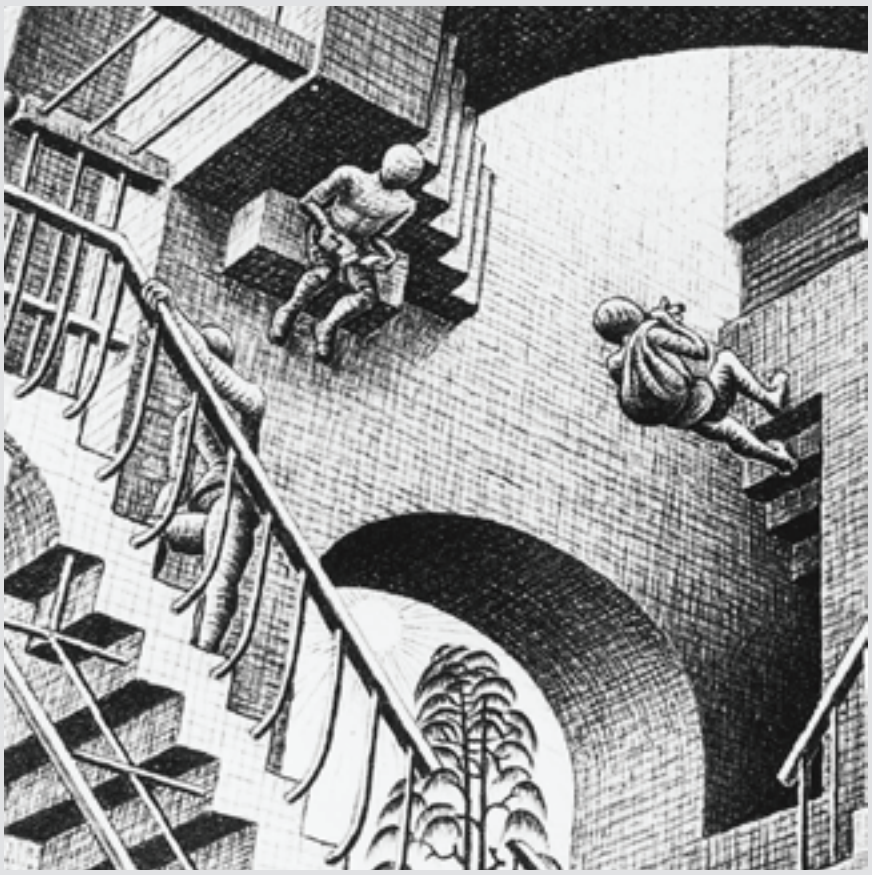
4 Education, health and nutrition disparities



Countries in the lowest income quartile are poles apart from those in the high- and upper-middle-income quartiles with respect to indicators of education, health and nutrition.

4.1. Introduction

This chapter is concerned with inequality in non-income dimensions of well-being. More specifically, the focus is on analysing the trends and drivers of inequality in health, nutrition and educational outcomes across and within countries since 2000. Inequality in these aspects of well-being is important for at least three reasons:

First, as has been noted at the outset of this Report, equity in such dimensions of material well-being is of intrinsic value, that is, it warrants recognition in its own right as it contributes to the very meaning of a good life (Sen, 1985, 1987; Dworkin, 2011).

Second, inequality in health, nutrition and educational outcomes is of instrumental value because of its links to economic growth and income distribution. The distribution of human capital affects the factorial distribution of income and, through that channel, influences the distribution of income at the household level. This also has implications for the distribution of wealth and income across countries, since higher-income countries can grow wealthier (than low-income countries) due to greater access to human capital and human-capital-based technological progress (Ray, 1998).

Third, non-income inequality has informational value: it can reveal hidden income inequalities that are often difficult to monitor. For instance, gender mortality differentials within a country can reveal a lot about the extent of gender inequality in a society (Sen, 1998). Such information is a 'political good' capable of influencing public and policy opinion.

The chapter is organized as follows. The first section focuses on levels and trends in inequality with respect to health, nutrition and education outcomes between countries. This analysis is disaggregated by region and also by the income status (i.e., level of per capita income) and growth performance of countries.

The second section explores the drivers of inequality in these non-income aspects of well-being. Specifically, the section examines the pathways through which economic development can influence outcomes in health, nutrition and educational levels. In this context, the role of income growth, poverty reduction, public expenditure in social services, and institutional factors such as the quality of governance are explored.

The third section examines the level and trends in inequality with respect to education, health and nutrition outcomes within countries and across income/wealth quintiles, gender and spatial dimensions. The fourth section examines the drivers of health, nutrition and education inequality within countries. The conclusion follows.

4.2. Trends and levels of inequality in education, health and nutrition between countries

Trends in inequality in health, nutrition and education between countries were analysed using data from the WDI for the period 2000–2010. For each dimension, two indicators were selected for the analysis based on their relevance as well as data availability (Table 4.1).

Table 4.1. Indicators for education, health and nutrition

Dimension	Indicators
Education	1. Primary completion rate (PCR) 2. Secondary enrolment rate (SER)
Health	1. Total fertility rate (TFR)[1] 2. Under-5 mortality rate (U5MR)[2]
Nutrition	1. Maternal mortality rate (MMR)[3] 2. Proportion of stunted children under 5 (PSC)

4.2a. Regional trends

Figure 4.1 presents the population-weighted regional averages of six indicators to identify patterns and trends in health, nutrition and education inequality between regions for two time periods: 2001–2005 and 2006–2010.

Trends in education outcomes between regions

Trends show large improvements in primary completion rates between the early 2000s and the late 2000s for all regions. However, the levels on primary completion rates vary considerably across regions, with East Asia and the Pacific and Latin America and the Caribbean achieving near 100 percent primary completion rates in the last decade, while, in sub-Saharan Africa, rates stand at 65 percent.

Trends in secondary enrolment rates were more mixed. While the East Asian and Pacific and Latin American regions raised the secondary enrolment rate by 9 percent and 8 percent (from 92 percent to 99 percent and from 95 percent to 100 percent, respectively) during the last decade, the matched increase for South Asia was only about 2 percent. In fact, the trend decelerated in sub-Saharan Africa; the secondary enrolment rate declined by 9 percent.

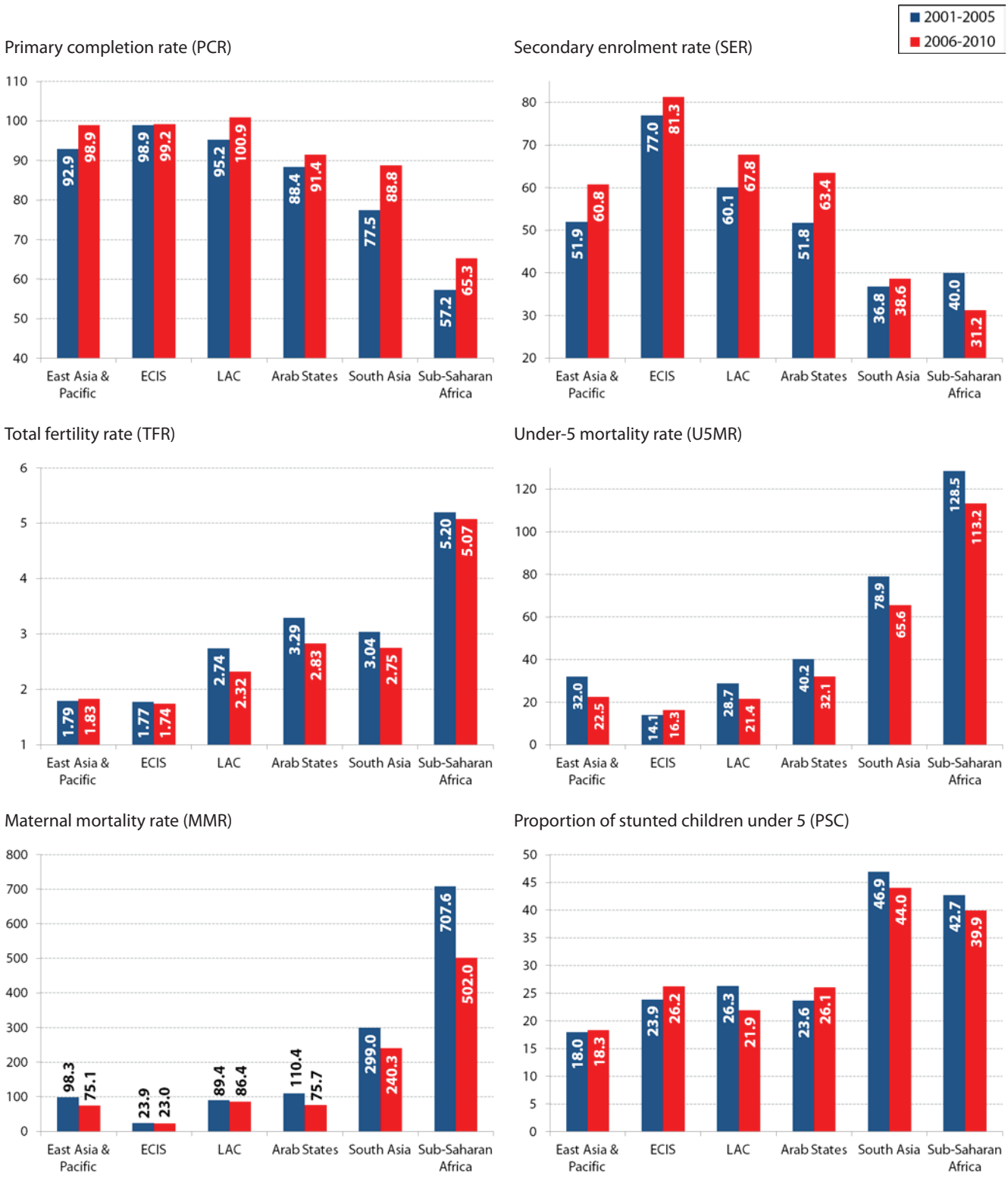
In terms of levels, as of 2010, South Asia and sub-Saharan Africa lagged far behind other regions with respect to secondary enrolment rates: 39 percent and 31 percent, respectively, compared to almost universal primary completion in other regions.

More remarkable is the fact that, across all developing regions, there remains a marked fall between primary completion rates and secondary enrolment rates. Even in regions where primary completion rates are close to 100 percent, we see that only between 60 to 80 percent of the official secondary education age population are enrolled in secondary education. In sub-Saharan Africa, the secondary enrolment rate is about half the primary completion rate (31 percent against 65 percent, respectively).

Trends in health outcomes by regions

The total fertility rate declined across all developing regions except for East Asia and the Pacific between the early and late 2000s. It fell at a faster rate in Latin America and the Middle East compared to other regions. The progress was nearly stagnant in sub-Saharan Africa.

Figure 4.1. Regional averages of education, health and nutrition indicators



Source: *World Bank (2012).*

The child mortality rate also declined across all regions between the early and late 2000s and at fairly high rates (between 30 and 12 percent). The decline was slowest in sub-Saharan Africa, which started off with much higher levels compared to other regions. Child mortality only decreased from 128.53 to 113.2 per 1,000 live births between the early and the late 2000s in this region.

Despite progress, the gap in child mortality between regions remained staggering in the period between 2006 and 2010. Child mortality is relatively low in Europe and Central Asia (16 percent). In contrast, every tenth child in sub-Saharan Africa and every twentieth child in South Asia is likely to face death before his or her fifth birthday. The child mortality rate in sub-Saharan Africa is almost five times higher than that in developing countries in Eastern Europe and Central Asia.

Trends in nutrition outcomes by regions

The gaps in maternal mortality across regions are striking, with mothers over 20 times more likely to die at childbirth in sub-Saharan Africa than in Eastern Europe and Central Asia in the period between 2006 and 2010. This is so despite some impressive progress in sub-Saharan Africa, where maternal mortality fell by almost 30 percent, from 129 to 113 deaths per 100,000 live births, between the early and late 2000s.

The gaps in maternal mortality across regions are striking, with mothers over 20 times more likely to die at childbirth in sub-Saharan Africa than in Eastern Europe and Central Asia in the period between 2006 and 2010.

Trends in stunting rates during the period since 2000 show reversals in some regions: while stunting rates fell in South Asia, sub-Saharan Africa and Latin America, they rose by about 10 percent in East Asia and the Middle East and North Africa regions. The gap between the regions with the lowest and highest stunting rates is large, with South Asia having stunting levels over twice as high as those in East Asia Pacific.

Overall, trends in such non-income aspects of well-being indicate substantial inequality, as measured by the regional averages of indicators that reflect educational, health and nutrition outcomes. Sub-Saharan Africa and South Asia lag behind all indicators, while Latin America and the Caribbean and Europe and Central Asia perform better across the board. In general, Latin America and the Caribbean and the Middle East and North Africa made faster progress in improving well-being compared to other regions. Progress in South Asia and sub-Saharan Africa was mixed, with significant improvements in some indicators (i.e., primary completion rates, and child and maternal mortality), but weak or even negative improvements in others (i.e., secondary enrolment, total fertility and stunting rates).

