382	30351	22496	40.3%
1990	74328	2103	4093	2888	3.9%	18334	35729	25193	33.9%
1995	86310	1833	3556	2512	2.9%	20418	40050	28159	32.6%
1996	90373	1938	3746	2651	2.9%	21177	41599	29230	32.3%
1997	93359	2056	3950	2803	3.0%	22017	43223	30379	32.5%
1998	96520	2193	4186	2979	3.1%	22844	44270	31293	32.4%
1999	101156	2291	4313	3088	3.1%	23884	46132	32657	32.3%
2000	103460	2343	4429	3165	3.1%	24297	46434	33026	31.9%
2001	106916	2353	4475	3190	3.0%	24522	46934	33360	31.2%
2002	109906	2378	4551	3235	2.9%	24793	47579	33778	30.7%
2003	112994	2403	4591	3266	2.9%	25080	48461	34300	30.4%
2004	116520	2439	4651	3311	2.8%	25498	49545	34981	30.0%
2005	120045	2461	4683	3337	2.8%	25799	50555	35561	29.6%
2015	155361	2661	4954	3565	2.3%	28294	54511	38632	24.9%

Figure 4.7. Share of $1 and $2 Working Poor in Employment, 1990-2015, Middle East and North Africa

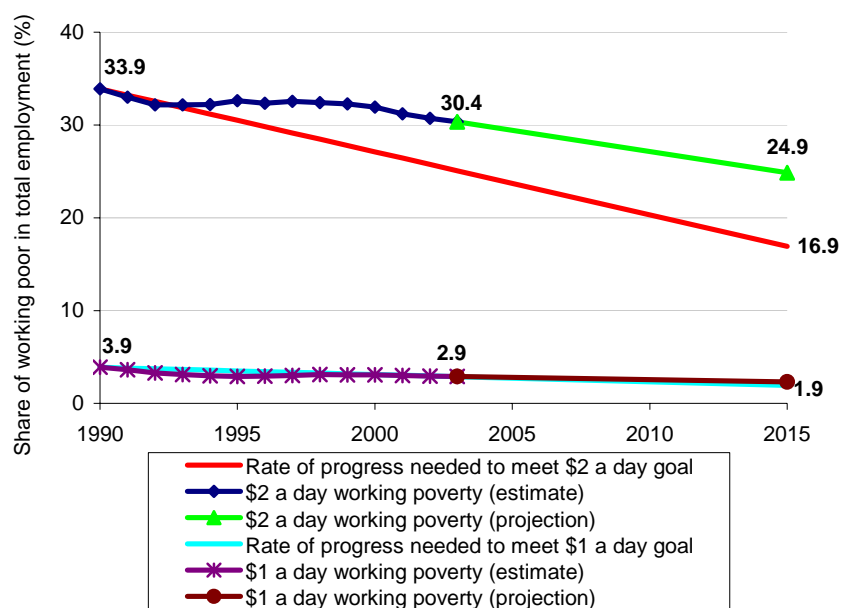Table 4.14, breaking down the picture by sub-region, provides a more detailed outlook. In the Middle East, the historical growth rates appear sufficient to achieve the working poverty reduction targets of halving $1 working poverty, and they are nearly sufficient for halving $2 working poverty. The outlook is dimmer in North Africa, where, particularly for $2 poverty, far more growth would be needed.

**Table 4.14. Annual GDP Growth Required to Achieve Targets,
Middle East and North Africa**

| Region	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
Middle East and North Africa	**4.1%**	**7.4%**	**4.0%**	**4.3%**
Middle East	3.7%	4.5%	3.9%	4.3%
North Africa	5.2%	14.7%	4.2%	4.1%

Sub-Saharan Africa

By all working poverty measures used in this paper, sub-Saharan Africa has been the poorest overall regional performer. From 1980 to 2004, the region's shares of $1 and $2 working poor actually grew, and with the rapid growth of the working age population, the numbers of working poor have skyrocketed. Today there are around 140 million $1 working poor and over 220 million $2 working poor in sub-Saharan Africa. Each of these figures is approximately two times the region's levels in 1980.

