Projecting Progress toward the Millennium Development Goals

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Abstract

The Millennium Development Goals have become the frame of reference for most of the development community: the standard by which performance will ultimately be judged. Given their importance, considerable attention has been paid as to whether these goals will be met or not. The overwhelming conclusions from such analyses are not positive. The goals will not be met. There are exceptions—education has expanded rapidly, although questions are raised about quality, and some countries, notably in South East Asia, but also South Asia to a lesser extent, have done well across the board and will meet several of the goals. But many countries, most especially in Africa, will not. The projections show that poverty will become more heavily concentrated in Africa in both relative and absolute terms. In addition, whilst urban poverty will increase, in 2015 poverty will remain a predominately rural phenomenon, with 60-70 per cent of the poor (depending on the measure) living in rural areas. But these projections are based on assumptions, including the assumption of business as usual. Various adverse shocks may result in far worse scenarios. On the other hand, more intensive promotion of pro-poor policies can mean that the goals might yet be realized.

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1 Introduction

Since the adoption of the International Development Targets, and their successor Millennium Development Goals (MDGs), a growing number of publications have presented estimates of development outcomes in 2015, the target year for most of the goals. What most these projections show is that the developing world as a whole is 'off track' with respect to most targets. They will not, in aggregate, be met and many countries will fall far short. The MDGs seem set to pass into history as another set of missed development targets.

This paper looks at the soundness of these dire projections. Section 2 briefly discusses the basis for making such projections and then findings for major MDG targets (income poverty, mortality, education, nutrition and HIV/AIDS in Sections 3-7). Section 8 concludes.

2 Approaches to making projections[1]

Projections may vary because of differences in assumptions regarding (1) determinants of the outcome of interest, (2) model parameters, or (3) future values of the determinants. The simplest models, and by far the most common approach, take time as the only determinant, i.e., the future is forecast-based on historical trends, an approach called here naïve projections. Naïve projections tell us if a country is on track or not to meet the relevant goal, which is certainly of policy interest, but are of less use in predicting actual expected values at some point in the future unless its determinants really are uncertain or unforecastable.

The next most common approach is to use an outcome-income elasticity to base the forecast on projections of economic growth, the latter usually being taken from some other source, such as the World Bank's Global Economic Prospects (GEP). Since income is highly correlated with most of the outcomes of interest, this approach can be expected to give a reasonable first approximation. However the correlation with income is imperfect, so adding more variables to the right-hand side of the determinants-equation will help, at least if the future values of these determinants can be predicted with any degree of confidence. More sophisticated versions utilize multi-equation models. There are undoubted advantages to such models, which allow a wider range of policy simulations, but they are quite resource intensive and assumption dependent. Results from the most recent multi-equation model, the World Bank Maquette for MDG Simulations (MAMS), are thus far only available for one country (Ethiopia), and such approaches are not the basis of the projections presented here.

Some indicators have risen in recent years at a far greater rate than their historical precedent—primary enrolment being the most obvious case. In these cases, if naïve projections are based on very recent trends then such forecasts may be superior to those which are model-based. But naïve projections will under-estimate future growth if the period used to calculate expected growth includes many years prior to any recent expansion. The main point is that policy can make a difference to the achievement of

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[1] The Annex presents a fuller discussion of the different approaches.

goals—as shown by the experience of countries which do not follow the expected outcome-income trajectory (see World Bank 2005, for a discussion of Bangladesh which has been remarkably successful in reducing fertility and mortality faster than growth would suggest). If the right policies were to be implemented, then all future outcomes would be better than suggested here, though this of course begs the question as to what the 'right policies' are.

A further source in variation of projections is the level of disaggregation at which they are made. Although most sources report results at the regional level, it is preferable that these regional aggregates be based on country-level projections using country-specific data and parameters. This is not always the case. All methods are of course dependent on the quality of data used. Data availability has improved greatly in the last two decades, though most outcomes are not available on an annual basis.[2] There are also exceptions to the general increase in data availability, such as maternal mortality and literacy, for which data are less reliable. Moreover, even where data are good there are frequently groups missed from the data, notably those not in fixed households (nomads, street children, those in institutions, etc.).

Basis of own projections

Our own projections are made at the country level and are reported using either the UN or World Bank regional classifications. The baseline data (i.e. pre-projection) are from the UN Millennium Indicators Database, supplemented by the World Bank's World Development Indicators and Demographic and Health Survey (DHS) data as necessary. Population data are from the UN Population Database 2004 Revision. Projections are made using one of three methods: (1) naïve projections, (2) growth-based estimates, and (3) model-based estimates (i.e. growth plus other factors). The latter two approaches use differential elasticities to capture the greater poverty-reducing effect of growth in low inequality settings. Rural-urban rates are based on country-specific estimates of the rural-urban differential. Specific details of the projections are as follows:

- Income poverty is modelled as a function of income growth alone with the elasticity varying according the level of initial inequality.
- Under-five mortality is modelled as a function of income poverty (elasticity = 0.4) and female enrolments (elasticity = -1.3) and an autonomous decline of 1.5 per cent per annum.
- Under-nutrition is modelled as a function of income alone, with the elasticity again varying by the level of inequality.
- Net enrolments are based on naïve projections, made separately for male and female, capped at 98 and the female rate capped at the male rate.
- Literacy is calculated in two ways: (1) naïve projections, done separately for male and female, and capped at 99.5, and (2) an accounting approach based on age structure and net enrolments, removing older, less literate, people from the population and adding those graduating from school who are assumed to be literate. Again the data are capped at 99.5.

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2   They may be reported on an annual basis in sources such as UNDP's *Human Development Report*, but this is not the same thing. These figures are based on interpolation between available data points.

- Separate rural and urban estimates are made by using the ratio of rural to urban incidence, based on observed values where available and modelled (as a function of poverty, urbanization, education and regional dummies) when not available.

3   Income poverty

Early estimates of progress toward reducing income poverty come from studies conducted by the Institute of Social Studies for the Sida 2015 project (hereinafter the ISS study, Hanmer et al. 1997a, 1997b), and work undertaken by the Overseas Development Institute (ODI).[3] These two studies made forecasts based on estimates of the elasticity of poverty with respect to income, allowing the elasticity to vary according to the degree of inequality.[4] The World Bank has since begun publishing annual estimates of income poverty in 2015 in *Global Economic Prospects* (GEP). These estimates are the same as those to be found in the Bank's MDG *Global Monitoring Report*. The methodology used in these studies is not public, but appears to be based on household data rather than cross-country elasticities. Elasticities based on household data are generally higher than those from cross-country regressions, so the estimates of future numbers of poor will be less than if elasticities estimated using cross-country data are used.

Our own estimates follow the ODI-Sida approach applied on a country-by-country basis. Projected growth rates are based on regional averages from GEP, with a few exceptions. The poverty elasticity is assumed to vary according to initial inequality.[5] To calculate regional figures of absolute numbers of poor, the total for the region is scaled-up to capture the population not covered by the data.

Table 1 summarizes the various results. The most recent World Bank estimates present a more positive picture than do the earlier studies, except with respect to sub-Saharan Africa (SSA). Our own estimates give figures more similar to those of the earlier studies. In general this will be because we assume lower elasticities than those used by the World Bank, especially for high inequality countries, so the rate of poverty reduction as a consequence of growth is less. However, in the case of Africa, our estimates are more positive. This discrepancy is most likely as the World Bank is using recent country-specific poverty estimates not available to us. Discrepancies also arise from both differing assumed growth rates and data revisions to poverty estimates in the base year (1990). More recent growth forecasts are generally more positive than the older ones[6] and estimates of poverty in 1990 have been revised downward, especially for Latin America and the Caribbean (LAC).

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[3]   The same person, Lucia Hanmer, was responsible for the design of the quantitative aspects of both these studies.

[4]   Forecasting was also carried out by Demery and Walton (1998) from the World Bank using an approach similar to that used in the ISS and ODI studies, though the results were not presented in a way allowing regional tabulations.

[5]   The elasticity is taken as -0.5, -0.8 and -1.2 for high, middle and low inequality countries respectively, where the former has a Gini coefficient of ≥ 0.54 and the latter ≤ 0.40.

[6]   These more positive estimates reflect the relative strength of recent growth performance. Making estimates in this way ignores the cyclical nature of growth and possible threats to growth in some regions, such as the growing dominance of Asian economies.

Table 1: Income poverty forecasts (% living below $1 a day) for 2015 from three studies

	Sida 2015	Hanmer and Naschold	World Bank (2005)	Own estimates
Sub-Saharan Africa	32.4	33.2	38.4	30.0
Middle East and North Africa	3.4	1.9	0.9	4.2
East Asia and Pacific	7.2	10.1	0.9	8.4
South Asia	18.6	23.3	12.8	16.8
Latin America and Caribbean	14.3	15.7	6.9	16.1
Eastern Europe and CIS	2.7	3.9	0.4	4.3

Source: See text.

