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POVERTY AND HUMAN DEVELOPMENT: WHAT DOES THE FUTURE HOLD?

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POVERTY AND HUMAN DEVELOPMENT: WHAT DOES THE FUTURE HOLD?

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Abstract

What will the level of poverty and human development in the world's developing regions be in the next century? We present projections of poverty and selected human development indicators for the year 2015 for three policy variants - pro-poor policy, neutral policy and anti-poor policy - and four growth scenarios. The projections show poverty will remain a major problem in many world regions. Indicators of human development improve considerably, although sub-Saharan Africa and South Asia continue to lag behind the other regions. We find policy orientation can be as important as economic growth to reduce poverty and increase human development.

1. INTRODUCTION

Poverty and social development are back on the international political agenda. While in the 1980s the main international development agencies, such as the World Bank and the International Monetary Fund, were primarily interested in how to promote economic growth, by the 1990s it increasingly came to be recognised that more attention needed to be given to social development. This shift in emphasis is, for example, reflected by the large number of world summits that have been organised since 1990 on issues related to social development; housing, population, education, environment, women, food. In 1995, the World Summit on Social Development held in Copenhagen put poverty and social development prominently on the agenda, by defining social development as the reduction and elimination of

[1] The authors would like to acknowledge the support of the Swedish International Development Agencies (Sida) who commissioned the report from which this article is drawn. We are also grateful to those present at the seminar organised by Sida to discuss the issues addressed by this article. In particular we would like to thank Gus Edgren, Dag Ehrenpreis, Agneta Lind, Cynthia Hewitt de Alcántara, Jack van Holst Pellekaan, Diane Elson, Andrea Cornia and Stefan de Vylder.

widespread poverty, the increase of productive employment and the enhancement of social integration (UN, 1994). And the United Nations declared 1996 the "International Year for the Eradication of Poverty" and established the decade 1997-2006 as the first decade for the Eradication of poverty (UNESCO, 1996:155).

Given the concern of the international community for poverty alleviation and social development, a relevant question is: what progress can we expect on these fronts? What are the current trends in poverty and social development in the various regions of the world, and where will they lead in 15 or 20 years time? Where, and under what circumstances, is poverty likely to increase and where might we expect greatest progress in its reduction? The answers to these questions are extremely important, primarily to people who live in marginal circumstances, but also to policy makers and other development practitioners. Can positive trends in poverty eradication and human development be strengthened? Is it possible to improve human development indicators and reduce poverty when economic growth is low? This article provides some answers to these questions.

The research presented here is part of a larger study[2] commissioned by the Swedish International Development Agency (Sida) as part of the Sida *Project 2015*.[3] In this article we limit ourselves to a discussion of econometric models to estimate future poverty and future human development. As far as the latter is concerned, we project future values of school enrolment rates, literacy rates and life expectancy. The definition of human development we use thus draws on the concept of human development that is elaborated by the United Nations Development Programme in their *Human Development Reports* (UNDP, various years). Future social development is not, of course, captured by trends in human development indicators alone. Other factors that are likely to effect future social development, including political instability and war, gender, specific government policies

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[2] Lucia Hanmer, Niek de Jong, Rachel Kurian and Jos Mooij, *Social Development: Past Trends and future scenarios*, Stockholm: Sida (1997). The report has a broader thematic coverage than this article.

[3] Project 2015 is a major review of the socio-economic environment in which Swedish development assistance strategies operate. It aims to delineate the most important characteristics of the global political economy in 2015 and assesses the role of international development agencies in this future world (Frühling 1996).

and some technological and environmental changes are discussed in our full report *Social Development: Past Trends and Future Scenarios* (Hanmer *et al.*, 1997).

The article proceeds as follows. A brief overview of past developments is given in Section 2, where poverty estimates and various human development (HD) indicators are presented for the major developing regions. Most of this article, however, is about the future. To estimate poverty rates and levels of HD indicators for the year 2015 we use simple econometric models. We start from the regional economic growth projections produced by the Dutch Central Planning Bureau and the World Bank. On the basis of past correlations between economic growth on the one hand and poverty reduction and HD indicator improvement on the other, we specify the models used to produce our projections. The models are described in more detail in Section 3. The outcomes of the models are subsequently discussed in Section 4. We present projections of regional poverty incidence, the associated numbers of poor people and regional levels of some selected HD indicators, *viz.* combined school enrolment rate, literacy and life expectancy. The projections are made for three policy variants: pro-poor policy, neutral policy and anti-poor policy. Finally, in Section 5, we draw some conclusions and point out some caveats that should be borne in mind when considering our results.

2. PAST TRENDS IN POVERTY AND HUMAN DEVELOPMENT.

Trends in HD indicators over the past 20 to 30 years in the major regions of the world show that progress has been made almost everywhere, in almost every respect. Life expectancy has, on average, increased by more than 10 years in all developing countries. Infant mortality has been reduced by more than 50 per cent. And adult literacy has increased from 43% to 61%. Table 1 provides more details of these major achievements.

Although there have been overall improvements, the table shows that the situation in sub-Saharan Africa and South Asia is still bleak as compared to other developing regions. Life expectancy in sub-Saharan Africa is particularly low, and the infant mortality rate is very high. In South Asia more that half of all children under five years old are underweight, and more than

Table 1 Trends in human development indicators

	Sub-Saharan Africa	Arab States	South Asia	East Asia	East Asia exc. China	S.E. Asia and Pacific	Latin America and Carib-bean	Least developed countries	All develop-ing countries	Eastern Europe and CIS	Industrial countries (incl E. Europe and CIS)	World
Life expectancy (years).												
1960	40	45	44	48	55	45	55	39	46	67	69	50
1993	51	62	60	69	71	64	69	51	62	69	74	63
Infant mortality rate (per thousand births)												
1960	167	167	164	146	83	127	107	173	150	..	..	..
1993	97	66	84	42	18	53	45	110	70	..	..	..
Access to safe water (%)												
1975-80	25	69	27	70	70	15	60	21	40	..	..	..
1990-95	43	76	71	94	94	63	81	38	68	..	..	..
Underweight children (< 5 years old, %)												
1975	31	20	69	26	..	46	16	51	40	..	..	..
1985-95	31	11	51	17	..	37	10	45	30	..	..	..
Adult literacy rate (%)												
1970	27	29	31	88	88	65	71	28	43	..	..	..
1993	55	55	48	98	98	86	85	47	61	..	..	..
Enrolment ratio, all levels (age 6-23, %)												
1980	39	48	37	51	65	51	59	31	46	..	..	..
1990	36	55	45	44	73	54	62	31	47	..	..	..
Real GDP per capita (PPP$)												
1960	990	931	698	729	869	732	2,138	561	915	..	..	..
1993	1,379	4,263	1,576	2,681	11,088	3,680	5,816	887	2,709	..	..	..

Source: UNDP (1996), Human Development Report 1996

half of all adults are illiterate. Adult literacy is lower in South Asia than in any other region of the world.

What is also striking is that 20-30 years ago, the variation in most of the HD indicators across the regions of the world was less marked than it is in the 1990s. So improvements in the overall average have been accompanied by relative deterioration, particularly for sub-Saharan Africa and South Asia.

While it is relatively straightforward to investigate regional trends in many HD indicators, it is, however, much more difficult to analyse trends in poverty. There are no comparable data on poverty in various regions of the world spanning the past 20 to 30 years. Recently, the World Bank has developed a more or less consistent poverty data base using a common extreme poverty line that allows comparisons to be made across countries (see World Bank *World Development Report, 1990*). It is based on a US$1 per person per day cut-off point and employs purchasing power parity (PPP) indices based on consumption.[4] The poverty rates in Table 2 are calculated using this method. They show regional trends in poverty between 1987 and 1993. The data suggest that in this relatively short time span the percentage of poor people has hardly changed. The absolute number of poor people shows, however, an increase of 7 per cent. In 1987 1,227 million people were poor, while in 1993 the number stood at 1,314 million.

[4] The methodology involves that consumption measured in US$ per person is converted into consumption measured in local currency, using an exchange rate that takes into account the difference in purchasing power of the US dollar between countries.

Table 2 Regional Estimates of Extreme Poverty (percentage of people with income below $1 PPP a day).

