CHAPTER 3

# What Will It Take to Achieve Universal Primary Completion by 2015?

Chapter 2 showed that while a number of developing countries have already achieved universal primary completion and others are on track to do so by 2015, as many as 86 developing countries are at risk of not reaching the MDG on current trends. Sixty of these are very low income, or IDA-eligible, countries; 26 are middle-income countries. Any global strategy for achieving the MDG must find ways to help these at-risk countries accelerate progress.

A first step toward such a strategy is understanding what drives EFA success. Why have some countries achieved universal primary completion so much faster than others? Among those that haven't achieved it, why are some making more rapid progress? A growing body of international experience and research offers the potential for a deeper understanding of the determinants of EFA success. This chapter reviews and extends that work, based on analysis of primary completion.

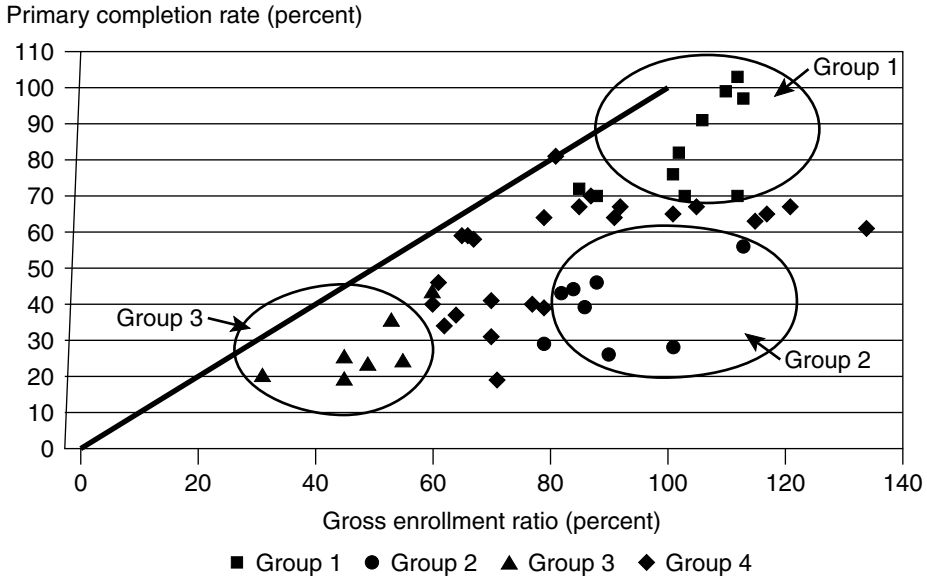
## Determinants of EFA Progress

For the 55 low-income countries with populations over 1 million for which sufficient data could be compiled, we compared primary gross enrollment ratios and primary completion rates in a scatter plot (figure 3.1).[1] The diagonal line in this figure, where the PCR equals the GER, represents a perfectly efficient student flow through the primary system, in a steady state. Since the completion rate obviously cannot exceed the gross enrollment ratio, all country observations fall below the line. The greater the distance from the line, the less efficient the cohort flow in that country. The closer to the origin a country falls, the lower its primary education coverage.

Figure 3.1 shows the wide range in primary completion rates across countries and equally wide disparities in the relationship between gross enrollments and primary completion. To deepen our understanding of the underlying determinants of high primary completion, we compared characteristics of the education systems in "successful" and less successful countries. To ensure that the sample of successful countries was regionally diverse and of a reasonable size (to avoid biasing the results

1. The starting sample included all 79 IDA-eligible countries with per capita GNI below $885 in 2000. Time limitations prevented us from analyzing the 16 low-income countries with populations below 1 million. Of the remaining 63 countries, we had to exclude Bosnia and Herzegovina, Liberia, Myanmar, Somalia, Sri Lanka, Serbia and Montenegro, Tajikistan, and Afghanistan for lack of data, although we used an alternative methodology to estimate the financing requirements for Afghanistan, as described in chapter 4. This left us with a sample of 55 countries, of which 8 have achieved or are close to UPC (defined here as completion rate through grade 5 or 6 over 90 percent) and 47 have not. See annex table A.1 for a full list of countries in the sample.

