

EMPLOYMENT PAPER

2002/38

**World and Regional Employment Prospects:
Halving the World's Working Poor by 2010**

Stefan Berger
Bonn University

Claire Harasty
International Labour Office

Employment Strategy Department

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorization, on condition that the source is indicated. For rights or reproduction, or translation, application should be made to the ILO Publications Bureau (Rights and Permissions), International Labour Office, CH-1211 Geneva 22, Switzerland. The International Labour Office welcomes such applications.

Libraries, institutions and other users registered in the United Kingdom with the Copyright Licensing Agency, 90 Tottenham Court road, London W1P 9HE (Fax:+ 44 171 436 3986), in the United States with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 (Fax:+ 1 508 750 4470), or in other countries with associated Reproduction Rights Organizations, may make photocopies in accordance with the licences issued to them for this purpose.

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland. Catalogues or lists of new publications are available free of charge from the above address.

Preface

The work on the working poor was initiated in 2000 as background work for the World Employment Report 2001 by Nomaan Majid and is published as Employment Paper 2001/16. When work on the Global Employment Agenda for Decent Work started in spring 2001, it was felt that additional research had to be carried out in order to estimate what rate of economic growth would be necessary to halve the share of the working poor in employment by 2010. A scenario-building exercise was thus launched, the results of which are presented in this paper.

Based on a comprehensive database, the paper presents new global and regional estimates of employment, unemployment and working poor for 2000, as well as extrapolations of these variables and of GDP growth to 2010 based on three distinct scenarios. The first scenario assumes that labour market conditions will follow in 2000-2010 their historical trend of the 1990s. The second scenario sets the unemployment rate in 2010 at half its 2000 level. And the third scenario assumes that both unemployment and working poor rates in 2010 are half their 2000 levels. The results show that the increase in GDP per capita growth necessary to achieve these labour market targets is significant, of the order of 1.2 per cent globally. Marked regional differences also appear, stressing the fact that the challenges are diverse across the world.

Further work is now necessary to identify the policies that would facilitate this transition to more employment and less poverty throughout the world and contribute to the construction of the Decent Work agenda.

Rashid Amjad
Director a.i.
Employment Strategy Department

Acknowledgements

We thank Ajit Ghose, Peter Richards, Nomaan Majid, David Kucera, Fahrad Mehran, Werner Sengenberger and Martin Godfrey for helpful comments and Natalia Popova for research assistance. We are particularly grateful to Ken Coutts for his contribution on parts of this paper.

Contents

| | | |
|-----------|--|-----------|
| 1. | Introduction | 1 |
| 2. | Data | 1 |
| 3. | Method | 2 |
| 3.1 | Aggregation method for world and regional estimates | 2 |
| 3.2 | Estimation of the working poor population at the country level | 2 |
| 3.3 | Relationship between productivity and working poor growth | 3 |
| 4. | Extrapolating employment trends to 2010 | 4 |
| 4.1 | The three scenarios | 4 |
| | (a) Baseline scenario for 2000-2010: an extrapolation of current trends | 4 |
| | (b) The intermediary scenario (1): fall in unemployment rate by half over ten years | 4 |
| | (c) The decent work scenario (2): fall in unemployment rate and in the proportion of the working poor by half over ten years | 4 |
| 4.2 | Formal relationship between productivity growth and the working poor | 4 |
| 4.3 | Schematic representation of the scenarios | 5 |
| 5. | Empirical results: patterns and trends of employment and working poor and GDP growth forecasts | 7 |
| 5.1 | World employment trends | 7 |
| | (a) Implications of faster country-level rates of productivity growth for world employment | 8 |
| | (b) Regional distribution of labour force, employment and unemployment: current situation and prospects for 2010 | 8 |
| 5.2 | Regional and sub-regional employment scenarios | 9 |
| | (a) Sub-Saharan Africa | 10 |
| | (b) Latin America and the Caribbean | 10 |
| | (c) Asia and the Pacific | 12 |
| | (d) Middle East and North Africa | 13 |
| | (e) Transition Economies | 13 |
| 6. | Conclusion | 13 |
| | References | 17 |
| | Annexes: | |
| | Annex A: Countries included in the aggregates of the population, GDP, employment poverty data | 19 |
| | Annex B: Aggregation method for regional and world estimates | 20 |
| | Annex C: Coverage of the Chen and Ravallion data set | 22 |
| | Annex D: Formal relationship between working poor and productivity | 23 |
| | Annex E: Employment situation in circa 2000 | 26 |
| | Annex F: Estimates of the working poor | 27 |
| | Annex G: Summary table of world and regional aggregates | 28 |
| | Endnotes | 31 |
| | Tables | |
| | Table 1: World employment trends under baseline scenario | 8 |
| | Table 2: Regional distribution of labour force, employment and unemployment (%) | 9 |
| | Table 3(a): Regional employment scenarios: Labour force, employment and GDP growth | 11 |
| | Table 3(b): Regional employment scenarios: Unemployment, and working poor rates | 12 |
| | Table 4: Summary of the key figures of the trend projections | 14 |
| | Figures | |
| | Figure 1: Scenario 1: baseline | 6 |
| | Figure 2: Scenario 2: reduce unemployment | 6 |

1. Introduction

Prospects for the world economy are the subject of much debate and controversy. Indeed, it is extremely difficult to forecast future trends with accuracy and this applies even more to employment trends. The world has set itself a target of reducing poverty by half by 2015 and various exercises provide estimates of GDP growth rates needed to achieve the target¹. These exercises, however, never take the employment variable into account. But because work is often the only source of income for the poor, poverty has a direct relationship to employment: it results from, on the one hand, long-term unemployment in industrialised countries and, on the other hand, low-productivity employment in developing countries². Therefore, achieving the poverty target implies achieving a reduction of unemployment and low-productivity employment. In this paper, we address the poverty challenge in those terms. We differ from previous work done on this issue by looking only at the working-age poor population. The paper attempts to show, based on a number of working assumptions, what are the growth requirements to halve both unemployment and low-productivity employment by the end of this decade.

In order to do this, the paper presents three scenarios for future employment and GDP growth at the global and regional level. First, employment, unemployment, low-productivity employment (hereafter referred to as working poor), output per worker and GDP growth data are presented for 2000 and extrapolated to 2010 using the historical trends (baseline scenario). Second, an intermediary scenario assumes that country-level unemployment rates are halved over ten years. This gives the employment growth rate for 2000-2010 and, assuming constant productivity growth, the GDP growth rate for the same period. In the third scenario, both unemployment rates and the share of the working poor in total employment are halved over a ten year period. These three scenarios thus show a range of possible employment situations depending on policy choices.

We develop a methodology to estimate the regional and global aggregates for employment and for the working poor as well as for the relationship between output per worker (or productivity) and working poor (or low-productivity employment).

There are numerous limitations to this work – data quality being the major one – and simplifying assumptions had to be made to arrive at certain estimates, in particular concerning the working poor. The reader must be warned that all the numbers presented at the regional and world levels are crude estimates based on incomplete country-level data and meant only to give an idea of the magnitude of the employment problem facing policy makers in the next decade.

2. Data

Data on the labour force for 1990 and 2000 is provided by the ILO statistics department (*LABPROJ*). It is based on the official UN population data to which labour force participation rates are applied. For 2000, the projections are based on the 1995 participation rates. Data coverage is 100% of world population.

Data on employment and unemployment for circa 1990 and circa 2000 is provided by the ILO Statistics Department (*Laborsta*) and the Employment Strategy Department (*Key Indicators of the Labor Market*). Numerous problems arise in using this data in cross country samples as the coverage and the source often differ between countries. After selecting only those countries for which there is comparable data, the coverage reaches approximately 80% of the world population.

Data on GDP for 1990 and 1999 is provided by the World Bank *World Development Indicators 2001*. GDP at market prices at constant 1995 US Dollars is used to calculate the

average annual growth rate of GDP between 1990 and 1999. Data coverage is higher than for employment data.

Data on poverty is taken from Chen and Ravallion (2000). It is based on household surveys and uses the \$1 a day poverty line. They provide estimates for 1987, 1990, 1996 and 1998 using distributions from 265 national surveys from 83 countries representing 88 per cent of the total population of the developing world.

3. Method

3.1 Aggregation method for world and regional estimates

We have assembled data for labour force, employment, unemployment and the working poor over the 1990s and constructed world, regional and sub-regional estimates of absolute employment, unemployment and working poor levels, and of employment, GDP and productivity growth rates. All these aggregates are derived from country-level data.

Time series of sufficient length and quality vary between countries and between series. The GDP and the labour force data are complete for almost all countries. This is not the case for the employment data, where there are fewer time series of sufficient quality. Therefore, statements about regional or global aggregates have to be derived from countries for which the data set is complete for labour force, employment and/or GDP. We assume countries for which we have data to be a representative sample of all the countries within one region.

Regional employment growth is estimated by aggregating country-level employment growth rates, weighted by their share in the world labour force. We only use the countries with data on both employment and GDP. It is implicitly assumed that participation rates do not vary too much between countries in one region, so that basing the weights on labour force instead of employment does not incur a significant error. The detailed method is presented in the annex [Annex B].