Regions	1987	1990	1993
East Asia and the Pacific	28.2	28.5	26.0
(excluding China)	(23.2)	(17.6)	(13.7)
Eastern Europe and Central Asia	0.6	n.a.	3.5
Latin American and the Caribbean	22.0	23.0	23.5
Middle East and North Africa	4.7	4.3	4.1
South Asia	45.4	43.0	43.1
Sub-Saharan Africa	38.5	39.3	39.1
Total	30.1	n.a.	29.4
Total (excluding ECA)	33.3	32.9	31.8

Source: World Bank, 1996b:4

3. PROJECTIONS OF POVERTY AND HUMAN DEVELOPMENT

This section outlines the methodology we use to produce estimates of future levels of poverty and human development indicators. The section starts with a brief review of the literature on this topic. Next, we describe the key characteristics of our models and finally we detail the various economic growth rate projections on which our projections of poverty and human development are based.

3.1. Literature review.

The literature review that follows is based on a small number of studies which use projections of economic growth and a poverty elasticity (or HD coefficient) - *i.e.* the percentage decrease in the poverty incidence (or change in HD indicator) which results from a one per cent increase in per capita GDP - to estimate future poverty rates. In this review we focus particularly on one aspect of these studies, namely the poverty (or HD) elasticity. What is its value, and on what does this value depend?

To our knowledge only one such projection has been made recently that includes all developing regions of the world,[5] namely Hopkins' study of trends in absolute poverty until the year 2000 (Hopkins, 1980).[6] Hopkins' projections are based on two poverty lines, a uniform PPP food poverty line and a basic needs poverty line. The food poverty line used is one defined by the World Bank which takes the income level of the 40th percentile of the income distribution in India in 1975 as its benchmark. The basic needs poverty line is calculated to include expenditures on housing, education and health in addition to food. Regional average poverty lines are calculated assuming an absence of purchasing power differences within regions. The methodology used for the projections is very simple. It assumes that trend economic growth rates (approximated by the annual growth rates of private consumption) between 1960 and 1975 continue until 2000; that income distribution (measured by Lorenz curve for each region) remains unchanged; and, that population grows according to the UN "low" population projections. The projections are thus made for a distributionally neutral pattern of growth. A poverty elasticity is implicit in the methodology, although it is not specified. Poverty in the year 2000 in the developing world (excluding China) is projected to be 754 million using the food poverty line and 1,083 million using the basic needs poverty line. Hopkins acknowledges that these results may be over optimistic as annual growth rates between 1960-75 were high compared to later years.

Ravallion and Huppi (1991), Kakwani (1993a) and Ravallion and Sen (1996) use poverty elasticities in their country level studies of poverty in, respectively, Indonesia, Côte d'Ivoire and Bangladesh. In the Bangladesh study, poverty elasticities are estimated with respect to changes in mean rural and urban consumption (relative to the poverty line), under alternative assumptions regarding the pattern of growth. Three patterns of growth are identified: (1) *inequitable growth*, i.e. growth with rising inequality, as observed over the period 1983/84 to 1991/92; (2) *neutral growth*, i.e. growth with unchanged inequality,

[5] China is not included due to lack of data.

[6] In his study Hopkins refers to earlier studies projecting growth and poverty.

and; (3) *equitable growth*, i.e. growth combined with a modest reduction in inequality. The poverty elasticities are in the range -0.7 to -1.9.

The elasticities of neutral growth in Bangladesh are small compared to those estimated for Indonesia for the mid-1980s by Ravallion and Huppi (1991). In the case of Indonesia the estimated poverty elasticity was -2.05 for 1984 and even higher for 1987, although its exact value has not been reported. The 1987 elasticity is used to project the change in poverty in Indonesia after 1987 (see Ravallion and Huppi, 1991).

The two studies are not fully comparable, however, because they do not use the same poverty line. The Indonesian study uses the $1 PPP a day poverty line, while the Bangladesh study uses another poverty line. Poverty elasticities are sensitive to the choice of poverty lines. Other things remaining equal, the absolute value of the poverty elasticity is higher the lower the poverty line.

Apart from the level of the poverty line, the poverty elasticity is also sensitive to the distribution of incomes. Other things remaining equal, the poverty elasticity is higher the more equal the income distribution. The literature shows that there are a number of different methodologies that can be used to ensure poverty projections are comparable, both between countries and over time.

The sensitivity of the poverty elasticity to the poverty line for a given income distribution is demonstrated by Kakwani (1993a) on the basis of 1985 data for Côte d'Ivoire. This study uses two different poverty lines which identify the poorest 10 per cent and poorest 30 per cent of the total population of Côte d'Ivoire. The estimated elasticities of poverty with respect to mean income are -2.95 for the low poverty line and -1.5 for the high poverty line. Kakwani projects poverty from 1986 to 1990 on the basis of estimated poverty elasticities and projected growth rates of GDP per capita, using however a poverty measure other than the head-count index.

The review of these studies shows that poverty elasticities can be expected to fall within a wide range of values. Their magnitude will depend on the level of the poverty line used and equality of income distribution, as well as country or regionally specific political and economic characteristics that effect poverty.

Turning now to human development indicators, Pritchett and Summers (1996) estimate the effect of income (GDP per capita in 1985 PPP dollars) on infant and child mortality and life expectancy, using cross-country data from the period 1960-85. The authors use a double-log specification in five-year differences and estimate the model using instrumental variables (IVs). First-differences are used to eliminate the potential impact of country specific time invariant variables related to both income and health and, hence, to reduce the effect of excluded variables on the coefficients on the income IVs.[7] The instrumental variables estimation technique shows that the relationship between income and health variables is a stable, causal one, as opposed to a merely associative one or one created by reverse causation. The total elasticity of infant and child mortality with respect to income is estimated to lie in the range -0.2 to -0.4. The estimated elasticity for life expectancy is much smaller and not significant at the 5 per cent level. Pritchett and Summers quote results of other studies, that arrived at partial income elasticities of infant and child mortality, in contrast to their total elasticities, which range from -0.16 to -0.27. They also refer to the results of a study by Kakwani (1993b), who found much larger total income elasticities of infant mortality, namely ranging between -0.5 and -0.6. These elasticities are estimated on the basis of a specification in levels, rather than in first-differences. Kakwani's estimates fall in the range of elasticities estimated by Pritchett and Summers, when levels are used. Results of other studies on the income elasticity of life expectancy indicate a higher elasticity than found by Pritchett and Summers.

[7] In the authors' words: "... one would expect that the estimated relationship would change when different variables, related to income but not directly related either to health or to the lurking "third" variable, were used to instrument for income changes in estimating their association with mortality changes" (Pritchett and Summers, 1996: 848). The instrumental variables that were used for income growth are: terms-of-trade shocks, the ratio of investment to GDP, the black market premium for foreign exchange and the deviation of the official exchange rate from its PPP level.

Pritchett and Summers use their estimated elasticities to simulate the effect that alternative growth paths in the 1980s (1% higher level of GDP, 1% higher growth of GDP, same growth as in 1960-80) would have had on infant and child mortality in developing countries. One of their findings is that if Africa had maintained its pre-1980 growth rates, it could have averted 400-700 thousand child deaths in 1990 alone.

We are not aware of studies in which projections are made of life expectancy, school enrolment and literacy on the basis of estimated coefficients and projected growth of GDP per capita. The study that comes closest to such an exercise is UNDP (1996), which develops some simple econometric models to explain variation in adult literacy, life expectancy and school enrolment across countries. The models are specified with a lagged relationship between income and the HD indicators. In some models non-income variables are included in the explanatory variables, although not all of them were found to be significant.

3.2 Modelling poverty and human development

The elasticities and parameters we use in our projections of poverty and HD indicators for the year 2015 are estimated with models that use respectively 1985/1990 and 1993 cross section data for developing countries. Subsequently, the models we use for the projections combine forecasts of economic growth for the major developing regions with the estimated elasticities and other model parameters to produce future poverty rates and levels of HD indicators in these regions. These projections are thus only meaningful if past relationships between economic and social variables can be extrapolated into the future. We turn to briefly outline the key features of the models used in this study (see Appendix 1 for the technical details).