FIGURE 3.1 **Primary School Completion Rates and Gross Enrollment Ratios in a Sample of Low-Income Countries, circa 1999/2000**




to the particular institutional features of any one region), we set a relative definition of EFA success as follows:

EFA success = GER 85 percent or above and PCR 70 percent or above.[2]

We called this set of high-performing countries Group 1. Given the wide range of GERs and PCRs in the sample, in order to sharpen the analysis we also set boundary parameters that separated the most extreme of the "unsuccessful" countries into two distinct, stylized groups:

- High inefficiency countries: GER 80 percent or above, but PCR 60 percent or lower. These countries were designated Group 2.
- Low coverage countries: GER and PCR both 60 percent or lower. This was Group 3.

When the sample was sorted on these boundaries, 10 countries fell into the category of relative EFA success (Group 1), 8 in high inefficiency (Group 2), and 7 in low coverage (Group 3). (For a full listing of the country groups see annex table A.3). Twenty-four countries fell in between the defined ranges (Group 4). Following Colclough and Lewin (1993), for each of the three groups we analyzed the domestic financing available for primary education; spending per student and key underlying cost factors; and the average repetition rate, which is a key driver of the

2. With "EFA success" defined as a completion rate over 90 percent, four of the eight countries in the sample that met the criterion were countries in Eastern Europe and Central Asia. Given the unique institutional legacy of these countries, it would bias the analysis of success factors if these countries retained this weight in the successful group. We omitted these countries from Group 1, but in order to get an adequate sample size had to set the criterion of (relative) EFA success as 70 percent completion rate or higher. European and Central Asian countries with estimated completion rates below 90 percent were retained in the simulation exercise, however. See annex table A.1.

*Table 3.1*

**Key Education System Parameters for Adjusted Sample of 49 Countries, Grouped by Relative EFA Success**

| Variable | Group 1 | Group 2 | Group 3 | Group 4 | Sample Average |
|---|---|---|---|---|---|
| Number of countries | 10 | 8 | 7 | 24 | n.a. |
| Gross enrollment ratio (percent) | 103 | 91 | 48 | 85 | 84 |
| Primary completion rate (percent) | 83 | 39 | 27 | 53 | 53 |
| Government revenues (as percentage of GDP)[a] | 20.7 | 21.3 | 17.1 | 19.5 | 19.7 |
| Education recurrent spending | | | | | |
| as percentage of GDP | 3.8 | 2.5 | 2.6 | 3.3 | 3.1 |
| as percentage of government revenues | 18.2 | 15.5 | 16.9 | 17.7 | 17.3 |
| Primary education recurrent spending | | | | | |
| as percentage of GDP | 1.7 | 1.3 | 1.3 | 1.4 | 1.5 |
| as percentage of total education recurrent spending | 47.6 | 52.4 | 50.8 | 47.2 | 48.6 |
| Unit cost (as percentage of per capita GDP) | 11.8 | 9.5 | 18.7 | 11.8 | 12.4 |
| Average annual teacher salary (as multiple of per capita GDP) | 3.3 | 3.4 | 6.9 | 3.5 | 4.0 |
| Spending on inputs other than teachers (as percentage of primary education recurrent spending) | 26.0 | 23.4 | 27.1 | 23.3 | 24.4 |
| Pupil-teacher ratio | 39:1 | 49:1 | 56:1 | 40:1 | 44:1 |
| Private enrollments (as percentage of total) | 7.3 | 10.5 | 7.7 | 10.4 | 9.4 |
| Average repetition rate (percent) | 9.5 | 27.8 | 19.5 | 13.3 | 15.8 |

n.a. Not applicable.

**a.** Government current revenues, excluding grants.

completion rate. The mean values are summarized in table 3.1. The full set of country-level data is found in annex tables A.2 through A.5.