Regional poverty aggregates are taken from Chen and Ravallion (2000). The list of countries they used is presented in the annex [Annex C]. The regional working poor aggregate is then derived using the regional poverty and employment aggregates. Annex E shows the results of this exercise.

3.2 Estimation of the working poor population at the country level

The working poor are defined by the ILO as those who work *and* belong to poor households (Majid 2001). There are no direct estimates of the working poor and we do not have statistics showing the joint distribution of poverty and employment. Thus we do not know whether there is a higher incidence of poverty among the employed than among the general population; or whether the poor are more or less likely to be unemployed or out of the labour force altogether. But some idea of the size of the working poor population may be obtained by making assumptions about the labour market characteristics of the poor.

Majid (2001) assumed that the poor have the same participation and employment rates as those above the poverty threshold³. This means that there is no correlation between employment and poverty and gives a lower bound estimate of the working poor population. We refer to this assumption as **L**. For an upper bound, we assume that all the poor of working age who are able to work do work, so that there is a strong positive correlation between employment and poverty. In this case, the poor have unit participation and employment rates. We refer to this assumption

as U .⁴

We define

| | |
|--------|--------------------|
| WP | total working poor |
| $POOR$ | total poor |
| POP | total population |
| EMP | total employment |

Then

$$WP_L = POOR \times \frac{EMP}{POP}$$

$$WP_U = POOR \times \frac{POP_{15-64}}{POP}$$

These two definitions give two extreme estimates of the working poor and in the absence of empirical evidence it may be reasonable to assume that the true size of the working poor population falls within the range given by those two bounds. Annex F shows the results of this exercise.

3.3 Relationship between productivity and working poor growth

Total employment can be decomposed in the working poor – referred to here as the *low productivity jobs* – and employment held by the non-poor, calculated as the residual and called productive employment – sometimes referred to as the *high productivity jobs*.

Our target in this exercise is to reduce low productivity employment. This is why we have chosen to use the relationship between productive employment and GDP growth rather than between the growth of total employment and GDP growth to project employment trends. Since productive employment is merely the difference between total employment and the size of the working poor and since the size of the working poor is deducted from poverty figures, one would suspect a close relationship between the poverty elasticity to growth and the productive employment elasticity to growth. This relationship is investigated in annex D, where the implications of a constant productive employment elasticity to growth on the poverty elasticity to growth are worked out. The poverty elasticity is then expressed as a function of the productive employment elasticity, labour market participation rate of poor and non-poor and of population and GDP-growth.

The results show that when productive employment responds positively to output growth, then poverty declines. Moreover, for every percentage point increase of output, the decline in poverty will be higher than the increase in productive employment. Finally, a broad labour market participation – indicated by a high employment to population ratio – is beneficial in the sense that it leads to a higher reduction of poverty incidence for any given output growth. However, a higher employment to population ratio for the poor means that the poverty elasticity to growth will be lower since a larger part of total employment is in low-productivity jobs held by the poor.

The separation of total employment into high and low productivity employment also serves as an upper bound and consistency check for the assumption that the poor have a participation and employment rate of one, since the number of working poor can not exceed the total number of employed.

4. Extrapolating employment trends to 2010

Our database provides a snapshot of the employment situation in 2000, globally, regionally, sub-regionally and nationally. The regional and sub-regional groupings illustrate the differences that arise between geographical areas, highlighting the diversity in the nature and magnitude of the employment problem encountered. From that basis, three exercises are carried out to project employment trends to 2010.

4.1 The three scenarios

(a) *Baseline scenario for 2000-2010: an extrapolation of current trends*

In this scenario, it is assumed that employment and output per worker will grow at the same rate as in the 1990s. Using the historical trends to project the various variables to 2010, this scenario gives an idea of the nature and the magnitude of the employment problem by 2010 if the current trend remains unchanged. It also highlights the regional differences in the employment challenge.

(b) *The intermediary scenario (1): fall in unemployment rate by half over ten years*

This scenario explores the implications of a faster rate of employment growth in the first decade of the 21st century that would halve the country-level unemployment rates, given the projected growth of the labour force and the country-level productivity growth of the 1990s⁵. The share of the working poor is assumed to remain constant. It is also assumed that employment does not fall in countries where the decreasing rate of growth of the labour force would result in a negative employment growth rate. In those cases, employment growth is set equal to zero. The scenario derives the associated growth rate of GDP that this unemployment target entails.

(c) *The decent work scenario (2): fall in unemployment rate and in the proportion of the working poor by half over ten years*

This scenario shows what growth rates of GDP would be needed to deliver both a halving of the unemployment rate and a halving of the share of the working poor in employment. The first objective sets the assumption on employment growth for a given growth rate of the labour force, the second on productivity growth, based on the methodology briefly described below (and in more details in annex D) on the relationship between productivity growth and the share of working poor in employment.

4.2 Formal relationship between productivity growth and the working poor

Define

u unemployment rate

w working poor rate

LF labour force

| | |
|------|--|
| TE | total employment |
| WP | working poor |
| PE | productive employment |
| e | elasticity of productive employment growth to GDP growth |

Then

$$TE = (1 - u)LF = PE + WP \Leftrightarrow PE = (1 - u)LF - WP \quad (1)$$

$$WP = wTE \quad (2)$$

Inserting (2) in (1) gives

$$PE = (1 - u)(1 - w)LF \quad (3)$$

These three equations explain how the scenarios were generated. First, unemployment (u) and working poor (w) rates are fixed – either at the same rate as in 2000 (baseline scenario) or at half the 2000 rate (intermediary and decent work scenarios). Using the projection of the labour force for 2010, u and w give the number of productive jobs (PE) in 2010. The projected growth rate of the number of productive jobs associated with the elasticity of productive employment to GDP yield the GDP growth rate for 2010.⁶

$$G\dot{D}P = \frac{P\dot{E}}{e}$$

4.3 Schematic representation of the scenarios⁷

Figure 1 illustrates the relationships among the main labour market variables discussed in the scenarios. For convenience, the vertical scale is measured in proportional units (by using a logarithmic scale). Linear projections imply constant rates of growth of the variables. In the example illustrated in figure 1, the growth rates of the labour force and of employment are identical so that the unemployment rate does not change significantly over the ten year period.

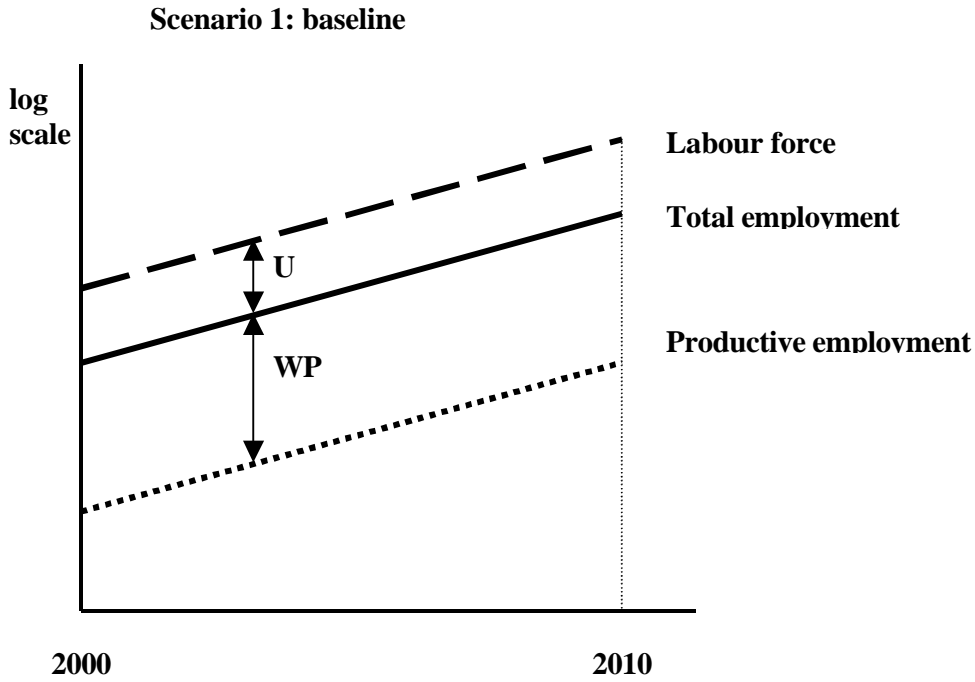


Figure 2 has the same growth rate of labour force as in figure 1, but a higher growth rate of total employment, so that unemployment decreases over the ten-year period. In the illustration, the proportion of the working poor in total employment is unchanged and hence productive employment has the same growth rate as total employment. The growth rate of output inferred from productivity trends will be higher in this scenario than under figure 1.