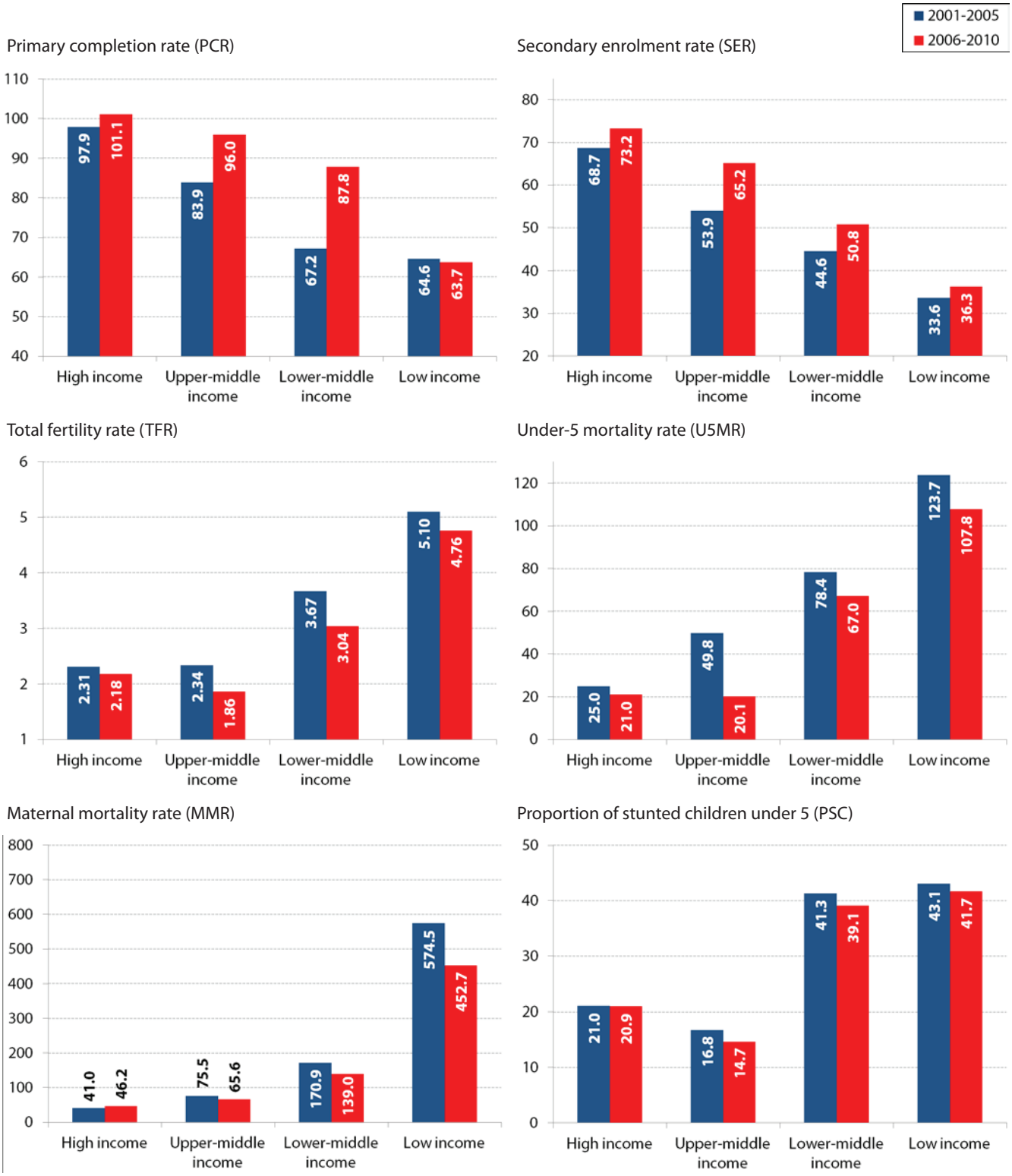
4.2b. Trends by income status

Figure 4.2 presents the levels and trends for indicators according to the income status of countries. Countries were classified as high-income, upper-middle-income, lower-middle-income, or low-income based on the quartile of per capita GDP at purchasing power parity in 2010.[4]

Trends in education outcomes by income status

The primary completion rate in the period 2005–2010 reached 100 percent in high-income countries, 96 percent in upper-middle-income countries and was close to 90 percent in lower-middle-income countries. Low-income countries, however, failed to raise primary completion rates in the last decade, with the level stuck at around 64 percent.

Figure 4.2. Education, health and nutrition indicators by income status



Source: *World Bank (2012).*

Secondary enrolment rates showed modest improvements across income groups, except for the upper-middle-income groups, which improved at a rate of 21 percent. It is a matter of grave concern that the secondary enrolment rate improved so little — by 8 percent — throughout the last decade in low-income countries.

Despite substantial achievements in primary completion rates, huge lags remain for secondary enrolment. The gap between primary completion and secondary enrolment was high for all income groups, but highest for countries in the lower-income quartile, where 65 percent of the relevant age group completed primary education, but only 36 percent of the relevant age group enrolled in secondary education. This gap actually increased from the early to late 2000s.

Trends in health outcomes by income status

The total fertility rate improved for all income groups, although very modestly for high- and low-income groups (the rates of decline were 7 percent and 6 percent, respectively). The total fertility rate in low-income countries was 2.5 times higher than that in countries in the upper-middle-income group.

The child mortality situation also improved in all income groups between the early and late 2000s. Nonetheless, in the period between 2006 and 2010, children in countries from the lowest income quartile were five times more likely to die before reaching their fifth birthday than children in the countries of the second income quartile.

Progress in both health indicators was fastest in countries belonging to the upper-middle-income quartile, with the total fertility and child mortality rate falling by 20 percent and 40 percent, respectively, from the early to the late 2000s. Progress was slowest in countries belonging to the low-income quartile, with reductions of only 6 percent in total fertility rate and 12 percent in under-five mortality rate between the early and late 2000s.

Trends in nutrition by income status

The maternal mortality rate declined for all income groups between 2000 and 2010.[6] The rate of decline was higher for the low-income group (21 percent) than for the lower-middle (19 percent) and upper-middle (13 percent) income groups. However, despite this progress, women in the low-income group are seven times more likely to die at childbirth than those in the upper-middle-income group.

The malnutrition situation remained almost stagnant in the last decade. In fact, child stunting in the lower-middle-income and low-income groups was almost identical at around 40 percent between the early and late 2000s.

Overall, the results indicate that countries in the lowest income quartile are poles apart from those in the high- and upper-middle-income quartiles with respect to indicators of education, health and nutrition. Higher-middle-income countries exhibited the fastest rates of improvements between the early and late 2000s across the board, while high- and low-income groups made slow progress. Income levels seem to be an important determinant of well-being, although unequal progress across groups points to the fact that it is not the only, or even the most significant, factor.

4.2c. Trends by growth performance

Can high-growth episodes bring about faster improvements in human development? Figure 4.3 presents indicators of education, health and nutrition outcomes according to the growth performance of countries[7] and sheds some light on the correlation between economic growth and levels and trends of indicators of human well-being.

Trends in education by growth performance

Improvement in education, both in primary completion and secondary enrolment, were seen in countries across all growth performance groups. Generally, countries with the fastest rates of improvements were those that experienced either very high or low growth. Progress in the middle two categories was modest, particularly for secondary enrolment (2 percent improvement for the high-growth group and 8 percent for the medium-growth group).

Trends in health by growth performance

The total fertility rate declined in all growth performance groups between the early and late 2000s, although at slow rates (between 7 percent and 6 percent for all regions). Child mortality rates also declined across the board, albeit at much faster rates for the very-high- and high-growth groups (21 percent for the high- and very-high-growth groups compared to 11 percent and 14 percent for the medium- and low-growth groups).

Trends in nutrition by growth performance

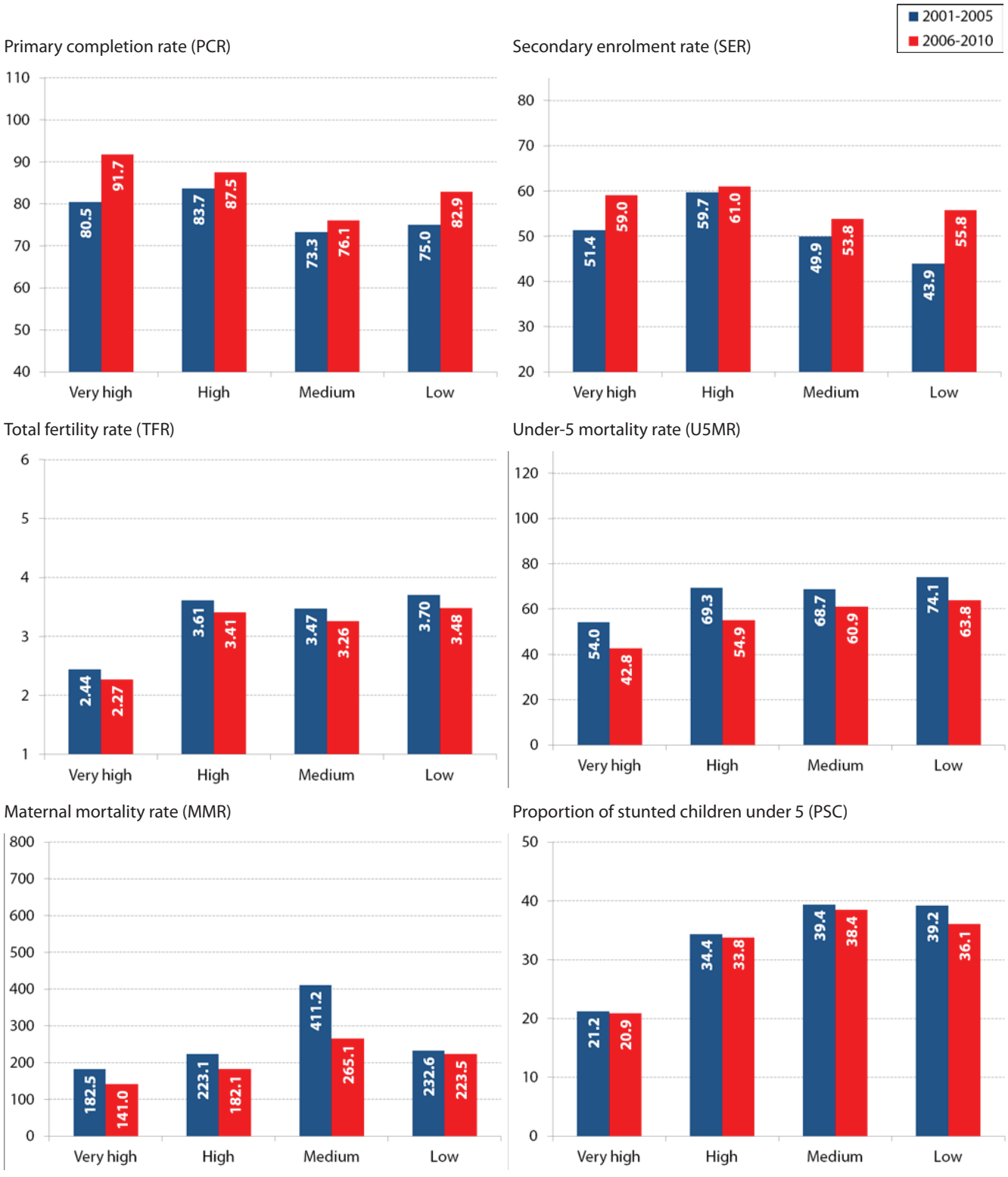
Maternal mortality declined significantly for most growth performance groups, with the exception of the low-growth group, between the early and late 2000s. Medium-growth performers were able to decrease maternal mortality by as much as 36 percent during this period. However, levels for medium- and low-growth groups remained remarkably high and the distance with the levels achieved by the very-high- and high-growth groups remained very large.

Overall, very-high-growth performing countries (i.e., the top growth quartile) were successful in making improvements in some indicators (primary completion, secondary enrolment rates, child mortality and maternal mortality rates), but not in all.

Stunting rates showed little improvements for all groups (a decline of about 2 percent), except for the low-growth group, which experienced a decline of 8 percent. Despite this progress, children in the low- and medium-growth groups were almost twice as likely to experience child malnutrition, compared to those in the very-high-growth group.

Overall, very-high-growth performing countries (i.e., the top growth quartile) were successful in making improvements in some indicators (primary completion, secondary enrolment rates, child mortality and maternal mortality rates), but not in all. The performance of countries belonging to the second growth quartile was more mixed. They performed well in raising the primary completion rate and the child mortality rate, but did not do as well with respect to secondary enrolment, total fertility, maternal mortality and child stunting. In these respects, they were similar to countries with medium-growth performance, which performed rather moderately on improving health indicators compared to the benchmark prevailing at the start of 2000s. Low-growth countries, while starting at low levels for all indicators, were able to make progress generally at faster rates than the high- and medium-growth groups.

Figure 4.3. Education, health and nutrition indicators by growth performance



Source: *World Bank (2012).*

In summary, the analysis of education, health and nutrition trends according to regions, income status and growth performance points to four stylized facts:

- The level of income appears to be an important determinant of performance in education, health and nutrition, but not the only, or even the most significant, factor. Countries with high levels of income performed better on indicators of education, health and nutrition than countries with lower levels of income. However, the progress of countries with high income in the last decade was low relative to other income groups.
- While growth is important for improving well-being, it does not guarantee or automatically translate into faster improvements in education, health and nutrition outcomes. If growth was the main determinant of such outcomes, countries in the very-high- and high-growth groups would have experienced faster improvements on all indicators, which was not the case, as seen in the analysis above.
- Countries that achieved higher growth rates were also countries that started off with higher initial levels of education, health and nutrition outcomes. This suggests that improvements in education, health and nutrition might have positive impacts on future growth.
- Economic growth is not the only driver accounting for improvements in education, health and nutrition outcomes. Countries with low-growth performance were indeed able to make significant progress on various indicators, many times at faster rates than high- and medium-growth countries (particularly in secondary enrolment rates and stunting rate).