These data show that the Group 1 (relative EFA success) countries:

- Devote a higher share of national resources to public primary education (1.7 percent of GDP compared with 1.3 percent of GDP in Groups 2 and 3)
- Exhibit about average unit costs (spending the equivalent of 11.8 percent of per capita GDP per public primary student, compared with the sample average of 12.4 percent)
- Pay annual teacher salaries averaging 3.3 times per capita GDP
- Spend slightly more than average of their recurrent budget on items other than teacher salaries
- Have a pupil-teacher ratio of about 39:1, considerably below the averages for Groups 2 and 3, and
- Have much lower repetition than the other groups (9.5 percent compared with the sample average of 15.2 percent).

Group 1's pattern may be summed up as: *healthy spending; reasonable unit costs, teacher salaries, and class size*; and *low repetition.* It is interesting to note that Group 1's higher spending on primary education derives mainly from higher spending on education as a share of the government budget, and not from higher tax revenues

relative to GDP or a higher share of education spending for primary education. In fact, Group 1 devotes a lower share of education spending to the primary level than the other groups, most likely because its relatively high primary completion rates mean more demand for subsequent levels of the education system.

The countries in Group 2 have gross enrollment ratios close to those of Group 1, and also above the average for the sample. But their completion rates are only half as high as Group 1's and below the sample average. This dramatic gap between enrollments and completion is the principal stylized characteristic of Group 2. Group 2 has the highest revenue-GDP ratio in the sample, but its lower share of total public spending for education results in lower spending on primary education as a share of GDP than in Group 1, even though Group 2 countries devote a higher share of their education spending to the primary level.

Group 2's unit costs are the lowest of the sample, reflecting its higher pupil-teacher ratio (49:1, compared with Group 1's 39:1) and lower spending on non-salary items. But the defining characteristic of Group 2 is the average repetition rate of 28 percent—at any given moment, more than one of every four primary school children in these countries are repeating a grade. Thus, although unit costs are relatively low, the costs per graduate in these countries are very high.

The dropout rate in primary school, although not measured directly here, is clearly high in Group 2 countries, reflected in the fact that only 39 percent of children complete primary school, despite high access. The stylized pattern of Group 2 is therefore *inadequate spending on quality* and *excessive repetition.*

Group 3 countries are painfully far from EFA goals by any definition. The first defining characteristic of these countries is extremely low primary coverage. Less than half of all children in these countries have access to schooling, and only one child in four completes a primary education. Group 3 countries mobilize the lowest share of national resources in taxes of any of the groups, which translates into a low share of GDP for primary education, even though Group 3 countries' budget shares for education in general and for primary education in particular are close to those of the other groups.

A second defining characteristic of Group 3 countries is their dramatically higher unit costs—60–70 percent above unit costs in Groups 1 and 2. The underlying driver is also clear. Teacher salaries in Group 3 average almost seven times per capita GDP, about double the ratio of the other countries. The extremely high cost of teachers forces the education system to adjust with very high pupil-teacher ratios (56 students per teacher, compared with 39 in Group 1). Perhaps related to the very large class size, Group 3's repetition rates are also high—more than double those of Group 1, although still lower than in Group 2.

The stylized characterization of Group 3 is *low primary coverage* deriving from a disastrous combination of *low spending, high unit costs driven by extremely high teacher salaries,* and *relatively poor efficiency.*

We conducted two different batteries of statistical tests to assess the validity of these results. First, we tested whether the differences in variables across our three reference groups were statistically significant (at the 5 percent level).[3] Since the samples were small, we used non-parametric tests to compare the distribution of

3. We are grateful to Luis Crouch for assistance in this analysis.

*Table 3.2*

**Regression Analysis of Key Parameters**

| | Coefficients | t Stat |
|---|---|---|
| Intercept | 47.86 | 5.08 |
| 1990 PCR | 0.40 | 4.14 |
| Recurrent spending on primary education as % of GDP | 12.28 | 3.90 |
| Average Teacher Salary (as multiple of per capita GDP) | (4.49) | (4.02) |
| Pupil-teacher ratio | (0.01) | (0.04) |
| Average repetition rate (%) | (0.72) | (3.46) |
| R Square 0.81 | | |
| Observations 44 | | |

**Note:** 1990 PCR values were taken from tables 2.4–2.9. All other regression variables were taken from Annex table A.2.

values for each parameter across the three groups. This analysis confirmed that the difference in primary completion rates between Groups 1, 2, and 3 was statistically significant. The difference in primary GER between Group 3 and the other groups was also statistically significant. As expected, the difference in GER between Groups 1 and 2 was not statistically significant.