Table 4.15. $1 and $2 Working Poverty 1980-2015, Sub-Saharan Africa

Year	Total Employ-ment ('000s)	$1 Working Poor Low Estimate ('000s)	$1 Working Poor High Estimate ('000s)	$1 Working Poor ILO Estimate ('000s)	Share of $1 Working Poor in Emp.	$2 Working Poor Low Estimate ('000s)	$2 Working Poor High Estimate ('000s)	$2 Working Poor ILO Estimate ('000s)	Share of $2 Working Poor in Emp.
1980	129108	61066	81015	68932	53.4%	104704	119162	110405	85.5%
1990	169021	83707	110754	94373	55.8%	143681	161053	150531	89.1%
1995	194867	100428	130855	112426	57.7%	165208	187089	173836	89.2%
1996	201166	104011	135275	116339	57.8%	170367	193249	179390	89.2%
1997	206600	105686	137071	118062	57.1%	174876	198026	184005	89.1%
1998	212646	107531	139053	119961	56.4%	179622	203191	188916	88.8%
1999	218748	108983	140621	121459	55.5%	184342	209268	194171	88.8%
2000	224295	112621	145079	125420	55.9%	189446	214807	199447	88.9%
2001	230657	115402	148690	128528	55.7%	194286	220377	204574	88.7%
2002	236178	118322	152305	131723	55.8%	199514	225685	209834	88.8%
2003	241938	120819	156797	135006	55.8%	204855	231704	215443	89.0%
2004	249061	123528	160256	138011	55.4%	209791	238177	220985	88.7%
2005	254460	125745	163357	140577	55.2%	213931	243257	225495	88.6%
2015	328335	158070	206546	177185	54.0%	272455	310855	287597	87.6%

Table 4.15 makes clear the disturbing trends in poverty in sub-Saharan Africa. Rather than the increases in working poverty resulting from some sort of adverse economic or political event, the number of working poor has steadily risen since 1980, and in no year in the 1990s or 2000s has their been a net decline in the number of working poor.

Figure 4.8. Share of $1 and $2 Working Poor in Employment, 1990-2015, Sub-Saharan Africa
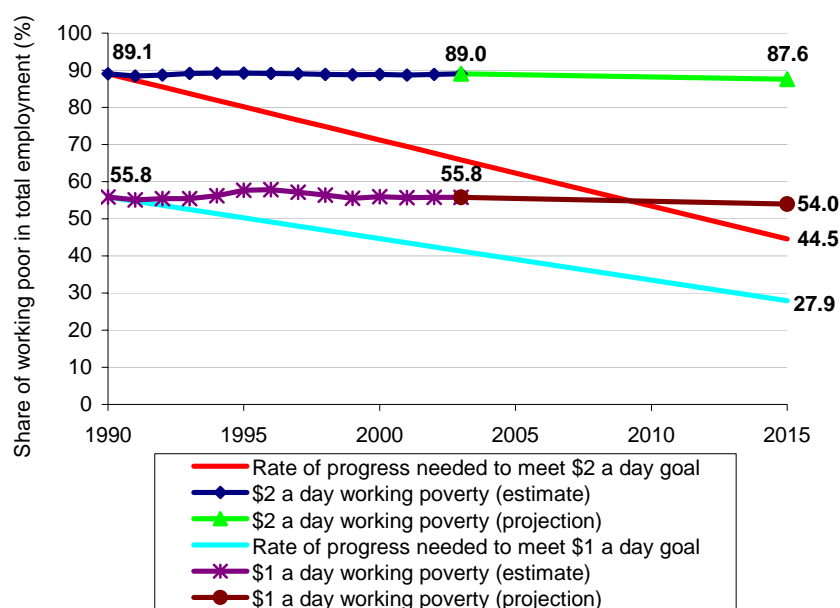
If current economic growth trends continue, sub-Saharan Africa is forecast to make little to no progress toward halving the share of working poor by 2015. Instead, the region is forecast to have a $1 working poverty rate still over 50 per cent in 2015, with the $2 rate still in the 85 to 90 per cent range, as figure 4.8 shows. Given the enormous share of the workforce engaged in low-productivity employment, it is difficult to conceive of how an economic environment conducive to the sustainable generation of higher-productivity employment opportunities could be fostered in sub-Saharan Africa. Yet this is precisely what is needed to begin to improve the lives of the working poor in this region.