Income poverty will be increasingly concentrated in Africa (Figure 1), with absolute numbers of poor under the $1 a day standard in Africa overtaking South Asia at around the current time. If a $2 a day poverty line is used then South Asia will continue to have the bulk of the world's income poor in 2015 (46 per cent), followed by SSA (31 per cent).

Figure 1: Share of global poverty (proportion of poor in each region using $1 a day poverty line)

Source: Calculated from World Bank *GEP* data.

Sub-regional estimates

Sub-regional figures (Table 2) are based on our own income poverty estimates. The total number of poor in 2015 (736 million) sits well within the range of earlier World Bank estimates, though it is higher than their current projection. The headcount ratio is highest in West and East Africa. Central Africa appears better off than Central and South America but it should be recalled that most of the African countries do not have data, especially those affected by conflict where poverty will be high. These patterns are also evident in the map, although the data limitations also show up there (Figure 2).

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Table 2: Sub-regional income poverty estimates 2015 ($1 a day)

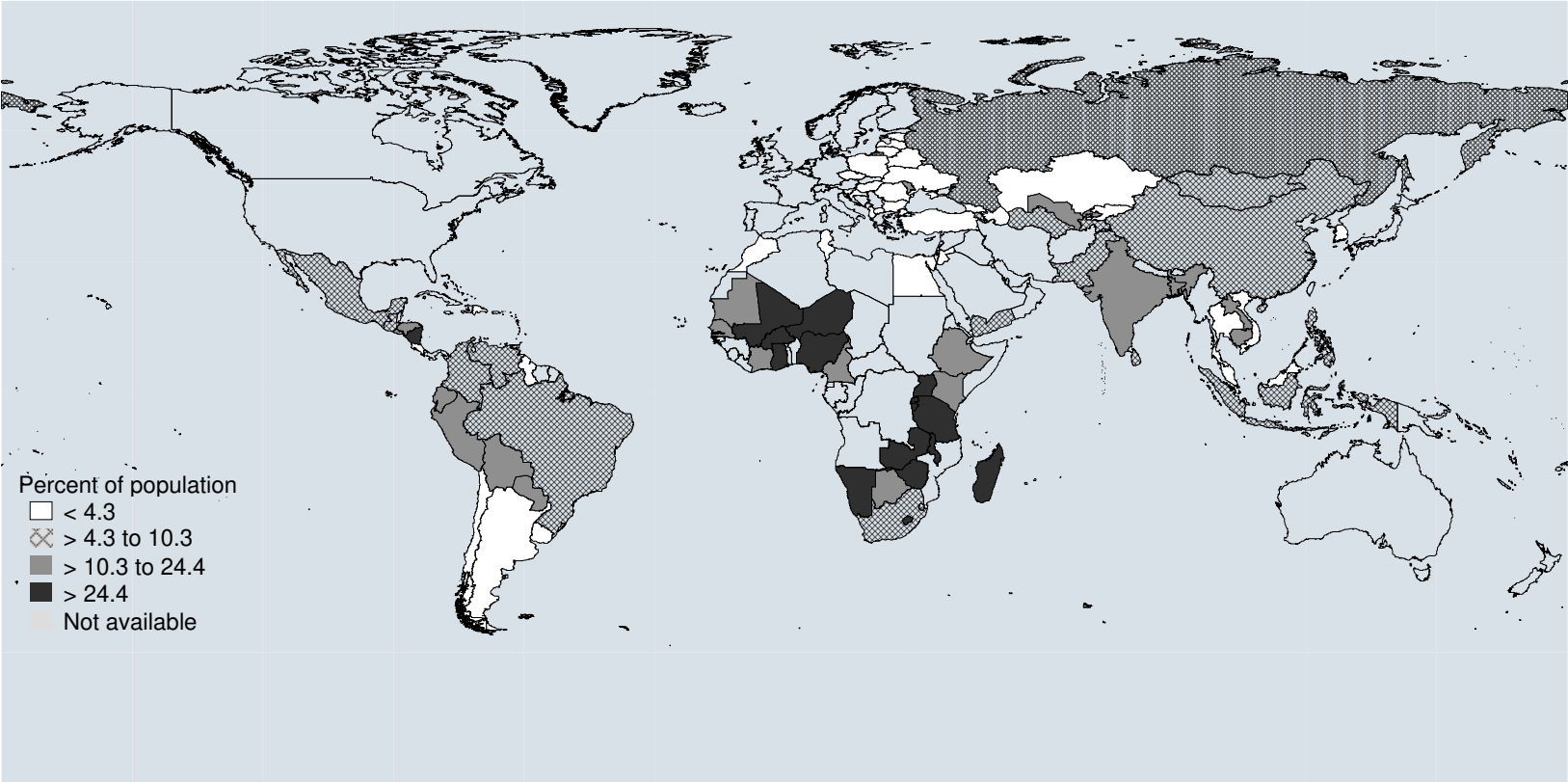|	Income poverty in 2015				Progress in halving income poverty	
	Headcount ratio (% poor)	Number (millions)	Population share (%)	Contribution to poverty (%)	2015 headcount as % 1990[1]	Number of countries expected to meet goal[2]
East Africa	33.8	122	5.0	16.6	84	0/7
Central Africa	7.5	11	2.0	1.5	..	0/0
North Africa	1.4	3	3.1	0.4	64	0/3
Southern Africa	11.3	6	0.8	0.8	89	1/5
West Africa	37.5	124	4.6	16.8	78	1/9
Eastern Asia	6.1	98	22.2	13.3	21	1/1
South-central Asia	14.5	271	25.8	36.8	37	6/9
South-east Asia	4.6	29	8.6	3.9	29	4/6
Western Asia	3.3	9	3.6	1.2	141	0/2
Eastern Europe	3.0	9	3.9	1.2	74	2/9
Northern Europe	1.0	1	1.4	0.1	25	1/2
Southern Europe	1.0	2	2.1	0.2	52	..
Caribbean	1.7	1	0.6	0.1	55	1/3
Central America	9.7	16	2.3	2.2	51	2/5
South America	8.5	36	5.9	4.9	97	2/10
Total	10.2	736.3	100.0	100.0	..	21/71

Notes: (1) calculated using only countries for which estimates available for both 1990 and 2015. (2) second figure is the number of countries for which early 1990s income poverty data were available. (Data availability for this column is less than that used for poverty projections, as more recent poverty data were usually used for the projections.)

Source: Authors' estimates.

As shown in Table 2, the reasonable progress in reducing income poverty is not usually sufficient to meet the MDG of halving poverty by 2015. Of the 71 countries for which there are data, less than one-third (21) are expected to achieve the goal (using our own growth-based projections), with Asian countries accounting for a disproportionate share of success. India, China, Indonesia, Bangladesh and Vietnam are all predicted to meet the target. Together these five countries will account for close to half (46 per cent) of the population of the developing world in 2015. Hence expressed in terms of the world's population the prospects appear better (about half will reach the goal, which of course means that half will not), than when expressed in terms of countries (over two-thirds will not meet the target).

Figure 2: Income poverty 2015 (growth-based projections, differential elasticities)

Percent of population
- □ < 4.3
- > 4.3 to 10.3
- > 10.3 to 24.4
- ■ > 24.4
- Not available

Rural versus urban poverty

The poverty rate is generally higher in rural areas than urban. Data were available on rural and urban poverty rates using the national poverty line for 56 countries for various years in the 1990s. The mean ratio of numbers of rural and urban poor was 1.86 (and the median 1.53). For only seven of the 56 countries was urban poverty higher than rural, compared to 18 in which it was over twice as high in rural areas. In order to generate urban and rural poverty estimates for a larger number of countries this ratio was imputed based on a regression of determinants.[7] The estimates are made at the country level, using (1) mostly regional growth rates with some country-specific adjustments, and (2) elasticities which vary according to the degree of initial inequality. The main finding is that in 2015 two-thirds of the world's income poor will be in rural areas. The majority of the populations in Africa and Asia will be rural until after 2020. Given the higher poverty rate in rural areas (16 per cent globally compared to 7 per cent in urban areas), it follows that these areas must account for a disproportionate number of the poor (Table 3).

Table 3: Rural and urban poverty in 2015: headcount ratio and millions of people ($1 a day)

	Headcount ratio			Millions of people			Per cent rural
	Total	Urban	Rural	Total	Urban	Rural	
Sub-Saharan Africa	30.0	21.6	37.4	282	86	196	69.6
Middle East and North Africa	2.8	1.6	4.2	10	4	6	63.6
E. Europe and Central Asia	3.2	2.5	4.3	15	8	7	47.9
East Asia and Pacific	5.7	3.1	8.4	120	33	87	72.5
South Asia	14.8	10.6	16.8	255	59	196	76.8
L. America and Caribbean	8.7	7.0	16.1	54	35	19	35.3
Total	11.8	7.4	16.3	737	225	512	69.5

Source: Authors' estimates (see Appendix).