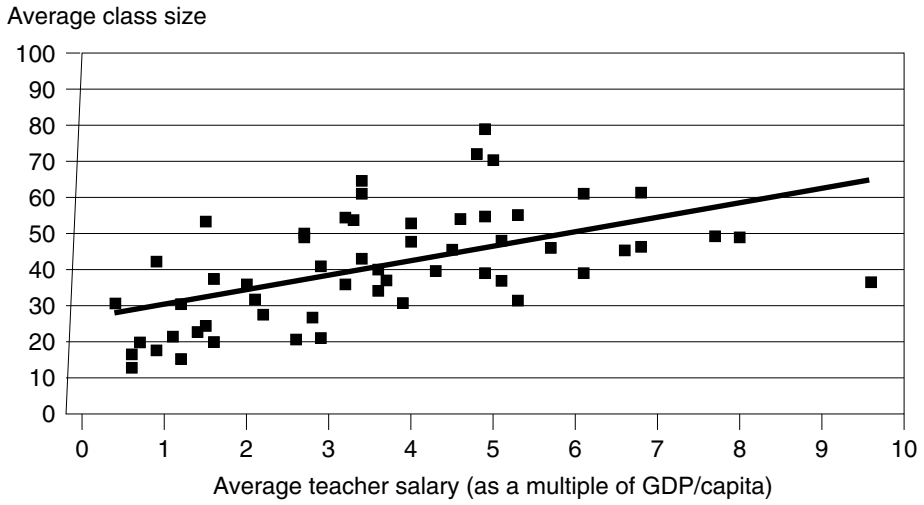
This analysis also confirmed our hypothesis that key explanatory variables were differentially distributed across the three groups to a statistically significant degree. Between Groups 1 and 2, the difference in the repetition rate was significant. Between Groups 1 and 3, there were statistically significant differences in the teacher salary, the pupil-teacher ratio, and the repetition rate. And between Groups 2 and 3, there were statistically significant differences in the teacher salary and unit costs. In sum, this analysis confirmed that the three stylized groups did in fact reflect statistically significant differences in primary completion rates and in four key underlying variables: the teacher salary, the pupil-teacher ratio, the repetition rate, and unit costs.

We then used regression analysis to evaluate the explanatory power of these variables in relation to the sample as a whole. We used the baseline PCR in 1990 as a way of controlling for the independent effects that national cultural and historical factors have on the evolution of the education system.[4] As a result, the model focuses on the variables that have driven PCR progress over the decade. The regression results are summarized in table 3.2. They show three variables (in addition to the baseline PCR) as statistically significant correlates of differences in primary completion rates. One variable—primary education recurrent spending as a share of GDP—had a strong positive effect. The other two variables—the average teacher salary and the average repetition rate—had a strong negative effect.

These results suggest that indeed the notably high average teacher salaries in some countries in the sample has been a constraint to school system expansion and completion rate progress. They also confirm the more intuitively obvious fact that high repetition constrains primary completion progress. When the pupil-teacher ratio appears

4. Five countries for which we had no 1990 PCR value were omitted from the analysis.

FIGURE 3.2 Class Size in Relation to Teacher Salary




**Source:** Mingat 2001.

in the regression along with the average teacher salary, its additional explanatory impact is insignificant. But these two variables are correlated, and in alternative regressions without the teacher salary variable, the pupil-teacher ratio became statistically significant, similarly with a negative effect. The regression variables explained about 80 percent of the variance in primary completion rates across the sample.

When compared with the earlier analysis of the three clusters, the regression results point to spending on primary education as an important factor in completion rate outcomes in general, but not an important differentiator of the three stylized groups we analyzed (high GER: high PCR; high GER: low PCR; low GER: low PCR). Those outcome patterns appear to be more clearly linked to *how* resources are used than to the level of resources available.