Table 4.16. Annual GDP Growth Required to Achieve Targets, Sub-Saharan Africa

Region	Halve $1 Working Poverty Rate	Halve $2 Working Poverty Rate	IMF GDP Growth Rate 1995-2005	IMF GDP Growth Rate 2000-2005
Sub-Saharan Africa	**14.5%**	**42.3%**	**3.7%**	**3.8%**
Eastern Africa	21.6%	38.0%	3.8%	3.1%
Middle Africa	21.5%	34.3%	6.1%	7.9%
Southern Africa	6.1%	48.1%	2.9%	3.0%
Western Africa	19.6%	40.0%	3.9%	4.1%

The sub-regional picture in table 4.16 again reveals substantial differences in terms of forecasts of working poverty, yet one stark commonality among the sub-Saharan African sub-regions is that none of the regions is forecast to have growth rates close to those needed to make substantial reductions in working poverty. Southern Africa, which has only around 2.5 per cent of the region's $1 working poor and 4 per cent of the region's $2 working poor would require a doubling of historical growth rates to halve its share of working poor in employment. In Eastern and Western Africa, together with over 80 per cent of the region's

working poor, the outlook is even bleaker. The economies in Middle Africa have experienced relatively robust GDP growth in recent years, which has contributed to at least a slower rate of growth in working poverty in this sub-region than in the rest of the sub-continent.

5. Conclusions

Given the importance of income from employment for the extreme poor, the estimates and projections of poverty among the world's workers presented in this paper reveal much about the likelihood of reducing poverty in line with the MDGs. While the world as a whole does appear to be on track to reach the MDG on poverty, the trends in working poverty since 1980 point to a profound shift in the overall geographical distribution of poverty. As figure 4.9 shows, whereas East Asia had 50 per cent of the world's $1 working poor in 1980, the region has less than 15 per cent today. Sub-Saharan Africa's weak economic performance has resulted in the region now accounting for over 40 per cent of the world's $1 working poor (figure 4.9).

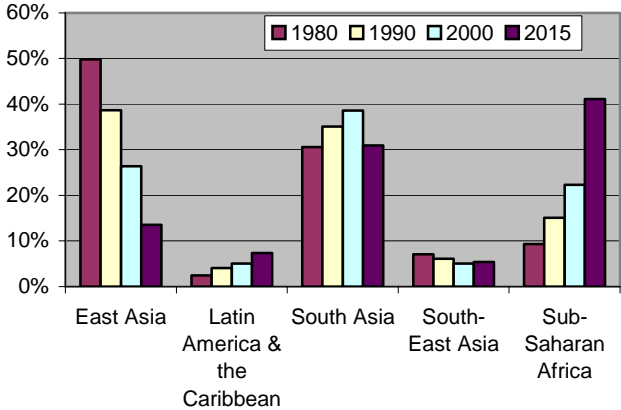**Figure 4.9. Regional Shares of World's $1 Working Poor**

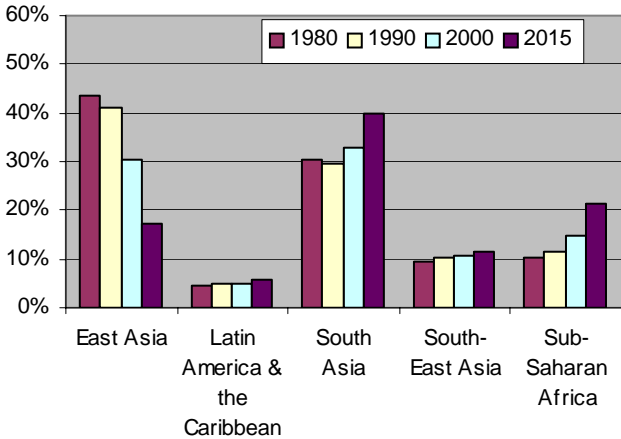**Figure 4.10. Regional Shares of World's $2 Working Poor**

Figure 4.10 shows that most $2 working poverty still remains in South Asia. While the share of these workers in total employment is falling, their absolute numbers will likely continue to rise, and in 2015 South Asia will account for a full 40 per cent of the world's $2 working poor. Yet, while these trends are significant, they only provide rough estimates of the magnitude and distribution of the problem. The real question for policy-makers is what to do about it – that is, how to address the ongoing shift in the global working poverty burden, and how to foster poverty alleviation in regions in which progress has been elusive.