4.3. Drivers of inequality in education, health, nutrition between countries

The previous section showed that the income level and growth performance of countries do matter, but are not sufficient to fully explain the variations and trends in education, health and nutrition. This section explores in detail the potential drivers of differences in non-income well-being between countries. Two approaches have generally been used in the literature to analyse these drivers.

The first approach argues that growth affects education, health and nutrition outcomes not directly, but indirectly. Hence, this approach is concerned with testing the channels through which economic growth is likely to influence education, health and nutrition outcomes. In this context, the rate of poverty and the level of public expenditure in social services are seen to be important channels through which growth influences such outcomes (Anand and Ravallion, 1993; HDR, 1995; World Bank, 2007). In other words, if growth has a strong impact on reducing poverty, then improvements in education, health and nutrition outcomes are more likely.

Similarly, growth can be more beneficial for human development if the growth dividends are translated into fiscal gains that support broad-based access to public and social goods. In other words, if the growth dividend leads to an effective use of public expenditure, improvements in education, health and nutrition are more likely. In summary, the growth effects on improvements in non-income material outcomes would depend largely on the strength of these channels (i.e., on the growth elasticity of public spending and growth elasticity of poverty). In both instances, the channels are conditional on growth.

The second approach emphasizes that growth is just one determinant of outcomes in education, health and nutrition. Other factors, too, play an important role in accounting for changes in education, health and

nutrition outcomes. According to this approach, non-growth drivers, such as pre-existing pro-human development institutions and social practices reflecting female-friendly norms, are equally important factors in shaping the level and trends in inequality in non-income aspects of well-being (Banerjee and Iyer, 2005; Acemoglu and Robinson, 2012; Dreze and Sen, 2013).

Which of these two approaches can explain the differential progress in reducing inequality in education, health and nutrition outcomes across nations? Both approaches were tested using a different set of tests for each approach and both approaches provide important insights into the dynamics of economic growth and improvements in non-income dimensions of material well-being.

While growth is important for improving well-being, it does not guarantee or automatically translate into faster improvements in education, health and nutrition outcomes. If growth was the main determinant of such outcomes, countries in the very-high- and high-growth groups would have experienced faster improvements on all indicators, which was not the case.

A number of different potential determinants of variations in education, health and nutritional outcomes are explored in both approaches. These determinants include income level (measured by per capita GDP), the poverty rate (measured as the percentage of people below US$ PPP1.25/ day), public spending on health (measured by per capita spending on health) and public spending on education (measured by per capita public spending).[8]

Furthermore, the effects of governance on education, health and nutrition outcomes were also considered. Indeed, recent literature has pointed to how institutions can influence the choice and supply of public goods, including the quality of public, social, and infrastructural spending (Alesina and Rodrik, 1994; Banerjee and Iyer, 2005; Acemoglu and Robinson, 2012; Pritchett, 2004; Miller, 1997; Easterly, 2001; World Bank WDR, 2009).

Governance ratings were used to examine the role of institutions on education, health and nutrition. These ratings (Kaufmann et al., 2012) are the average of ratings of six different dimensions of governance: (a) voice and accountability, (b) political stability and absence of violence, (c) government effectiveness, (d) regulatory quality, (e) rule of law, and (f) control of corruption.

4.3a. The channels of growth approach

The first set of tests examines the channels through which income level affects other dimensions of material well-being. The channels investigated include poverty, governance and public spending. These tests are inspired by the empirical approach suggested by Sudhir Anand and Martin Ravallion (1993).

Table 4.2 tests for the effect of the income level on six indicators of education, health and nutrition outcomes (PCR, SER, MMR, U5M, TFR and PSC). Regional dummies were added to capture the effects of other drivers.

The results show that income levels are significant for education, health and nutritional outcomes. Yet, the impact of changes in income on changes on these outcomes (income elasticity) can vary greatly. In other words, the impact of each extra unit of income on improving educational outcomes is not the same as its impact on improving health outcomes. The income elasticities of the maternal mortality rate and the child mortality rate are quite high (0.84 and 0.48, respectively). In contrast, the sensitivity of primary completion rates to income is much lower (0.11) than other indicators. The low-income elasticity of nutritional outcomes (-0.21 for TFR and

Table 4.2. Effect of income and region on education, health and nutrition outcomes (log transformed)

	PCR	SER	MMR	U5M	TFR	PSC
Per Capita GDP	0.109***	0.259***	-0.836***	-0.487***	-0.210***	-0.249**
	(4.63)	(4.58)	(-5.49)	(-10.19)	(-8.65)	(-2.55)
East Asia and Pacific	0.373***	0.270*	-0.801*	-0.747***	-0.272***	0.156
	(4.49)	(1.72)	(-1.97)	(-5.25)	(-3.78)	(0.58)
Europe and Central Asia	0.370***	0.815***	-2.117***	-1.037***	-0.729***	-0.391
	(6.56)	(5.69)	(-6.56)	(-7.87)	(-10.90)	(-1.41)
Latin America and Caribbean	0.206***	0.292*	-0.196	-0.565***	-0.207***	-0.277
	(3.12)	(1.79)	(-0.47)	(-3.93)	(-2.85)	(-1.02)
Middle East and North Africa	0.309***	-0.103	-0.602	-0.468***	-0.201**	-0.462*
	(3.49)	(-0.39)	(-1.39)	(-2.77)	(-2.35)	(-1.70)
South Asia		0.240	-1.002*	-0.510***	-0.446***	0.0113
		(0.91)	(-1.79)	(-2.71)	(-4.67)	(0.02)
Constant	3.443***	1.732***	11.08***	7.551***	2.819***	5.083***
	(23.03)	(4.71)	(11.19)	(24.77)	(18.22)	(8.52)
Observations	**61**	**54**	**50**	**123**	**123**	**48**
Adjusted R^2	**0.695**	**0.627**	**0.692**	**0.742**	**0.735**	**0.364**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Note: *1. All variables are the average of the period of 2009-2011. 2. For regional control variable, sub-Saharan Africa was the base category.*

Source: *World Bank (2012).*

-0.25 for the stunting rate) is quite surprising, given the strong link between income and food consumption. Clearly, other factors besides income are important for improvements in nutritional outcomes.

Moreover, education, health and nutritional outcomes show significant variation between different regions of the developing world. In other words, countries in some regions perform better on human development outcomes than countries in other regions with comparable levels of income. These findings substantiate the analysis of trends in education, health and nutrition in the previous section, where it was shown that persistent interregional differences with respect to these important aspects of well-being remain.

Now that income level turned out to be significant for non-income dimensions of human development, would it still be independently significant once we include the regressions explanatory variables that capture the different channels through which growth might impact human development?

The regression in Table 4.3 is similar to the regression carried out in Table 4.2, except that additional explanatory variables are now included to capture different channels of growth, namely poverty, social spending on health, social spending on education, and governance.

The main result is that the inclusion of poverty, social spending and governance makes the income variable statistically insignificant (with the exception of total fertility rate). This supports the hypothesis that it is not income *per se* that affects education, health and nutrition outcomes, but it impacts them through other channels such as poverty and public spending on social services.

Of the different channels tested, poverty stands out as a key determinant of the level of health and nutrition outcomes (but not of education). For example, a 1 percent reduction in poverty could lead to a 0.3 percent

Table 4.3. Effect of income and region on education, health and nutrition outcomes with channels (log transformed)

	PCR	SER	MMR	U5M	TFR	PSC
Per capita GDP (2009–2011)	0.0152	-0.0278	-0.334	-0.0811	-0.184***	-0.295
	(0.29)	(-0.19)	(-1.21)	(-0.84)	(-3.10)	(-1.56)
Average education spending (2001-2009)	0.0553	0.176*				
	(1.52)	(1.71)				
Average health spending (2001-2009)			-0.0248	-0.0791	0.0443	0.158
			(-0.10)	(-0.91)	(0.84)	(0.99)
Average poverty rate: (2001-2009)	0.00459	-0.0691	0.312***	0.231***	0.0471*	0.235**
	(0.17)	(-1.07)	(2.95)	(5.94)	(1.98)	(2.44)
Average governance rating (2001-2009)	0.190	-0.290	-2.547*	-1.021**	-0.405	-1.520
	(0.75)	(-0.39)	(-1.93)	(-2.18)	(-1.42)	(-1.53)
East Asia and Pacific	0.457***	0.247	-1.063**	-0.916***	-0.418***	0.0436
	(4.69)	(1.04)	(-2.45)	(-6.98)	(-5.22)	(0.16)
Europe and Central Asia	0.423***	0.766***	-1.427***	-0.688***	-0.696***	0.243
	(4.52)	(3.32)	(-3.39)	(-4.66)	(-7.73)	(0.66)
Latin America and Caribbean	0.269***	0.453*	-0.298	-0.706***	-0.263***	-0.0160
	(3.32)	(2.02)	(-0.73)	(-5.45)	(-3.33)	(-0.05)
Middle East and North Africa	0.373***	-0.112	-0.0109	-0.302*	-0.119	0.164
	(2.87)	(-0.35)	(-0.02)	(-1.86)	(-1.20)	(0.47)
South Asia		0.324	-1.111**	-0.604***	-0.464***	0.0301
		(1.08)	(-2.19)	(-3.90)	(-4.91)	(0.06)
Constant	3.582***	3.709***	10.68***	5.957***	3.018***	6.405***
	(7.26)	(2.73)	(4.46)	(6.88)	(5.71)	(3.42)
Observations	**49**	**44**	**43**	**98**	**98**	**42**
Adjusted R^2	**0.698**	**0.618**	**0.785**	**0.870**	**0.814**	**0.508**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Note: *1. All variables are the average of the period of 2009-2011. 2. For regional control variable, sub-Saharan Africa was the base category.*

Source: *World Bank (2012).*

reduction in the maternal mortality rate, a 0.23 percent reduction in the under-five mortality rate, and a 0.24 percent reduction in the child malnutrition rate. This finding points to the instrumental importance of poverty reduction in reducing health and nutritional deprivations.

The national income level matters for other non-income dimensions of material well-being (education, health and nutrition), but mainly through the channels of poverty, governance and public spending. Yet the degree of impact of those channels is not uniform across all dimensions of material well-being or even across different indicators of the same dimension.

The second most significant channel of impact on health outcomes is governance. Improvements in governance have a significant impact on indicators of health outcomes: maternal mortality and under-five mortality rates. Surprisingly, public spending on health does not appear to have a significant effect on improvements in health outcomes. Part of the reason may be the very high degree of corruption in public social spending. This is indirectly corroborated by the independent significance of the institutional driver such as governance rating.

Also noteworthy, educational outcomes do not appear to be significantly determined by any of the channels tested in this regression. The only exception is public spending on education, which has a small and weak significant impact on secondary school enrolment rates.

In sum, the national income level matters for other non-income dimensions of material well-being (education, health and nutrition), but mainly through the channels of poverty, governance and public spending. Yet the degree of impact of those channels is not uniform across all dimensions of material well-being or even across different indicators of the same dimension. Poverty is particularly important for health and nutritional outcomes, while governance appears to be an important determinant of health outcomes in particular. Although the income level loses its independent significance as a determinant of education outcomes, the other channels tested also did not appear to be significant determinants.

4.3b. The 'growth plus other drivers' approach

The preceding discussion tested the channels of growth in relation to their effects on education, health and nutrition outcomes. The second set of tests[9] examines whether economic growth alone matters for non-income inequalities or whether other structural and/ or institutional drivers also matter.

To answer this question, the Tendulker model (World Bank, 2007) was used. The Tendulker model primarily examined whether past growth and institutional conditions mattered as independent drivers in explaining the cross-country differences in the current level of education, health and nutrition outcomes.

The first step in the Tendulker model involved testing for the effect of long-term growth (measured as the average growth over the period 1991–2010) on education, health and nutrition outcomes (Table 4.4). The analysis also included the level of income and regional dummy variables to capture the effect of interregional differences.

As can be seen from Table 4.4, past growth is significant in explaining non-income well-being. The average rate of long-term growth (over the period 1991–2010) is significant for health and nutritional dimensions of well-being, but not for educational attainments.