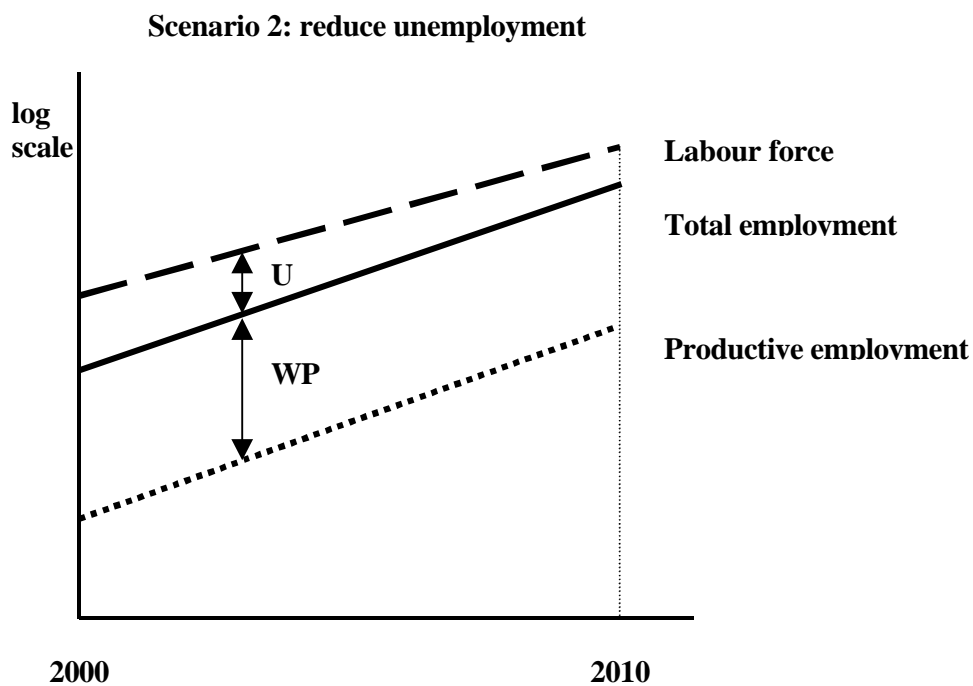
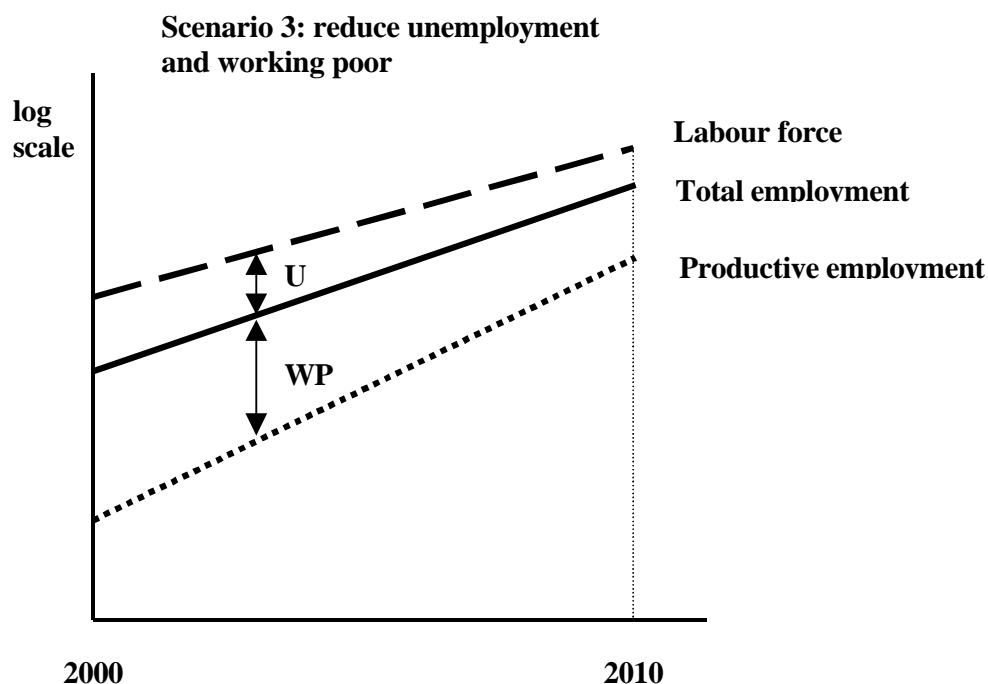


Figure 3 has the same growth rate of the labour force and total employment as in figure 2, but the proportion of the working poor is reduced to half its initial value by 2010. This requires a faster expansion of *productive* jobs. The growth rate of output will be higher in this scenario than under figure 2.



5. Empirical results: patterns and trends of employment and working poor and GDP growth forecasts

5.1 World employment trends

During the 1990s, world labour force grew at an annual average rate of 1.7 %, compared with a world employment growth rate of only 1.4 %. As a result, the world unemployment rate rose during the decade to over 6 % in 2000 and the number of unemployed exceeded 180 million. At the same time, the number of working poor increased in low income countries where they are estimated to represent approximately 30% of those in employment (between 20 and 27 per cent of those in employment worldwide). Underlying these problems was a low rate of growth of productivity, averaging 1.1 per cent annually for the world as a whole. The urgent priority in the coming decade is to combine the creation of a large number of jobs to decrease the unemployment rate with a reduction in the number of working poor and an increase in the quality of employment.

If current trends are maintained, the employment prospect for 2010 does not look bright. With labour force being projected to grow at 1.4 % per annum during the first decade of the 21st century, the unemployment rate would rise to 7 % and the number of unemployed to 239 million worldwide. The incidence of working poverty, however, would decrease to 15 to 19 per cent of total employment.

Table 1: World employment trends under baseline scenario

| | Labour Force Growth | Employment Growth | Unemployment Rate | Unemployment (millions) | Working Poor Rate | Working Poor (millions) |
|------|---------------------|-------------------|-------------------|-------------------------|-------------------|-------------------------|
| 2000 | 1.69 | 1.36 | 6.1% | 181 | 20.1 | 542.3 |
| 2010 | 1.45 | 1.36 | 7% | 239 | 14.5 | 461.1 |

Source: Authors

(a) *Implications of faster country-level rates of productivity growth for world employment*

S *The intermediary scenario: fall in unemployment rate by half over ten years*

Given country-level employment growth rates that reduce the unemployment rates by half, the intermediary scenario projects an average world employment growth rate of 1.6 per cent per annum between 2000 and 2010 and an average GDP growth rate of 2.2 per cent annually. This allows unemployment rates to be cut by half and a fall in the number of unemployed to around 105 million. The share of the working poor in total employment remains equal to the 2000 share which means, in reality, an increase in absolute numbers from 542 million in 2000 to 639 million in 2010.

S *The decent work scenario : fall in unemployment rate and in the proportion of the working poor by half over ten years*

The GDP growth rate associated with a halving of country-level unemployment rates and of the country-level shares of working poor in employment is 3.4 per cent annually over ten years. The number of working poor would then decrease to 321 million in 2010, down from 542 million in 2000.

(b) *Regional distribution of labour force, employment and unemployment: current situation and prospects for 2010*

More than half of the world's labour force and employed are in Asia and it will remain so by 2010. China by itself accounts for 1/4 of the world's labour force and employed. The other developing regions (Sub-Saharan Africa, the Middle East and North Africa and Latin America) account for another fourth of the world's labour force and employed and this share will increase by 2010. The industrialized countries and transition economies make up the remaining fourth, but their share will decrease by 2010. (Table 2)

Under current trends, by 2010 the bulk of the jobs will be created in Asia (70%), Sub-Saharan Africa (16%) and Latin America (12%). The quality of those jobs will mainly be very low. Asia appears to be the most dynamic region with robust job creation and decreasing unemployment. The transition economies on the contrary will witness a net destruction of jobs (-7%). As a result, the share of the region in world unemployment will increase from 13.4% in 2000 to 25.4% in 2010. The industrialized countries will see their share in total unemployment decrease significantly from 17.8% in 2000 to 4.7% in 2010 thanks mainly to a decreasing labour force. (Table 2)

Table 2: Regional distribution of labour force, employment and unemployment (%)

| | Labour Force | | Employment | | Unemployment | |
|---|--------------|-------------|-------------|-------------|--------------|-------------|
| | 2000 | 2010 | 2000 | 2010 | 2000 | 2010 |
| Asia and the Pacific | 56.7 | 56.8 | 57.5 | 59.1 | 43.5 | 25.6 |
| East and South-East Asia, excluding China | 10.2 | 10.5 | 10.1 | 10.8 | 11.7 | 7.2 |
| China | 25.9 | 24.2 | 26.2 | 25.5 | 21.1 | 6.9 |
| South Asia | 20.4 | 21.8 | 21.0 | 22.8 | 11.0 | 7.9 |
| Pacific Islands | 0.2 | 0.2 | 0.2 | na | 0.1 | na |
| Latin America and the Caribbean | 7.5 | 7.9 | 7.3 | 7.9 | 11.3 | 8.5 |
| Caribbean | 0.6 | 0.6 | 0.5 | 0.6 | 1.3 | 0.5 |
| Central America | 1.9 | 2.1 | 1.9 | 2.2 | 1.3 | -0.1 |
| South America | 5.1 | 5.3 | 4.8 | 5.1 | 9.0 | 7.9 |
| Middle East and North Africa | 4.0 | 4.7 | 3.8 | 4.1 | 6.4 | 13.2 |
| Middle East | 1.8 | 2.3 | 1.9 | na | 1.7 | na |
| North Africa | 2.1 | 2.5 | 2.0 | 2.2 | 4.6 | 6.5 |
| Sub-Saharan Africa | 9.3 | 10.3 | 9.4 | 10.2 | 7.5 | 10.9 |
| Industrialised countries | 15.1 | 13.6 | 14.9 | 14.3 | 17.8 | 4.7 |
| Major Europe | 6.1 | 5.3 | 5.9 | 5.4 | 9.7 | 4.0 |
| Major non-Europe | 7.8 | 7.1 | 7.9 | 7.7 | 6.6 | -1.1 |
| Other | 1.2 | 1.2 | 1.2 | 1.2 | 1.5 | 1.3 |
| Transition economies | 7.1 | 6.4 | 6.7 | 5.0 | 13.4 | 25.4 |
| Eastern Europe | 2.2 | 1.9 | 2.0 | 1.8 | 4.6 | 3.6 |
| CIS | 4.9 | 4.5 | 4.6 | 3.2 | 8.8 | 21.5 |

Source: Authors

Note: Data for 2010 based on baseline scenario.