The model presented in this paper has very much focused on the implications of economic growth on working poverty reduction. This very simplified framework is useful in the present context mainly because it allows for the maximum population coverage, which is required for generating reliable world and regional estimates. Yet the emphasis on economic growth as a correlate of working poverty should in no way give the impression that growth alone is the answer to reducing working poverty. Long-run economic growth is itself a function of many variables, including labour productivity, capital formation, health status, demographics, institutional quality, and political stability, just to name a few. The models developed here were not constructed with the notion that they explain all of the variation in the dependent variables of interest, but rather that they do provide results that can serve as a first estimate as to the magnitude of the problem of working poverty in the developing world.

With additional data, several improvements could be made to these estimates. First, it would be useful to examine in greater detail the microeconomic characteristics of the working poor. A careful analysis of household survey data could allow researchers to estimate the labour force participation and unemployment rates of the poor, as well as the poverty rate among the working age population. Given these new pieces of information, much progress could be made in refining the estimates. Second, non-GDP indicators should be incorporated into the Berger and Harasty model to give a clearer picture of what is required to reduce working poverty. While it may well be that GDP growth is the most important factor for reducing working poverty over time, future models of working poverty should strive to explain precisely what "type" of growth is best. That is, is growth accompanied by robust productivity gains what is needed? Is growth with equity the key? These are the questions that should be answered in order to provide policy-makers with a roadmap as to the best ways to address the problem of working poverty. Finally, the present analysis only provides regional aggregate trends, based on country-level data. Policy-makers would benefit from a more detailed evaluation of the trends in working poverty, which could include estimates of working poverty by sector, in rural versus urban areas, as well as estimates of the incidence of working poverty among different demographic groups such as women and youth. These types of more refined data would allow for better targeting of policies aimed at addressing poverty among the world's workers.

Appendix 1. Countries included in analysis

Table A1.1. Countries by KILM Region and Sub-region

Transition Economies	East Asia	Latin America and the Caribbean	Middle East and North Africa	Sub-Saharan Africa Continued

Central and Eastern Europe	China
	Hong Kong
	Korea
	Macau
	Mongolia
		Caribbean
		
		Bahamas
		Barbados
		Dominican
		    Republic
			Middle East
			
			Algeria
			Bahrain
			Iran
			Israel
				Middle Africa
				
				Angola
				Cameroon
				Central African
				    Republic

Albania Bosnia and Herzegovina Bulgaria	**South-East Asia**	Haiti Jamaica Puerto Rico Trinidad and	Jordan Kuwait Lebanon Oman	Chad Congo Congo, D.R. of Equatorial Guinea
Croatia Czech Republic Hungary Poland	*Melanesia* Fiji Papua New	Tobago *Central America*	Saudi Arabia Syrian Arab Republic United Arab	Gabon *Southern Africa*
Romania Serbia and Montenegro Slovakia	Guinea Solomon Islands *South-Eastern*	Belize Costa Rica El Salvador	Emirates West Bank and Gaza Strip Yemen	Botswana Lesotho Namibia
Slovenia Macedonia, TFYR	*Asia* Brunei	Guatemala Honduras Mexico	*North Africa*	South Africa Swaziland
Baltic States	Darussalam Cambodia Indonesia	Nicaragua Panama	Egypt Morocco	*Western Africa*
Estonia Latvia Lithuania	Lao PDR Malaysia Philippines	*South America*	Sudan Tunisia	Benin Burkina Faso Cape Verde
CIS	Singapore Thailand Viet Nam	Argentina Bolivia Brazil	**Sub-Saharan Africa**	Cote d'Ivoire Gambia Ghana
Armenia Azerbaijan Belarus	**South Asia**	Chile Colombia Ecuador	*Eastern Africa*	Guinea Guinea-Bissau Liberia
Georgia Kazakhstan Kyrgyzstan Republic of Moldova	Bangladesh Bhutan India	Guyana Paraguay Peru	Burundi Comoros Eritrea Ethiopia	Mali Mauritania Niger
Russian Federation Tajikistan Turkmenistan	Maldives Nepal Pakistan	Suriname Uruguay Venezuela	Kenya Madagascar Malawi	Nigeria Senegal Sierra Leone
Ukraine Uzbekistan	Sri Lanka		Mauritius Mozambique Rwanda	Togo
			Tanzania Uganda Zambia Zimbabwe	