Summary

Recent estimates show that Africa is overtaking South Asia as the region with the largest number of those living on less than a dollar a day, and by 2015 half of those below this poverty line globally will be in that region. The prospects for most of Africa meeting the MDG of halving income poverty seem remote. These trends reflect both the region's poorer growth performance and the fact that it has high and growing levels of inequality. By contrast the share of East Asia in world poverty is falling rapidly and will be only 3 per cent by 2015; this region will meet the MDG as will other parts of Asia. Latin American countries will be close to achieving the goal, but excluding several in South America. If a higher poverty line of $2 a day is used then the global poverty profile shifts, with South Asia again having most the world's

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7 The model contains net enrolments, the degree of urbanization and sub-regional dummies.

poor, followed by Africa. Income poverty is higher in rural areas than urban ones. In 2015, 70 per cent of the income poor will live in rural areas.

4   Mortality

Different estimates

Hanmer and Naschold (2000) provide regression-based estimates of infant and under-five mortality allowing for income, HIV/AIDS, education and health services.[8] However, there have been substantial upward revisions to mortality estimates in the base year (1990) since they carried out their analysis, so it is to be expected that their results have a downward bias. Indeed, the figures are lower than those available from other sources. Using data from the World Bank *Global Monitoring Report*, we made our own naïve projections at the regional level, and then adjusted these to allow for expected higher future growth. We also made country-specific estimates using a model based on poverty levels and female primary enrolment. The final estimates are those from the UN World Population Prospects, 2004 revision. These estimates are based on demographic trends, without reference to economic conditions, but nonetheless appear broadly consistent with the growth-adjusted estimates we made.

Table 4: Mortality estimates 2015 (rates per 1,000)

	Hanmer and Naschold	Own projections			UN population projections
		Naïve projection	Growth adjusted	Model based	
Under-five mortality					
Sub-Saharan Africa	118	168	138	97	130
Middle East and North Africa	34	42	30	31	28
East Asia and Pacific	8	30	32	27	30
South Asia	55	78	75	50	69
Latin America and Caribbean	15	25	10	24	22
Eastern Europe and Central Asia	6	29	30	25	30
Infant mortality					
Sub-Saharan Africa	67	96	89	89	80
Middle East and North Africa	22	53	28	28	25
East Asia and Pacific	7	24	27	27	25
South Asia	43	54	56	56	51
Latin America and Caribbean	14	19	29	29	17
Eastern Europe and Central Asia	10	25	31	31	6

Note: Own projections are at regional level for model-based.

Source: See text.

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8   Infant mortality is the probability of death in the first year of life and under-five mortality that before the fifth birthday. These rates are expressed per 1,000 live births. Child mortality is the probability of death between first and fifth birthdays.

However, the model based estimates show a stronger reduction in mortality, notably in SSA and South Asia, this discrepancy being driven by rapid growth of female enrolments in some countries and the fact that the model does not allow for additional AIDS related deaths (Table 4).

Sub-regional and country data

Table 5 shows the sub-regional figures using the UN Population projection estimates. Rates are highest in West and Central Africa. These are both areas in which tropical diseases remain important and so have unusually high ratios of child to infant deaths. But they are also areas in which conflict has adversely affected mortality. The maps show the scar of premature death running across Africa (Figure 3).

Some trends

All three major developing country regions have seen declining under-five mortality, though it has been more rapid in Asia and LAC than Africa (Figure 4). Indeed, the rate of reduction in Africa has been insufficient to keep up with population growth, so the number of deaths is continuing to climb. As a result, Africa's share of under-five deaths is growing. In the case of infant deaths this trend represents a dramatic reversal. In the 1960s three-quarters of all infant deaths were in Asia, but by 2015 Africa will account for the majority, as it has done for child deaths for some years now.

Table 5: Sub-regional estimates of infant and under-five mortality, 2015

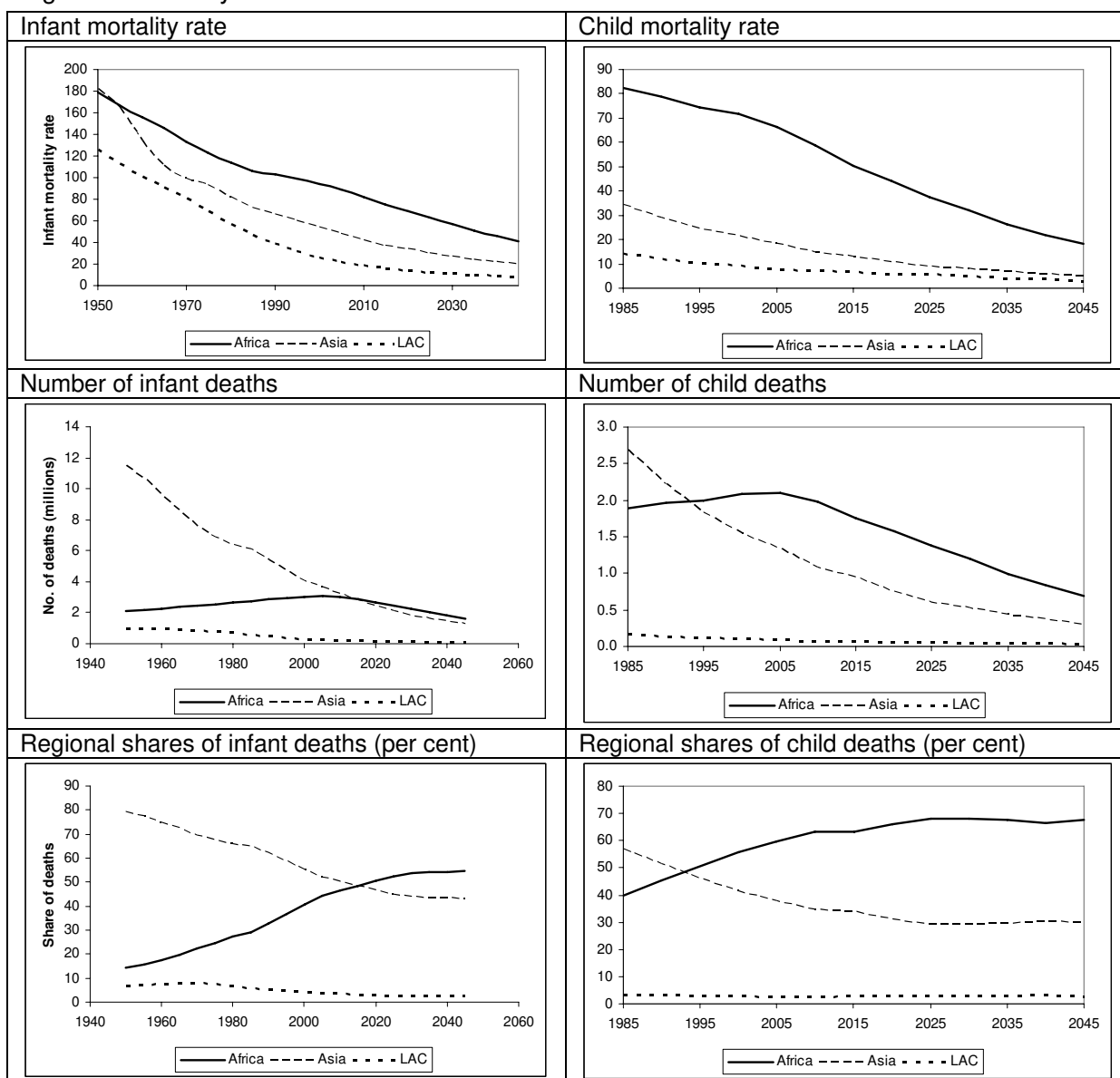|	Infant mortality in 2015			U5M in 2015			Progress toward reducing U5M by two-thirds	
	IMR (per 000)	Number (millions)	Share	U5M (per 000)	Number (millions)	Share	U5M in 2015 as a per cent of rate in 1990	Number of countries expected to meet goal
East Africa	71	0.9	15.8	113	1.3	16.9	65	0/16
Central Africa	95	0.6	10.2	162	0.8	10.4	82	0/9
North Africa	28	0.1	2.3	37	0.2	2.6	39	0/6
Southern Africa	29	0.0	0.5	47	0.1	1.3	73	0/5
West Africa	93	1.1	18.8	149	1.5	19.5	69	0/17
Eastern Asia	23	0.5	7.7	27	0.5	6.5	58	0/5
South-central Asia	50	1.9	32.7	67	2.5	32.5	55	0/14
South-eastern Asia	26	0.3	4.6	32	0.3	3.9	41	3/11
Western Asia	27	0.2	2.6	32	0.2	2.6	47	0/18
Eastern Europe	12	0.0	0.5	15	0.0	0.0	71	2/10
Northern Europe	4	0.0	0.1	6	0.0	0.0	..	..
Southern Europe	6	0.0	0.1	7	0.0	0.0	..	..
Western Europe	4	0.0	0.1	5	0.0	0.0	..	..
Caribbean	27	0.0	0.6	39	0.0	0.0	52	0/12
Central America	14	0.0	0.7	18	0.1	1.3	36	0/8
South America	18	0.1	2.0	22	0.2	2.6	42	0/12
Northern America	6	0.0	0.5	5	0.0	0.0	50	..
Australia/New Zealand	4	0.0	0.0	5	0.0	0.0	51	..
Melanesia	46	0.0	0.2	n.a.	0.0	0.0	68	..
Micronesia	35	0.0	0.0	8	0.0	0.0	26	..
Polynesia	17	0.0	0.0	14	0.0	0.0	33	..
Total	44	6.0	100.0	60	7.8	100.0		5/143

Source: UN Population Projections 2004.