Limited internationally comparable data exist on poverty incidence at the country level. Our study uses the data set produced by Chen, Datt and Ravallion (1994), which gives the incidence of poverty based on an internationally comparable poverty line of $1 PPP per day. The advantage of using the $1 PPP per day line is that it controls for the variation in

the poverty elasticity estimates that can occur due to differences in the real value of the poverty line used in different countries. The data set contains poverty incidence estimates for 46 countries, mostly for both 1985 and 1990. The total number of observations is 84. Using a double log functional form, the regression of the incidence of poverty on real per capita GDP (in constant PPP dollars), yields estimates of the poverty elasticity. Investigation showed that the size of the elasticity varied according to the country's Gini coefficient. The absolute value of the poverty elasticity was greater for countries with more equal income distribution, as measured by the Gini coefficient,[8] which is consistent with the findings of the Bangladesh study cited above. Dividing the sample into three groups of countries, with, respectively, low income inequality (Gini coefficient less than 0.4), medium income inequality (Gini coefficient between 0.4 and 0.5) and high inequality (Gini coefficient greater than 0.5), yields poverty elasticities with values of around -1.5, -1 and -0.5 respectively.[9] The projections of poverty for the year 2015 are based on poverty elasticities of -1.5, -1.0 and -0.5. Poverty elasticities are hence low in comparison to the results for Indonesia (-2%) and Côte d'Ivoire (-3%), especially considering that the $1PPP is an extreme (low) poverty line. However, the results are roughly in the range reported for Bangladesh. As indicated above in Section 3.1, the value of the poverty elasticities crucially depends on the level of the poverty line and the income distribution.

The Human Development Report (UNDP, various years) provides the data set for the indicators of human development. Again, we use observations from two points in time, 1993 and an earlier year, to investigate the relationship between per capita GDP and HD indicators. A model that includes only per capita GDP as a determinant of levels of HD indicators might reasonably be thought to be underspecified. However, cross-section regression results show that the effects of other factors, such as government social

[8] According to Datt and Ravallion (1992:287), a conventional measure of inequality (like the Gini coefficient), "can be a poor guide to the way distributional shifts can affect the poverty measures." Instead they use Lorenz curves as a basis to compare differences in inequality over time or between countries. Since such Lorenz curves are not available for (all) the 46 countries in the data set, we use the Gini index .

[9] A formal F-test for parameter stability indicates that pooling the sub-samples of countries classified according to their Gini coefficient is not valid (see the Technical Appendix).

expenditures and income inequality, are statistically insignificant in determining the level of most HD indicators.[10]

Exploratory data analysis techniques showed that the model for HD indicators was best specified by a semi-log functional form. The income parameter estimated using this functional form is not an elasticity; instead the responsiveness of the HD indicator to economic growth varies with the level of development. At low levels of GDP per capita, economic growth produces larger increases in HD indicators than at higher ones.[11] Using a semi-log functional form, the cross section regressions of literacy, life expectancy and school enrolment on per capita GDP produces the parameters that are used to project HD indicators. Exploring parameter stability in the HDI model produced two interesting results.[12] First, the slope coefficient decreased over time and second, the intercept term shifted upwards over time. These two results are incorporated into the simulation model by including a quadratic GDP per capita term to capture the reduced effect of increases in per capita GDP over time and an autonomous component to capture the upward shift of the intercept over time.

The change in the slope coefficients between the two time periods shows that the HD indicators become less responsive to economic growth. To achieve a one unit improvement in an HD indicator in 1990, more economic growth is necessary than would have been required in, say, 1970. Also, HD indicators are less responsive to increases in per capita income as a country reaches higher levels of per capita income, as they tend towards their maximum possible level.

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[10] Regression models that include public expenditures on health and education as a fraction of GDP were estimated. The coefficients for these variables were found to be statistically insignificant. Similar models are estimated by UNDP (1996) with similar results. This could be because it is often the allocation of expenditure *within* sectors which determines whether social sector spending results in improved HD indicators (World Bank, 1990; 1993). Thus the aggregate value of social expenditure or share of the government's budget devoted to health and education may not be a good indicator of the benefits of these services to the mass of the population.

[11] If the model is: $HD = \beta_0 + \beta_1 \log GDPpc$, then $dHD/dGDPpc = \beta_1/GDPpc$.

[12] No comparable data exist for the combined enrolment rate for an earlier year. Hence, the comparisons are made for adult literacy and life expectancy only. See Technical Appendix.

The change in the intercept term for HD indicators can be interpreted as the effect of technological change, increased knowledge, political factors or changes in public action on HD indicators. These factors may explain that even at low levels of per capita income on average countries have higher HD indicators in 1993 than countries with equivalent levels of per capita income would have had in an earlier year. As technological, scientific and other changes are also likely to occur in the years to come, we may expect the intercept term to shift further upwards.

The estimated coefficients of per capita GDP are, of course, averages for the cross section of countries. In order to capture the fact that in some countries HD indicator levels diverge from the expected value we varied the coefficients by one standard error. Each growth scenario, hence, has three variants: neutral policy, pro-poor policy and an anti-poor policy. The neutral policy variant is one where policy reflects average past trends. In the pro-poor variant the coefficient is increased by one standard error and, hence, economic growth has a larger impact on HD indicators than in the base (neutral policy) case. In the anti-poor policy variant one standard error is deducted from the coefficient. This means economic growth has less effect on HD indicators than in the base case scenario.

3.3 Projections of future economic growth

To estimate poverty and levels of HD indicators for the year 2015 we use the projected long term regional growth rates forecast by the World Bank (1996a) and the Dutch Central Planning Bureau (CPB, 1992). The World bank develops one future scenario, while the CPB envisages different future scenarios.[13] These scenarios differ mainly in their underlying assumptions concerning growth rates in the major industrialised regions and subsequent spread effects to the developing regions. Trends in various regions of the world, including demographic trends, trends in natural resources depletion and environmental degradation, internationalisation, and social and political trends are also incorporated into

[13] Only 3 out of 4 CPB scenarios are used in this study, as we were unable to obtain the assumptions made about population growth in the fourth scenario.

the scenarios. However, the main emphasis is on economic development. The main characteristics of the four scenarios we use are summarised below.

World Bank (WB)

The World Bank projects economic growth rates until the year 2005. They reflect the growth outlook that would materialise provided some generally optimistic assumptions are fulfilled, current reform policies continue and the political situation does not deteriorate. They also assume continued policy adjustments in non-industrial countries.

Balanced Growth (BG)

The BG scenario is the most optimistic of all the CPB scenarios. The main industrialised countries grow at around 3% per annum. The model assumes that the spread effects of growth spill over to benefit developing regions. BG is the most optimistic forecast for sub-Saharan Africa, Latin America and the Caribbean, Eastern Europe and Asia (but the Asian NICs grow slightly faster in other scenarios).

European Renaissance (EU)

Western European growth is projected to be high in the EU scenario. With the shift of the economic centre of gravity to Europe and Japan, Eastern Europe and Africa do well. Asia still grows rapidly but Latin America grows at a lower rate than in all the other scenarios.

Global Shift (GS)

In the GS scenario the centre of economic activity shifts from Europe towards North America and Japan. This produces the most favourable growth scenario for the Asian region, while Latin America benefits from North American growth. Africa and Eastern Europe grow more slowly than in the BG scenario.

The first column of Table 3 shows the average annual compound growth rates of GDP according to the World Bank and CPB scenarios, while the second column shows the average annual compound growth rate of the population for the major developing regions: Sub-Saharan Africa (SSA), the Middle East and North Africa (MENA), East Asia and the Pacific (EA&P), South Asia (SA), Latin America and the Caribbean (LAC) and Eastern