KILM Regions are in bold. Sub-regions are in italics. These are all countries for which working poverty data are available for at least some of the years under investigation.

Appendix 2. Data coverage by year and region

Table A2.1. Population Coverage of World Bank Poverty Estimates (%)

Year	World Bank Poverty	World Bank Poverty – Post Interpolation
1978	15.4	15.4
1979	0.0	15.5
1980	23.4	38.9
1981	4.3	43.2
1982	0.8	44.0
1983	15.7	44.0
1984	32.3	51.3
1985	6.3	54.9
1986	21.2	58.1
1987	27.8	62.1
1988	25.5	68.3
1989	24.9	69.5
1990	48.8	69.4
1991	4.6	71.7
1992	47.5	72.3
1993	53.6	74.5
1994	46.4	74.8
1995	52.0	75.2
1996	57.0	74.8
1997	46.5	74.3
1998	40.6	71.2
1999	51.2	66.6
2000	18.9	44.0
2001	25.1	28.6
2002	3.5	3.5

Table A2.2. Regional Population Coverage of World Bank Poverty Estimates (%)

Region	1980	1985	1990	1995	2000
Transition Economies	0.0	9.4	0.0	17.3	52.7
East Asia	94.1	0.0	94.2	94.4	0.0
South-East Asia	0.0	13.4	40.8	4.2	65.9
South Asia	0.0	3.2	87.1	85.1	10.1
Latin America and the Caribbean	7.9	33.8	43.9	70.0	32.1
Middle East and North Africa	0.0	11.8	22.7	30.7	21.7
Sub-Saharan Africa	2.6	4.0	0.0	27.1	21.5

Table A2.3. Regional Population Coverage of World Bank Poverty Estimates, Post-Interpolation (%)

Region	1980	1985	1990	1995	2000
Transition Economies	0.0	9.4	85.8	88.9	62.2
East Asia	94.1	94.1	94.2	94.4	94.2
South-East Asia	0.0	71.0	70.7	86.2	65.9
South Asia	76.5	89.0	98.6	98.3	10.1
Latin America and the Caribbean	8.4	66.7	80.7	86.6	66.1
Middle East and North Africa	0.0	11.8	41.2	64.6	21.7
Sub-Saharan Africa	2.6	16.8	41.7	65.1	26.6

Table A2.4. Population Coverage of Working Poverty Estimates by Region, 1980-2015 (%)

Region	1980	1990	2000	2015
Transition Economies	15.0	94.3	100.0	100.0
East Asia	98.2	98.4	98.4	98.4
South-East Asia	72.9	88.2	90.5	90.8
South Asia	98.3	98.7	98.4	97.9
Latin America and the Caribbean	96.9	97.2	97.4	97.8
Middle East and North Africa	83.2	88.0	89.1	87.8
Sub-Saharan Africa	76.6	99.2	99.8	99.9

Table A2.5. Population Coverage of Growth Requirement Estimates by Region (%)

Region	Coverage
Transition Economies	91.3
East Asia	98.4
South-East Asia	88.0
South Asia	98.3
Latin America and the Caribbean	97.5
Middle East and North Africa	87.3
Sub-Saharan Africa	65.0

Appendix 3. Regression results for poverty estimates

Table A3.1. $1 and $2 Poverty Interpolation Results

	$1 Poverty	$2 Poverty
Log Life Expectancy	-5.638 (1.383)**	-4.602 (1.620)**
Constant	19.341 (5.802)**	17.444 (6.795)*
Observations	356	373
R-squared	0.89	0.86