In sum, these statistical tests confirmed, first, that the three groups we identified on the basis of differential GER and PCR outcomes indeed had statistically significant differences in the distribution of key underlying variables. Second, regression analysis established that three of these key variables are statistically significant factors—both positive and negative—in explaining variance in primary completion rates.

## Implications for Accelerating EFA Progress

The above analysis suggests several things. First, the pattern exhibited by the countries with the highest primary completion rates—relatively healthy spending on primary education as a share of GDP, moderate unit costs, and low repetition—may represent a broadly balanced and sustainable pattern of resource allocation that is a necessary condition for EFA progress. While it is far too strong to label the Group 1 average values for some of these parameters—such as 39 students per teacher or teacher salaries of about 3.3 times per capita GDP—as "norms" for a healthy education system, it appears that deviating very far from these values forces education systems into unhealthy adjustments, if financing is constrained.

## Box 3.1 Accounting Framework for Spending on Primary Education

$$\frac{\text{Total public spending on primary education}}{\text{GDP}} = \frac{\text{Average teacher salary as a multiple of GDP/capita}}{\text{pupil-teacher ratio}}$$

$$\times (1 - \text{share of pupils in privately financed schools}) \times (1 + \text{spending on inputs other than teachers as a multiple of spending on teacher salaries})$$

$$\times \frac{\text{total enrollments}}{\text{school-age population}} \times \frac{\text{school-age population}}{\text{total population}}$$

A relatively simple accounting framework, outlined above, helps to show why increases in some of the parameters we examined must necessarily be balanced by decreases in others. This accounting identity has at least four important implications for our analysis.

First, and most fundamentally, the accounting identity establishes that the total amount of resources spent on primary education in a given country must equal the per-student spending on teachers and inputs other than teachers times the size of the school-age population enrolled. If a country wishes to increase the share of the school-age population enrolled, it must either increase its spending on primary education or find economies in the average teacher salary, the efficiency with which teachers are deployed (the pupil-teacher ratio), and/or the spending on inputs other than teacher salaries. The empirical experience in low-income countries shows that it is often impossible to increase overall spending on primary education as more children are enrolled, and that compression of spending on other inputs and increases in the pupil-teacher ratio are very commonly the balancing items.

Second, the accounting identity shows that the fiscal cost of enrollment expansion is linked to the size of the privately financed schooling sector. Note that the issue is not the extent of privately *delivered* schooling, which in many countries is a positive force for schooling expansion since government resources channeled through NGO, community, or religious schools can often help improve the efficiency of education spending. The privately *financed* schooling sector in this framework refers to the school sector that receives no government funding, typically a for-profit sector that serves only an elite segment of the population. Although the relative size of this sector is not usually an explicit policy variable for countries, it is not uncommon for constraints on public financing of primary education to lead to eroding quality in the public system and to produce a spontaneous shift in enrollments to privately financed schools. Leaving aside the question of whether or not this is good for education policy, the accounting identity shows that this can ease the fiscal costs of achieving universal primary enrollment.

Third, the accounting identity indicates that the fiscal pressure a country faces in achieving universal primary enrollment is also a function of the relative size of the school-age (7- to 12-year-old) population in the overall total—or the "schooling dependency ratio." This ratio varies widely across countries. For example, in the year 2000 in our sample, while the dependency ratio for the sample as a whole was 16 percent, it ranged from 9 percent in Georgia to 18 percent in a number of African countries (see annex table A.5). The average for the African countries was 17 percent. The projected evolution of this variable also differs across regions. Whereas for the African countries in our sample, population projections show little decline in the size of the school-age population before 2020, for many of the countries outside Africa it is expected to decline substantially—creating a "demographic bonus" that will make it relatively easier to achieve universal primary enrollment without

Box 3.1 **continued**

increasing the share of national resources devoted to education. The accounting identity shows that, other things being equal, Benin and Kenya will have to spend twice as much on education as a share of GDP in 2015 as will Georgia in order to achieve the same degree of primary education coverage and quality.