Source: Authors.

5.2 Regional and sub-regional employment scenarios

Most of the new jobs that will need to be created by 2010 will be located in developing countries and under current trends, the developing countries' share in total employment will increase substantially to reach 81.3 per cent of world employment in 2010 (Table 2). The bulk of the unemployment problem will be in the transition countries and the MENA region, while the rest of the world will be confronted with the problem of low quality, low productivity jobs and poverty in employment. So clearly, the challenges vary from one region to another and only a regional and sub-regional analysis of employment trends can give an adequate picture of the challenge ahead. Table 3 summarizes the regional employment scenarios.

(a) Sub-Saharan Africa

During the 1990s, employment and GDP growth in Sub-Saharan Africa were 2.2 and 2.3 per cent respectively. The unemployment rate in 2000 is estimated at 4.9 per cent of the labour force. Productivity growth in 1990-2000 was 0.09 per cent. The share of the working poor in total employment is between 46 per cent at the lower bound and 62 per cent at the upper bound in 1998. In other words, the growth process in Sub-Saharan Africa is employment-intensive, but the jobs created are not very productive, mostly located in the informal sector, and do not permit those who work to lift their families above the poverty line.

If current trends continue, the region will see its unemployment rate rise to 7.4 per cent in 2010 and 26 million people will be unemployed, twice more than in the 1990s. What is more likely to occur, in fact, is a slowing down of productivity growth and the new entrants into the labour market joining the ranks of the informal sector.

Under the intermediary scenario, the country-level unemployment rates are halved, which is consistent with a growth rate of employment of 2.7 per cent per annum and a GDP growth of 2.4 per cent under the lower bound assumption. By assumption, the number of working poor remains constant. In order to both half the unemployment and working poor rates at the country-level, regional GDP growth would need to be 5.1 per cent annually between 2000 and 2010 under the lower bound assumption and 9.8 per cent under the upper bound assumption. Clearly, Sub-Saharan Africa is facing an immense challenge if the decent work targets are to be attained and the poverty problem addressed.

(b) Latin America and the Caribbean

In Latin America and the Caribbean in the 1990s, annual employment growth averaged 2.1 per cent, below the rate of increase of the labour force of 2.4 per cent. The resulting unemployment rate in 2000 is 9.2 per cent and the number of unemployed exceeded 20 million. GDP and productivity growth during the last decade were 3.2 and 1 per cent respectively. The share of the working poor in total employment is between 16 and 25 per cent in 1998.

The Caribbean fared better than the other two sub-regions during the 1990s with a rate of increase of employment higher than labour force and a GDP growth higher than in Central and South America. Central America had a low rate of growth of productivity (0.3 per cent), which when mirrored with the unemployment rate of 4.2 per cent shows that employment creation in that sub-region took place mainly in the low productivity informal sector. The other two sub-regions on the contrary have relatively high unemployment rates: 13.3 per cent in the Caribbean and 10.8 per cent in South America, reflecting the polarisation of the labour market between the working poor (11.2 and 17.8 per cent respectively under the lower bound assumption) and the unemployed.

If current trends continue, the rate of growth of employment in the region will overpass the rate of growth of labour force in the first decade of the 21st century, which by itself will bring down the unemployment rate to 7.5 per cent in 2010. But the number of unemployed will remain above 20 million. This will be due to South America where the unemployment rate will not decrease much as employment and labour force growth will be more or less equal, 1.86 and 1.81 per cent respectively. Under this baseline scenario, the Caribbean sees its employment situation improve significantly, the unemployment rate decreasing to 6.4 per cent in 2010 and the number of unemployed diminishing by half. But in Central America, the slowing down of labour force growth will result in a theoretical 0 unemployment rate and will in fact require to either increase participation rates or to use migrant labour, the deficit being 154 thousand workers by 2010.

Under the intermediary scenario, the region would have to grow at its historical rate of GDP growth of 3.2 per cent over ten years to reduce the country-level unemployment rate by half and bring the number of unemployed to 12.5 million. But if the target of halving the proportion of working poor is to be reached, GDP needs to grow at between 4.2 and 4.9 per cent annually between 2000 and 2010.

At the sub-regional level, The Caribbean and South America will have to accelerate the rate of growth of GDP over the next decade just to halve their unemployment rate. So the effort needed to also bring down the number of working poor is potentially impossible to make. Central America does not have a big unemployment problem and a rate of growth of GDP lower than the historical rate would be sufficient to halve it. However, the poverty-productivity problem in Central America is very acute and even though we do not have estimates of the rate of growth needed to halve the proportion of working poor, we expect it to be very high.

Table 3(a): Regional employment scenarios: Labour force, employment & GDP growth

| | Labour force growth 2000-2010 | Employment growth 2000-2010 | | GDP growth 2000-2010 | | | | |
|---|-------------------------------------|--------------------------------|-------------|-------------------------|-------|-------|-------|-------|
| | | Baseline | (1) and (2) | Baseline | (1) | | (2) | |
| | | | | | Lower | Upper | Lower | Upper |
| | | | | | | | | |
| Sub-Saharan Africa | 2.5% | 2.2% | 2.7% | 2.3% | 2.4% | 3.4% | 5.1% | 9.8% |
| Latin America and the Caribbean | 2.0% | 2.1% | 2.4% | 3.2% | 3.2% | 3.1% | 4.2% | 4.9% |
| China | 0.8% | 1.1% | 1.1% | 9.9% | 3.6% | 2.6% | 6.7% | 5.0% |
| East and South-East Asia, excluding China | 1.8% | 2.0% | 2.2% | 5.0% | 3.4% | 3.1% | 4.3% | 4.2% |
| South Asia | 2.1% | 2.2% | 2.3% | 5.2% | 3.8% | 3.0% | 7.9% | 8.5% |
| Middle East and North-Africa | 3.2% | 2.0% | 3.8% | 2.9% | 4.6% | 4.6% | 4.7% | 4.8% |
| Transition Economies | 0.4% | -1.6% | 0.9% | -1.8% | 0.5% | 0.4% | 0.7% | 0.7% |

Source: Authors

Table 3(b): Regional employment scenarios: Unemployment & working poor rates

| | Unemployment | | | Working poor, share in total employment | | | |
|----------------------------------|------------------|------------------|------------------|---|-------|-------|-------|
| | 2000 | 2010 | | 2010 | | | |
| | | Baseline | (1) and (2) | Baseline | | (2) | |
| | | | | Lower | Upper | Lower | Upper |
| Sub-Saharan Africa | 13507 (4.9%) | 26028 (7.4%) | 7981 (2.3%) | 44.2% | 63.5% | 22.1% | 31.8% |
| Latin America and the Caribbean | 20'512 (9.2%) | 20'353 (7.5%) | 12'570 (4.6%) | 13.7% | 22.8% | 6.9% | 11.4% |
| China | 38237 (5.0%) | 16'420 (2.0%) | 20'693 (2.5%) | 0.0% | 0.0% | 0.0% | 0.0% |
| South-East Asia, excluding China | 21135 (7.0%) | 17'103 (4.7%) | 12'847 (3.6%) | 0.0% | 0.0% | 0.0% | 0.0% |
| South Asia | 19882 (3.3%) | 18'924 (2.5%) | 12'400 (1.7%) | 33.4% | 46.0% | 16.7% | 23.0% |
| Middle East and North-Africa | 11559 (9.8%) | 31584 (19.4%) | 11867 (7.3%) | 1.3% | 2.6% | 0.7% | 1.3% |
| Transition Economies | 24295 (11.6%) | 60794 (27.8%) | 12724 (5.8%) | 10.3% | 17.1% | 5.2% | 8.6% |

Source: Authors

(c) Asia and the Pacific

During the 1990s, employment and GDP growth were 1.6 and 6.4 per cent respectively in the region. Productivity growth was high at 4.8 per cent per annum on average. This is due mainly to China's performance in the 1990s: 8.8 and 9.9 per cent productivity and GDP growth respectively. In 2000, unemployment in the region is 4.7 % of the labour force, which amounts to a number of unemployed of close to 79 million. The share of the working poor in employment is high, mainly because of South Asia, which has between 40 and 56 per cent of those employed who are poor. East and South-East Asia, excluding China, has between 11 and 16 per cent of working poor, with an unemployment rate of 7 per cent.