Table 3 Annual compound growth rates of GDP, Population and GDP per capita

GDP Growth					Pop Growth				GDP per capita growth rate						
World Bank															
	91/93	94	95	96/15	90/95	95/00	00/15		91/93	93/94	94/95	95/00	00/15		
SSA	0.7	1.7	3.8	3.8	3.03	2.85	2.72		-2.33	-1.33	0.77	0.95	1.08		
MENA	2.4	2.1	2.5	2.9	2.53	2.53	2.28		-0.13	-0.43	-0.03	0.37	0.62		
EA&P	9.4	9.7	9.2	7.9	1.32	1.21	0.97		8.08	8.38	7.88	6.69	6.93		
SA	3.9	5.7	5.5	5.4	2.14	2.02	1.77		1.76	3.56	3.36	3.38	3.63		
LAC	3.6	4.9	0.9	3.8	1.85	1.68	1.43		1.75	3.05	-0.95	2.12	2.37		
EEUR	-9	-8.4	-0.7	4.3	0.17	0.21	0.25		-9.17	-8.57	-0.87	4.09	4.05		
Balanced growth									BG scenario[2]						
				95/15	95/00	00/05	05/10	10/15	91/93	93/94	94/95	95/00	00/05	05/10	10/1
SSA				4.85	3.07	2.83	2.48	2.09	-2.33	-1.33	0.77	1.78	2.02	2.37	2.76
MENA				2.59	2.29	2.04	1.80	1.59	-0.13	-0.43	-0.03	0.29	0.55	0.79	1.00
EA&P				7.00	0.61	0.41	0.30	0.25	8.08	8.38	7.88	6.39	6.59	6.70	6.75
SA				6.10	0.38	0.44	0.40	0.32	1.76	3.56	3.36	5.72	5.66	5.70	5.78
LAC				5.60	1.50	1.36	1.24	1.10	1.75	3.05	-0.95	4.10	4.24	4.36	4.50
EEUR				2.19	0.59	0.56	0.51	0.47	-9.17	-8.57	-0.87	1.60	1.63	1.68	1.72
European Renaissance									EU scenario[3]						
SSA				4.02	3.26	3.17	2.97	2.69	-2.33	-1.33	0.77	0.76	0.85	1.04	1.33
MENA				3.50	2.72	2.50	2.28	2.03	-0.13	-0.43	-0.03	0.78	1.00	1.22	1.47
EA&P				6.16	0.73	0.57	0.45	0.41	8.08	8.38	7.88	5.43	5.59	5.71	5.75
SA				4.90	2.11	1.90	1.67	1.43	1.76	3.56	3.36	2.79	3.00	3.23	3.47
LAC				2.80	1.79	1.64	1.51	1.38	1.75	3.05	-0.95	1.01	1.16	1.29	1.42
EEUR				3.09	0.59	0.56	0.51	0.47	-9.17	-8.57	-0.87	2.50	2.54	2.58	2.63
Global Shift									GS scenario[4]						
SSA				2.90	3.20	3.12	2.96	2.70	-2.33	-1.33	0.77	-0.30	-0.22	-0.07	0.20
MENA				3.60	2.66	2.45	2.26	2.03	-0.13	-0.43	-0.03	0.94	1.15	1.34	1.57
EA&P				7.25	0.69	0.53	0.39	0.34	8.08	8.38	7.88	6.56	6.72	6.86	6.91
SA				6.50	2.11	1.90	1.67	1.43	1.76	3.56	3.36	4.39	4.60	4.83	5.07
LAC				4.25	1.79	1.64	1.51	1.38	1.75	3.05	-0.95	2.46	2.61	2.74	2.87
EEUR				0.32	0.44	0.40	0.43	0.43	-9.17	-8.57	-0.87	-0.12	-0.08	-0.12	-0.1

(1) Realized rates of per capita economic growth in 1991-1995 in all scenarios is calculated from growth rates of GDP reported in World Bank (1996) and population growth as reported in ILO (1996). In the WB scenario, projected growth of GDP is combined with UN population projections reported in ILO (1996) to project future GDP per capita growth. Economic growth rates projected until 2005 and population growth rates until 2010 are extended until 2015. (2) Demographic trends are based on the medium variant of United Nations forecasts, but a rapidly declining fertility rate is assumed. (3) The medium variant of the United Nations projected population growth rates is used. (4) The demographic trend differs from the medium variant of the United Nations as rapidly declining fertility in Asia and migration from East and South to Western Europe and the USA are assumed.

Europe (EEUR). The final column shows the realized per capita growth rates in 1991-1995, taken from world bank (1996) and calculated per capita GDP growth rates for the time period 1995-2015.

Table 3 shows that for some regions projections of the future GDP per capita growth vary considerably. For example, growth in sub-Saharan Africa ranges between 0.2% and about 3% under CPB scenarios, compared to 1% for the World Bank's scenario, between 2000 and 2015. And growth in Eastern Europe ranges between -0.1% and about 3% under CPB scenarios compared to 4% under the World Bank's scenario over the same time period.

All the scenarios show the Asian region achieving growth rates which are well above their rates of population growth. Japan is the most dynamic industrial economy in every scenario. There are no pessimistic forecasts for the Asian region in any of the scenarios. When economic activity shifts towards Japan and North America (the Global Shift scenario) growth is forecast to be highest in the Asian region. The Balanced Growth scenario shows the most optimistic outcome for Eastern Europe, Africa and Latin America.

4. FUTURE POVERTY AND HUMAN DEVELOPMENT

4.1 Poverty in the year 2105.

Table 4 shows the projected poverty incidence and projected absolute numbers of poor in 2015 calculated under different assumptions about the pattern of growth. A pro-poor growth pattern is represented by a high elasticity of the poverty incidence with respect to GDP per capita (b = -1.5), a neutral growth pattern is represented by a unitary poverty elasticity (b = -1), and an anti-poor growth pattern by a low poverty elasticity (b = -0.5).

Table 4. Poverty in the year 2015 under different scenarios

		Poverty Incidence (%)						Number of Poor (in millions)				
		Actual			2015			Actual			2015	
		1987	1990	1993	b=-0.5	b=-1	b=-1.5	1987	1990	1993	b=-0.5	b=-1
WB	SSA	38.5	39.3	39.1	35.2	31.7	28.5	149.7	187.5	198.0	325.9	293.4
	MENA	4.7	4.3	4.1	3.9	3.6	3.4	8.6	9.7	9.7	15.3	14.5
	EA&P	28.2	28.5	26.0	12.2	5.5	2.4	422.2	477.6	447.2	263.7	120.0
	SA	45.4	43	43.1	29.1	19.5	13.0	461.4	513.0	536.4	542.9	363.8
	LAC	22	23	23.5	18.4	14.4	11.2	83.7	100.9	107.0	116.9	91.3
	EEUR	0.6	na	3.5	2.5	1.7	1.2	2.3	na	14.4	10.7	7.4
BG	SSA	38.5	39.3	39.1	31.4	25.2	20.1	149.7	187.5	198.0	283.1	226.8
	MENA	4.7	4.3	4.1	3.8	3.6	3.4	8.6	9.7	9.7	14.1	13.2
	EA&P	28.2	28.5	26.0	12.5	5.9	2.7	422.2	477.6	447.2	239.2	112.4
	SA	45.4	43	43.1	23.7	12.8	6.8	461.4	513.0	536.4	332.2	179.6
	LAC	22	23	23.5	15.2	9.7	6.2	83.7	100.9	107.0	93.0	59.6
	EEUR	0.6	na	3.5	3.1	2.8	2.4	2.3	na	14.4	14.3	12.7
EU	SSA	38.5	39.3	39.1	35.5	32.2	29.2	149.7	187.5	198.0	346.2	314.1
	MENA	4.7	4.3	4.1	3.7	3.3	2.9	8.6	9.7	9.7	14.7	13.2
	EA&P	28.2	28.5	26.0	13.8	7.2	3.7	422.2	477.6	447.2	271.2	141.1
	SA	45.4	43	43.1	30.5	21.5	15.1	461.4	513.0	536.4	563.7	397.2
	LAC	22	23	23.5	20.6	18.0	15.8	83.7	100.9	107.0	133.1	116.5
	EEUR	0.6	na	3.5	2.8	2.3	1.9	2.3	na	14.4	13.1	10.6
GS	SSA	38.5	39.3	39.1	39.6	40.1	40.6	149.7	187.5	198.0	384.2	389.0
	MENA	4.7	4.3	4.1	3.6	3.2	2.8	8.6	9.7	9.7	14.4	12.7
	EA&P	28.2	28.5	26.0	12.3	5.7	2.6	422.2	477.6	447.2	240.2	111.0
	SA	45.4	43	43.1	26.1	15.6	9.2	461.4	513.0	536.4	481.8	288.4
	LAC	22	23	23.5	17.8	13.5	10.2	83.7	100.9	107.0	115.3	87.2
	EEUR	0.6	na	3.5	3.7	3.9	4.2	2.3	na	14.4	16.7	17.7