Figure 3: Under-five mortality 2015 (UN Population Projection, 2004 Revision)

Deaths per 1,000 live births

☐ < 27
⊠ > 27 to 64
▨ > 64 to
■ > 118
░ Not available

However, as with income poverty reduction, the rate of decline is rarely sufficient to meet the ambitious goal of a two-thirds reduction by 2015. Our own projections suggest that only five countries will do so: Indonesia and Vietnam are the only two of significance (the others are Montserrat and Vanuatu; outside the sample, Portugal, Moldova and the Czech Republic will also do so). The UN Population projections are more optimistic, showing 10 countries expected to reach the target, with Egypt, Syria and Tunisia being amongst those added to the list.

Figure 4: Mortality trends

Source: Based on UN Population Projections 2004 revision

Rural and urban differences

Mortality is higher in rural areas than urban in virtually all countries of the world. Data from the last 15 years from 126 Demographic and Health Surveys (DHS) were examined. In only eight countries was infant mortality lower in rural areas than urban ones: on average IMR was just over one-third higher in rural areas, though the ratio

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was over two in the case of Peru. The contrast is stronger for child mortality, with the average ratio being 1.7 (median 1.6), in only five cases was rural mortality lower than that in urban areas, and rural mortality was double that in urban areas in 30 cases, reaching a ratio of 4.9 in Armenia. There are no clear regional patterns in these differentials. For simulation purposes, actual values of the ratio for under-five mortality are used for those countries covered by the survey, with remaining countries set at the sample median (1.4).[9] The results are shown in Table 6 (applied to the model-based estimates). Of the 30 million under-five deaths in 2015, 20 million (i.e. two-thirds) will take place in rural areas.

Table 6: Rural urban differentials in under-five mortality, 2015

	U5M rate (per 000)			Number (millions)		
	Urban	Rural	Total	Urban	Rural	Total
Sub-Saharan Africa	81	108	97	4.9	9.2	14.1
Middle East and North Africa	24	39	31	0.6	0.6	1.2
Europe and Central Asia	21	32	25	0.4	0.3	0.7
East Asia and Pacific	19	35	27	1.4	2.5	3.9
South Asia	36	57	50	2.0	6.7	8.7
Latin America and Caribbean	22	36	24	0.9	0.4	1.3
Total	37	63	51	10.3	19.8	30.0

Source: Authors' estimates.

Water supply

Lack of access to water will be a largely rural phenomenon by 2015: three quarters of the 761 million without access to water will be in rural areas. Lack of access will be concentrated in East Asia and SSA which will together account for 80 per cent of those without access (Table 7).

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9 Given the importance of China, which is not covered by the DHS data, other sources were consulted. The 1997 China Human Development Report gives under-five mortality in rural area as 71 compared to 21 in urban areas, a ratio of 3.5. This ratio is much larger than the sample maximum (2.2 for Peru) which might just reflect data differences, but may also be a real disparity on account of the strong differences in development in the western provinces compared to the eastern seaboard and the stronger enforcement of the one child policy in urban areas (personal communication: Hilary Standing and Gerry Bloom, IDS). The ratio for China is set to 2 for the simulation.

Table 7: Access to water in 2015

	Access to water (% of population)			Number without access (millions)			Share of total number globally	Share of those without access in rural areas
	Urban	Rural	Total	Urban	Rural	Total		
Sub-Saharan Africa	82.2	57.6	69.3	72	227	288	38	79
Middle East and N. Africa	96.0	79.4	89.7	9	30	37	5	80
Europe and Central Asia	99.4	83.2	94.1	2	28	29	4	98
East Asia and Pacific	86.3	78.2	85.4	147	225	308	41	73
South Asia	95.7	94.9	95.6	24	59	77	10	77
L. America and Caribbean	98.0	85.4	96.5	10	18	22	3	81
Total	91.4	81.5	87.8	264	586	761	100	77

Source: Authors' calculations, naïve projections.

Summary

All three major developing country regions have seen declining mortality, though it has been more rapid in Asia and Latin America and the Caribbean (LAC) than in Africa. But only in rare cases has the rate of reduction been at the 1.6 per cent a year required to achieve the MDG of a two-thirds reduction by 2015. Indeed, the rate of reduction in Africa has been insufficient to keep up with population growth, so the number of deaths is continuing to climb. As a result, Africa's share of under-five deaths will continue to grow. In the case of infant deaths this trend represents a dramatic reversal. In the 1960s three-quarters of all infant deaths were in Asia, but by 2015 Africa will account for the majority, as it has done for child deaths for some years now, with the highest rates in Western and Central Africa. Two-thirds of these deaths will be in the rural areas of Africa, which is a similar share of under-five deaths in rural areas across the world.

Similar patterns reveal themselves with respect to critical determinants of under-five mortality: access to water and immunization. For example, West and Central Africa are also the two sub-regions with the lowest access to water expected in 2015. Over three-quarters of those without water in 2015 will be in rural areas. Immunization coverage fell in some countries in the 1990s and there remain a significant minority of countries with unacceptably low coverage rates.

Falling under-five mortality, other health improvements which increase longevity and the demographic transition are increasing the share of the elderly in the population of all regions. This trend will in time create new problems for developing countries.

5   Education

The Millennium Project Task Force on Education (MPTFE) is the only study to estimate primary net enrolment rates.[10] Projections are made based on predictive power of the s-curve (i.e. that later enrolments are harder) and suggest that SSA will continue to lag behind other regions with an estimated enrolment rate just under 80 per cent. South Asia and Middle East and North Africa are also estimated to lie below 90 per cent whilst other regions are expected to lie within five per cent of universal enrolment. This 'last five per cent' is increasingly recognized as being 'problem groups' requiring different policies. Our own country-level naïve projections do not allow for this effect, which may explain the higher figures in South Asia and LAC. Naïve projections seem appropriate since the policy push behind primary enrolments has enabled increases over and above those expected by economic performance or other possible determinants. It is the possibility of such a push in Africa which explain the higher rates there estimated by MPTFE. However, India began a very recent push, not yet shown in the data and so not picked up by naïve projections (Table 8).

Table 8: Net primary enrolment rate, 2015 (proportion of age cohort enrolled)

	MPTFE	Own projections
Sub-Saharan Africa	79.6	73.9
South Asia	86.1	92.4
Middle East and North Africa	88.0	89.3
Latin America and Caribbean	95.6	98.0
Eastern Europe and Central Asia	96.3	91.3
East Asia and Pacific	97.0	90.8

Sources: MPTFE and own projections.