In Asia and the Pacific, the prospects are good. If current trends continue, employment growth will be higher than labour force growth in the three sub-regions, which will result in a lower unemployment rate in 2010 than in 2000 (3.2 instead of 4.7 per cent) and the number of unemployed will go down to approximately 61 million. China will register the biggest decrease in unemployment, followed by East and South-East Asia. In South Asia, the unemployment rate will decrease from 3.3 to 2.5 per cent, but the absolute number of unemployed will not decrease much, from 19.9 to 18.9 million.

The intermediary scenario is not very relevant for the region as unemployment is not a challenge in Asia and the Pacific. The Decent Work scenario, on the contrary, shows that the rate of growth of GDP has to be increased substantially in South Asia in order to tackle the poverty in employment problem. China should keep up with a high rate of growth of GDP (between 5 and 7 per cent) to reduce its number of working poor by half.

(d) *Middle East and North Africa*

Employment growth was 2.2 per cent in the 1990s, significantly below labour force growth. The number of unemployed reached 11.5 million in 2000, 9.8 per cent of the labour force. Most of the unemployed are in Northern Africa, while the Middle East registers only 5.5 per cent unemployment. GDP growth in the region was 2.9 per cent in the 1990s and productivity growth 0.7 per cent. The share of the working poor in total employment is between 2 and 3 per cent in 1998.

Employment prospects for 2010 are gloomy. If current trends continue in the first decade of the 21st century, the unemployment rate will rise to 19.5 per cent and the number of unemployed to 31.5 million.

Under the intermediary scenario, GDP growth would need to be 4.6 per cent annually between 2000 and 2010, which is consistent with a growth rate of employment of 3.8 per cent. To both half unemployment rates and the share of the working poor in employment, a GDP growth of 4.7 to 4.8 per cent is required.

(e) *Transition economies*

In the transition countries of Europe and Central Asia, the main problem in 2000 is negative employment and GDP growth between 1990 and 2000, which brought about declining productivity. The unemployment rate is 11.6% in 2000 and the number of unemployed exceeds 24 million. Between 5 and 8.5 per cent of those working were poor in 1998.

If current trends continue, unemployment will increase to 27.9 per cent of the labour force, despite the sharp reduction in labour force growth between 2000 and 2010. This will bring up the number of unemployed to almost 61 million. The problem here, therefore, is both one of employment creation to go back to a positive rate of growth of employment and one of going back to positive productivity growth to avoid creating low quality jobs that would swell the working poor population.

Under the intermediary scenario, an average annual growth rate of GDP of 0.5 per cent would allow to decrease unemployment by half by 2010, up from -1.8 per cent per annum in the 1990s. But the projected expansion of employment would be primarily still in low productivity, low income jobs. To reduce both unemployment poverty in employment rates by half over ten years, GDP must grow at least at 0.7 per cent annually.

6. Conclusion

Using projections of the labour force, we projected employment to 2010 using the historical

growth rates of the 1990s. We then deducted the level of unemployment and the associated rate of growth of output for each major region and the world as a whole.

Table 4 summarizes the key features of the trend projections based on the assumption that the poor have the same participation and employment rates as the general population and with an aggregate global figure of working poor of 542 million in 1998. Given that this is the lower bound assumption for estimating the working poor, the figures in Table 4 are on the optimistic side.

Table 4: Summary of the key features of the trend projections

| | Situation in circa 2000 | | | | Baseline scenario (Trend extrapolation of total and of productive employment growth) | | Historical GDP per Capita growth 1990-1999 | GDP per Capita growth associated with achieving labour market targets | |
|---|-------------------------|---------------------------|----------------|--------------------------|---|----------------------|--|---|--|
| | Unemployment | | Working Poor | | Unemployment rate | Working Poor rate | | (1) Halving of unemployment rates and constant working poor rate | (2) Halving of unemployment rates and halving of working poor rates |
| | rate (1999) | in millions; (1998) | rate (1998) | in millions (1998) | 2010 | 2010 | | 1998-2010 | 1998-2010 |
| Sub-Saharan Africa | 4.9% | 12.9 | 46.3% | 115.3 | 7.3% | 44.2% | -0.3% | 0.1% | 2.8% |
| Latin America & the Caribbean | 9.2% | 19.7 | 15.6% | 30.3 | 7.3% | 13.7% | 1.5% | 1.8% | 2.8% |
| China | 5.0% | 37.4 | 18.5% | 131.5 | 2.0% | 0% | 8.8% | 2.8% | 5.9% |
| South Asia | 3.3% | 19 | 40.0% | 223.2 | 2.5% | 33.4% | 3.3% | 2.2% | 6.3% |
| East and South-East Asia, excluding China | 7.0% | 20.3 | 11.3% | 30.5 | 4.7% | 0% | 3.3% | 2.1% | 3.0% |
| Middle East and Northern Africa | 9.8% | 11.1 | 2.0% | 2 | 19.6% | 1.3% | 0.9% | 2.9% | 3.0% |
| Transition Economies | 11.6% | 25 | 5.1% | 9.8 | 26.4% | 10.3% | -1.4% | 0.5% | 0.7% |
| World | 6.1% | 175.5 | 20.1% | 542.3 | 7.0% | 14.5% | 1.0% | 1.0% | 2.2% |

Source: Authors

The growth rates of total and of productive employment have greatly varied among the regions during the last decade. Consequently, the employment prospects in these regions take very different paths when the 1990s' trends are extrapolated. While poverty in employment would be eliminated in China and East-Asia, there would only be small reductions of the working poor rates in Sub-Saharan Africa, Latin America and South Asia. (Table 4)

In scenario 1 (fall in unemployment rate by half over ten years with constant working poor rate), the additional jobs that need to be generated over ten years require only a small increase in annual growth rates, but leave a very high proportion of global employment at poverty rates of income. At the regional level, the GDP per capita growth rates associated with this scenario do not exceed 3 % in any of the regions, but they necessitate an increase over the historical growth rates of the nineties for all the regions, except East Asia. (Table 4)

In scenario 2, the additional objective of reducing the proportion of working poor by half over ten years gives a required growth rate of productive employment that is higher than under scenario 1.

The increase in output growth required is also much higher than in scenario 1. It exceeds the historical growth rates everywhere except in East Asia and is of the order of 3 to 6 per cent. (Table 4)

One may think of the process in scenario 2 as encouraging the creation of jobs whose average productivity growth with respect to total employment will be higher than under scenario 1. The growth of output will then necessarily be greater to generate the large number of more productive jobs. While this is a simple way of illustrating the broad order of the increased growth rates of output that is required, it implies that the effect of any policy to help the working poor is to raise their productivity to the average of those in employment above the poverty threshold, while having no effect on the productivity of workers who are only a little above the threshold. One would, however, expect spillovers or externalities that would also increase the productivity of workers who are above the poverty threshold. Such effects are difficult to quantify, but, to the extent that they occur, the growth of overall productivity would be higher than this scenario allows for. The required growth rate of GDP would thus need to be higher than forecasted under scenario 2.

Care should, however, be taken in interpreting the historical data as reflecting long-term productivity growth rates. For example, China experienced fast growth of output in the 1990s, accompanied by only a modest rise in employment. At the same time, there was a substantial fall in the number of working poor, implying rapid growth in productive employment. If in the next decade there were no further change in the proportion of working poor in China, projections of the growth rate of output associated with any increase in employment would depend on the productivity patterns with respect to total employment or productive employment.⁸

The GDP projections presented here must be taken just as results of a scenario building exercise based on very specific assumptions on employment and productivity growth. To really grasp the dynamics that manage the relationship between employment, productivity and GDP growth would require a much more complex modelling exercise. While casual observation of the regionally aggregated data suggest a relationship between productive employment and economic growth, the trends and projections presented lack rigorous foundations and a statistically robust analysis of this relationship remains to be undertaken. This could be done by means of cross-country regression analysis. Future work could also concentrate on a few well-chosen countries illustrative of this relationship.

Finally, the use of statistics showing the joint distribution of employment and poverty could yield a better understanding of the interaction between output, employment and poverty.

References

- Aghion, Philippe, Eve Caroli and Cecilia García-Peñalosa, 1999, "Inequality and Economic Growth: The Perspective of the New Growth Theories", *Journal of Economic Literature*, 37(4), 1615-1660.
- Banerjee, Abhijit and Esther Duflo, 2000, "Inequality and Growth: What can the data say?", *Working Paper*, MIT.
- Berger, Stefan, 2001, "The Working Poor in Developing Countries; Changes in the past decades and prospects for 2010", *Mimeo, Employment Strategy Department*, ILO: Geneva.
- Bruno, Michael, Martin Ravallion and Lyn Squire, 1998, "Equity and Growth in developing countries: Old and new perspective on the policy issues", in: Tanzi, Vito and Keyoung Chu (eds), *Income distribution and High-Quality Growth*, MIT-Press, Cambridge, MA.
- Chen, Shaohua and Martin Ravallion, 2000, "How did the World's poorest fare in the 1990s?", *Policy Research Paper 2409*, World Bank, Washington DC.
- Collier, Paul & David Dollar, 2001, "Can the world cut poverty in half? How policy reform and effective aid can meet international development goals", *World Development*, 29/11, 1787-1802.
- Hanmer, L. & Naschold, F. 2000, "Attaining the international development targets: will growth be enough?" *Development Policy Review*, 18, 11-36.
- Harasty, Claire, 2001, "World and regional employment prospects for 2010", *Mimeo, Employment Strategy Department*, ILO: Geneva.
- Majid, Nomaan, 2001, "The size of the working poor population in developing countries", *Employment Paper 2001/16*, ILO: Geneva.
- Ravallion, Martin, 1997, "Can high-inequality developing countries escape absolute poverty?", *World Bank Policy Research Paper No. 1775*, World Bank.
- Ravallion, Martin, 2000, "Growth, Inequality and Poverty: Looking Beyond Averages", *World Bank Discussion Paper*.
- Temple, Jonathan, 1999, "The new growth evidence", *Journal of Economic Literature*, 37(1), 112-56.