Table 5. Regional poverty in the year 2015

Region	Finding	Comments
Sub-Saharan Africa (SSA)	Poverty incidence decreases 7-14% in all scenarios except GS. In the GS scenario poverty incidence in 2015 is roughly unchanged at 40%.	The GS scenario is only mildly pessimistic compared to past trends. All per capita growth rates in GS are higher than those achieved in 1993-5.
	The absolute number of poor people increases in all scenarios and all patterns of growth (except pro-poor BG)	GDP per capita growth must reach 2.8% with a pro-poor pattern for the number of poor people to decrease.
		In other scenarios the number of people in poverty in 2015 increases by 0.7-2 hundred million.
Middle East and North Africa (MENA)	The poverty incidence falls slightly (0.5 - 1%) from a low base in all scenarios.	In 2015 there are 1.5 million more poor people in the best outcome (GS).
	The absolute number of the poor increases in all scenarios	
East Asia and the Pacific (including China). (EA&P)	Poverty incidence decreases rapidly by 12-22% in all scenarios.	Growth projections are optimistic (>=5% per capita). However the pattern of growth makes a great difference to the poverty outcome. Poverty incidence is 12-13% with anti-poor growth, compared to 2-3% with a pro-poor growth pattern.
	The absolute number of poor people declines in all scenarios and decreases from about 4 to 0.5 hundred million if the pattern of growth is pro-poor.	
South Asia (SA)	Large decreases (13-36%) in the poverty incidence by 2015.	There are more poor people in S. Asia than any other region. If pro-poor patterns of growth are attained their number decreases from about 5 hundred million in 1993 to 0.7-2.4 hundred million in 2015.
	The absolute number of poor people increase in only two scenarios (WB, EU) when the pattern of growth is anti-poor.	
Latin America and the Caribbean (LA&C)	Poverty incidence decreases in all scenarios by 3-17%.	Latin America has a lower poverty incidence in 1993 than EA&P, SA or SSA. By 2015, LA&C's poverty incidence is higher than in the EA&P region, while the difference with SA's poverty incidence decreases from 20% higher to only a few percentage points higher in most scenarios.
	The absolute number of poor people increases if the pattern of growth is anti poor (WB, EU, GS).	
Eastern Europe (EEUR)	The poverty incidence falls (0.5-1.5%)from a low base in all scenarios (except GS).	The absolute number of poor people may well increase, as compared to past trends the GS scenario is only mildly pessimistic.
	The absolute numbers of poor increase also only in the GS scenario.	

Table 4 shows that the poverty incidence decreases in all regions with two exceptions. Under the Global Shift scenario the poverty incidence is projected to increase in both Eastern Europe and sub-Saharan Africa by 2015, as a results of the negative growth rate of per capita income in these two scenarios. Also it can be seen that when per capita GDP growth is negative (e.g. GS for SSA), the low poverty elasticity (b = -0.5) produces the smallest increase in poverty incidence, as the poor are relatively isolated from the impact of this negative economic growth.[14]

Table 4 also shows that when growth rates are positive, the pattern of growth (and hence the value of elasticity) makes an enormous difference to the incidence of poverty and the absolute number of poor people in 2015. For example, using the World Bank's projections of economic growth, the total number of poor people is about 0.7 billion in 2015 if the pattern of growth is one that is associated with a reduction of the Gini coefficient, while the same level of economic growth combined with worsening income distribution would lead to 1.275 billion people living in poverty, which is almost the same as in 1993. The main findings of these poverty projections are summarised in Table 5.

Our simulation model is a fairly crude tool for projecting future trends in poverty reduction in terms of economic growth in developing regions. One of the things it does not capture is the wide variation of performance in growth and poverty reduction that will occur *within* regions. At the country level poverty incidence may diverge significantly from the regional average, as it happened in the past (see Chen, Datt and Ravallion 1994). For example, projections for South Asia show the poverty incidence to be less than or equal to 15% in all scenarios by the year 2015. However this is an average figure and it is likely that in some countries the poverty incidence will be well above this level and in others well below it. Economic development between 1960 and 1990 was characterised by increased polarisation and uneven economic growth within regions (Hanmer *et al.*, 1997). While some countries

[14] However, these results are not necessarily accurate. The elasticities used in our model were estimated for positive growth rates and the impact of negative growth on poverty may not be symmetrical to that of positive per capita growth.

experienced sustained economic growth, for others the decades of the 1980s and 1990s were characterised by unsustainable debt levels, lack of access to foreign capital, deterioration in external terms of trade and exclusion from the international economy. If these trends continue into the twenty first century, they could result in increased unevenness, even within regions.

To sum up, while the poverty incidence decreases under all scenarios and in all regions (except one scenario, GS, for sub-Saharan Africa and Eastern Europe), the absolute number of poor people will increase in many regions *even when optimistic growth rates* are forecast. However, if the pattern of growth is one that lowers the Gini coefficient, the number of people living below the poverty line in the year 2015 can be reduced considerably.

4.2. Human development in the year 2015.

Table 6 shows projections of future levels of the HD indicators (school enrolment rates, adult literacy rates and life expectancy) for the four economic growth scenarios. The model used to produce these results differs in some respects from the model used for the poverty projections. Future levels of HD indicators depend not only on economic growth but also on the positive influence of other, autonomous factors; *i.e.* factors that are not captured by the level of economic development alone. Progress that is not reflected in the economic growth rate of the region concerned, e.g. technical progress, medical advances, increased knowledge or progressive political and social changes, can thus affect human development in our model (see Section 3.2).

Table 6 shows that HD indicators improve considerably by the year 2015 for all developing regions. In Latin America, East Asia and the Pacific and Eastern Europe, overall literacy is achieved in the year 2015. Even under the Global Shift scenario, where per capita income growth is negative for Eastern Europe and sub-Saharan Africa, HD indicators still improve, although not as rapidly as in the other growth scenarios. This is consistent with past development trends. In sub-Saharan Africa, for example, the school enrolment ratio

increased three percentage points in the period 1980-93, despite negative per capita income growth during the period.

Table 6. Trends in human development based on GDP per capita

	Combined Enrolment		2015			
	1980	Base 1993	WB	BG	EU	GS
SSA	39	42.0	53.8	57.2	53.7	50.3
MENA	48	56.0	63.1	63.3	64.5	64.8
EA&P	51	59.0	82.3	81.9	80.2	82.1
SA	37	52.0	69.3	74.0	68.1	71.9
LAC	59	69.0	78.0	81.3	75.9	78.6
EEUR	na	74.0	84.1	79.0	81.0	74.6
	Literacy		2015			
	1970	Base 1993	WB	BG	EU	GS
SSA	27	55.0	65.7	69.6	65.5	61.8
MENA	29	53.0	62.7	62.9	64.2	64.6
EA&P	65	86.0	100.0	100.0	100.0	100.0
SA	31	48.8	69.7	75.2	68.5	72.7
LAC	71	85.9	95.5	99.8	92.9	96.3
EEUR	na	97.6	100.0	100.0	100.0	97.0
	Life expectancy		2015			
	1960	Base 1993	WB	BG	EU	GS
SSA	40.1	50.9	61.9	64.0	61.8	59.8
MENA	45.2	62.1	69.7	69.8	70.5	70.7
EA&P	45.4	63.7	81.2	80.9	79.9	81.1
SA	43.6	60.3	74.0	76.9	73.3	75.6
LAC	55.4	68.5	77.2	79.3	76.0	77.6
EEUR	na	69.2	78.8	75.8	77.0	73.1

The projections also show that by the year 2015:

- school enrolment and life expectancy in *sub-Saharan Africa* reach the level already achieved by East Asia and the Pacific in 1993;
- school enrolment in *South Asia* reaches the level achieved by Latin America and the Caribbean in 1993; and
- literacy in *South Asia* and *sub-Saharan Africa* is still below the level achieved by East Asia and the Pacific and Latin America and the Caribbean in 1993.

Table 7. Trends in female human development indicators

	Comb.Enr. Base 1993	2015			
		WB	BG	EU	GS
SSA	37.2	49.3	53.2	49.1	45.3
MENA	51.0	58.0	58.3	59.7	60.1
EA&P	58.1	84.4	83.8	81.7	84.1
SA	43.2	62.8	68.4	61.5	65.9
LAC	68.2	77.6	81.7	75.0	78.4
EEUR	76.5	87.1	80.9	83.4	75.7
	Literacy Base 1993	2015			
		WB	BG	EU	GS
SSA	45.4	55.3	60.3	55.1	50.1
MENA	40.4	49.4	49.7	51.3	51.8
EA&P	82.6	100.0	100.0	100.0	100.0
SA	35.0	58.3	64.9	56.8	62.0
LAC	84.2	93.4	98.0	90.4	94.3
EEUR	96.3	100.0	99.9	100.0	93.6
	Life exp. Base 1993	2015			
		WB	BG	EU	GS
SSA	52.5	63.7	66.0	63.6	61.3
MENA	64.1	71.7	71.9	72.6	72.9
EA&P	66.0	83.7	83.5	82.5	83.6
SA	60.5	75.0	78.0	74.3	76.6
LAC	71.2	79.9	81.8	78.6	80.2
EEUR	74.2	83.5	80.4	81.7	77.6

Table 7 shows the projected future levels of life expectancy, adult literacy and school enrolment rates for women and girls in 1993 for each scenario.