Table 4.4. Effect of long-term economic growth, income level and region on education, health and nutrition outcomes (log transformed)

	PCR	SER	MMR	U5M	TFR	PSC	Poverty Rate
Per capita GDP growth (1991–2010)	0.0209	0.0495	-0.231***	-0.0891***	-0.0509***	-0.0795*	-0.234***
	(1.54)	(1.61)	(-4.41)	(-3.67)	(-4.02)	(-1.73)	(-3.45)
Per capita GDP (1991)	0.101***	0.237***	-0.613***	-0.509***	-0.198***	-0.249*	
	(3.91)	(3.78)	(-3.74)	(-9.20)	(-6.86)	(-1.94)	
East Asia and Pacific	0.358***	0.428***	-0.841*	-0.923***	-0.305***	-0.0306	-1.161*
	(3.86)	(2.72)	(-1.99)	(-6.07)	(-3.84)	(-0.08)	(-1.82)
Europe and Central Asia	0.356***	0.841***	-2.203***	-0.946***	-0.723***	-0.384	-3.779***
	(6.04)	(5.80)	(-7.04)	(-6.95)	(-10.18)	(-1.32)	(-8.90)
Latin America and Caribbean	0.198***	0.333**	-0.501	-0.536***	-0.216***	-0.228	-1.582***
	(2.99)	(2.05)	(-1.23)	(-3.67)	(-2.83)	(-0.73)	(-3.95)
Middle East and North Africa	0.301***	-0.0675	-0.869**	-0.461***	-0.225**	-0.418	-2.357***
	(3.54)	(-0.26)	(-2.13)	(-2.70)	(-2.52)	(-1.39)	(-3.35)
South Asia		0.241	-0.853	-0.507**	-0.418***	0.0220	0.261
		(0.96)	(-1.62)	(-2.48)	(-3.91)	(0.04)	(0.43)
Constant	3.502***	1.827***	9.933***	7.735***	2.785***	5.146***	3.963***
	(22.58)	(4.72)	(9.69)	(22.52)	(15.53)	(6.81)	(13.86)
Observations	**59**	**52**	**48**	**115**	**115**	**45**	**58**
Adjusted R^2	**0.691**	**0.646**	**0.704**	**0.750**	**0.723**	**0.346**	**0.658**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Notes: *1) All dependent variables are the average of the period 2009-2011. Per capita GDP growth is the annual average of the period 1991-2010. Per capita GDP is for the year 1991. 2) For regional control variable, sub-Saharan Africa was the base category.*

Source: *World Bank (2012).*

However, past growth rates turned out to be mostly insignificant once the model was extended to include other potential determinants of education, health and nutrition (Table 4.5).[10] The determinants considered in Table 4.5 were the poverty rate, social spending on health and education, and governance.

Poverty is an important driver of child mortality and stunting rates. A 1 percent reduction in poverty drives down the child mortality rate by 0.18 percent (and stunting rates by 0.32 percent).

We previously found that public health and education spending per capita had few independent effects on education, health and nutrition outcomes when the income level is considered (Table 4.3). However, when the growth effect was considered, public spending on health appeared to be weakly significant for the child mortality rate and total fertility rate (Table 4.5). A 1 percent increase in per capita government spending on health leads to a 0.21 percent reduction in under-five mortality rates and a 0.11 percent reduction in the total fertility rate.

Table 4.5. Effect of long-term economic growth, income level, poverty, social spending, governance and region on education, health and nutrition outcomes (log transformed)

	PCR	SER	MMR	U5M	TFR	PSC
Per capita GDP growth (1991–2010)	0.0217	-0.000484	-0.116*	-0.0130	-0.0295	-0.102
	(0.93)	(-0.01)	(-1.75)	(-0.45)	(-1.60)	(-1.18)
Per capita GDP (1991)	-0.0208	0.247	-0.197	0.0321	-0.00242	-0.00955
	(-0.21)	(1.38)	(-0.73)	(0.28)	(-0.03)	(-0.03)
Per capita education spending	0.101	-0.0719				
	(1.19)	(-0.52)				
Per capita health spending			-0.203	-0.207**	-0.111*	0.0252
			(-0.94)	(-2.05)	(-1.72)	(0.11)
Poverty rate (1991-1995)	-0.0134	-0.0126	0.0701	0.181***	0.0350	0.327*
	(-0.40)	(-0.21)	(0.68)	(3.55)	(1.07)	(1.87)
Governance rating	-0.102	0.712	-0.553	-1.130**	-0.0549	-1.210
	(-0.33)	(1.18)	(-0.41)	(-2.16)	(-0.16)	(-0.90)
East Asia and Pacific	0.512***	0.454*	-1.740**	-1.231***	-0.574***	0.0607
	(3.27)	(2.05)	(-2.70)	(-6.80)	(-4.95)	(0.10)
Europe and Central Asia	0.357**	0.769***	-2.615***	-0.864***	-0.712***	0.168
	(2.74)	(3.20)	(-6.57)	(-4.77)	(-6.13)	(0.21)
Latin America and Caribbean	0.242**	0.267	-1.001**	-0.612***	-0.235**	0.0172
	(2.20)	(1.18)	(-2.49)	(-3.80)	(-2.28)	(0.03)
Middle East and North Africa	0.268		-1.654***	-0.497**	-0.348***	0.0799
	(1.65)		(-3.67)	(-2.44)	(-2.67)	(0.13)
South Asia		0.249	-1.493***	-0.794***	-0.506***	
		(1.03)	(-3.02)	(-3.96)	(-3.94)	
Constant	4.118***	1.068	8.597***	5.817***	1.763***	4.179*
	(6.76)	(0.96)	(3.40)	(6.38)	(3.02)	(1.76)
Observations	**28**	**27**	**34**	**70**	**70**	**29**
Adjusted R^2	**0.700**	**0.723**	**0.762**	**0.852**	**0.755**	**0.429**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Notes: *1) All dependent variables are the average of the period 2009-2011. Per capita GDP growth is the annual average of the period 1991-2010. Per capita GDP is for 1991. Per capita education spending, health spending and poverty rate are the annual averages of the period 1991-1995. Governance rating is for 1996. 2) For regional control variable, sub-Saharan Africa was the base category.*

Source: *World Bank (2012).*

Table 4.6. Effect of long-term economic growth, income level, income inequality, social spending, governance and region on education, health and nutrition outcomes (log transformed)

	PCR	SER	MMR	U5M	TFR	PSC
Per capita GDP growth (1991–2010)	0.0331	0.0160	-0.147**	-0.0580*	-0.0443**	-0.101
	(1.40)	(0.35)	(-2.65)	(-1.87)	(-2.53)	(-1.66)
Per capita GDP (1991)	0.00469	0.303*	-0.129	-0.347***	-0.215***	-0.143
	(0.05)	(1.76)	(-0.47)	(-3.60)	(-3.94)	(-0.77)
Per capita education spending (1991-1995)	0.0793	-0.0977				
	(0.98)	(-0.68)				
Per capita health spending (1991-1995)			-0.387*	0.00481	0.0367	0.0453
			(-1.76)	(0.08)	(1.13)	(0.49)
Average Gini (1991-1995)	-0.0628	-0.185	-0.377	0.509*	0.280*	-0.676
	(-0.36)	(-0.61)	(-0.63)	(1.92)	(1.86)	(-1.11)
Type of Gini	0.101	0.0413	0.701*	-0.173	-0.0611	-0.0729
	(1.11)	(0.22)	(2.02)	(-1.31)	(-0.82)	(-0.25)
Governance rating	-0.0374	0.866	-0.840	-1.718***	-0.427	-0.784
	(-0.13)	(1.38)	(-0.66)	(-3.14)	(-1.38)	(-0.77)
East Asia and Pacific	0.395**	0.272	-1.820***	-0.739***	-0.346***	-0.212
	(2.34)	(1.28)	(-3.18)	(-3.68)	(-3.05)	(-0.45)
Europe and Central Asia	0.228	0.556**	-3.495***	-0.750***	-0.538***	-1.090*
	(1.47)	(2.26)	(-5.75)	(-2.98)	(-3.78)	(-1.72)
Latin America and Caribbean	0.121	0.125	-1.370***	-0.572***	-0.187*	-0.446
	(1.21)	(0.47)	(-2.92)	(-3.12)	(-1.80)	(-1.10)
Middle East and North Africa	0.243*		-1.466***	-0.388*	-0.162	-0.920**
	(1.76)		(-3.22)	(-1.82)	(-1.35)	(-2.24)
South Asia		0.0735	-1.598**	-0.404	-0.288*	
		(0.28)	(-2.59)	(-1.51)	(-1.90)	
Constant	4.141***	1.267	10.70***	7.333***	2.359***	8.264***
	(4.56)	(0.87)	(3.07)	(6.34)	(3.61)	(3.27)
Observations	**33**	**29**	**39**	**83**	**83**	**36**
Adjusted R^2	**0.663**	**0.722**	**0.752**	**0.775**	**0.725**	**0.355**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Notes: *1) All dependent variables are the average of the period 2009-2011. Per capita GDP growth is the annual average of the period 1991-2010. Per capita GDP is for the year 1991. Per capita education spending, health spending and the Gini coefficient are the annual averages of the period of 1991-1995. Governance rating is for the year 1996. 2) For regional control variable, sub-Saharan Africa was the base category.*

Source: *The World Bank (2012).*

Previously, public spending on education weakly mattered for secondary enrolment when income levels were considered (Table 4.3), but it does not appear to matter once long-term growth is taken into account (Table 4.5). This may be due to two factors: (a) data (with large gaps in WDI) and (b) governance of public spending.

Governance appears to be particularly relevant for improvements in child mortality rates. We have previously seen that governance is an important channel through which the level of income can have positive effects on education, health and nutrition outcomes (Table 4.3), but the role of governance mostly disappears when the long-term growth rate is considered (Table 4.5). This may suggest that governance is more correlated with income than with growth.

In Table 4.6, we run the same regression as in Table 4.5, but the poverty rate is replaced by the Gini index of income inequality.[11] Growth was slightly more significant when inequality was considered, instead of the poverty rate, in explaining differences in maternal and child mortality and in total fertility.[12] In other words, reductions in income inequality were significant drivers of child mortality and total fertility rates.

In sum, neither income levels nor economic growth could individually explain variations and improvements in education, health and nutrition outcomes across countries in the developing world. Moreover, for some indicators of well-being, income and economic growth were not even a relevant factor. Other drivers appeared to be necessary for making improvements in education, health and nutrition outcomes. These drivers included poverty, public spending on education and health services, governance and even the level of income inequality.

4.4. Inequality in education, health and nutrition outcomes within countries

After examining inequality across countries, we now turn our attention to the disparities in education, health and nutrition within nations. How has the educational gap between males and females changed? Is the health gap between the rich and the poor widening or narrowing? Is the nutritional gap between rural and urban children disappearing? This section describes the trends of inequality in education, health and nutrition within countries and across the wealth, spatial and gender dimensions using data from the Demographic and Health Survey (DHS)[13] for the period between 2000 and 2010.[14] The level and trends of inequality within countries are examined. The data are presented as regional aggregates (weighted by population) for the sake of convenience.

4.4a. Inequality by wealth quintiles

Tables 4.7 and 4.8 present the levels and trends of indicators of education, health and nutrition according to wealth quintiles within countries.[15]

Inequality in education by wealth quintiles

According to the data, the gap in the primary completion rate between the richest and lowest quintiles was prominent in all regions in the late 2000s. It was at its maximum in South Asia, where children in the wealthiest quartile were two times more likely to complete primary school than those in the lowest quintile (90 percent as opposed to 44 percent). Even in regions where the average primary completion rate was close to 100 percent (Latin America and the Caribbean, Middle East and East Asia), we still see important gaps, with only about 80 percent of the children in the lowest quartile completing primary education.

Table 4.7. Level of education, health and nutrition indicators by household wealth index (late 2000s)

Indicator	Regions	Household Wealth Index (Late 2000s)						
		Lowest	Second	Middle	Fourth	Highest	H/L	Total
PCR	Sub-Saharan Africa	54.30	63.76	70.34	77.22	87.34	1.61	70.59
	Middle East	80.20	86.38	92.58	96.14	98.83	1.23	90.82
	South Asia	43.89	60.25	68.85	80.46	90.49	2.06	68.79
	East Asia	78.95	85.49	88.83	92.99	97.44	1.23	88.74
	Latin America and the Caribbean	84.34	91.28	94.77	97.77	99.29	1.18	93.49
TFR	Sub-Saharan Africa	6.82	6.19	5.65	4.80	3.46	0.51	5.24
	Middle East	3.37	3.10	2.83	2.77	2.30	0.68	2.83
	South Asia	3.73	3.13	2.67	2.27	1.83	0.49	2.67
	East Asia	4.23	3.33	3.03	2.63	2.23	0.53	2.97
	Latin America and the Caribbean	5.10	3.68	3.07	2.35	1.77	0.35	2.90
U5M	Sub-Saharan Africa	143.33	138.05	127.81	116.4	85.67	0.60	125.0
	Middle East	36.67	29.33	25.67	25.33	24.00	0.65	28.33
	South Asia	93.00	83.00	76.00	60.67	39.33	0.42	73.67
	East Asia	75.33	60.00	48.00	37.33	26.33	0.35	52.00
	Latin America and the Caribbean	72.00	59.00	50.00	36.67	26.83	0.37	44.60
Stunting (Height-for-age) below -2 SD	Sub-Saharan Africa	45.12	43.12	40.52	34.75	24.43	0.54	38.45
	Middle East	22.87	18.30	17.57	17.90	15.57	0.68	18.73
	South Asia	47.95	43.45	35.75	31.35	23.28	0.49	37.65
	East Asia (Cambodia Only)	57.05	53.95	49.90	44.80	35.10	0.62	49.00
	Latin America and the Caribbean	34.33	26.10	18.75	12.22	7.22	0.21	20.92
Percent of Women with BMI percent < 18.5	Sub-Saharan Africa	16.18	13.89	11.96	9.63	6.56	0.40	11.77
	Middle East	2.30	1.20	0.70	1.05	0.25	0.11	1.15
	South Asia	31.65	30.70	26.60	21.30	12.90	0.41	25.25
	East Asia (Cambodia Only)	26.35	23.15	21.10	22.05	16.40	0.62	21.90
	Latin America and the Caribbean	6.22	7.72	5.70	4.96	3.52	0.56	5.62

Source: *ICF International (2012).*

Table 4.8. Percentage change in education, health and nutrition indicators by household wealth index (2000-2010)