Annex A: countries included in the aggregates of the population , GDP, employment and poverty data.

| Region and Country | Popula-tion | GDP and Emp | Poverty | Region and Country | Popula-tion | GDP and Emp | Poverty | Region and Country | Popula-tion | GDP and Emp | Poverty |
|------------------------------|-------------|-------------|---------|--|-------------|-------------|---------|-------------------------------------|-------------|-------------|---------|
| Sub-Saharan Africa | | | | Togo | * | | | Nepal | * | * | |
| Angola | * | * | | Uganda | * | | * | Pakistan | * | * | * |
| Benin | * | | | Zambia | * | | * | Sri Lanka | * | * | * |
| Botswana | * | | * | Zimbabwe | * | * | * | East and South-Eastern Asia | | | |
| Burkina Faso | * | | * | Latin America and the Caribbean | | | | Hong Kong, China | | * | |
| Burundi | * | | | Antigua and Barbuda | * | | | Indonesia | * | * | * |
| Cameroon | * | | | Argentina | * | * | | Korea, Republic of | * | * | |
| Cape Verde | * | | | Bahamas | | * | | Lao People's Dem. Rep. | * | | * |
| Central African Republic | * | | * | Barbados | * | * | | Macau | | * | |
| Chad | * | | | Belize | * | * | | Malaysia | * | * | * |
| Comoros | * | | | Bolivia | * | | * | Mongolia | * | | * |
| Congo | * | | | Brazil | * | * | * | Philippines | * | * | * |
| Congo, Dem. Rep. | * | | | Chile | * | * | * | Singapore | | * | |
| Cote d'Ivoire | * | | * | Colombia | * | * | * | Thailand | * | * | * |
| Equatorial Guinea | * | | | Costa Rica | * | * | * | Viet Nam | | * | |
| Eritrea | * | | | Cuba | * | | | Middle East and North-Africa | | | |
| Ethiopia | * | | * | Dominican Republic | * | * | * | Algeria | * | * | * |
| Gabon | * | | | Ecuador | * | * | * | Egypt | * | * | * |
| Gambia | * | | * | El Salvador | * | * | * | Jordan | * | | * |
| Ghana | * | | * | Grenada | * | | | Morocco | * | * | * |
| Guinea | * | | | Guadeloupe | * | | | Tunisia | * | | * |
| Guinea-Bissau | * | | | Guatemala | * | | * | Transition Economies | | | |
| Kenya | * | | * | Guyana | * | | * | Eastern Europe | | | |
| Lesotho | * | | * | Haiti | * | | | Albania | * | | * |
| Liberia | * | | | Honduras | * | | * | Bulgaria | * | * | * |
| Madagascar | * | | * | Jamaica | * | * | * | Croatia | | * | |
| Malawi | * | | * | Mexico | * | * | * | Czech Republic | * | * | * |
| Mali | * | | | Nicaragua | * | * | * | Estonia | * | | * |
| Mauritania | * | | * | Panama | * | * | * | Hungary | * | * | * |
| Mauritius | * | * | | Paraguay | * | | * | Latvia | * | * | * |
| Mayotte | * | | | Perú | * | | * | Lithuania | * | * | * |
| Mozambique | * | | * | Puerto Rico | * | | | Poland | * | * | * |
| Namibia | * | | | St Kitts and Nevis, St Lucia St Vincent and the Grenadines | * | | | Romania | * | * | * |
| Niger | * | | * | Suriname | * | * | | Slovakia | * | * | * |
| Nigeria | * | * | * | Trinidad and Tobago | * | * | * | Slovenia | * | * | * |
| Rwanda | * | | * | Uruguay | * | | * | Azerbaijan | * | * | * |
| Sao Tome and Principe | * | | | Venezuela | * | * | * | Belarus | * | * | * |
| Senegal | * | | * | China | | * | * | Kazakhstan | * | | * |
| Seychelles | * | | | South Asia | | | | Kyrgyzstan | * | * | * |
| Sierra Leone | * | | * | Afghanistan | * | | | Moldova | * | | * |
| Somalia | * | | | Bangladesh | * | * | * | Russian Federation | * | * | * |
| South Africa | * | | * | Bhutan | * | | | Turkmenistan | * | | * |
| Swaziland | * | | | India | * | * | * | Ukraine | * | | * |
| Tanzania, United Republic of | * | | * | Maldives | * | | | Uzbekistan | * | * | * |

Annex B: aggregation method for regional and world estimates

We assume an exponential growth process of the form:

$$\begin{aligned} emp_{1i} &= emp_{0i} * \exp(\mathbf{a}_i * \mathbf{t}) \\ \Leftrightarrow \mathbf{a}_i &= \frac{1}{\mathbf{t}} * \ln\left(\frac{emp_{1i}}{emp_{0i}}\right) \end{aligned}$$

where

\mathbf{a}_i is the average annual growth rate of country i

\mathbf{t} is the time period between year 0 and year 1

employment is total employment.

The average annual regional growth rate of employment is then estimated as follows:

$$\mathbf{a}_w = \frac{1}{\mathbf{t}} * \ln\left(\sum_i^J a_i * \exp(\mathbf{a}_i * \mathbf{t})\right)$$

where

\mathbf{a}_w is the aggregate annual growth rate of employment

The set J contains all the countries within one region for which employment data exists

a_i is the weight of country i in the region so that $\sum_i^J a_i = 1$

When adding up the absolute regional employment and unemployment figures, the total might be different from the world total reported. This difference is due to the aggregation method and does not reflect an error in the data.

The aggregated GDP growth is determined in a similar fashion:

$$\begin{aligned} \mathbf{b}_w &= \frac{1}{\mathbf{t}} * \ln\left(\frac{\sum_i^K gdp2_i}{\sum_i^K gdp1_i}\right) = \frac{1}{\mathbf{t}} * \ln\left(\frac{\sum_i^K gdp2_i}{\sum_i^K \sum_i^K gdp1_i}\right) = \frac{1}{\mathbf{t}} * \ln\left(\frac{\sum_i^K gdp1_i * \exp(\mathbf{b}_i * \mathbf{t})}{\sum_i^K gdp1_i}\right) \\ \mathbf{b}_w &= \frac{1}{\mathbf{t}} * \ln\left(\sum_i^K b_i * \exp(\mathbf{b}_i * \mathbf{t})\right) \end{aligned}$$

where

b_w is the aggregate annual growth rate of GDP

$gdp1_i$ is the constant 1995 \$ GDP of country i in year 1

$gdp2_i$ is the constant 1995 \$ GDP of country i in year 2

The set K contains all countries for which GDP data exists.

b_i is the weight of country i in the region so that $\sum_i^K b_i = 1$

Finally, the employment elasticities are given by

$$\hat{a}_i = \frac{a_i}{b_i}$$

$$e_w = \frac{\ln\left(\sum_i^J a_i * \exp(a_i * t)\right)}{\ln\left(\sum_i^K b_i * \exp(b_i * t)\right)}$$

An alternative estimator is given by

$$e_w = \frac{\ln\left(\sum_i^{J \cap K} a_i * \exp(a_i * t)\right)}{\ln\left(\sum_i^{J \cap K} b_i * \exp(b_i * t)\right)}$$

Here, only the countries with complete employment and GDP data are used for the aggregation.