The sub regional breakdown shows the problem in Africa to be least in southern Africa (Table 9), which is confirmed partially by the map, but it is patchy owing to limited data (Figure 5). Defining universal primary enrolment as an NER of 98 per cent shows that the majority of countries appear on track to achieve this goal.
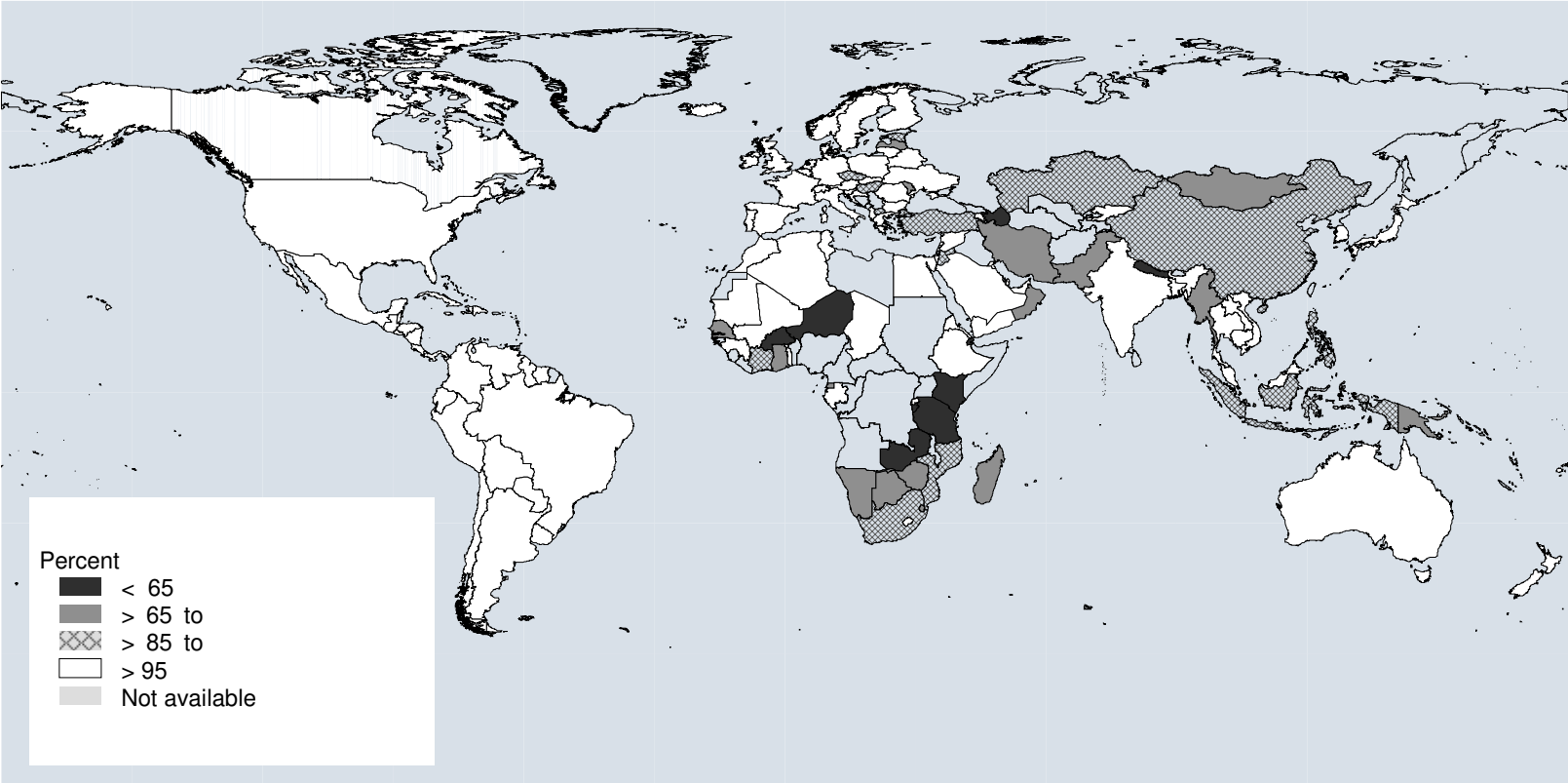
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[10] UN Millennium Project (2005a).

Table 9: Sub-regional primary enrolment rates (NER) and numbers out of school, 2015 (millions)

	No.	NER	No. of countries with UPE by 2015		No.	NER	No. of countries with UPE by 2015
East Africa	13.9	76.5	9/17	S. Europe	0.3	96.3	5/10
Central Africa	5.6	77.3	7/9	W. Europe	0.2	98.0	..
North Africa	4.2	84.8	6/7	Caribbean	0.1	98.0	11/13
Southern Africa	0.6	90.5	1/5	C. America	0.4	98.0	24/24
West Africa	15.4	70.8	12/18	South America	0.9	98.0	8/8
Eastern Asia	9.3	91.8	4/7	N. America	0.6	98.0	..
South-central Asia	19.1	91.2	10/14	Australia/NZ	0.0	98.0	..
South-eastern Asia	6.3	90.2	7/11	Melanesia	0.2	85.8	..
Western Asia	2.0	93.6	13/18	Micronesia	0.0	98.0	..
Eastern Europe	0.8	95.2	5/10	Polynesia	0.0	98.0	..
Northern Europe	0.2	97.6	11/13	Total	80.0	89.1	182/230

Source: authors' projections.

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Figure 5: Net enrolment rates 2015 (naïve projections)

Numbers out of school

Breaking down our own projections we see that SSA will account for nearly half of all the 80 million children out of primary school by 2015 (Table 10), reflecting the lower enrolment rates across the sub continent (Figure 5).

Table 10: Numbers of children out of school 2015 (millions)

	Boys	Girls	Total	Proportion girls	Share of total out of school
Sub-Saharan Africa	17.9	21.4	39.3	54.5	48.8
Middle East and North Africa	2.4	2.4	4.7	49.8	5.9
E. Europe and Central Asia	1.3	1.8	3.1	59.0	3.9
East Asia and Pacific	9.5	5.9	15.4	38.4	19.1
South Asia	6.8	8.5	15.3	55.7	19.0
Upper middle income	0.7	0.7	1.3	50.0	1.7
High income	0.7	0.7	1.4	50.0	1.7
Total	39.2	41.4	80.6	51.4	100.0

Source: Authors' projections.

Gender dimension

Areas with low enrolments have a disproportionate number of girls out of school (see table above). The MPTFE study also provides estimates of gender equality in primary education measured by female to male net primary enrolment. Sub-Saharan Africa is estimated to have the lowest ratio with 93 girls to 100 boys (Table 11).

Table 11: Gender equality in education, female/male ratio 2015

Region	MPTF on education (primary)	MPTF on gender (primary, gross)	Own estimates (primary)
South Asia	95.3	111.0	99.6
Sub-Saharan Africa	93.2	94.6	98.8
Latin America and	99.1	96.2	100.0
Europe and Central Asia	99.3	98.3	99.2
East Asia and Pacific	98.8	98.4	101.1
Middle East and North Africa	96.0	100.0	100.0

Sources: UN Millennium Project (2005b), and own estimates.

Literacy

No other estimates of literacy were located. Country-level projections were made for this report using two methods: (1) naïve projections, and (2) an accounting approach

based on the net enrolment rate.[11] The two approaches are not entirely consistent, with naïve projections predicting lower literacy. This is because recent rapid increases in enrolments are not yet reflected in higher literacy, but the accounting approach picks up these increases. However, both methods find that the vast majority of illiterates in 2015 will be in South Asia, with the majority of the remainder in SSA (Table 12).

Table 12: Literacy in 2015 by region

	Naïve projections		Accounting based	
	Literacy rate	No. of illiterates (millions)	Literacy rate	No. of illiterates (millions)
Sub-Saharan Africa	81.7	99	93.7	34
Middle East and North Africa	86.6	33	91.9	20
Europe and Central Asia	99.1	4	99.3	3
East Asia and Pacific	99.1	16	99.3	11
South Asia	68.1	387	80.9	232
Latin America and Caribbean	98.1	9	99.4	3
Developed	99.1	8	96.8	26
Total	89.6	555	93.8	329

Source: Authors' calculations.

Summary

Sub-Saharan Africa will continue to lag behind other regions with respect to primary school enrolments with an estimated enrolment rate just under 80 per cent, though the problem is less in Southern Africa than elsewhere. South Asia and Middle East and North Africa are also estimated to lie below 90 per cent whilst other regions are expected to lie within five per cent from universal enrolment. However, this 'last five per cent' is increasingly recognized as being 'problem groups' requiring different policies.

6   Nutrition

Different estimates

Nutrition outcomes have been comprehensively modeled in three different sources: two IFPRI studies (Smith and Haddad 2000; von Braun et al. 2005) and FAO's agricultural projections.[12] In addition Onis et al. (2004) present sub-regional based naïve

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[11] Older people with lower literacy were removed from the population and younger people who have been to school added to it. It is being assumed that all those enrolled are literate on completion. This is certainly a rather heroic assumption, but it is one that already lays behind the literacy data themselves. Literacy is capped at 99.5 in all countries.

[12] The forecasts from the latter IFPRI study are not given here as their results are only available in graphical form.

projections. The FAO study refers to adults who are undernourished (defined with reference to a calorie requirement of 1,900 kcal per day), whereas the IFPRI studies and Onis et al. refer to children only (using anthropometric measurement). The IFPRI results shown forecast for 2020 rather than 2015 (Table 13).

The different estimates do *not*, in this case, give a similar picture. Smith and Haddad's estimates are in general higher than those of Onis, and there is a marked discrepancy in the case of East Asia—which Smith and Haddad have as accounting for 15 per cent of children underweight by 2020, compared to Onis' 3 per cent in 2015. Whilst, both have South Asia's share as exceeding that of Africa, Smith and Haddad predict higher prevalence in South Asia than Africa, but Onis the reverse. FAO's forecasts for adults give the two regions an equal share.