Indicator	Regions	Household Wealth Index (Late 2000s)						
		Lowest	Second	Middle	Fourth	Highest	Lowest 60%	Highest 40%
PCR	Sub-Saharan Africa	8.46	13.09	10.21	7.26	2.12	10.59	4.69
	Middle East	11.61	7.12	5.95	3.80	1.25	8.23	2.52
	South Asia	25.65	17.54	10.01	6.76	9.36	17.73	8.06
	East Asia	13.77	12.31	9.58	6.41	2.00	11.88	4.20
	Latin America and the Caribbean	6.82	4.39	3.28	1.76	1.23	4.83	1.49
TFR	Sub-Saharan Africa	0.63	-0.07	-0.26	-0.71	-0.46	0.10	-0.59
	Middle East	-1.20	-0.67	0.85	5.06	1.55	-0.34	3.31
	South Asia	-4.94	-1.91	-3.89	-2.22	-2.11	-3.58	-2.16
	East Asia	-0.93	-1.73	-0.84	-1.26	1.41	-1.17	0.07
	Latin America and the Caribbean	-1.73	-2.42	-1.79	-2.01	-2.42	-1.98	-2.22
U5M	Sub-Saharan Africa	-2.04	-2.83	-2.50	-2.60	-1.65	-2.46	-2.13
	Middle East	-2.49	-4.59	11.20	7.84	-0.58	1.38	3.63
	South Asia	-5.56	-3.65	-4.52	-3.64	-6.67	-4.58	-5.15
	East Asia	-2.10	-3.23	-3.15	-3.30	0.75	-2.83	-1.28
	Latin America and the Caribbean	-3.42	-3.48	-3.48	-1.81	-1.88	-3.46	-1.85
Stunting (Height-for-age) below -2 SD	Sub-Saharan Africa	-1.15	-0.57	-1.06	-0.89	-0.15	-0.93	-0.52
	Middle East	-2.27	-0.96	-1.70	2.33	-0.83	-1.64	0.75
	South Asia	-2.72	-2.40	-3.88	-4.49	-4.18	-3.00	-4.34
	East Asia (Cambodia only)	-1.19	-1.62	-1.80	-2.96	-2.96	-1.54	-2.96
	Latin America and the Caribbean	-2.30	-2.57	-1.92	1.00	3.28	-2.26	2.14
Percent of Women with BMI percent < 18.5	Sub-Saharan Africa	1.79	0.52	0.94	-0.86	1.75	1.08	0.44
	Middle East	3.61	-3.50	-4.99	-3.76	-12.24	-1.63	-8.00
	South Asia	-1.41	-1.76	-2.55	-3.83	-4.68	-1.91	-4.26
	East Asia (Cambodia only)	-1.33	-1.20	-2.71	-0.71	-0.19	-1.75	-0.45
	Latin America and the Caribbean	7.85	-6.07	2.95	-0.33	1.03	1.58	0.35

Source: *ICF International (2012).*

Progress in the achievement in primary education between 2000 and 2010 was faster in the lowest wealth quartile than in the highest for all regions except sub-Saharan Africa, where progress was faster for the second and middle wealth groups. The increase in primary completion rate among the lowest 60 percent of households was fastest in South Asia (18 percent), followed by East Asia (12 percent).

Inequality in health by wealth quintiles

Fertility rates were inversely correlated to wealth in all regions in the late 2000s. This is particularly prominent in sub-Saharan Africa, where women in the lowest wealth quintile gave birth to around seven children on average, compared to three in the highest quintile. The gap in the fertility rate among wealth quintiles was also high in Latin America and Caribbean, where women in the poorest quintile gave birth to about three more children than women in the highest quintile. Moreover, inequality in fertility rates actually increased in Latin America and sub-Saharan Africa between 2000 and 2010, while decreasing in the Middle East, South Asia and East Asia.

Across all regions, children in the lowest wealth quintile were more likely to die before their fifth birthday than children in the richest quintiles in the late 2000s. Children in the lowest asset quintile of East Asia and Latin America were about three times more likely to die before their fifth birthday than children from the same region who are born in the highest asset quintile. The disparities in child malnutrition across wealth groups was lowest in the Middle East and North Africa, but child mortality rates were still about 50 percent higher for the lowest quintile compare to the highest quintile.

The child mortality rate for the poorest quintiles has declined at a faster rate than that for the richest groups for all regions except South Asia. This is particularly true in Latin America, where child mortality among the poorest quintile decreased twice as fast than for the richest quintile. In sub-Saharan Africa, the fastest progress was seen in the three middle-wealth quintiles, with slower progress among the richest and poorest. Remarkably, child mortality has been rising among middle-class households (third and fourth asset quintiles) in the Middle East while declining for households in all other quintiles.

Inequality in nutrition by wealth quintiles

Children in the lowest wealth quintile were more likely to be malnourished than children in the highest wealth quintile across all regions in the late 2000s. In Latin America and the Caribbean, the poorest children were five times more likely to be malnourished than the richest. The gap was also quite high in South Asia (48 percent in the poorest quintile as opposed to 23 percent in the richest quintile).

The prevalence of child malnutrition declined between 2000 and 2010 in all regions for the lowest three quintiles. In South Asia, it declined at a faster rate across all wealth groups compared to other regions, possibly because of very high initial levels. The slowest pace of decline in child malnutrition was observed in sub-Saharan Africa.

While one in four women in South Asia was malnourished (i.e., had a body-mass index below 18.5) in the late 2000s, every third woman in the lowest wealth quintile was likely to suffer from malnutrition. In sub-Saharan Africa, the gap in malnourishment between the highest and lowest quintiles was about 10 percentage points. The gap was smallest in the Latin America and the Caribbean and the Middle East.

Unfortunately, female malnutrition seems to have increased for the lowest quintiles in sub-Saharan Africa, the Middle East and Latin America and the Caribbean between 2000 and 2010. The increase is particularly stark in Latin America and the Caribbean, where it rose by almost 8 percent. Interestingly, female malnutrition declined by 6 percent in the second quartile, suggesting that policies or expenditure to improve nutrition might not be reaching the poorest in this region. Female malnutrition declined across all wealth categories in South Asia, but the drop was much faster among the rich (with a 1.9 percent decline for the lowest 60 percent as opposed to a 4.2 percent decline rate for the highest wealth quintile). In sub-Saharan Africa, where female malnutrition has increased across the wealth groups, the poor experienced a sharper deterioration than the rich.

In conclusion, there is a wide gap between the top and the bottom wealth quintiles in all non-income indicators of material well-being. Despite some progress, particularly in education, the gap has remained persistent or is even increasing for some regions.

4.4b. Inequality by place of residence

Tables 4.9 and 4.10 present the levels and trends of indicators of education, health and nutrition according to place of residence and gender within a country. This section will focus on the levels and trends according to place of residence, while gender trends will be analysed in the following section (4.3).

Inequality in education by place of residence

Children living in urban areas were more likely to complete primary school than children in rural areas for all regions in the late 2000s. The urban-rural gap in primary completion rate was highest in South Asia and sub-Saharan Africa, where it stood at about 30 percent compared to 7 percent in Latin America. However, the rural primary completion rate increased quite fast in all regions between 2000 and 2010 and at faster rates than urban areas across the board.

Inequality in health by place of residence

An urban-rural gap in fertility rates was observed in all regions in the late 2000s. It was especially high in sub-Saharan Africa, where women in rural settings were likely to give birth on average to six children, compared to four children for women in urban areas. Between 2000 and 2010, fertility rates in rural areas actually increased in sub-Saharan Africa and the Middle East while declining in the other regions. Fast declines of the urban-rural gaps in fertility rates were observed in Latin America, followed by South Asia.

The rural child mortality rate was quite high compared to urban areas in all the regions except in the Middle East in the late 2000s. In sub-Saharan Africa, more children per 1,000 were likely to die before their fifth birthday if they lived in rural rather than urban areas. The gap was largest in Latin America and the Caribbean, where child mortality in rural areas is 34 percent higher than in urban areas. Progress was made in child mortality in urban and rural areas across all regions between 2000 and 2010 and it was faster in rural areas, except for the Middle East, where rural child mortality increased, suggesting a decrease in the gap in child mortality between urban and rural areas.

Inequality in nutrition by place of residence

The urban-rural gap in child malnutrition was persistent in the late 2000s. It was most prominent in Latin America and the Caribbean, followed by sub-Saharan Africa and South Asia. Although progress was made

Table 4.9. Level of education, health and nutrition indicators by residence and gender (late 2000s)[16]

Indicator	Regions	Residence			Gender	
		Total	Urban	Rural	Male	Female
PCR	Sub-Saharan Africa	70.59	85.55	65.88	77.65	68.25
	Middle East	90.82	95.15	86.98	99.70	90.98
	South Asia	68.79	81.55	62.71	74.50	65.53
	East Asia	88.74	95.05	86.93	89.57	86.68
	Latin America and the Caribbean	93.49	97.53	90.49	93.78	93.77
TFR	Sub-Saharan Africa	5.24	3.82	5.96		
	Middle East	2.83	2.70	3.00		
	South Asia	2.67	2.03	2.87		
	East Asia	2.97	2.43	3.30		
	Latin America and the Caribbean	2.90	2.38	3.70		
U5M	Sub-Saharan Africa	125.00	99.14	133.38	132.71	116.9
	Middle East	28.33	26.33	28.67	30.33	26.33
	South Asia	73.67	56.33	78.33	73.67	74.33
	East Asia	52.00	31.67	60.33	57.67	46.33
	Latin America and the Caribbean	44.60	36.00	52.20	47.10	42.00
Stunting (Height-for-age) below -2 SD	Sub-Saharan Africa	38.45	29.13	41.56	41.25	35.68
	Middle East	18.73	17.17	21.27	19.57	17.83
	South Asia	37.65	29.60	39.40	38.38	36.90
	East Asia (Cambodia only)	49.00	38.35	51.40	50.95	47.10
	Latin America and the Caribbean	20.92	13.87	27.93	22.43	19.37
Percent of Women with BMI percent < 18.5	Sub-Saharan Africa	11.77	8.29	13.18		
	Middle East	1.15	1.05	1.25		
	South Asia	25.25	17.30	27.45		
	East Asia (Cambodia only)	21.90	18.10	22.95		
	Latin America and the Caribbean	5.62	4.92	6.10		

Source: *ICF International (2012).*

Table 4.10. Percentage change in different indicators per year according to residence and gender (2000-2010)

Indicator	Regions	Residence			Gender	
		Total	Urban	Rural	Male	Female
PCR	Sub-Saharan Africa	4.21	2.78	5.59	3.67	4.75
	Middle East	1.42	0.98	1.91	0.87	1.98
	South Asia	4.47	1.08	4.40	2.36	6.57
	East Asia	4.29	2.57	5.18	3.31	5.27
	Latin America and the Caribbean	2.07	0.98	5.11	1.61	2.53
TFR	Sub-Saharan Africa	-0.26	-0.22	0.08		
	Middle East	0.57	1.15	0.22		
	South Asia	-2.36	-2.45	-2.55		
	East Asia	-1.08	-1.51	-1.05		
	Latin America and the Caribbean	-2.76	-2.45	-3.11		
U5M	Sub-Saharan Africa	-2.49	-1.99	-2.48	-2.25	-2.80
	Middle East	1.17	3.02	-7.68	2.47	-1.85
	South Asia	-4.82	-4.08	-4.70	-5.03	-4.41
	East Asia	-2.73	-3.53	-2.76	-2.69	-2.36
	Latin America and the Caribbean	-3.42	-3.26	-3.60	-3.69	-3.16
Stunting (Height-for-age) below -2 SD	Sub-Saharan Africa	-1.33	-0.93	-1.25	-0.93	-1.77
	Middle East	1.72	6.65	-0.16	2.22	1.25
	South Asia	-5.66	-6.55	-5.47	-5.61	-5.65
	East Asia (Cambodia only)	-4.60	-5.96	-4.39	-4.41	-4.81
	Latin America and the Caribbean	-4.61	-0.41	-5.50	-5.12	-4.10
Stunting (Height-for-age) below -2 SD	Sub-Saharan Africa	-0.91	-0.60	-0.92	-0.67	-1.17
	Middle East	-0.70	1.04	-1.27	-0.97	-0.46
	South Asia	-3.34	-3.89	-3.20	-3.25	-3.41
	East Asia (Cambodia only)	-1.99	-3.51	-1.73	-1.68	-2.28
	Latin America and the Caribbean	-2.61	-1.86	-2.35	-3.03	-2.10
Percent of Women with BMI percent < 18.5	Sub-Saharan Africa	0.43	-0.16	0.93		
	Middle East	-0.91	2.22	-2.08		
	South Asia	-2.57	-3.66	-2.29		
	East Asia (Cambodia only)	-1.42	-0.95	-1.42		
	Latin America and the Caribbean	-3.63	-0.91	-5.70		

Source: *ICF International (2012).*

in rural areas across all regions between 2000 and 2010, progress in urban areas was generally higher. Thus, there is no sign that the gap between urban and rural areas is closing. The only exception to this is Latin America, where child malnutrition decreased at a much faster rate in rural areas (-5.5 percent) than in urban areas (-0.4 percent).

Women's malnutrition was higher in rural than in urban areas across all regions in the late 2000s. The gap was particularly stark in South Asia, where women in rural areas were 26 percent more likely to be malnourished than women in urban areas. Progress in this indicator was modest throughout, with progress closing the gap in some regions, but increases in disparities in others. Latin America, for example, reduced the urban-rural gap by reducing women's malnutrition by almost 6 percent in rural areas, while improvements in urban areas were closer to 1 percent. Inversely, the gap grew larger in sub-Saharan Africa, where the percentage of malnourished women in rural areas actually grew by 1 percent while slightly decreasing in urban areas.