It is well established in the development literature that improved health and education indicators are linked to the degree of gender equality (this is discussed in greater depth in Chapter 3 of Hanmer *et al.*, 1997). Further, equal access to education and health for women and girls can be viewed as fundamental to their quality of life and as such an integral part of human development, even when disregarding the positive additive effects it has for the population as a whole. Reducing the gender gap in human development is, hence, very important. However, what we see when we compare Table 6 and Table 7 is that school enrolment and adult literacy

for women and girls are lower than the average rate for the population as a whole in all developing regions.

Of particular note from Table 7 are the following points:

- women's and girl's school enrolment and literacy are lowest relative to that of the total population in South Asia;
- in sub-Saharan Africa only about 50% of girls are enrolled in school in 2015;
- girls' school enrolment in the Middle East and North Africa and South Asia (most scenarios) is, in 2015, about the same as girls school enrolment in East Asia and the Pacific in the 1990s;
- East Asia and the Pacific and Eastern Europe (some scenarios) achieve 100% literacy for women and men by 2015; and,
- female life expectancy in sub-Saharan Africa in 2015 reaches the level achieved by East Asia and the Pacific in 1993.

4.3. Policy orientation, poverty and human development.

What then is the impact of policies on poverty and HD indicators projected for 2015? Table 8 shows the results of simulations on differences in the pattern of growth on the school enrolment ratio, literacy and life expectancy. The results are presented for the most optimistic and most pessimistic growth scenario for each region. Some of the main results of the projections are summarised in Table 9.[15]

The projections for HD indicators show that they will increase by the year 2015, even in the low growth scenario. This is due to the inclusion in our model of the autonomous element, which captures ability factors other than economic growth to influence social development. Our simulations also suggest that policy orientation can be as important as economic growth in achieving improvements in HD indicators. As is true for the preceding projections of poverty, country performance within regions is likely to vary, so similar caveats apply here also.

[15] In Hanmer *et al.* (1997) we repeat this exercise for the female HD indicators. The results are not reported here as the model's assumptions mean that the same magnitude of change is observed as for the HD indicators shown in Table 8. For some regions the 2015 level of female HD indicators remains lower than that for the population average as they start from a lower base.

Table 8. Pattern of growth and HD indicators for 2015

(most optimistic and most pessimistic growth scenario for each region)

		1993 level	anti-poor	base-line	pro-poor
Sub-Saharan Africa					
CER	BG	42	52	57	63
	GS		50	50	50
LIT	BG	55	63	66	69
	GS		61	62	63
LIFE	BG	51	62	64	67
	GS		60	60	60
Middle East and North Africa					
CER	GS	56	62	65	68
	WB		62	63	65
LIT	GS	53	60	65	69
	WB		61	63	65
LIFE	GS	62	69	71	72
	WB		69	70	70
East Asia & the Pacific					
CER	WB	59	60	82	105
	EU		61	80	99
LIT	WB	86	82	100	100
	EU		84	100	100
LIFE	WB	64	71	81	85
	EU		71	80	85
South Asia					
CER	BG	52	57	74	91
	EU		59	68	78
LIT	BG	49	55	75	97
	EU		57	69	81
LIFE	BG	60	69	77	85
	EU		69	73	78
Latin America and the Caribbean					
CER	BG	69	69	81	94
	EU		72	76	80
LIT	BG	86	83	100	100
	EU		88	93	98
LIFE	BG	69	74	79	85
	EU		74	76	77
Eastern Europe					
CER	WB	74	75	84	93
	GS		72	75	78
LIT	WB	98	97	100	100
	GS		93	97	100
LIFE	WB	69	75	79	83
	GS		72	73	74

Note: CER = combined enrolment rate; LIT = adult literacy rate; LIFE = life expectancy at birth

Table 9. Summary findings for HD indicators

	Finding	Comment
SSA	Indicators increase 6-16%.	Growth matters. All outcomes in the high growth scenario (BG) are superior to the low growth (GS) scenario. But policy matters too in the BG scenario.
MENA	Indicators increase 6-16%	Lower growth and pro-poor policies can produce better results than higher growth and anti-poor policies (LIT and CER).
EA&P	Indicators increase about 20% (neutral policy). LIT reaches 100% (all scenarios, neutral policy)	High growth rates ensure improvements in all HD indicators if policy is neutral or pro-poor. With anti-poor polices LIT and CER remain at their 1993 level.
SA	Indicators increase 13-26% (neutral policy). For all policy scenarios the range is 5-28%	Redistributive policies are as important as growth. Lower growth and pro-poor policies can produce better results than higher growth and neutral or anti-poor policies (LIT, LIFE).
LAC	Indicators increase 7-14% (neutral policy). LIT reaches 100% For all policy scenarios the range is 7-25%	Redistributive policies are as important as growth. Lower growth and pro-poor or neutral policies can produce better results than higher growth and anti-poor policies (CER, LIT).
EEUR	Indicators increase 6-19%. LIT reaches 100% with high growth.	Low growth and anti-poor policies produce retrogression (CER, LIT).

4.4. Discussion

Table 10 shows the predicted range of poverty incidences and levels of human development indicators in 2015.

Table 10. The predicted range of poverty incidence and human development indicators in 2015

Region	Poverty (%)	School Enrolment (%)	Literacy (%)	Life expectancy (years)
Sub-Saharan Africa	20-40	50-63	61-69	60-67
Middle East and North Africa	3-4	62-68	60-69	69-72
East Asia and the Pacific	2-14	60-100	82-100	71-85
South Asia	7-30	57-91	55-97	69-85
Latin America and the Caribbean	6-21	69-94	83-100	74-85
Eastern Europe	2-4	72-93	93-100	72-83

Table 10 shows that poverty incidence in 2015 will still be considerable in several regions of the world. This observation becomes even more important when we realise that our estimates are based on an extreme poverty line. If we had defined poverty in a less extreme way, the incidence in 2015 would be even higher.

What is immediately clear is that poverty incidence will be highest in sub-Saharan Africa, as compared to other world regions. Growth is of paramount importance to reduce poverty. According to our estimations per capita GDP growth rates must reach 2.8 per cent to reduce poverty incidence in sub-Saharan Africa to 25 per cent. This is a very optimistic growth rate. Apart from growth, the policy orientation also matters enormously. Also with regard to HD indicators we can conclude that both growth and policy orientation are important. If, as has been found in South East Asia (see, for example World Bank, 1993; Barro, 1991), higher levels of human capital can also in Africa contribute to higher economic growth, investment in social sector expenditure may be very important. But increasing human capital alone is not sufficient (Hanmer, Pyatt and White, 1996). Pro-poor policies will also have to include measures that ensure that the poor gain increased access to all productive assets, land, labour and capita, and

get the maximum possible return from them.[16] Policies targeting women could be of prime importance.

The prospects for South Asia are brighter than those for sub-Saharan Africa. In 1993 the level of poverty is 43% in South Asia, slightly higher in fact than sub-Saharan Africa's 39% in that year. By the year 2015 the incidence of extreme poverty is reduced to between 13% and 22%. The range of poverty incidence projections for 2015 are premised on per capita income growth rates that either are maintained at their 1993/4 rate of 3.5% or increase to 6% up until the year 2015. For South Asia policy makes an enormous difference to progress achieved in poverty eradication. Consider the moderately optimistic World Bank scenario, (per capita income growth remains at about 3.5% between 1995 and 2000 and increases to about 4% per annum between 2000 and 2015). If policy is pro-poor the poverty incidence falls to 13% in this scenario. Similarly, school enrolment and adult literacy increase from around 50% in 1993 to around 80% in 2015 in the pro-poor policy scenario. Growth is important, but it is most effective in achieving poverty reduction and human development when it is occurs in a policy environment that is associated with a low Gini coefficient and that prioritises human development. Here too, policy interventions should aim to ensure that the poor gain increased access to all productive assets, land, labour and capital, and get the maximum possible return from them.