Standard errors in parentheses
* significant at 5%; ** significant at 1%
Coefficients for country dummy variables not shown

Table A3.2. $1 Poverty Regression Results

	Transition Economies	East Asia	South-East Asia	South Asia	Latin America and the Caribbean	Middle East and North Africa	Sub-Saharan Africa
Log GDP per Capita	-0.859 (0.546)	-1.197 (0.083)**	-2.475 (0.186)**	-0.849 (0.250)**	-2.301 (0.333)**	-2.811 (0.632)**	-0.735 (0.274)**
Constant	0.450 (4.969)	5.776 (0.505)**	13.752 (1.142)**	2.654 (1.618)	14.164 (2.032)**	16.455 (4.655)**	3.259 (1.429)*
Observations	214	26	82	76	260	80	193
R-squared	0.68	0.91	0.93	0.90	0.84	0.79	0.93

Standard errors in parentheses
* significant at 5%; ** significant at 1%
Coefficients for country dummy variables not shown

Table A-3.3. $2 Poverty Regression Results

	Transition Economies	East Asia	South-East Asia	South Asia	Latin America and the Caribbean	Middle East and North Africa	Sub-Saharan Africa
Log GDP per Capita	-5.110 (0.634)**	-1.186 (0.182)**	-1.153 (0.204)**	-0.887 (0.320)*	-2.076 (0.455)**	-3.420 (1.582)*	-1.011 (0.445)*
Constant	27.025 (3.472)**	7.813 (1.130)**	7.498 (1.662)**	6.275 (1.696)**	14.396 (3.920)**	23.381 (11.650)	6.456 (2.294)**
Observations	83	14	33	30	111	21	69
R-squared	0.83	0.79	0.95	0.86	0.80	0.76	0.95

Standard errors in parentheses
* significant at 5%; ** significant at 1%
Coefficients for country dummy variables not shown

Appendix 4. Assessment of poverty estimates

Since the country-level poverty rates used in this poverty estimation model are taken from the World Bank's PovcalNet database, which itself is used to produce the World Bank's world and regional poverty estimates, one straightforward way of testing the accuracy of the poverty predictions generated by the model used in this paper is to compare the aggregate post-estimation poverty figures with those published by the World Bank. This exercise is carried out here and the results are given in tables A4.1-3.

Table A4.1 shows that for each of the years in question between 1980 and 2001, the world aggregate poverty estimates produced by the model developed in this paper are within 3 percentage points (and in all cases but one within 1 or 2) of the World Bank's own aggregate estimates, indicating a high degree of agreement between the methodologies and outputs used to produce both sets of estimates. There is, however, a divergence between the two estimates when one looks at the forecasted figures for 2015. There are several potential reasons behind the differences in projection. First, this paper assumes growth between 2005 and 2015 will be the equivalent of the growth that between 1995 and 2005 (the last two years of which are IMF estimates). This contrasts with the World Bank's base-case assumptions, which take a longer-term poverty perspective. The World Bank also provides projections to 2015 based on a low-growth scenario as well as a "future growth equal to growth in the 1990s" scenario. The estimates generated by the model developed for this paper actually are actually lower when compared with these two less optimistic cases. Second, this paper uses the IMF's real GDP growth figures, whereas the World Bank's forecasts are based on the Bank's own GDP figures. Finally, the Bank's estimates incorporate inequality trends, whereas inequality is an (admittedly unfortunate) omitted variable in the present analysis.

Yet in terms of this base case scenario produced by the World Bank, there are reasons to believe that the estimates may be overly optimistic. The Bank estimates that $1 world poverty will fall by 367 million between 2001 and 2015, an annual reduction of 26 million. This is a substantial increase in the rate of poverty reduction from that which occurred in the previous decade, as well as in the decade before that. Between 1990 and 2001, the Bank estimates that 118 million people rose above the $1 poverty line, a reduction of only 10.7 million per year. Thus the Bank's forecasts call for a 143 per cent increase in the rate of $1 poverty reduction.