4.4c. Inequality by gender

Inequality in education by gender

The gender gap in primary completion rate varied greatly across regions between 2000 and 2010. It was highest in sub-Saharan Africa and South Asia, where male children were around 14 percent more likely to complete primary school that females, and insignificant or small in Latin America and East Asia (0.01 percent and 3 percent, respectively). A declining gap between male and female primary completion rates was evident across all regions between 2000 and 2010.

Inequality in health by gender

Mortality rates for female children were lower than those for male children in all regions except South Asia in the late 2000s. Progress was made in overall child mortality between 2000 and 2010, and mortality for males decreased at a faster rate in all regions with the exceptions of sub-Saharan Africa and the Middle East. In the Middle East, male child mortality actually increased between 2000 and 2010.

Inequality in nutrition by gender

Child malnutrition was also higher for male children across all regions in the late 2000s. In sub-Saharan Africa and Latin America, the gap in malnutrition between female and male children stood at about 15 percent. Progress in this indicator of nutrition was modest for females and males between 2000 and 2010.

Overall, inequality remains very high within countries across wealth quintiles, place of residence and gender, despite some progress in closing gaps in education, nutrition and health indicators. In general, inequality in primary completion rates declined for all regions in all three dimensions. The progress in health indicators, however, was more mixed. While progress was made towards closing gaps in child mortality, the evidence suggests that total fertility rates remained highly unequal across wealth and spatial dimensions. Progress in nutrition was even more discouraging. The gap in child malnutrition between males and females actually grew, as did the gap in women's malnutrition across wealth quintiles, and no clear progress was made in reducing nutritional inequality according to place of residence.

Box 4.1. Inequality and people with disabilities

Inequality in non-income outcomes is also obvious across other groups. For instance, disability has received relatively little attention in development discourse as a source of inter-group inequality despite the fact that, according to the most recent estimates, approximately one person in seven experiences some form of disability and between 2.2 percent and 3.8 percent of the world population has a severe impairment. However, the disadvantage faced by persons with disabilities is very strong. Evidence provided by the World Report on Disability (WHO and The World Bank) shows that, compared to non-disabled people, persons with disabilities experience not only higher rates of poverty, lower educational achievements, and poorer health outcomes, but also less legal protection and less political and cultural participation, amongst other forms of disadvantage. Children with disabilities are less likely to attend school, which, in turn, decreases their chances of developing skills for future employment opportunities. For instance, the gap in primary school attendance rates between disabled and non-disabled children has been documented to be as high as 60 percent in some countries. This pattern of non-attendance is more pronounced in poorer countries. Persons with disabilities are more likely to be unemployed and earn less even when they are employed. Evidence indicates that microfinance institutions are often unwilling to lend to persons with disabilities, whom they often do not consider creditworthy, thus depriving them of the financial resources that they need to obtain an independent and sustainable livelihood. Persons with disabilities may have extra costs resulting from disability — such as costs associated with medical care or assistive devices, or the need for personal support and assistance — and thus often require more resources to achieve the same outcomes as non-disabled people.

4.5. Drivers of inequality in education, health and nutrition outcomes within countries

Inequalities in education, health and nutrition outcomes between individuals are prevalent and, in many cases, quite persistent, even when there have been improvements in average levels. If such inequalities are to be addressed by policy makers, it is important to understand the drivers that impact the distribution of well-being outcomes across individuals and household by different wealth endowments, gender or place of residence.

We have little guidance from the literature for modelling the drivers of within-country education, health and nutrition inequalities.[17]

In section 3, a number of drivers of the international inequality in national averages of education, health and nutrition were identified. Income levels, economic growth, poverty, governance and social spending were all among the significant determinants for one or more of the indicators of education, health and nutrition outcomes. The question now is whether those determinants also matter for improvements in the distribution of education, health and nutrition outcomes across households from different wealth quintiles or from different regions within a country. In this section, we test five different potential drivers of within-country non-income material human: 1) income level, 2) economic growth, 3) income inequality, 4) governance, and 5) social norms.

The first three drivers are all income-related (i.e., they reflect the level, growth and distribution of income). It is important to investigate whether countries with higher income levels necessarily have less inequality in the non-income dimensions of material well-being or whether countries with higher rates of growth are more or

less likely to reduce education, health and nutrition inequalities. Answering these questions will help shed light on whether higher incomes have a 'trickle-down' impact on non-income human development outcomes.

Income inequality is also a potential driver of non-income inequality because of the strong evidence that indicates that household income levels matter for education, health and nutrition outcomes. This is confirmed by the extensive prevalence of inequalities in these dimensions by wealth quintiles (see section 4.1 above).

The last two drivers tested are governance and social norms. As before, the measure of governance used here are the Worldwide Governance Indicators (Kaufmann et al., 2010). To capture social norms, the female-to-male ratio of secondary enrolment rates was used as a proxy.[18] This ratio reflects the practice at the social and institutional levels of systemic intergroup inequality, based on a different valuation of women and men. For instance, if the norm is for girls to marry young, a norm may emerge whereby societies differentially fund education.

These five factors, plus regional dummies (to capture inter-regional differences in within-country inequality), were used to test their impact on inequality in human development by wealth quintile, gender and place of residence (Tables 4.14–4.16).

4.5a. Drivers of inequality in education, health and nutrition by wealth quintile

Table 4.11 shows the results of the analysis of the drivers of within-country inequality by wealth quintile (measured as the ratio of the average outcome in the 20 percent of households with the most wealth to the average outcomes in the 20 percent of households with the lowest levels of wealth).

The level of income and economic growth do not affect within-country inequality in any of the indicators of education, health and nutrition tested. This is a very significant result. The income status and growth performance of a country do not necessarily indicate lower inequalities in non-income dimensions of material well-being. Income and growth affect the national average level of education, health and nutrition outcomes, but have no significant impact on the distribution of those outcomes between rich and poor households. Countries can have growing incomes without witnessing any improvements in education, health and nutrition inequalities.

The income status and growth performance of a country do not necessarily indicate lower inequalities in non-income dimensions of material well-being. Income and growth affect the national average level of education, health and nutrition outcomes, but have no significant impact on the distribution of those outcomes between rich and poor households.

Income inequality, on the other hand, emerges as a particularly significant determinant of inequality in health outcomes (total fertility rate and under-five mortality). For example, 87 percent of variation in the ratio of under-five mortality rates between the richest and lowest quintile could be attributed to variations in income/wealth inequality (Table 4.11). Income inequality can therefore give a good indication of the degree of inequality in health outcomes. In other words, improving income inequality will have positive impacts on inequality in health outcomes.

We have previously seen that governance is an important channel through which the level of income can have positive effects on non-income dimensions of well-being. However, the quality of governance does not appear to be a prominent independent driver of within-country inequality in human development. A possible explanation for this finding is that the Worldwide Governance Indicators capture a "broad underlying concept

Table 4.11. Drivers of inequality in education, health and nutrition outcomes by wealth quintiles (log transformed)

	PCR	TFR	U5M	PSC	MMM
Average per capita GDP Growth in 2000s	0.0236	-0.0635	-0.0326	-0.0553	-0.108
	(0.66)	(-1.66)	(-0.90)	(-1.11)	(-0.92)
Per capita GDP	-0.116	0.169	-0.0690	-0.0591	-0.433
	(-1.08)	(1.71)	(-0.59)	(-0.32)	(-1.49)
Gini in 2000s	0.586	-0.696*	-0.870**	-0.374	0.218
	(1.64)	(-1.93)	(-2.40)	(-0.55)	(0.26)
Dummy for Income Gini	-0.284**	0.176*	0.0676	0.00764	0.149
	(-2.31)	(1.73)	(0.36)	(0.04)	(0.43)
Average governance ratings in 2000s	0.0536	-0.123	-0.0165	-0.105	0.128
	(0.31)	(-1.04)	(-0.08)	(-0.51)	(0.28)
M/F ratio in SER	-1.859***	0.799	-0.666	-0.439	0.478
	(-3.47)	(1.57)	(-1.09)	(-0.65)	(0.28)
East Asia and Pacific	0.289*	0.0937	-0.578***	0.0465	1.290**
	(1.89)	(0.38)	(-3.49)	(0.24)	(2.63)
Europe and Central Asia	-0.0667	0.298	0.0840	0.359	1.748*
	(-0.28)	(1.26)	(0.24)	(0.67)	(1.92)
Latin America and Caribbean	0.599***	-0.361**	-0.238	-0.937***	1.323**
	(3.07)	(-2.48)	(-0.96)	(-3.46)	(2.54)
Middle East and North Africa	-0.0635	0.0357	-0.517**	0.133	0.176
	(-0.31)	(0.19)	(-2.45)	(0.26)	(0.32)
South Asia	-0.273	0.247	-0.397*	-0.187	0.136
	(-1.55)	(1.36)	(-1.85)	(-0.87)	(0.24)
Constant	-1.035	0.893	3.284**	1.260	1.008
	(-0.79)	(0.74)	(2.57)	(0.65)	(0.38)
Observations	**33**	**31**	**31**	**28**	**29**
Adjusted R^2	**0.628**	**0.518**	**0.482**	**0.541**	**0.284**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Note: *Dependent variables are a log of ratios of respective non-income indicators of the richest and poorest quintiles. Therefore, for all dependent variables except the primary completion rate, the higher the ratios, the lower the inequality in the country. Ratios used as dependent variables are generated from the latest Demographic and Health Surveys available for the sample countries in the 2000s. Per capita GDP growth and Gini are the annual averages of the period 2000-2010. Per capita GDP is from the corresponding year of the Demographic and Health Surveys available for countries. Average governance ratings in the 2000s derive from the annual average of aggregate governance rating from Kaufmann et al. (2012). The dummy for income Gini is a dummy variable to indicate whether the Gini coefficient is an income Gini or a consumption Gini*

Source: *ICF International (2012).*

Box 4.2. Governance and non-income inequality

The relationship between governance and inequality is well-established in the development literature. Political systems and processes determine the policy choices and the provision of basic public services, such as health and education, which have a significant bearing on non-income dimensions of well-being. Numerous studies have found a significant association between high and rising corruption with unequal access to education, higher dropout rates in primary schools, lower levels and effectiveness of social spending, and negative impacts on health indicators such as child and infant mortality (Gupta et al., 2002; Mauro, 2005; Gupta et al., 2000). One study using national service delivery surveys for 62 countries finds that countries with high levels of corruption have child mortality rates about one third higher than countries with low levels of corruption (Gupta et al., 2000).

of effective governance" (Langbein and Knack, 2010) rather than the inclusivity of the governance system (i.e., its ability to represent the interests of the marginalized and disadvantaged), which is more directly relevant to within-country inequality (along the income and the non-income dimensions). Research shows that differences in the capacity to shape political processes allow the rich and powerful to 'capture' institutions to their advantages and reinforce discriminatory public policies (Acemouglu and Robinson, 2008; Robison, 2010; Gradstein, 2007; You and Khagram, 2005).

We also examine whether gender-biased social norms and institutions (proxied by the male-female ratio in secondary enrolment)[19] matter for within-country inequality by wealth quintile. Social norms do not appear as a significant factor for explaining inequality in education, health and nutrition outcomes by wealth quintile, but, as will be shown in the next section, they it do matter for gender and urban/rural inequalities.

Although the analysis shows that the level of income does not independently explain gaps in non-income dimensions of well-being, evidence at the country level points to the fact that these might be related through the public spending channel.[20] Indeed, public spending, particularly in education and health, has a significant impact on levels of inequality (de Mello and Tiongson, 2008; Holzner 2010; Sylwester, 2002; Zhang, 2008). In Latin America, for example, an increase in public expenditure in education from 4.1 to 5.2 percent of GDP between 2000 and 2010, was accompanied by an improvement of secondary enrolment rate from 72 percent to 86 percent (UNCTAD, 2012) and a reduction in the gap in years of education across income quintiles (Cruces and Gasparini, 2011). Similarly, a study for African countries finds that a 10 percent increase in per capita public health expenditure could reduce under-five child mortality by 25 percent or lead to a 21 percent reduction in the infant mortality rate (Anyanwu and Erhijakpor, 2009). The total redistributive effect of public spending, of course, largely depends on its composition, since not every policy has the same distributive impact (Lustig et al., 2011; Cuesta, 2013).

4.5b. Drivers of inequality in education, health and nutrition by residence

Table 4.12 presents the results of the analysis of the drivers of gender inequality in education, health and nutrition outcomes (measured as the ratio of urban-to-rural outcomes).