Table 13: Alternative estimates of underweight

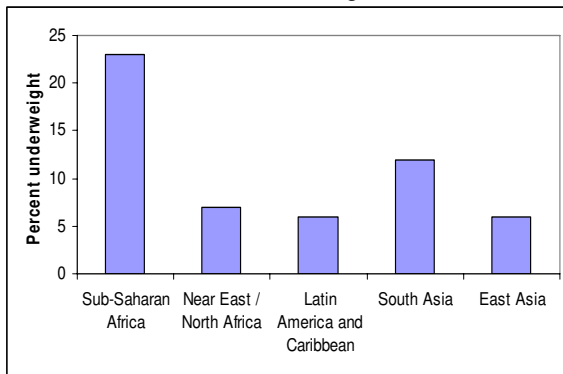|	Adults	Children	
	FAO	Smith and	Onis et al.
	(2015)	Haddad (2020)	(2015)
Prevalence			
South Asia	12	37.4	26.2
Sub-Saharan Africa	23	28.8	29.2
East Asia	6	12.8	3.0
Near East and North Africa	7	5	7.4
Latin America and Caribbean	6	1.9	3.4
Numbers			
South Asia	195	66	61.8
Sub-Saharan Africa	205	48.7	42.7
East Asia	135	21.4	3.0
Near East and North Africa	37	3.2	3.4
Latin America and Caribbean	40	1.1	2.0
Developing countries	612	140.4	112.9
Shares			
South Asia	31.9	47.0	54.7
Sub-Saharan Africa	33.5	34.7	37.8
East Asia	22.1	15.2	2.7
Near East and North Africa	6.0	2.3	3.0
Latin America and Caribbean	6.5	0.8	1.8
Developing countries	100.0	100.0	100.0

Source: See text.

The different studies do give broadly similar results for prevalence in SSA, as does another IFPRI recent study which suggests prevalence of child malnutrition to be 30.4 per cent in 2015 by their baseline 'business as usual' scenario (Rosegrant et al. 2005). However, the point of that study is to show how different policy interventions—such as rural infrastructure and investing in agricultural research—can make an enormous difference to nutritional outcomes. The different scenarios place the number of malnourished children in 2025 at between 9.4 million and 55.1 million.
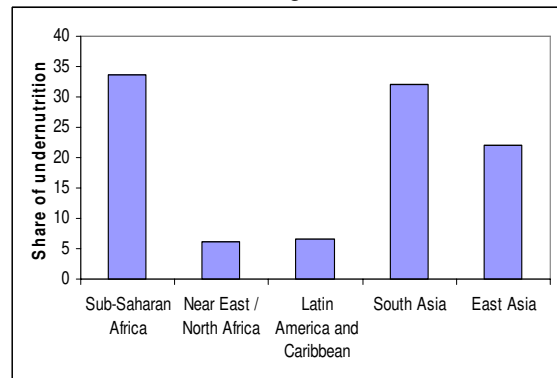
Some trends

Figure 6 show trends from the FAO data. As mentioned above, the shares of Africa and Asia are about the same in 2015, reflecting a growing number of undernourished people in Africa, compared to a steady decline in South Asia.
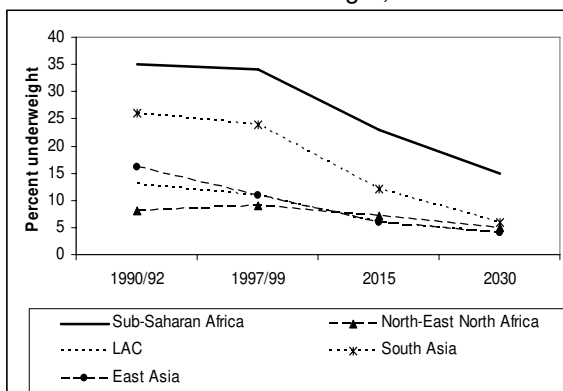
Figure 6: Patterns and trends from FAO data

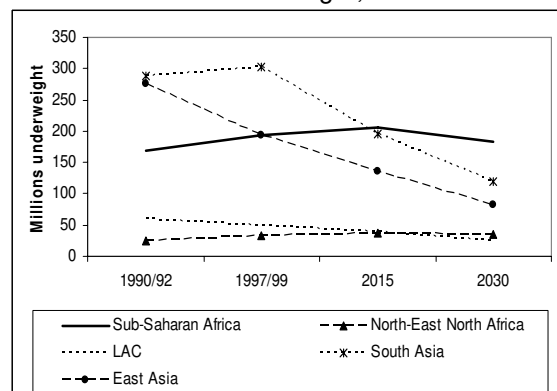Prevalence of adult underweight, 2015

Share of adult underweight, 2015

Prevalence of adult underweight, 1990-2030

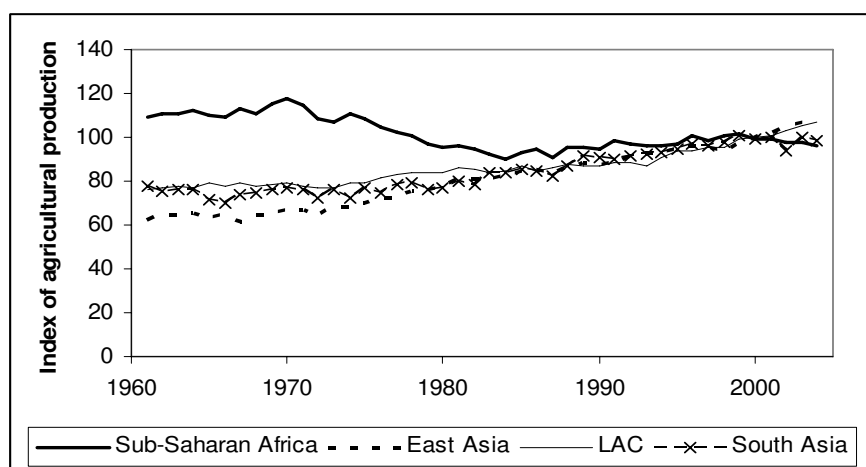Number of adult underweight, 1990-2030

Source: FAO (2002).

These trends reflect differing trends in food availability. FAO report data on food consumption, based on calculations of food production and the net trade balance. Food consumption in Africa is set to rise slowly, falling further behind that of other regions (Table 14). This trend reflects the region's dismal agricultural performance. In contrast to other regions which have experienced rising agricultural productivity since the 1960s, that in Africa has declined (Figure 7).

Table 14: Per capita food consumption (calories per person per day)

	1964-66	1997-99	2015
Developing countries	2054	2681	2850
Sub-Saharan Africa	2058	2195	2360
Near East/North Africa	2290	3006	3090
Latin America and the Caribbean	2393	2824	2980
South Asia	2017	2403	2700
East Asia	1957	2921	3060

Source: FAOSTAT (http://faostat.fao.org/).

Figure 7: Trends in agricultural output per person (2000=100)

Source: calculated from FAOSTAT (http://faostat.fao.org/).
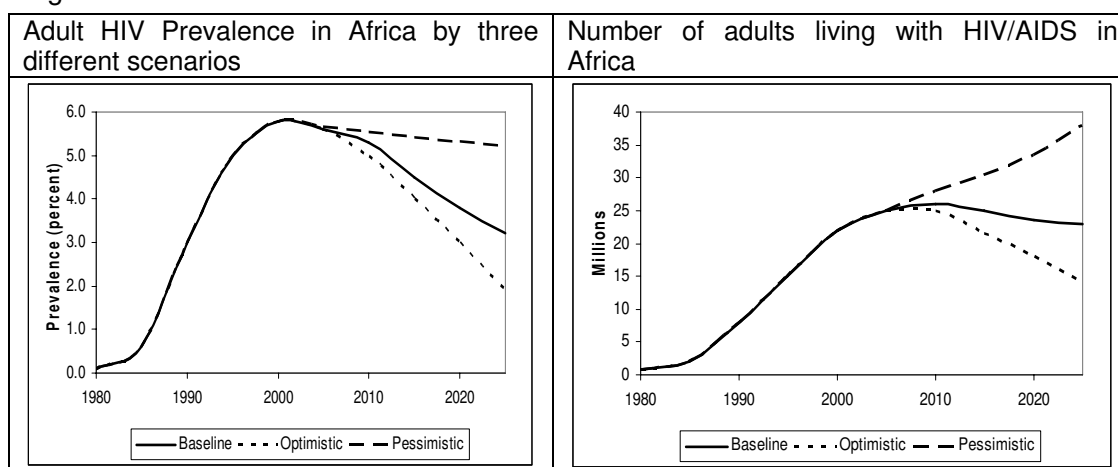
Inequality

The FAO report (FAO 2002) graphs differing levels of malnutrition for three different distributions against average food consumption. With high inequality, which is experienced in SSA, then the region's average food availability yields undernutrition of 23 per cent. But if the region were to have low inequality then, with the same level of food availability, undernutrition would be just 10 per cent.