What is striking about the projections for Latin America and the Caribbean is the relative deterioration of the performance on poverty and human development of this region. In 1993 Latin America and the Caribbean had a lower poverty incidence than South Asia, East Asia and the Pacific and sub-Saharan Africa. Furthermore human development indicators in Latin America and the Caribbean in 1993 were substantially above those for all the other developing regions apart from Eastern Europe. By the year 2015, as a results of growth

[16] See for instance Westphal (1978) and Edwards (1992), who observe that the relative equal distribution of asset holding (particularly land holdings) in Southeast Asia at the onset of rapid industrialization and growth, may be an important explanation for the economic success of these countries.

rate forecasts of 1-4% per capita per annum, the poverty incidence projected for Latin America and the Caribbean will be roughly in the range of South Asia's.

Again, what really makes the difference to poverty reduction in this region is the pattern of growth. Consider, for instance, the World Bank growth scenario of about 2% per capita per annum growth between 1995 and 2015. If policy is pro-poor then poverty incidence falls to 11%, only little above the 10% projected for the BG scenario which forecasts per capita GDP growth increasing from 4% to 4.5% between 1995 and 2015. In fact even with the high rates of growth forecast in the BG scenario, Latin America and the Caribbean can only maintain its relatively favourable position in terms of poverty incidence, if the pattern of growth is one that is associated with a low Gini coefficient (see Table 4).

HD indicators continue to perform well in all scenarios, but, as already noted, pro-poor policies and lower growth can produce better results than higher growth and anti-poor policies.

The Latin America and the Caribbean region contains mainly middle income developing countries. In countries that have a more developed market structure and a larger industrial base greater income equality can be achieved through progressive fiscal policies and other redistributive state policies in addition to policies that increase the poor's access to and returns from productive assets. Typically, only small proportions of the total population earn their living from subsistence farming in these countries, hence policies to increase employment generation and raise labour productivity take on increasing importance in middle income countries.

To summarise, our results imply that growth is important, but also that measures to bring down the Gini coefficient and give the poor access to resources to improve their livelihoods are crucial. What these additional measures are depends on the specific characteristics of the regions (or countries). While in Sub-Saharan Africa redistribution of land may be very important, the

middle income countries in the Latin American region would probably benefit especially from progressive fiscal measures and other redistributive policies.

5. CONCLUDING REMARKS

We started this article with the question of what we can expect in terms of poverty eradication and improvements in human development indicators in the major world regions. Our projections are based on an extreme poverty line of $1 PPP a day. If a wider range basic expenditures were to be included in the definition of the poverty line, our estimates of future poverty would be higher. Our results show that poverty incidence will reduce in all regions by 2015, under all growth scenarios, except in two cases:

- in sub-Saharan Africa, if per capita GDP growth remains negative or negligible, the percentage of poor people will remain at about 40%; and,
- in Eastern Europe, if per capita GDP growth remains negative, the percentage of poor people will remain at about 3.5% or increase by about 0.5 percentage points.

The regions that are forecast to make most progress in poverty reduction are:

- East Asia and the Pacific, which includes China; here the poverty incidence decreases to 2-4% by 2015;
- South Asia, where several of the scenarios predict the poverty incidence to fall from about 43% to around 20% in 2015; and ,
- if growth is associated with a more equal income distribution, three of our four scenarios show that the poverty incidence in Latin America and the Caribbean is reduced by at least 50%.

The poverty numbers show, however, a less rosy future. East Asia and the Pacific is the only region where the absolute number of people living in poverty decreases in all scenarios.

- For sub-Saharan Africa our projections show, that with one exception, the number of people living in poverty increases in all scenarios, under all policies.

- In the Middle East and North Africa the number of people living in poverty increases in all scenarios.

The difference that alternative policies can make to progress in poverty reduction are clearly illustrated by the projected absolute number of poor people in 2015 for some regions. In the lower growth scenarios for South Asia and Latin America and the Caribbean,

- the number of people living in poverty only increases if the pattern of growth is anti-poor, i.e. growth is accompanied by increasing inequality in the income distribution.

Projections of human development indicators (combined school enrolment, literacy and life expectancy) show that the levels of these indicators improve considerably by the year 2015 for all developing regions. In Latin America, East Asia and the Pacific and Eastern Europe, overall literacy is achieved in the year 2015. Even under the Global Shift scenario, where per capita income growth is negative for Eastern Europe and sub-Saharan Africa, HD indicators still improve, although not as rapidly as in the other growth scenarios. Two important findings from our HD indicator projections are:

- for sub-Saharan Africa economic growth is of crucial importance in achieving higher levels of HD indicators. Higher growth scenarios produce better HD indicators than lower growth scenarios in all policy variants. But,
- for all other regions there are examples of lower growth and pro-poor policies producing better HD indicators than higher growth and anti-poor or unchanged policies.

Our simulations thus suggest that policy orientation can be as important as economic growth in achieving improvements in HD indicators.

One of our findings that gives rise to a certain amount of optimism regarding the future prospects for poverty and human development is that there is a degree of substitutability between pro-poor policy and economic growth. Sustained per capita GDP growth is a necessary condition for poverty reduction and improvements in HD indicators. But the

good news is that if policy orientation is pro-poor, and the pattern of growth is one that is associated with a more equal distribution of income, progress in poverty eradication and human development can equal the results predicted from higher growth rate scenarios when the income distribution is unchanged or when policies are less pro-poor. Hence, we conclude that progress on poverty reduction and human development can be greatly enhanced if policy adjustments promote greater equity as well as greater economic growth. In many countries, especially low income ones, policy thus needs to not only concerned with growth, but also access to and the distribution of assets, as well as with promoting productive employment generation. A pro-poor strategy automatically involves a pro-women policy.

A discussion of the projected future rates of poverty and human development would not be complete without noting some of the limitations and uncertainties inherent when such an exercise is based on econometric modelling. We start by noting some limitations that are specific to our model and then turn to more general limitations of econometric models for forecasts such as these.

First, we are well aware that our model is almost certainly misspecified in two important respects. The first is that economic growth is not only a cause of human development, but is itself the result of various factors. The relationship between human development and economic growth is a complex one and causality may not be unidirectional, as we have assumed in the model. Also assuming a two-way relationship between the two is, in fact, too simple, as there are other - often country-specific - socio-political factors which play an important role in creating the environment in which human development and economic growth have particular impacts.

The other important aspect which we have not taken into account is that our models fails to capture the influential role that gender relations have in determining progress in human development. Country studies show that gender relations are often key to understanding progress in child welfare, health, education, literacy, poverty reduction and other aspects of

social progress (see Hanmer *et al.*, 1997 for discussion of these issues in greater depth). Recent cognisance of the importance of gender relations in general, and the position of women in particular, for human and social development has prompted efforts by the multilateral institutions to gather data on variables that can be considered indicators of the degree of gender equity or the position of women. The UNDP (1995) Gender-related Development Index and Gender Empowerment Measure are but two examples. However, since time series data on gender indicators do not exist, they could not be incorporated into our models.

Finally we should point out that econometric models are a very blunt tool to carve out representations of the social characteristics of the future. The methodology employed assumes a high degree of continuity with the past. Thus the projections presented above make no allowance for structural breaks with past trends, and hence their results need to be treated with due caution. Most major shocks that cause breaks with past trends are by their nature unpredictable and hence difficult to quantify and incorporate into econometric modelling exercises. However even relatively recent economic history gives examples of shocks to the world economy causing discontinuities and breaks with past trends. In Hanmer *et al.* (1997), we discuss four potential sources of future shocks: technological breakthroughs which *inter alia* may have enormous impact on employment and migration; increasing volatility and unpredictability in some global markets; environmental degradation and natural resource scarcity; and, political instability, war and civil conflict. These caveats should be borne in mind when examining the projections of future poverty and human development indicators presented here.