Table A4.1. Ratio of World Bank to ILO $1 and $2 World Poverty Aggregates, Selected Years

Year	WB $1 Poverty Count	ILO $1 Poverty Count	Ratio of ILO to World Bank $1 Poverty Count	WB $2 Poverty Count	ILO $2 Poverty Count	Ratio of ILO to World Bank $2 Poverty Count
1980	1'451'353	1'440'540	**0.99**	2'419'079	2'384'196	**0.99**
1990	1'218'910	1'188'801	**0.98**	2'688'699	2'632'072	**0.98**
1993	1'205'918	1'175'141	**0.97**	2'759'079	2'720'423	**0.99**
1996	1'074'883	1'080'417	**1.01**	2'664'925	2'641'859	**0.99**
1999	1'117'162	1'093'563	**0.98**	2'730'314	2'749'384	**1.01**
2001	1'100'797	1'079'088	**0.98**	2'732'574	2'743'489	**1.00**
2015	734'000	818'080	**1.11**	2'144'000	2'508'204	**1.17**

As regards a comparison of regional aggregate poverty estimates, while there is less agreement between the estimates on a regional level, the figures are seldom off by an alarmingly large ratio. The two regions with the greatest discrepancies, the Middle East and North Africa and Europe and Central Asia, are actually not homogeneous groups, when one compares the countries included in the Bank's estimates, with the ILO country groupings. This is likely responsible for a substantial share of the discrepancy in these cases.[26] One large difference in the regional data is in the 2015 forecast for East Asia. This is the main region driving the large difference in forecasted poverty rates for 2015 and is likely the result of the three factors described in the discussion of the world poverty aggregate discrepancies above.

Table A4.2. Ratio of World Bank to ILO $1 Regional Poverty Aggregates, Selected Years

	1981	1990	1993	1996	1999	2001	2015
East Asia	1.00	0.97	0.98	0.96	1.06	0.96	2.79
South Asia	0.99	0.99	0.99	1.08	0.97	1.02	0.93
Sub-Saharan Africa	0.92	0.92	0.93	0.97	0.93	0.92	1.03
Latin America and the Caribbean	1.15	1.08	1.02	0.81	0.97	1.08	1.21
Middle East and North Africa	0.74	1.31	1.54	1.18	0.96	1.06	2.01
Europe and Central Asia	4.15	2.54	0.59	0.90	0.90	1.06	1.07

Table A4.3. Ratio of World Bank to ILO $2 Regional Poverty Aggregates, Selected Years

	1981	1990	1993	1996	1999	2001	2015
East Asia	1.00	0.99	1.00	0.99	1.03	1.02	1.65
South Asia	0.98	1.00	1.00	1.02	1.02	1.02	1.07
Sub-Saharan Africa	0.89	0.94	0.95	0.96	0.94	0.93	1.04
Latin America and the Caribbean	1.09	1.05	1.01	1.02	1.00	1.03	1.12
Middle East and North Africa	1.08	1.23	1.24	1.14	1.07	1.11	2.19
Europe and Central Asia	0.69	0.32	0.65	0.74	0.89	0.93	0.62

Tables A4.4-6 evaluate the poverty estimates from another perspective. Whereas previous World Bank world and regional poverty estimates used consumption expenditure per capita as an explanatory variable for poverty, due to the notion that average consumption levels give a clearer picture of the well-being of the poor, this paper uses instead the broader (and more readily available) measure of GDP per capita.

Tables A4.4-6 test whether the use of GDP per capita results in substantially different aggregate poverty estimates than using data on consumption. Table A4.4 shows that, for the world as a whole, there is very little difference (2% or less) between the two estimates, except in the case of the estimates for 2015, where using data on consumption results in higher working poverty estimates.

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[26] It is also the case that the poverty figures in these cases are quite low. For this reason, the ratios can be large, yet the actual difference in the aggregate figures may not be large.