The results in Table 4.12 confirm the earlier findings that income and economic growth have no significant impact on inequality in education, health and nutrition outcomes between urban and rural areas.[21] Rather,

social norms seem to matter most for explaining urban-rural inequalities. Indeed, they can have a major impact on inequality in all dimensions (education, health and nutrition) of material well-being. Improvements

Table 4.12. Drivers of inequality in education, health and nutrition outcomes between urban and rural households (log transformed)

	PCR	SER	TFR	U5M	PSC	MMM
Average per capita GDP Growth in 2000s	-0.0812*	-0.0176	-0.0424	-0.0364	-0.0139	-0.0253
	(-2.07)	(-0.62)	(-1.68)	(-1.33)	(-0.47)	(-0.39)
Per capita GDP	-0.0101	-0.0402	0.119*	0.145	-0.000411	0.0129
	(-0.08)	(-0.55)	(2.05)	(1.42)	(-0.00)	(0.07)
Gini in 2000s	-0.476	-0.102	-0.281	-0.610**	-0.0612	-0.473
	(-1.06)	(-0.45)	(-1.63)	(-2.48)	(-0.17)	(-0.99)
Average governance ratings in 2000s	-0.139	0.115	0.0138	-0.121	-0.0900	-0.0613
	(-0.64)	(0.78)	(0.12)	(-0.83)	(-0.79)	(-0.29)
M/F ratio in SER	2.497***	1.781***	0.480	-1.032***	-0.667*	-0.565
	(4.30)	(3.44)	(1.69)	(-3.28)	(-1.78)	(-0.51)
Dummy for income Gini	0.439**	0.0844	0.0856	0.0395	0.0988	0.0749
	(2.52)	(0.91)	(1.27)	(0.28)	(0.83)	(0.36)
East Asia and Pacific	-0.0470	-0.0445	0.214**	-0.563***	0.0481	0.490**
	(-0.32)	(-0.37)	(2.23)	(-5.63)	(0.40)	(2.24)
Europe and Central Asia	0.0537	0.00321	0.303	-0.345	0.0497	0.433
	(0.13)	(0.02)	(1.45)	(-1.65)	(0.20)	(0.93)
Latin America and Caribbean	-0.358*	0.0941	-0.0604	-0.318*	-0.426***	0.822***
	(-1.99)	(0.74)	(-0.64)	(-1.89)	(-3.65)	(3.34)
Middle East and North Africa	0.314	0.0278	0.0242	-0.425*	0.0738	-0.00439
	(1.19)	(0.16)	(0.20)	(-1.92)	(0.26)	(-0.02)
South Asia	0.523**	0.0777	0.321**	-0.289**	0.0848	-0.163
	(2.54)	(0.49)	(2.48)	(-2.09)	(0.73)	(-0.50)
Constant	1.471	0.841	-0.0626	1.308*	-0.112	1.168
	(0.99)	(1.01)	(-0.10)	(1.75)	(-0.11)	(0.82)
Observations	**33**	**33**	**33**	**32**	**28**	**29**
Adjusted R^2	**0.616**	**0.424**	**0.354**	**0.327**	**0.223**	**0.437**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Note: *Dependent variables are the log of ratios of respective non-income indicators of urban and rural areas. For the total fertility rate, under-five mortality, stunting and women's malnutrition, the higher the ratios, the lower the inequality in the country. For primary completion rates and secondary enrolment rates, the lower the ratios, the lower the inequality. Ratios used as dependent variables are generated from the latest Demographic and Health Surveys available for the sample countries in the 2000s. Per capita GDP growth and Gini are the annual average of the period 2000-2010. Per capita GDP is from the corresponding year of the Demographic and Health Surveys available for countries. Average governance ratings in the 2000s derive from the annual average of aggregate governance rating from Kaufmann et al. (2012). The dummy for the income Gini is a dummy variable to indicate whether the Gini coefficient is an income Gini or a consumption Gini.*

Source: *ICF International (2012).*

in social norms go hand-in-hand with reductions in the gap between urban and rural households in education, health and nutrition outcomes.

Table 4.13. Drivers of inequality in education, health and nutrition outcomes between females and males (log transformed)

	PCR	SER	U5M	PSC
Average per capita GDP Growth in 2000s	0.0421	0.000923	0.0133	0.00234
	(1.47)	(0.05)	(1.14)	(0.25)
Per capita GDP	-0.117*	-0.0353	-0.0548	0.0450**
	(-1.87)	(-0.92)	(-1.47)	(2.18)
Gini in 2000s	0.636**	-0.233*	0.276*	-0.0303
	(2.11)	(-1.78)	(1.71)	(-0.34)
Average governance ratings in 2000s	-0.113	-0.0886**	-0.0338	-0.00913
	(-1.13)	(-2.17)	(-0.49)	(-0.29)
Dummy for income Gini	0.0195	0.0440	0.0250	-0.00492
	(0.18)	(1.06)	(0.60)	(-0.23)
East Asia and Pacific	0.188**	-0.0717	0.0579	-0.0953**
	(2.06)	(-1.38)	(1.02)	(-2.33)
Europe and Central Asia	0.0117	-0.192*	0.168	-0.149**
	(0.06)	(-1.82)	(1.52)	(-2.82)
Latin America and Caribbean	0.302*	-0.0215	-0.0170	-0.0772**
	(1.84)	(-0.29)	(-0.24)	(-2.75)
Middle East and North Africa	0.400***	0.0256	0.179**	-0.147**
	(3.17)	(0.34)	(2.04)	(-2.36)
South Asia	0.212	-0.251***	-0.0775	-0.198***
	(1.59)	(-7.12)	(-1.28)	(-8.05)
Constant	-1.844*	1.132*	-0.613	-0.0163
	(-1.95)	(2.04)	(-1.07)	(-0.06)
Observations	**41**	**33**	**43**	**32**
Adjusted R^2	**0.271**	**0.311**	**0.230**	**0.445**

*t statistics in parentheses, * p< 0.10, ** p< 0.05, *** p< 0.01;*

Note: *Dependent variables are the log of ratios of respective non-income indicators of males and females. For under-five mortality and stunting, the higher the ratios, the lower the inequality situation in the country. For primary completion rates and secondary enrolment rates, the lower the ratio, the lower the inequality situation. Ratios used as dependent variables are generated from the latest Demographic and Health Surveys available for the sample countries in the 2000s. Per capita GDP growth and the Gini coefficient are the annual average of the period 2000-2010. Per capita GDP is from the corresponding year of the DHS available for countries. Average governance ratings for 2000s are the annual average of aggregate governance rating from Kaufmann et al. (2012). The dummy for the income Gini is a dummy variable to indicate whether the Gini coefficient is an income Gini or a consumption Gini.*

Source: *ICF International (2012).*

4.5c. Drivers of inequality in education, health and nutrition by gender

Table 4.13 shows the results of the analysis of the drivers of gender inequalities in education, health and nutrition.

Neither income levels nor economic growth are independent determinants of gender inequality. Governance plays a prominent role in gender inequality in secondary school enrolment rates. Income inequality is a significant driver of gender inequality in primary completion rates (and, to a lesser extent, to secondary school enrolment rates and under-five mortality rates).

In sum, inequalities between households in education, health and nutrition outcomes cannot be reduced by focusing on economic growth. As a matter of fact, income levels and economic growth are not significant drivers of inequality in those 'non-income' dimensions of material well-being. The distribution of income (income inequality), not its level or pace of growth, drives these inequalities. This is an important result for policy makers to consider when designing policies to increase equity in education, health and nutrition outcomes.

Encouraging high economic growth and achieving higher income status does not mean that within-country inequality in education, health and nutrition outcomes will necessarily fall. What matters more for such inequalities is the distribution of income between households.

Other drivers of within-country inequality in education, health and nutrition, especially between gender and between urban and rural households, include governance and social norms. Admittedly, much remains to be understood about the different non-income-related drivers of education, health and nutrition inequalities.The drivers considered in this analysis could explain only an average of 35 percent of the variation in such inequalities;[22] the rest could be due to other drivers.

4.6. Conclusion

The analysis of the trends and drivers of international (inter-country) and national (within-country) inequality sheds much light on the intricate connections between income and non-income dimensions of material well-being.

With respect to inequality between countries, progress was made on educational, health and nutritional dimensions of well-being. Yet the pace of progress has been slow compared to growth in income levels. Economic growth does not necessarily translate into improvements in education, health and nutrition outcomes. In other words, high income levels and economic growth acceleration do not by themselves guarantee improvements in non-income dimensions of material well-being.

Indeed, many countries have seen very little progress or even stagnation in some of the indicators of well-being. The low-income group of countries did not raise the primary completion rate in the last decade from a low level of 64 percent. Secondary enrolment rates remained almost stagnant throughout the last decade in low-income countries. While fertility rates were maintained at 'replacement level' (around 2) in the upper-middle-income group, total fertility rates in low-income countries were 2.5 times higher than those in the lower- and upper-middle-income groups.

The impact of growth on non-income material well-being is mediated through a number of channels. Poverty, social spending and governance are three major channels through which growth in incomes is transformed into improvements in education, health and nutrition. Without improvements in these three channels, economic growth *per se* may have a minimal positive impact on non-income material well-being.

With respect to within-country inequality in education, health and nutrition outcomes, the available data points to significant and persistent gaps in education, health and nutrition outcomes between households on account of differences in wealth, gender and place of residence. Despite substantial improvements in the national averages of many of the indicators of education, health and nutrition outcomes, gender and urban-rural inequalities are still high in many regions, especially in sub-Saharan Africa and South Asia.

The analysis of the drivers of within-country inequality in non-income material well-being provides interesting insights. Income levels and economic growth are not significant drivers of inequalities in education, health and nutrition outcomes; encouraging high economic growth and achieving higher income status does not mean that within-country inequality in education, health and nutrition outcomes will necessarily fall. What matters more for such inequalities is the distribution of income between households. Households with more equal incomes also have more equal education, health and nutrition outcomes. Other significant drivers of non-income inequality include governance, social spending and social norms. Gender and urban-rural inequality appear to be particularly sensitive to changes in social norms and institutions.

Annex 4.A. Data validation checks: Demographic and Health Surveys (DHS) vs. World Development Indicators (WDI)

Since two different sources, namely WDI and DHS, have been used for capturing international and national dimensions of non-income inequalities, the question may arise about the comparability (for levels) and consistency (for trends) between the two data sets. To check this, we compile statistics from the sources on individual countries for three selected indicators (total fertility rate, under-five mortality and stunting rate). We could not do similar checks for three other indicators — primary completion rate, secondary enrolment rate and maternal malnutrition — due to differences in measurement used in the two sources.[23] For example, WDI provides data on the primary completion rate for the total number of children as per the official graduation age; in contrast, DHS reports provide the primary completion rate for all the population covered under the survey. Thus, a downward bias in primary completion rate according to DHS is expected. We also faced a problem in identifying a particular indicator such as maternal malnutrition in both the sources. An indicator measuring female malnutrition (BMI<18.5) is found in DHS data; WDI data reports the malnutrition situation for the overall population.

For indicators common to both surveys, the following may be noted. The results are carried out for 65 countries covered by both sources and presented in the table below. Similar statistics have been found for the total fertility rate and the stunting rate in both sources. For the total fertility rate, we have found absolute differences between the two sources to be about ±0.2. This is true for 41 countries. In contrast, the difference is higher than ±0.5 for 13 countries. For chronic malnutrition among children, we use the measure of stunting (height-for-age) for children under five years old. Of 45 countries for which we have data in both sources, the absolute difference is within the range of ±1 for 35 countries. Thus, little difference exists in fertility and child stunting rates between DHS and WDI.

However, a wide variation is observed between the two sources for the indicator of under-five mortality rate among children under five years old. Only in 11 of 62 countries do we find the matched discrepancy to be within the range of ±5, while most countries exhibit a double-digit difference for the same year. Child mortality rates generally are higher in DHS for most countries (55 of 62 countries). Why do statistics vary between these two sources? DHS data come mainly from large-scale household surveys. On the other hand, WDI merely compile data from different sources. Though many indicators in WDI have been sourced from DHS, the indicators selected for this study have not been sourced from DHS. The total fertility rate of WDI has been compiled from the United Nations Population Division and other national statistics offices, not from DHS directly. Similarly, malnutrition data of WDI has been sourced from the Global Database on Child Growth and Malnutrition maintained by the World Health Organization (WHO). Nevertheless, we find very similar statistics for these indicators between DHS and WDI. This is mainly because these sources, used by WDI, have, in turn, compiled data from DHS.

However, it is difficult to find obvious explanations for the considerable differences that persist in the child mortality rate between DHS and WDI. The latter cites the UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA, UNDP) as the source of child mortality rate data. The DHS database makes its estimates based on the information of child deaths that have occurred in the past five years (for improving the accuracy of sample-based estimates). One possibility is that the UN Inter-agency data is not based on DHS data and instead uses administrative data from the health ministry that keeps child death records (possibly with varying degrees of completeness across the countries). This may explain why DHS estimates of under-five mortality are generally higher than the official data.

But, as long as we are confined to a single data source for a particular cross-country analysis, such a discrepancy observed for child mortality data between the two data sources should not matter for conducting the trend analysis. WDI data is mainly used for exploring the trends in (and drivers of) non-income inequality through the prism of 'three dimensions-six indicators'. DHS data has been used to explore the level of non-income inequality in the within-country distribution of these indicators across wealth quintile, gender and spatial dimensions. Given the separate analytical purposes to which they are put to use, this should not affect the broad conclusions regarding the 'trends of non-income inequality' or the 'drivers of change' that we derive from our statistical and econometric analysis.