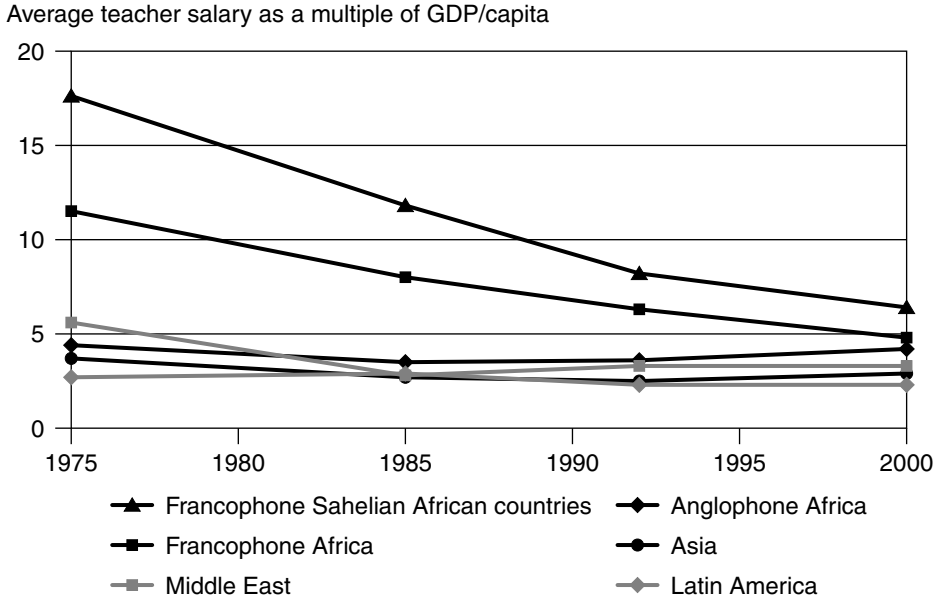
Finally, and importantly for the present study, while the above accounting identity explains primary education unit costs, it does not explain costs per graduate. If the target of analysis is the primary completion rate (rather than primary enrollments), the above framework must be complemented with one additional variable: the average repetition rate in primary education, which is the key driver of student flow efficiency, completion rates, and costs per graduate.

The expenditure accounting framework shown in box 3.1 explains how these variables are linked. The implications of the accounting framework are clearly borne out by our results. In a resource-constrained setting, if average teacher salaries are very much higher than 3.3 times per capita GDP, there is upward pressure on the pupil-teacher ratio (PTR)—as the data from our sample, graphed in figure 3.2, show. Although from an accounting standpoint, the same ratio of average teacher salary to PTR may be satisfied with many different values for the two variables, from a service delivery standpoint they are not all equally efficient. Research especially points to the adverse impact on student learning when average class size exceeds the range of 40–45 (Lockheed and Verspoor 1991). Thus, very high average teacher salaries balanced by large class size is not an efficient resource mix.

On the other hand, empirical evidence does not suggest that lowering class size below the range of 40–45 is an efficient investment, either. Lowering class size is costly, and research indicates that within the range of 40–45 to as low as 20 pupils per teacher, declines in class size are not correlated with appreciable gains in student learning (Lockheed and Verspoor 1991). If the pupil-teacher ratio is very much below 40, the system needs to employ many more teachers, and as the accounting framework indicates, if financing is constrained this will cause average salaries to be compressed. This is also evident from figure 3.2. This pattern is also suboptimal, as low teacher salaries are linked to other systemic problems: inability to attract the best and brightest into teaching; inability to attract teachers to work in remote or hardship areas; inability to reward high performance; chronic absenteeism caused by low teacher motivation or the need to work multiple jobs; and, in many countries, overwhelming pressures for teachers to demand fees for private tutoring or other direct payments from parents, to supplement their unsustainably low salaries.

The "right" level of teacher salary in a given country is one that is sufficient to attract qualified individuals into teaching and motivate continued good performance, given that the schools are in competition with other sectors for educated workers. The appropriate level will depend on the supply of educated individuals, the demand from all sectors of the economy (and foreign countries), and the combined attractiveness of salary and non-salary compensation (such as the shorter work hours, long vacations, and job stability that are common in the teaching profession). Only labor market data for the individual country can determine the appropriate wage for teachers in a given country context.