Table A4.4. Ratio of $1 and $2 World Poverty Estimates Using *Per Capita* Consumption versus GDP, Selected Years

Year	ILO $1 Poverty Count Using Per Capita GDP	ILO $1 Poverty Count Using Per Capita Consumption	Ratio	ILO $2 Poverty Count Using Per Capita GDP	ILO $2 Poverty Count Using Per Capita Consumption	Ratio
1980	1'440'540	1'468'518	1.02	2'384'196	2'392'864	1.00
1990	1'188'801	1'192'239	1.00	2'632'072	2'634'550	1.00
1993	1'175'141	1'174'720	1.00	2'720'423	2'714'431	1.00
1996	1'080'417	1'078'429	1.00	2'641'859	2'636'779	1.00
1999	1'093'563	1'091'738	1.00	2'749'384	2'745'775	1.00
2001	1'079'088	1'064'135	0.99	2'743'489	2'721'312	0.99
2015	818'080	916'620	1.12	2'508'204	2'651'982	1.06

Tables A4.5 and A4.6 perform the same test on a regional level. For the most part, there is also little difference in regional poverty estimates, the notable exceptions being the 1981 and 2015 estimate for the Transition Economies and the 1981 estimate for South-East Asia. However, the main cause of these differences is likely the relative lack of consumption data available for these regions. The net result appears to be that the use of GDP per capita does not yield substantially different predictions of aggregate poverty than the use of consumption per capita.

Table A4.5. Ratio of $1 Regional Poverty Estimates Using *Per Capita* Consumption versus GDP, Selected Years

	1981	1990	1993	1996	1999	2001	2015
Transition Economies	0.49	1.03	0.99	1.03	1.02	0.83	2.64
East Asia	1.00	1.00	1.00	1.00	1.00	1.00	1.04
South-East Asia	1.34	1.03	1.01	1.01	1.00	1.01	0.96
South Asia	0.98	1.00	1.00	1.00	1.00	0.97	1.18
Latin America and the Caribbean	1.05	1.06	0.97	0.95	0.95	0.95	0.98
Middle East and North Africa	0.84	0.85	0.81	0.82	0.90	0.91	0.95
Sub-Saharan Africa	1.01	0.99	1.01	1.00	1.01	1.01	1.12

Table A4.6. Ratio of $2 Regional Poverty Estimates Using *Per Capita* Consumption versus GDP, Selected Years

	1981	1990	1993	1996	1999	2001	2015
Transition Economies	0.20	1.01	0.99	1.02	1.01	0.85	2.26
East Asia	1.00	1.00	1.00	1.00	1.00	1.00	1.01
South-East Asia	1.07	1.00	1.00	1.00	1.00	1.00	0.95
South Asia	1.00	1.00	1.00	1.00	1.00	0.99	1.08
Latin America and the Caribbean	1.04	1.05	0.99	0.98	0.97	0.97	1.00
Middle East and North Africa	0.93	0.95	0.95	0.96	0.99	1.00	1.03
Sub-Saharan Africa	1.00	1.00	1.00	1.00	1.00	1.01	1.05

Appendix 5. World and regional aggregation methodology

Working poverty estimates

Country-level working poverty estimates are aggregated in the following manner:

$$WP_{rj} = \frac{\sum WP_{ij}}{\sum SHARE_{ij}} \qquad (16)$$

The number of working poor in region r and in year j is equal to the sum of the number of working poor in all of the countries in the region, WP_i, divided by the sum of the countries' shares of the region's total population for all countries for which a working poverty estimate has been generated. The regional denominators for this calculation are provided in table A.23 above.

Growth requirement estimates

World and regional estimates of GDP growth rates required to halve working poverty are generated by weighting the country-level estimates by the IMF's Shares of Aggregate GDP Based on Purchasing Power Parity (PPP) Valuation of Country GDP indicator.[27]

$$\text{GDP Growth rate in Region r} = \sum GDP_{i} * \left(\frac{PPP_i}{\sum_{i}^{N} PPP} \right) \qquad (17)$$

Within each region, the weight applied to the needed GDP growth rate for country i is equal to the country's PPP-adjusted share of the world's total output divided by the regional sum (among all countries for which there is a GDP growth rate requirement estimate) of the PPP-adjusted share of total world output.

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[27] IMF, *World Economic Outlook 2004 Database.*

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