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TECHNICAL APPENDIX

Simulations of poverty

To estimate the poverty elasticity with respect to GDP per capita, we pooled the 1985 and 1990 estimates of poverty incidence and corresponding GDP per capita figures, specifying a double log function of poverty incidence on GDP per capita. In the first instance we included slope and intercept dummies to account for shifts of the intercept and changes in the slope of the curve between the two years, but these dummies were not statistically significant. Probably five years is too short to capture any such differences econometrically. So our final model became:

$$\ln. H_{0t} = \beta_0 + \beta_1 \ln RGDP_t + \varepsilon_t ,$$

where:

H_{0t} = incidence of poverty in year t
$RGDP_t$ = GDP per capita in year t

We hypothesized that a country's poverty elasticity is likely to vary systematically with its income inequality. To test this hypothesis we classified the pooled cross country data, according to the Gini coefficient, into low, medium and high income inequality groups. This yielded three statistically significant different poverty elasticities (see Table A.1). The F-value of the Chow test is equal to 9.01, compared to a critical value of $F_{(4,78)}$ of about 5.68.

Table A.1: Estimation of Poverty Incidence

Sample	n	b_0	b_1	R^2	F	F Chow-test
Pooled 1985 and 1990	84	11.0 (9.24)	-1.1 (-6.82)	0.362	46.55	9.01
ibid., Gini < 0.4 Low inequality	31	14.6 (7.06)	-1.6 (-5.83)	0.540	33.99	-
ibid., 0.4 ≤ Gini ≤ 0.5 Medium inequality	24	10.6 (4.83)	-1.0 (-3.65)	0.377	13.29	-
ibid., Gini > 0.5 High inequality	29	8.2 (9.70)	-0.6 (-5.58)	0.536	31.14	-

Note: t-statistics in parentheses

To see how economic growth with different degrees of income inequality effects the influence of poverty (hereafter referred to as different patterns of growth), we produced projections of HD indicators for each growth scenario using the three poverty elasticities. Thus, for each region we have four growth scenarios, with three different poverty elasticities.

Simulations of human development indicators

To estimate the human development indicators we started by specifying a semi-log instead of a double-log function:

$$HD_t = \beta_0 + \beta_1 \ln RGDP_{t-1} + \varepsilon_t ,$$

where:

HD_t = Human Development indicator in year t

$RGDP_{t-1}$ = GDP per capita in year $t-1$

The reason for specifying a semi-log function is that the distributions of the HD indicators are fairly symmetrical. A log transformation of the data would yield skewed distributions.

Furthermore, scatter plots of HD indicators on GDP per capita supported the use of this functional form. For combined enrolment (CENR) there are only observations for 1993, but for life expectancy and adult literacy there are both observations for the early 1970s and for 1993. Comparison of the scatter plots of the two cross-sections for each of these two indicators suggests that the curves have shifted over time, *i.e.* that the intercepts have increased and the slopes have decreased. To test whether these changes are statistically significant, we regressed the pooled samples, as well as separate samples for the early 1970s and of 1993. The results of the Chow tests indicate that pooling is not valid, neither in the case of life expectancy (LE), nor for that of literacy (LIT) (Table A.2).

Table A.2: Estimation of Human Development

Sample	n	b_0	b_1	R^2	F (Regr.)	F (Chow-test)
LE, pooled	217	-15.02 (-4.29)	9.64 (21.70)	0.687	470.87	22.40
LE, 1970-73	124	-18.38 (-3.66)	9.76 (15.03)	0.649	225.80	-
LE, 1993	93	-3.94 (-1.05)	8.65 (18.66)	0.793	348.20	-
LIT, pooled	137	-74.62 (-7.07)	18.54 (14.00)	0.592	196.08	8.17
LIT, 1970-73	46	- 136.83 (-5.30)	26.02 (7.81)	0.581	60.98	-
LIT, 1993	91	-52.36 (-5.08)	16.04 (12.60)	0.641	158.78	-
CENR, 1993	91	-49.74 (-6.08)	14.02 (13.86)	0.684	192.16	-

Note: t-statistics in parentheses

For life expectancy, the calculated F-value is 22.40, against a critical value of $F_{(2, 213)}$ of about 3.04; for literacy, the calculated F-value is 8.17, compared to a critical value of $F_{(2, 133)}$ of about 3.07.

In addition, to see whether both intercept and slope changed significantly over time, we regressed a pooled sample and included intercept and slope dummies (Table A.3). In the case of life expectancy, the intercept dummy is significant but the slope dummy is not. In the case of literacy, both the intercept and the slope dummies are statistically significant.

Table A.3: Estimation of Human Development with Time Dummies

Sample	n	b_0	b_1	$d_{intercept}$	d_{slope}	R^2	F (Regr.)
LE, pooled	217	-18.38 (-4.14)	9.76 (17.01)	14.44 (2.23)	-1.11 (-1.36)	0.74 1	203.19
LIT, pooled	137	- 136.84 (-6.29)	26.02 (9.27)	84.48 (3.43)	-9.98 (-3.17)	0.63 7	77.75

Note: t-statistics in parentheses

A lower slope in the latter period implies that over time the HD indicator has become less responsive to economic growth. To achieve a unit improvement in an HD indicator in 1990 more economic growth is necessary than say, would have been required in 1970.

The upward shift of the intercept term that factors other than growth of GDP per capita of a country in question are becoming increasingly important for achieving higher human development. Such factors are not necessarily country specific, as they may, for example, include technical progress which has global effects.

If we extrapolate both these tendencies to the future, the slope coefficients will in 20 years from now have declined even further, whereas the intercept will have increased. We assume in the projection models that these tendencies hold for all the HD indicators, including combined enrolment.

Due to limited data availability we estimated cross-section models of HD indicators, rather than time series ones. To project HD indicators we have to extrapolate from a cross section of countries to a future time series. We thus included an element that captures the diminishing effectiveness of per capita GDP growth at higher levels of national income. If

this were not included, the combination of constant growth and a semi-log functional form would lead to constant rates of increases of the HD indicators over time. However a linear trend over time is however not plausible as there are limits to the extent HD indicators can increase, e.g. 100% in the case of literacy. In the projection model therefore included a quadratic term, the square of logged GDP per capita, implying that the effect of growth on HD indicators diminishes over time. For each of the HD indicators, the coefficients were estimated using the 1993 sample. The estimated coefficients of squared log GDP are negative, whereas those of log GDP remain positive. To model the effect of a higher intercept coefficient over time we added an autonomous component to the model. Thus, the projection model is specified as follows:

$$HD_t = b_0 + b_1 \ln RGDP_{t-1} + b_2 (\ln RGDP_{t-1})^2 + CAU_t ,$$

where:

HD_t = Human Development indicator in year t
$RGDP_{t-1}$ = Regional GDP per capita in year t-1
CAU_t = autonomous component in year t

The negative value of the coefficient (b2) can result in falling HD indicators when rapid economic growth combines with a low slope coefficient, as in this case the negative influence of the coefficient of quadratic term is greater than the positive influence effect of the coefficient of log GDP on the HD indicator. The autonomous component incorporates global and national changes of factors other than per capita GDP that influence human development. We assumed that the effect of this factor on the human development indicators is inversely related to the level of human development. So in regions where human development is lower, the growth of the "other factors" has a bigger impact than in regions with a higher level of human development. The functional form of autonomous growth in year t ( ) CAU_t) is as follows:

$$\Delta CAU_t = \frac{cau}{(HD_{t-1})^2}$$

where *CAU* is the fixed coefficient of autonomous growth. The value of *cau* was chosen arbitrarily to yield a shift of the intercept which is inversely related to the previous year's level of HD indicators and equal to 0.5 percentage point in 1994 in the case of the region with the lowest 1993 level of the HD indicator. For example, the combined enrolment ratio (CER) is lowest in sub-Saharan Africa in 1993. The *cau* was set at the value that resulted in the projected CER for sub-Saharan Africa in 1994 to increase by an additional 0.5 percentage points.

The estimated coefficients of per capita GDP are, of course, averages for the cross section of countries. In order to capture the fact that in some countries HD indicator levels diverge from the expected value we varied the coefficients by one standard error. Each growth scenario, hence, has three variants: neutral policy, pro-poor policy and an anti-poor policy. The neutral policy variant is one where policy reflects average past trends. In the pro-poor variant the coefficient is increased by one standard error and, hence, economic growth has a larger impact on HD indicators than in the base (neutral policy) case. In the anti-poor policy variant one standard error is deducted from the coefficient. In the anti-poor scenario the low coefficient means, as noted earlier that HD indicators can decrease in the presence of rapid economic growth.