FIGURE 3.3 **Evolution of Average Teacher Salary in Primary Education, by Region and Subregion, 1975–2000**




**Source:** Mingat 2001.

However, there are some broad global patterns. For example, the average wage paid to teachers, as a multiple of country per capita income, tends to decline as countries develop economically. The average annual wage in the sample of very low income countries we studied was in the range of 3 to 4 times per capita GDP (although with substantial variance, as we have noted). In middle-income countries in Latin America it is in the range of 2 to 2.5 times per capita GDP, and in the OECD it is currently about 1.8 times per capita GDP.

Another global pattern is the historical trend recently examined by Mingat (2001), which shows a steady decline in the average teacher wage in developing countries over the last 25 years, from 6.6 to about 3.7 times the per capita GDP (figure 3.3). While disparities across regions still exist, there has been a strong downward movement of wages in the highest wage subregions (francophone Africa and within francophone Africa, the Sahelian countries), moving toward convergence with the other regional averages over time.

The data presented in table 3.1 make clear that the incremental EFA progress from an additional unit of education spending in both the Group 2 and Group 3 countries is much lower than in Group 1. At Group 2's low internal efficiency, in fact, the challenge of reaching 100 percent primary completion (more than a doubling of current completion rates) would be staggering and the costs exorbitant. It would imply construction of nearly 80 percent more schools, with commensurate teacher hiring and other inputs, than will be needed in the Group 1 school systems to achieve the same goal. The ratio is far higher than the average repetition rate (28 percent) in these countries alone, because of the high correlation between repetition and dropout. Research shows that children who have repeated at least one grade are much more likely

than non-repeaters to drop out before completing primary school, a probability that is even higher for girls. Countries such as those in Group 2 simply cannot reach the goal of universal primary completion without substantially reducing repetition.

In Group 3 countries, very high unit costs limit the impact of additional spending. The equivalent amount of additional financing in a Group 1 country and a Group 3 country (with equal GDP) could bring 160 children into school in the former for every 100 in the latter. The high cost structure of educational provision in Group 3 countries, driven by very high average teacher salaries, has clearly limited the expansion of coverage in the past and unless addressed will continue to constrain the pace of EFA progress in the future. Extremely high pupil-teacher ratios in these countries and relatively high repetition rates only make things worse, as they contribute to relatively low primary completion rates. Although the internal efficiency of Group 3 countries is not quite as low as for Group 2, it still means that of every 100 children who enter school, only a little more than half complete. For countries in Group 3 to make faster EFA progress, not just one but many parameters of their education systems need to change sharply.

A final implication of table 3.1 is that countries in our sample currently exhibit very different levels of domestic commitment to reaching the goal of universal primary completion. Underlying the average values reported in the table is considerable variance in the share of GDP being spent on primary education, from more than 3 percent in Lesotho and Zimbabwe to less than 1 percent in countries such as Pakistan, Lao PDR, and Georgia. Needless to say, an additional 1-2 percent of GDP for primary education could make a huge difference in any country. Any global strategy for accelerating EFA progress must encourage more domestic effort where it is low, and take care not to penalize the countries currently showing the strongest domestic commitment.

Ultimately, this analysis shows that the road to universal primary completion will be quite different for countries in groups 1, 2, and 3, and for the remaining countries, which essentially present milder versions of the same issues. Although none of the education systems in this low-income sample is without problems, on average the balanced education system parameters of Group 1 countries suggest they are better positioned to reach the MDG without major system change.[5]

But for the other countries in the sample, that is clearly not the case. As the Group 2 countries demonstrate, if the EFA goal were framed as universal primary enrollment, these systems would be close to achieving it. Group 3 countries are much further behind, but even they could eventually get to universal enrollment with adequate financing. But universal primary completion is another story. It is simply unachievable in education systems functioning with internal efficiency this low, no matter how much money is poured in. The inescapable conclusion reconfirms what Colclough and Lewin (1993) asserted a decade ago: the attainment of universal primary education, for most low-income countries, depends even more crucially on education system reform than on incremental financing.

5. It should always be recalled, however, that underlying these average values there may be considerable variance in these parameters both across countries in the group and within individual countries that would, in fact, constrain EFA progress.