Annex C: coverage of the Chen and Ravallion data set

| Region | % of 1998 population | Country | |
|---------------------------------|-----------------------------|----------------------|---------------------|
| East Asia | 90.8 | China | Malaysia |
| | | Indonesia | Mongolia |
| | | Korea | Philippines |
| | | Laos | Thailand |
| Western Europe and Central Asia | 18.7 | Albania | Moldova |
| | | Belarus | Poland |
| | | Bulgaria | Romania |
| | | Czech Republic | Russian Federation |
| | | Estonia | Slovak Republic |
| | | Hungary | Turkey |
| | | Kazakhstan | Turkmenistan |
| | | Kyrgyz Republic | Ukraine |
| | | Latvia | Uzbekistan |
| | | Lithuania | |
| Latin America and Caribbean | 88 | Bolivia | Jamaica |
| | | Brazil | Mexico |
| | | Chile | Nicaragua |
| | | Colombia | Panama |
| | | Costa Rica | Paraguay |
| | | Dominican Republic | Peru |
| | | Ecuador | St Lucia |
| | | El Salvador | Trinidad and Tobago |
| | | Guatemala | Uruguay |
| | | Guyana | Venezuela |
| | | Honduras | |
| Middle East and North Africa | 52.5 | Algeria | Morocco |
| | | Egypt, Arab Rep. | Tunisia |
| | | Jordan | Yemen |
| South Asia | 98.0 | Bangladesh | Pakistan |
| | | India | Sri Lanka |
| | | Nepal | |
| Sub-Saharan Africa | 72.9 | Botswana | Mozambique |
| | | Burkina Faso | Niger |
| | | Central African Rep. | Nigeria |
| | | Côte d'Ivoire | Rwanda |
| | | Ethiopia | Senegal |
| | | Gambia | Sierra Leone |
| | | hana | South Africa |
| | | Kenya | Tanzania |
| | | Lesotho | Uganda |
| | | Madagascar | Zambia |
| | | Mali | Zimbabwe |
| | | Mauritania | |

Annex D: formal relationship between working poor and productivity

We define

| | |
|---------|---|
| TE | total employment |
| WP | working poor |
| PE | productive employment |
| $POOR$ | number of poor people below the poverty line |
| POP | total population |
| GDP | Gross Domestic Product |
| GDP_c | GDP per capita |
| g | Total employment to population ratio |
| h | Working poor to number of poor ratio |
| j | Incidence of poverty |
| a | Elasticity of productive employment to GDP growth |
| e | Elasticity of poverty to GDP per capita growth |

Periods are denoted by subscripts.

The growth rate of x is denoted by \dot{x} and by assumption $\dot{x} = \ln\left(\frac{x_1}{x_0}\right)$

$$a = \frac{\dot{PE}}{\dot{GDP}} \quad (1)$$

$$e = \frac{\dot{j}_1 - \dot{j}_0}{\dot{GDP}_c} \quad (2)$$

Rearranging and taking exponentials on (1) yields $\frac{PE_1}{PE_0} = \left(\frac{GDP_1}{GDP_0}\right)^a \quad (3)$

$$EMP = PE + WP$$

$$\Leftrightarrow PE = POP \frac{EMP}{POP} - \frac{WP}{POOR} \frac{POOR}{POP} POP$$

$$\Leftrightarrow PE = POP(g - hj) \quad (4)$$

Decomposing total employment yields

Substituting (4) in (3) and solving for j_1 yields

$$j_1 = \left(\frac{h_0}{h_1} j_0 - \frac{g_0}{h_1} \right) \left(\frac{GDP_1}{GDP_0} \right)^a \left(\frac{pop_0}{pop_1} \right) + \frac{g_1}{h_1}$$

$$\Leftrightarrow \Delta j = \left(\frac{h_0}{h_1} j_0 - \frac{g_0}{h_1} \right) e^{(aGDP_c)} \left(\frac{pop_0}{pop_1} \right) + \frac{g_1}{h_1} - j_0 \quad (5)$$

Equation (5) shows how changes in the incidence of poverty are determined assuming a constant elasticity of productive employment to GDP growth. It is a function of the growth rate of GDP per capita, but other factors also play a role. To derive a local measure of the poverty elasticity, we take a partial derivative of equation (5):

$$e = \frac{\partial \Delta j}{\partial GDP_c} = \left(\frac{h_0}{h_1} j_0 - \frac{g_0}{h_1} \right) \left(\frac{POP_1}{POP_0} \right)^{a-1} a e^{aGDP_c} \quad (6)$$

Assuming constant employment to population ratios for the poor and for the total population, so that $h_1 = h_0 = h$ and $g_1 = g_0 = g$ simplifies (6) and gives

$$e = \left(j_0 - \frac{g}{h} \right) \left(\frac{POP_1}{POP_0} \right)^{a-1} a e^{aGDP_c} \quad (7)$$

Several properties are worth noting:

$$\frac{\partial e}{\partial a} < 0 \quad (8)$$

$$\frac{\partial e}{\partial j_0} > 0 \quad (9)$$

$$\frac{\partial e}{\partial g} < 0 \quad (10)$$

$$\frac{\partial e}{\partial h} > 0 \quad (11)$$

Equation 8 shows that a higher elasticity of productive employment to GDP growth implies a lower poverty elasticity, meaning that the poverty incidence will decline further for every

percentage point increase of GDP per capita.

The level of initial poverty matters, as equation 9 confirms. The higher the initial incidence of poverty, the lower the absolute poverty elasticity. It implies that a reduction of the poverty incidence from 60% to 50% is much harder to do and requires a higher GDP growth than a reduction from 20% to 10%.

The following two partial differential results are labour market specific and show the effects of the participation and employment rates on the poverty elasticity. Equation 10 shows that a broad labour market participation as indicated by a high employment to population ratio is beneficial in the sense that there is a higher reduction of the poverty incidence for any given GDP growth. However, a higher employment-to-population ratio for the poor means that the poverty-reduction elasticity will be lower, since now a larger part of total employment are unproductive jobs held by the poor.

As one would expect, a higher productive employment elasticity implies a higher poverty elasticity (in absolute terms), meaning that if the growth rate of productive jobs is higher for each percentage change of GDP, then the poverty incidence falls by more percentage points for every rise in GDP per capita.

What is perhaps more interesting is the result that the initial level of poverty has an adverse impact on the poverty elasticity, meaning that a given percentage decrease of the poverty incidence is much harder to achieve if the initial incidence of poverty is high. A related property – a negative effect of initial inequality on the poverty elasticity – has been found in the literature on poverty and growth⁹, meaning that GDP growth in high-inequality countries is less pro-poor than growth in low-inequality countries.

Annex E: Employment situation in circa 2000

| | Labour Force | Employment | Unemployment | Working Poor | | GDP |
|---|-----------------|-----------------|---------------------------|-------------------------------|-------------|-----------------|
| | Growth Rate (%) | Growth Rate (%) | Share of Labour Force (%) | Share of Total Employment (%) | | Growth Rate (%) |
| | 1990 to 2000 | 1990 to 1999 | 2000 | 1998 | | 1990 to 2000 |
| | | | | Lower Bound | Upper Bound | |
| Sub-Saharan Africa | 2.6 | 2.2 | 4.9 | 46.3 | 61.5 | 2.3 |
| Latin America & Caribbean | 2.4 | 2.1 | 9.2 | 15.6 | 25.2 | 3.2 |
| China | 1.1 | 1.1 | 5.0 | 18.5 | 20.2 | 9.9 |
| East and South East Asia, excluding China | 2.2 | 2.0 | 7.0 | 11.3 | 15.5 | 5.0 |
| South Asia | 2.3 | 2.2 | 3.3 | 40 | 55.8 | 5.2 |
| Middle East and North Africa | 3.3 | 2.2 | 9.8 | 2.0 | 3.2 | 2.9 |
| Transition Economies | 0.3 | -1.4 | 11.6 | 5.1 | 8.5 | -1.4 |
| World | 1.7 | 1.4 | 6.1 | 20.1 | 26.6 | 2.4 |

Source: Authors

Annex F: Estimates of the working poor

| | Absolute number | | Absolute number | | Growth rates | |
|---------------------------------|-----------------|--------------|-----------------|------------|---------------|---------------|
| | Millions, 1990 | | Millions, 1998 | | 1990-1998 (%) | |
| | L | U | U | L | U | L |
| Sub-Saharan Africa | 99.4 | 125.3 | 115.3 | 153.2 | 1.86% | 2.51% |
| Latin America & Caribbean | 27.5 | 43.7 | 30.2 | 48.8 | 1.19% | 1.40% |
| China | 191.3 | 240.5 | 131.5 | 143.7 | -4.69% | -6.44% |
| South Asia | 206.1 | 286.8 | 223.1 | 311.1 | 0.99% | 1.01% |
| East and South-East Asia | 42.6 | 56.0 | 30.4 | 41.8 | -4.22% | -3.65% |
| Middle East and Northern Africa | 2.0 | 3.2 | 2.0 | 3.3 | -0.36% | 0.65% |
| Transition Economies | 3.3 | 4.7 | 9.8 | 16.1 | 13.50% | 15.45% |
| World | 572.2 | 760.2 | 542.3 | 718 | -0.67% | -0.71% |

Source: Majid (2001) for L bound; authors for U bound.