7   HIV/AIDS

Projections related to diseases are plagued by additional uncertainty regarding both current prevalence rates, the appropriate models to be used for prediction purposes and the extent to which effective action will be taken to combat the disease. Based on current trends, UNFPA estimate that there will be 46 million new HIV infections by 2010, but only one third that number (17 million) with an appropriate policy response (http://www.unfpa.org/icpd/inaction.htm). The three scenarios in a recent UNAIDS report on AIDS in Africa show that the current figure of 25 million adults living with HIV/AIDS may either fall to 14 million by 2025 or rise to 38 million—nearly 2/3 more than the optimistic estimate (Figure 8). Nonetheless, even the most pessimistic estimates

suggest that prevalence will decline, reflecting the belief that within 15 years there will be no new AIDS cases.

Figure 8: HIV/AIDS three scenarios for Africa

Adult HIV Prevalence in Africa by three different scenarios	Number of adults living with HIV/AIDS in Africa

Source: UNAIDS (2005).

Table 15: Number of HIV/AIDS related deaths

	1990-95	2000-05	2010-15	2020-25	2045-50
Absolute number of excess deaths from HIV/AIDS (000s)					
Sub-Saharan Africa	3216	14807	18933	18585	7510
Asia	1314	3461	10872	17078	4821
LAC	201	697	774	730	37
More developed	427	789	1692	1557	49
Total	5158	19754	32271	37950	12417
Share of excess deaths (per cent)					
Sub-Saharan Africa	62.3	75.0	58.7	49.0	60.5
Asia	25.5	17.5	33.7	45.0	38.8
LAC	3.9	3.5	2.4	1.9	0.3
More developed	8.3	4.0	5.2	4.1	0.4
Total	100.0	100.0	100.0	100.0	100.0

Note: more developed is Russia and USA.
Source: UN Population Division.

As AIDS in Africa is brought somewhat under control, attention is shifting to Asia, where the epidemic is in its early stages: the number of AIDS related deaths in Asia will quadruple in the next 15-20 years, compared to an increase of about one third in Africa. But, despite its larger population share, Asia will never account for even half of all deaths, a dubious honour that remains with Africa into the longer term (Table 15).[13] Africa's share is likely under-stated in this table given the efficacy with which Asian

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13 The table shows HIV/AIDS deaths from the UN Population Divisions medium variant. No global projections of the number of people living with HIV/AIDS have been found.

countries have been tackling the epidemic, and the continuing opportunity for some of these countries to head it off, compared to the more mixed picture in Africa.

Whilst no systematic data are available, available data suggest that the incidence of HIV/AIDS is higher in urban areas,[14] and many affected rural residents go to urban areas for treatment. However, since the majority of the population in Africa and Asia are rural it is possible that the absolute number of HIV/AIDS cases is higher in rural areas than urban ones.

8   Conclusions

There has been substantial progress in poverty reduction ...

The second half of the last century witnessed remarkable gains in the reduction of many forms of poverty. Mortality fell, and life expectancy rose, across the developing world at historically unprecedented rates—much faster than had been achieved in the now developed countries. With the exception of countries affected by HIV/AIDS, under-five mortality has continued to decline in most countries even in times of economic stagnation or decline, thanks to increased immunization coverage, access to safe water and so on. The last decade has seen many countries adopt programmes to ensure Universal Primary Education.

... and this progress will continue, though not fast enough to achieve the MDGs ...

All projections suggest that these gains will continue into the new millennium, although not usually fast enough to achieve the ambitious targets set by the Millennium Development Goals. Neither the goal for income poverty reduction nor that for lower mortality will be met in the vast majority of countries. Attaining universal primary education is the one area where the goal looks achievable in many, though by no means all, countries.

... so there will still be substantial poverty ...

Even if these goals were to be achieved substantial poverty will remain—the aim is only to half poverty not eliminate it. Current projects suggest there will be around three-quarters of a billion people living on less than a dollar a day in 2015. In absolute terms the number of children dying prematurely in Africa will continue to rise for some years to come.

... of which an increasing share will be in Africa.

Progress has been, and will continue to be, slowest in Africa, opening up a growing gap between the region and the rest of the developing world. South Asia, formerly the poorest region, continues to have substantial numbers of undernourished children, and

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14 The   HIV/AIDS   Surveillance   Database   of   the   US   Census   Bureau (http://www.census.gov/ipc/www/hivtable.html) reports data as 'major city' and 'outside major city', which is not the same as urban:rural. Nonetheless, these data show higher incidence in cities than outside in virtually all cases for which there are data.

the most children out of school (though recent efforts in India are not captured in the data).

And whilst more will be in urban areas, it will still be predominately rural.

Urban areas are growing rapidly, and with them slums. So poverty will become more and more an urban issue. But, other than HIV/AIDS, poverty indicators are worse in rural areas in virtually all countries. Since rural residents will remain the majority of the world's population, the bulk of the poor (60-70 per cent depending on the indicator) will still be in rural areas in 2015.

The nature of problems change ...

As poverty falls so does its character. Different polices are required when the bulk of the population are poor than when only a minority are so affected, especially as many of these remaining poor may share common characteristics (remote, ethnic minority, nomadic etc.). As under-five mortality falls it becomes more and more concentrated in the first months, or even days, of life. General socio-economic development and public health interventions can reduce high mortality rates, but once they are lower the required policies become more medically-intensive. 'The last 5 per cent' not in school—children of nomads, parents who think girls should not go to school, street children—are harder to reach, with simply providing schools not being enough.

... new problems emerge ...

Development brings with it new problems. The demographic transition will increase the share of the elderly in the population. Obesity rises with urbanization. Smoking becomes a major health problem.

… some remain hidden.

But some age old problems—notably the plight of people with disabilities—remain with us and largely ignored.

Finally, we should try to expect the unexpected.

Predictions of progress assume 'business as usual'. But shocks of various kinds should be expected, though their precise timing and location cannot be predicted with accuracy. Smaller shocks are frequent, but local in their effects and so with little impact on aggregate trends. Except for protracted conflict, smaller shocks also have short-lasting effects. But many low-income countries are vulnerable to very frequent small shocks, the cumulative impact of which seriously undermines poverty reduction efforts. More seriously still, there are strong grounds for believing there will be a major reversal, possibly related to either global conflict or environmental catastrophe, before the middle of this century.

Annex: projection methods

The value of an outcome indicator, $Y_{i,t}$, for country or region at time t is given in general by

$$Y_{i,t} \quad = \quad \beta_{0,i} + \beta_{1,i} \, X_{i,t} \tag{1}$$

where X is a vector of determinants comprising one or more variables. Hence the prediction of Y when t is at some point in the future (e.g. 2015) involves three unknowns:

1. Model specification: which variables to include in X

2. Projections of independent variables: the projected value of X at time t

3. Parameterization: The model parameters (estimation of which is usually based on historical data for X and Y). The general specification given in equation 1 allows the parameter values to vary between country/region.

Nearly all projections may be written in a form equivalent to equation (1).[15] The main exceptions are those based on demographic models, such as those produced for the UN and some analyses of HIV/AIDS, which rely on demographic accounting identities.[16] However, even for these exceptions, the formulation in equation (1) identifies the three potential sources of differences in projections. Different model specifications (sets of X variables) are now discussed in turn.

Constant time trend: naïve projections

The simplest model is to assume that the future will be like the past, i.e. to pass future trends on historical ones. The most common way of doing this is to use a version of equation (1) in which the Y variable is logged and X is simply a time trend:

$$\ln(Y_{i,t}) \quad = \quad \beta_{0,i} + \beta_{1,i} \, T \tag{2}$$

so β_1 = the annual rate of growth.[17] Estimates of β_1 may be made in two ways:

1. The most usual method is to estimate the rate of growth based on past data, usually from 1990 to the most recently available year. Hence it is being assumed that the indicator will continue to change at the same rate as it has done since 1990. This approach is implicit in all discussions as to whether countries are 'on-

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[15] The most sophisticated models are multi-equations models, such as MAMS. However, even these approaches can be written as a single reduced form equation such as equation (1).

[16] There is also an exception when calculating income poverty, which is noted below.

[17] An alternative specification would be to leave Y unlogged, which would imply a constant absolute change in Y. This is not a very plausible specification, but is one of the four used by Ramadas et al. (2002) for the World Bank SimSIP project (see below). Otis et al. (2004) use a logistic formulation for their analysis of malnutrition, thus allowing for the fact that the dependent variable is bounded between zero and one.

track' to meet the MDGs, and is the most commonly used with respect to social indicators (e.g. the *Global Monitoring Report 2005* presentations for primary school completion and under-five mortality).

2. Demery and Walton (1998) assume a decline in under-five mortality of 1.5 per cent a year, which they say has been identified historically as an autonomous element in mortality reduction. These estimates are then augmented to allow for the effects of female education and income.