Table 4.A1. Data validation: DHS data vs. WDI data

	Survey	TFR-DHS	TFR-WDI	U5M-DHS	U5M-WDI	PSC-DHS	PSC-WDI
Albania	2008-2009 DHS	1.6	1.6	22	15.8	19.30	23.1
Angola	2006-2007 MIS	5.8	5.9				
Armenia	2010 DHS	1.7	1.7	21	18.3	19.30	20.8
Azerbaijan	2006 DHS	2	2.3	58	54.4	25.10	26.8
Bangladesh	2011 DHS	2.3	2.2	64	46	41.30	
Benin	2006 DHS	5.7	5.6	136	120.2	43.10	44.7
Bolivia	2008 DHS	3.5	3.5	76	57.3	27.10	27.2
Burkina Faso	2010 DHS	6	5.9	148	148.8	34.60	35.1
Burundi	2010 DHS	6.4	4.3	127	141.7	57.70	
Cambodia	2010 DHS	3	2.6	68	46	39.90	40.9
Cameroon	2011 DHS	5.1	4.4	128	127.2	32.50	
Chad	2004 DHS	6.3	6.5	203	181.4		
Colombia	2010 DHS	2.1	2.1	22	18.3	13.20	12.7
Congo, Dem. Rep. of	2007 DHS	6.3	6.2	155	176.7	45.50	45.8
Dominican Republic	2007 DHS	2.4	2.7	37	29	9.80	10.1
Ecuador	2004 RHS	3.2	2.7	37	29.5		
Egypt	2008 DHS	3	2.8	33	25.8	28.90	30.7
El Salvador	2008 RHS	2.5	2.3	25	18.8		
Eritrea	2002 DHS	4.8	5.2	107	91.4	42.90	43.7
Ethiopia	2011 DHS	4.8	4.0	110	77	44.40	44.2
Gabon	2000 DHS	4.2	4.1	91	82.4		
Georgia	2005 RHS	1.6	1.6	33	26.4		
Ghana	2008 DHS	4	4.4	85	83	28.00	28.6
Guatemala	2008-2009 RHS	3.6	4.1	45	33.1		
Guinea	2005 DHS	5.7	5.6			39.30	39.3
Guyana	2009 DHS	2.8	2.3	39	38.3	18.20	19.5
Haiti	2005-2006 DHS	3.9	3.7	102	83	29.40	29.7
Honduras	2005-2006 DHS	3.3	3.4	37	26.7	30.00	29.9
India	2005-2006 DHS	2.7	2.8	85	72.3	48.00	47.9

Source: *ICF International (2012).*

Table 4.A1. Data validation: DHS data vs. WDI data

	Survey	TFR-DHS	TFR-WDI	U5M-DHS	U5M-WDI	PSC-DHS	PSC-WDI
Indonesia	2007 DHS	2.6	2.2	51	38.2		
Jamaica	2008-2009 RHS	2.4	2.4	21	19.6		
Jordan	2009 DHS	3.8	3.8				
Kenya	2008-2009 DHS	4.6	4.8	84	79.4	35.30	35.2
Lesotho	2009 DHS	3.3	3.3	105	95.8	39.20	39
Liberia	2009 MIS	5.9	5.3	158	89.2	39.40	21
Madagascar	2008-2009 DHS	4.8	4.7	82	67.2	50.10	49.2
Malawi	2010 DHS	5.7	6.0	127	89	47.10	47.8
Maldives	2009 DHS	2.5	1.8	27	14.4	18.90	20.3
Mali	2006 DHS	6.6	6.5	215	192.3	37.70	38.5
Mauritania	2000-2001 DHS	4.5	5.1	102	117.2		
Moldova	2005 DHS	1.7	1.5	26	19.6	10.20	11.3
Morocco	2003-2004 DHS	2.5	2.5	54	44.5	22.40	23.1
Mozambique	2003 DHS	5.5	5.5	178	152.1	47.00	47
Namibia	2006-2007 DHS	3.6	3.4	69	58.6	29.00	29.6
Nepal	2011 DHS	2.6	2.7	62	48	40.50	57.1
Nicaragua	2006-2007 RHS	2.7	2.8	41	30.9	24.90	25.2
Niger	2006 DHS	7	7.3	218	160.2	54.80	54.8
Nigeria	2008 DHS	5.7	5.6	171	139.1	40.60	41
Pakistan	2006-2007 DHS	4.1	3.6	93	80		
Paraguay	2008 RHS	2.5	3.1	28	25.4		
Peru	2007-2008 DHS	2.5	2.6	33	23.9	27.80	28.2
Philippines	2008 DHS	3.3	3.3	37	28.5		
Rwanda	2010 DHS	4.6	5.4	102	60.4	44.20	44.3
Sao Tome and Principe	2008-2009 DHS	4.9	3.7	72	89.1	29.30	31.6
Senegal	2010-2011 DHS	5	4.7	87	64.8	26.50	28.7
Sierra Leone	2008 DHS	5.1	5.2	168	199.7	36.40	37.4
Swaziland	2006-2007 DHS	3.9	3.6	106	120.6	28.90	29.5
Tanzania	2010 DHS	5.4	5.5	92	72.5	42.00	42.5
Timor-Leste	2009-2010 DHS	5.7	5.6	80	57.6	58.10	57.7
Turkmenistan	2000 DHS	2.9	2.8	88	71.4		
Uganda	2011 DHS	6.2	6.1	106	89.9	33.40	
Ukraine	2007 DHS	1.2	1.3	19	12.7		
Viet Nam	2002 DHS	1.9	1.9	33	31.3		
Zambia	2007 DHS	6.2	6.2	137	113.4	45.40	45.8
Zimbabwe	2010-2011 DHS	4.1	3.2	77	67.1	32.00	32.3

Source: *ICF International (2012).*

Annex 4.B. Sample characteristics

The table on the next page provides summary statistics of the variables considered in our regression analysis. Only developing countries (according to WDI classification) were included in the sample. Average per capita real GDP of the sample countries is US$1,917, while annual per capita GDP growth rate is about 2 percent. The primary completion rate is about 83 percent and the secondary enrolment rate is about 55 percent. The maternal mortality rate is quite high in the sample countries. Annual per capita public spending on health and education is about US$65 and US$89, respectively, in the sample countries. On average, every fifth person is likely to be poor and earning below US$1.25 a day in the sample countries. A woman is likely to give birth to an average of more than three children and each third child is likely to be malnourished in the sample countries.

We also look at the regional aggregations of major indicators that are used in the regression analysis. Sub-Saharan Africa and South Asia are lagging behind in all six indicators. Secondary enrolment rates are about 38 percent and 33 percent in South Asia and sub-Saharan Africa, respectively, as against the average of 55 percent for all developing countries. The child mortality rate is relatively low in the developing countries of Eastern Europe and Central Asia, followed by the countries in Latin America and the Caribbean. In contrast, every tenth child in sub-Saharan Africa — and every twentieth child in South Asia — is likely to face death before his or her fifth birthday. The under-five mortality rate in sub-Saharan Africa is almost five times higher than that in developing countries in Eastern Europe and Central Asia.

The maternal mortality rate is quite high in sub-Saharan Africa, where it is 16 times higher than that in Eastern Europe and Central Asia. Maternal mortality is also very high in South Asia and in the Middle East and North Africa. Countries in South Asia have been successful in bringing down the total fertility rate to a level less than 3 (though this is still very high), but the performance of sub-Saharan Africa is far poorer; mothers there are likely to give birth five times during their reproductive age.

The annual average per capita real GDP growth in 1991–2010 may be considered as the long-term growth performance of an economy. It is highest in South Asia, at 4 percent, and lowest in sub-Saharan Africa, at about 1 percent. Each second person in sub-Saharan Africa and every third person in South Asia is likely to be poor, i.e., earning less than US$1.25 a day. Developing countries in Eastern Europe, Central Asia and Latin America have been quite successful in keeping poverty rates to a very low level. The success of developing countries in Latin America and the Caribbean can be partially attributed to high public spending on health and education. The governance scenario, though, remains unsatisfactory in all regions. The average governance rating for all regions is less than zero, implying the predominance of a 'weak form of governance' in the developing world.

Table 4.B1. Summary statistics of different socio-economic indicators at the regional level

Indicators*	East Asia & Pacific	N	Europe & Central Asia	N	Latin America & Caribbean	N	Middle East & N. Africa	N	South Asia	N	Sub-Saharan Africa	N	Total	N
Primary completion rate	92.57	4	99.14	14	92.46	15	97.07	4	.	0	63.52	24	82.92	61
Secondary enrolment rate	50.58	8	83.94	12	62.80	13	40.57	2	37.73	2	33.36	17	54.67	54
Under-5 mortality rate	32.11	16	25.05	21	27.14	23	35.73	11	51.14	7	105.3	45	58.17	123
Maternal mortality rate	127.8	5	28.17	15	67.37	14	155.8	5	116.5	2	461.3	9	143.4	50
Total fertility rate	3.000	16	1.834	21	2.647	23	2.929	11	2.691	7	4.729	45	3.344	123
Child Malnutrition	35.49	6	21.30	5	20.85	11	17.56	8	40.50	1	37.31	17	28.42	48
Percentage of Malnourished People	16.81	15	8.524	17	15.10	20	5.063	8	16.38	5	27.68	38	18.19	103
Annual Average Growth Rate (1991-2010)	3.236	15	1.985	21	2.086	23	2.150	11	3.974	7	1.306	45	2.036	122
Per Capita Real GDP	2272	16	1898	21	3589	23	2638	11	1111	7	893.1	45	1917	123
Poverty Rate (percentage of people living below US$1.25/ day)	15.66	5	2.743	14	8.857	17	7.327	3	30.97	5	49.95	16	20.72	60
Annual Per Capita Public Spending on Health (US$)	62.60	16	71.04	21	139.3	23	78.17	11	32.03	7	27.41	44	65.47	122
Annual Per Capita Public Spending on Education (US$)	120.5	12	76.55	14	172.8	15	106.1	6	47.08	5	47.77	33	88.93	85
Annual Per Capita Public Spending on Health and Education (US$)	112.0	16	115.3	21	233.6	23	120.4	11	64.30	7	54.77	45	112.4	123
Average Governance Rating (-2.5 (weak) to 2.5 (strong))	-0.437	16	-0.474	21	-0.258	23	-0.597	11	-0.474	7	-0.608	45	-0.489	123

Note: *All variables are the average of the period 2009-2011.* ***Source:*** *ICF International (2012).*

Notes

1. The total fertility rate is total births per women and is an indicator that is sensitive to reproductive health.
2. The under-five mortality rate, expressed in terms of 1,000 live births, is a direct measure of well-being in the context of developing countries.
3. Maternal mortality ratio is the number of mother deaths per 100,000 live births. Maternal mortality is chosen as a proxy of nutrition, as evidence shows that malnourished mothers are more susceptible to diseases and death (UNICEF, 1998; Brabin et al., 2001; Rush, 2000).
4. The classification of countries into high-income, upper-middle-income, lower-middle-income and low-income was based on the ranking of countries with respect to per capita GDP at purchasing power parity in 2010.
5. MMR for the high-income group only includes data for Argentina since data for other countries in the high-income group was not available for both periods.
6. Data for high income is only available for Argentina, thus numbers are not representative.
7. The criteria used to distinguish between very high, high, medium or low growth were based on quartiles of the ranking of per capita GDP growth between 2000 and 2010.
8. For a detailed discussion on the summary statistics of the indicators, see Annex B.
9. Here we draw upon the econometric specification suggested by the late Suresh Tendulker to regress "current level of human development set against past growth controlling from initial income and other non-growth drivers measured as initial conditions" (World Bank, 2007, chapter 5). We call it the "Tendulker model".
10. Past growth appears significant (weakly) only in the case of the maternal mortality rate.
11. Since the poverty rate and the Gini index of income inequality are measures of the distribution of income, their independent effects on education, health and nutrition outcomes are tested in two separate regressions.
12. Declines in TFR might affect income inequality, as measured by Gini, since these tend to be larger in higher-income households than in low-income households, at least in the short run.
13. Non-income inequality across wealth quintiles can be readily determined for a large number of DHS countries. However, detailed information on the two specific nutritional indicators — child stunting rate and maternal malnutrition rate by asset quintiles and for two data points in time — is available for only a handful of countries. As a result, trend analysis by wealth categories is not always regionally representative for these two indicators due to the limited sample size in Demographic and Health Surveys data. This is especially true in the case of East Asia, where there is only one country (Cambodia). The other general point is that the Latin American sample is underrepresented in the Demographic and Health Surveys (the sample excludes Brazil, Chile, Argentina, and Uruguay, to name the notable exceptions). This should be kept in view while interpreting the region-specific results.
14. For the child stunting rate and female malnutrition, the DHS sample is restricted to the following countries in the following regions: sub-Saharan Africa (Benin, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia, Zimbabwe); the Middle East (Egypt and Jordan); South Asia (Bangladesh, India, Nepal); East Asia (Cambodia); Latin America and the Caribbean (Bolivia, Colombia, the Dominican Republic, Peru).
15. The secondary enrolment ratio is not available according to wealth quintile in the Demographic and Health Surveys and thus not included in the analysis of levels and trends.
16. Secondary enrolment rates were available according to gender and residence for only a very limited number of countries. Therefore, we excluded those rates from the analysis of Tables 4.12 and 4.13.
17. There is some literature on health inequalities (see, for example, Mormot, 2005).

18. Johannes et al. (2008) and Seguino (2007) used this ratio as one of the indicators that capture social and institutional norms towards gender.
19. We also have estimated separate specifications, including the male-female ratio in the secondary enrolment rate in 2001 as a proxy measure of the initial level of social institutions and norms. Although there was no qualitative change in the results, the number of observations was below 15 and we do not report the results.
20. Due to data limitations, it was not possible to include social spending in the regression analysis in Tables 4.14-4.16. As the number of Demographic and Health Surveys sample countries is limited, the addition of public spending would bring the sample size below 20.
21. Growth is very weakly significant for inequalities in primary education completion rates and income levels are only weakly significant for inequalities in the total fertility rate.
22. The R^2 of the regressions in Tables 4.14-4.16 averages 35 percent and ranges from 63 percent to 23 percent.
23. In principle, this problem can be resolved if the unit-record data from DHS is used. This is not a practical proposition for just the validation check on individual DHS countries.

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