Annex G: Summary table of world and regional aggregates

| | 1. Labour Force | | | | 2. Employment | | | | 3. Working poor | | | | | |
|---------------------------------|-----------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|-----------------|--------------|--------------|--------------|--------------|--------------|
| | Millions | | | growth rate | Millions | | | growth rate | Millions | | | | growth rates | |
| | 1990 | 1998 | 2000 | 1990 to 2000 | 1990 | 1998 | 2000 | 1990 to 2000 | 1990 | | 1998 | | 1990-1998 | |
| | | | | | | | | | L | U | L | U | L | U |
| Sub-Saharan Africa | 211.5 | 260.1 | 274.0 | 2.6% | 208.4 | 249.1 | 260.5 | 2.2% | 99.4 | 125.3 | 115.3 | 153.2 | 1.9% | 2.5% |
| Latin America & Caribbean | 175.9 | 212.7 | 223.0 | 2.4% | 163.6 | 194.1 | 202.5 | 2.1% | 27.5 | 43.7 | 30.2 | 48.8 | 1.2% | 1.4% |
| China | 682.5 | 747.5 | 764.7 | 1.1% | 650.5 | 710.6 | 726.5 | 1.1% | 191.3 | 240.5 | 131.5 | 143.7 | -4.7% | -6.4% |
| South Asia | 477.4 | 575.3 | 602.8 | 2.3% | 468.3 | 557.9 | 582.9 | 2.2% | 206.1 | 286.8 | 223.1 | 311.1 | 1.0% | 1.0% |
| East and South-East Asia | 241.6 | 289.1 | 302.3 | 2.2% | 230.4 | 270.2 | 281.2 | 2.0% | 42.6 | 56.0 | 30.4 | 41.8 | -4.2% | -3.6% |
| Middle East and Northern Africa | 85.4 | 110.8 | 118.2 | 3.3% | 85.7 | 102.1 | 106.6 | 2.2% | 2.0 | 3.2 | 2.0 | 3.3 | -0.4% | 0.7% |
| Transition Economies | 202.2 | 207.8 | 209.2 | 0.3% | 212.7 | 190.2 | 184.9 | -1.4% | 3.3 | 4.7 | 9.8 | 16.1 | 13.5% | 15.5% |
| World | 2'499 | 2'860 | 2'958 | 1.7% | 2'424 | 2'702 | 2'777 | 1.4% | 572.2 | 760.2 | 542.3 | 718.0 | -0.7% | -0.7% |

Annex G: Summary table continued

| | 4. Employment ratios | | | | | 5. GDP | | 6. Historical growth ratios (elasticities) | | | |
|---------------------------------|----------------------|--|--------------|--------------|--------------|------------------|-----------------------|--|------------------------------|-------------|-------------------------------------|
| | Unemployment rate | Poverty in employment rate (working poor rate) | | | | Total GDP growth | GDP per Capita growth | Total Employment to GDP | Productive Employment to GDP | | Poverty Incidence to GDP per Capita |
| | | 2000 | 1990 | | 1998 | | | | 1990-1999/2000 | | |
| | | L | U | L | U | 1990-1999 | | L | U | | |
| Sub-Saharan Africa | 4.9% | 47.7% | 60.1% | 46.3% | 61.5% | 2.3% | -0.3% | 0.96 | 1.10 | 0.77 | 4.66 |
| Latin America & Caribbean | 9.2% | 16.8% | 26.7% | 15.6% | 25.2% | 3.2% | 1.5% | 0.67 | 0.73 | 0.76 | -0.81 |
| China | 5.0% | 29.4% | 37.0% | 18.5% | 20.2% | 9.9% | 8.8% | 0.11 | 0.29 | 0.41 | -1.24 |
| South Asia | 3.3% | 44.0% | 61.2% | 40.0% | 55.8% | 5.2% | 3.3% | 0.42 | 0.59 | 0.75 | -1.23 |
| East and South-East Asia | 7.0% | 18.5% | 24.3% | 11.3% | 15.5% | 5.0% | 3.3% | 0.40 | 0.61 | 0.68 | -2.20 |
| Middle East and Northern Africa | 9.8% | 2.4% | 3.7% | 2.0% | 3.3% | 2.9% | 0.9% | 0.76 | 0.78 | 0.78 | -0.49 |
| Transition Economies | 11.6% | 1.6% | 2.2% | 5.1% | 8.5% | -1.4% | -1.4% | 0.97 | 1.29 | 1.55 | -2.56 |
| World | 6.1% | 23.6% | 31.4% | 20.1% | 26.6% | 2.4% | 1.0% | 0.56 | 0.79 | 0.90 | -5.01 |

Annex G: Summary table continued

| | 7. Projected Labour Force | | 8. Baseline Scenario | | | | 9. Scenarios 1 and 2 | | | | | | | |
|---------------------------------|----------------------------------|------------------|-----------------------------|-------------------|---|--------------|--|-------------|---|-------------|--|-------------|---|-------------|
| | Growth rate | Total (millions) | Total employment (millions) | Unemployment rate | Working poor, share of total employment | | GDP growth needed to Halve Unemployment rates and keep working poor rates constant | | GDP per capita growth needed to Halve Unemployment rates and keep working poor rates constant | | GDP growth needed to Halve Unemployment rates and halve working poor rates | | GDP per capita growth needed to Halve Unemployment rates and halve working poor rates | |
| | | | | | 2000-2010 | 2010 | 2010 | 2010 | 2010 | 1998-2010 | | 1998-2010 | | 1998-2010 |
| | | | | | L | U | L | U | L | U | L | U | L | U |
| Sub-Saharan Africa | 2.5% | 350.9 | 325.5 | 7.3% | 44.2% | 63.5% | 2.4% | 3.4% | 0.1% | 1.1% | 5.1% | 9.8% | 2.8% | 7.5% |
| Latin America & Caribbean | 2.0% | 270.6 | 250.8 | 7.3% | 13.7% | 22.8% | 3.24% | 3.14% | 1.8% | 1.7% | 4.2% | 4.9% | 2.8% | 3.5% |
| China | 0.8% | 827.7 | 811.3 | 2.0% | -1.1% | -13.6% | 3.6% | 2.6% | 2.8% | 1.8% | 6.7% | 5.0% | 5.9% | 4.2% |
| South Asia | 2.1% | 744.4 | 725.5 | 2.5% | 33.4% | 46.0% | 3.8% | 3.0% | 2.2% | 1.4% | 7.9% | 8.5% | 6.3% | 6.9% |
| East and South-East Asia | 1.8% | 360.2 | 343.2 | 4.7% | -0.8% | 0.3% | 3.4% | 3.1% | 2.1% | 1.8% | 4.3% | 4.2% | 3.0% | 2.9% |
| Middle East and Northern Africa | 3.2% | 165.1 | 132.7 | 19.6% | 1.3% | 2.6% | 4.6% | 4.6% | 2.9% | 2.9% | 4.7% | 4.8% | 3.0% | 3.1% |
| Transition Economies | 0.4% | 218.3 | 160.8 | 26.4% | 10.3% | 17.1% | 0.5% | 0.4% | 0.5% | 0.4% | 0.7% | 0.7% | 0.7% | 0.7% |
| World | 1.4% | 3'419 | 3'180 | 7.0% | 14.5% | 18.8% | 2.2% | 1.9% | 1.0% | 0.7% | 3.4% | 3.4% | 2.2% | 2.2% |

Endnotes:

1. Among other studies on the subject are: *Poverty Trends and Voices of the Poor: Two Scenarios for the next Decade*, World Bank, 1999 (www.worldbank.org/poverty/data/trends/scenario.htm); Collier P. and D. Dollar (2001), "Can the World Cut Poverty in Half? How Policy Reform and Effective Aid Can Meet International Development Goals", *World Development*, 29(11), pp. 1787-1802; Hanmer L. and F. Naschold (2000), "Attaining the International Development Targets: Will Growth Be Enough?", *Development Policy Review*, 18, pp. 11-36.
2. In this paper, we assume that productivity is measured by wages paid, so that workers are poor because they have low productivity. The reality, of course, is more complex. Apart from the fact that they may be poor because of many dependants, they are poor because their alternative occupation at the end of the line has low productivity, ie it is all a question of wage setting and the other jobs open to recognizable categories of labour. Tea plantation workers in Sri Lanka have a higher productivity than do rice farmers, but they are more likely to be poor because they have a weak bargaining position, as in general do many women workers.
3. Data was constructed for 86 countries, covering approximately 92% of the population of all low and medium income countries. An estimate of the working poor for all low and medium income countries (139 countries) has also been constructed.
4. It might be that the assumption that each member of a poor household of working age does work which leads to an upward bias in the number of working poor. It is, however, balanced by the additional assumption that only those of working age actually work, therefore leaving out child labour from the estimate. Moreover, because of lack of data, we assume that the poor share the same demographic characteristics as the non poor (i.e. we assume that the share of poor people of working age is the same as the share of non poor people of working age). While it might be reasonable to assume that the poor have higher mortality rates for every age cohort than the non poor, it is not clear how this affects this demographic ratio: does it decrease as children die before reaching working age, or does it increase as people do not survive working age? There is clearly a need for more research and empirical investigation in order to better estimate the prevalence of working poverty.
5. Except for countries where it was negative in the 1990s and where it is assumed that productivity will stop falling.
6. Most empirical studies (See for example Aghion et al.) test a linear relationship between changes in the incidence of poverty and GDP per capita growth. Thus we find it worth noting that our approach suggests a semilog specification, regressing changes in the incidence of poverty on GDP per capita growth and on the initial working poor and labour market participation rates (see annex D).
7. This section is based on work by Ken Coutts.
8.
$$EMP = PE + WP$$

$$p = \frac{Y}{PE + WP} \Leftrightarrow Y = p \times (PE + WP)$$
9. Aghion et al.(1999) and Banerjee and Duflo (2000) survey the results of cross-country studies examining the relationship between inequality and growth.