The first of these approaches is labelled as 'naïve projections',[18] since it takes no account of possible changes in the determinant variables between the previous period and the next.[19] However, the method does have the virtue of simplicity: (1) there is no need to project the *X* variable (since the value of the time trend is of course known in the future), and (2) the underlying model is easy to grasp, policymakers can readily understand a statement such as 'at the current rate of progress, the target of halving the proportion of the people who suffered from hunger in 1990 will not be met by 2015' (UN MDG Report, Goal 1, 2005: 5). Naïve projections do give information of value. If a country is off track there have to be compelling reasons for believing that performance will change if it is thought the target might still be met. However, they are of dubious value in predicting expected values for future years, which is the main purpose of this report, for variables which are closely linked to underlying determinants. But for variables which can be autonomously driven by policy then naïve projections may prove superior predictors to the models discussed below.

Income-based projections

The next most common approach, and the dominant one for income poverty projections, is to model *Y* as depending solely on income (GDP per capita, preferably adjusted for PPP). The form of equation (1) takes logs of both dependent and independent variable:

$$\ln(Y_{i,t}) \quad = \quad \beta_{0,i} + \beta_{1,i} \ln(INC_{i,t}) \tag{3}$$

where $INC_{i,t}$ is GDP per capita for country/region *i* at time *t*. Given equation (3), β_1 is the elasticity of *Y* with respect to income, that is the percentage change in *Y* given a 1 percentage change in income per capita.

The elasticity can be obtained from cross-country regressions. This procedure means that a single value of β_1 is used for all countries. However β_1 may be allowed to vary across sub-samples either by running sub-sample regressions, or allowing for a slope dummy for the required categories. For example, Hanmer and Naschold (2000) estimate different income elasticities for income poverty according to the level of inequality.

Whilst in principle time series data could be used to produce country-specific estimates of β_1 there are in practice few countries with sufficient time series of the required

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[18] The terminology follows that used in economics; naïve expectations are the belief that the variable of interest will not change value from one period to the next.

[19] Since the dependent variable in equation (2) is logged, this means that the rate of change of determinants is being assumed constant in making naïve projections, not their level (which would be worse than naïve).

indicators.[20] But in the case of income poverty then, as discussed in section 2 of this report, the elasticity is estimated by the slope of cumulative distribution function at the poverty line. Hence a single household income survey will allow a country-specific estimate of this elasticity.[21]

This model specification assumes distribution neutral growth, that is the income of all income groups grows at the same rate (equal to the overall rate of growth). Such occurrences are a historical rarity; whilst it is difficult to detect any systematic statistical relationship between the rate of growth and inequality,[22] this is not the same as saying that distribution does not change during growth episodes. It does, falling in roughly equal measure between growth episodes which are pro-poor (growth of income amongst the poor exceeds the average) and those which are anti-poor (growth of income amongst the poor is less than the average). Some analyses allow for changes in distribution during growth;[23] e.g. Demery and Walton calculated the growth required to half poverty with distribution neutral growth and, for selected countries, assuming distribution worsens to a specified level (given by the current level in a comparator country).

There remains debate as to the relative role of income versus other factors in determining social indicators. However, the forecaster is not so concerned with channels. The correlation between income per capita and most social indicators is high, with the R^2 from the simple regression typically being in the range 0.6-0.8. It is undoubtedly the case that the income term is picking up the effect of other determinants which are correlated with income, such as female education. But for forecasting purposes it is not necessary to separate out these effects. (Of course if female education has an effect independent from that of income, and education is not perfectly correlated with income, then the fit and therefore the forecast would be improved by adding this variable). Given this reasonably high R^2 from the simple regression, income-based forecasts can be taken as good first approximations. However, as will emerge in the subsequent discussions, ignoring distributional issues is a major shortcoming.

Adding more explanatory variables

Additional explanatory variables will improve the fit of the equation, and so the reliability of the forecast, provided that the predictions of the X variables are not too wildly inaccurate. Several studies have forecast various indicators using more explanatory variables.

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20 Data sources such as *World Development Indicators* and the *Human Development Report* give a misleading impression of the availability annual estimates for most indicators. However, these series are based on less than annual data collection. The intervening years are obtained by interpolation. Estimates obtained in this way enable cross-country comparisons on an annual basis, but cannot be meaningfully used for time series analysis.

21 A non-regression based approach can thus be used for income poverty estimates using household survey data. Assuming distribution neutral growth, the income of all households is increased by the same amount as the overall rate of GDP growth and the poverty measures recalculated.

22 It is the absence of such a relationship which is in fact being demonstrated in the influential Dollar and Kraay paper 'Growth is good for the poor', rather than the widely drawn conclusion that growth generally (or even necessarily) benefits the poor. See White and Anderson (2001) for an elaboration of this point, and for operationalization of the definitions of pro-poor growth given here.

23 This is different from the approach of Hanmer and Naschold mentioned above (and Hanmer et al. 2000), in which the elasticity varies according to the initial level of inequality.

The main example is the World Bank project, Simulations for Social Indicators and Poverty (SimSIP, www.worldbank.org/simsip). This project, which grew out of projections made for the LAC region, provides spreadsheets which can be downloaded and used to make country-level projections of a range of MDG-type indicators. The projections may be based on either historical trends (using the best fitting of four possible ways of fitting a trend) or model-based elasticities, where the independent variables are economic growth, population growth, urbanization and a time trend. Income poverty measures are disaggregated by rural and urban.

In addition to income, Hanmer and Naschold (2000) used HIV prevalence in the under-five and maternal mortality equations, and the number of physicians in the former and literacy in the latter. Demery and Walton used female literacy in their under-five mortality equation.

Multi-equation models

Any solvable multi-equation model can, in principle, be written as a reduced form equation in the form of equation (1), i.e. expressing the outcome as a function of the exogenous variables in the model. In practice however, such models are run as computer simulations, showing the effect of different assumptions regarding the trajectories of the exogenous variables (and possibly under different parameter assumptions reflecting different policy scenarios).

The World Bank has developed a model called MAMS, which is a CGE model incorporating social indicators. At present MAMS has only been applied to the case of Ethiopia. Whilst the CGE approach allows far more detailed modelling, critics of CGE-based analyses are wary of the extent to which the results are driven by model assumptions, which may in the end be derived by fairly crude methods. Having said that, multi-equation approaches can pick up the complementarities between the different indicators, which single equation estimates will not.[24]

Other multi-equation models have been used with respect to nutrition. FAO use country-level modelling of agricultural production and trade, from which they calculate nutrition outcomes. Two IFPRI studies have calculated child nutrition outcomes from different models (Smith and Haddad 2002; von Braun et al. 2005).

The level of analysis

Analysis is preferably carried out at country-level, and the result aggregated to present regional and global forecasts. No study can do this in its entirety, since there are countries for which data do not exist. Thus, either implicitly or explicitly, values are assigned to countries for which there are no data, most usually assuming their performance will equal the average for countries in that region (unlikely to be a good assumption since countries without data are more likely poor performers).

The level of analysis matters not only as each country may require different parameters and exogenous values, but because aggregation may conceal country-level limits. This

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24 This has elsewhere been called this the 'basic needs multiplier' (White 1997) and in more recent work on Ghana identified the importance of the 'inter-generational multiplier' whereby parents who have themselves been educated are more likely to send their own children to school (World Bank 2004).

is the case for many of the MDGs for which it is true that the world as a whole is on track to meet the goal simply by virtue of China's performance. It would therefore be wrong to say that if current trends continue then the goal will be met—not only because it will be met in China but not many other places (though this is true), but because China cannot logically sustain its rate of progress (more than 100 per cent of children cannot go to school, and less than 0 per cent cannot live below the poverty line).

Summary

Projections may vary because of differences in assumptions regarding (1) determinants, (2) model parameters, or (3) future values of the determinants. The simplest models—and by far the most common approach—take time as the only determinant. The result tells us if a country is on track or not to meet the relevant goal, which is certainly of policy interest, but of less use in predicting the actual expected value at some point in the future. Since income is highly correlated with most of the outcomes of interest, a first approximation can be given by applying the relevant elasticity to projected growth rates. This is the basis for many projections.

However the correlation with income is imperfect, so adding more variables to the right-hand side will help, at least if their future values can be predicted with any degree of confidence. It is argued below that distribution is a right-hand side variable which should not be ignored. More sophisticated versions utilize multi-equation models. There are undoubted advantages to such models, which allow a wider range of policy simulations, but they are quite resource intensive and assumption dependent.

Table A1: Summary of main approaches to projecting MDG indicators

Model specification	Parameterization	Projection of independent variables
Naïve projections	Calculation of historical growth rate	Not necessary (only independent variable is time trend, which is known).
Income-based	(1) Elasticities taken from existing studies; (2) regression-based estimates	(1) Use of regional growth forecasts by recognized authority (usually WB *Global Economic Prospects*); (2) regression-based growth estimate based on initial values.
Income plus models	As for income-based	As for income-based
Multi-equation models	(1) Regression-based; (2) CGE approach	Assumed values for different policy simulations

Source: See text.

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