The Costs of Secondary Education Expansion

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EXECUTIVE SUMMARY

The World Bank has expressed interest in the cost of expansion of secondary education as evidenced by the Bank's increasing activity in this subsector. The interest has generated demands for a study of the costs of expanding the secondary education sector. The study focused on three issues.

Findings

We extracted data from UNESCO files to derive unit costs estimates. Data were only available for thirty countries. Although we cannot make worldwide generalizations from these countries, we can make some more guarded observations. First, on average Sub-Saharan Africa has higher unit costs than the other regions in the sample. Second, the costs of gender equalization are much lower than the costs of universal enrollment.

Methodological Caveats

The lack of countries with available data to provide unit cost estimations presents problems for a thorough study of the costs of expanding the secondary education system. Also we must explain the caveats in the unit costs derived from the thirty countries. First, UNESCO data includes data for central government expenditures. Local and private spending is ignored. Second, converting the data to US dollars is difficult for countries with high inflation and these countries must be removed from the sample. Third, private education creates further problems. The students in private schools are included in enrollment figures but the expenditure side is treated in an ad hoc manner. Fourth, the choice of central government expenditures as a proxy for costs means a reliance upon adequate reporting by central authorities.

The Role of the Secondary Structure

Last, we explore the implications of the cost of secondary expansion when we take account for the structure of the system. Secondary systems include upper and lower secondary and the separation of functions is generally wide. This separation of functions implies that lower secondary unit costs are lower than upper secondary unit costs. Using average (a combination of lower and upper) secondary unit costs generates erroneous conclusions. A full understanding of the costs of expanding the secondary system needs to data on the costs of lower and upper secondary
INTRODUCTION

1. Interest in the World Bank concerning the cost of expansion of the secondary education system derives from sources. First, Summers, the former Chief Economist at the Bank, showed interest in the cost of expanding female enrollments to match the level of male enrollments. In a prepared speech, he reported that the combined effort of all developing countries to raise female enrollments to parity with male enrollments would cost USD$1.4 billion. That number, not surprisingly, made use of several simplifying assumptions.

2. For example, Summers assumed that unit costs of secondary education are twice those of primary school. He derived that multiplier based upon an examination of SARs that provide unit cost data for both primary and secondary levels. Summers believed that satisfactory estimates of the average cost of secondary education for a broad range of countries were unavailable. His speech acknowledged that a fuller treatment of the question of unit costs for secondary education was necessary for a thorough understanding of the effort required of developing countries wishing to expand or maintain current enrollment levels.

3. The second reason for the concern with the costs of secondary expansion is the Bank’s own increasing activity in the subsector. Secondary schooling has grown steadily in most parts of the developing world since World War II. The growing number of secondary education projects under preparation stimulated the Education and Social Policy Department to begin work on a number of secondary education themes, including this one, which will ultimately result in a best-practice paper.

4. This paper presents the findings and discusses methodological questions of interest that emerged from ESP’s study of unit costs. It focuses on three general areas. First, it presents the general findings of the costs of secondary expansion derived from the available cost data. Second, it describes some data deficiencies, i.e. the general lack of data, issues of definition, and ambiguities. Third, it develops a more basic and fundamental thesis that the cost of expansion depends critically on the method of expansion. Whether expansion is achieved by increasing access throughout the secondary education system or restricted to one level (lower or upper secondary) or whether expansion is to come from efficiency gains, the cost implications are significant.

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2 The multiplier is the median of the ratio of secondary school unit costs to primary school unit costs in a sample of 20 countries.
GENERAL FINDINGS

5. Computing unit (or average) costs of secondary education is fairly straightforward methodologically. One needs simply to divide the total costs by the total enrollments in secondary education. As discussed below, cost for education are very difficult to obtain so we substituted expenditures for costs and performed the calculation. We used a data set derived from the familiar UNESCO education data files. Only thirty, out of a 108 countries, had sufficient data to compute unit costs for years after 1985. The reduced sample size does not justify generalizations regarding global estimates of the effort required for enrollment expansions. However, we can glean a number of important insights from the calculation of unit costs of secondary graduates in these countries.

The Costs Are Highest in Sub-saharan Africa

6. Our findings show that the costs of attainment of universal secondary enrollment are greatest in Sub-saharan Africa. These countries must spend an average of 16.8 percent of 1990s GNP to raise the enrollment ratio to 100 percent (excluding Tanzania reduces the average to 8.7 percent). The reasons for the extraordinary effort required of Sub-saharan African nations are two-fold. First, enrollment ratios are very low relative to other regions. The region has an average gross enrollment ratio (GER) of 22 percent for secondary education compared with a GER of 50 percent for the other countries in the sample. Second, unit costs are a larger percent of GNP in Sub-saharan African countries than is true of the other countries in the sample.

7. The major reasons for Africa’s relative high unit costs are: (1) relatively inefficient use of teaching staff, (2) large use of expatriate teachers, (3) relative high wages for teachers, (4) few economies of scale due to small size of secondary education system, and (5) relatively large number of boarders in the secondary education system. The commitments Sub-saharan Africa must make in order to expand secondary education enrollments will include controlling or lower unit costs.

Gender Parity Requires Lower Effort

8. We also observe that the budgetary effort to achieve gender equalization is much smaller than the efforts to achieve universal enrollments. Many countries require no extra spending having already achieved gender equalization. However, there exists a large variance among countries in terms of access of women to secondary education. On average, the countries of the Middle East show the largest gap between male and female enrollments.

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3 Tanzania has a very low secondary enrollment and a very high unit cost of secondary education. The result is that Tanzania must spend 112% of its GNP to achieve universal secondary enrollment.

Still, the countries that have not attained gender equalization need only spend an average of 0.15 percent of their 1990 GNP to achieve equalization.

METHODOLOGICAL CAVEATS

9. Having presented the general findings from the unit cost analysis, we turn to a brief presentation of the main obstacles encountered in this activity. These we hope will be useful to other researchers dealing with typical UNESCO and Bank data files and will likewise sound an appropriate cautionary note to those who rush in to improve upon Mr. Summers shorthand method of multiplying primary unit costs by two.

The Number of Countries is Small

10. The first and perhaps chief obstacle is the number of countries with sufficient data from which to derive unit cost estimates is small. Table 1 lists the 30 countries and the unit cost countries for each. The majority of countries lacked the expenditure data that are necessary to compute unit costs. The study started with 108 countries from which only 30 countries had sufficient data to compute unit costs. There are data for most countries on enrollments but relatively few have central government expenditures and almost none have other public or private expenditures. Several other countries were lost due to difficulties with the exchange rates, most notably, countries that had experienced rapid inflations. For these countries, yearly data do not provide a coherent picture. The data jump from low to astronomically high numbers. To evaluate these countries, expenditure data must be broken down into shorter time periods than annually; however, only annual data are available from UNESCO.

Private Expenditures are Excluded

11. The second problem with these estimates of unit costs is in the exclusion of private expenditures on secondary education. Private expenditures take two major forms. The first is the payment of fees, for textbooks, supplies, etc., to attend public school. Whether or not the fees paid by students are reported as expenditures on secondary education is unclear. If local authorities retain these funds to spend them at their discretion than most likely they are not reported in the data. Also, expenditures on private schools create problems for the research attempting to compute costs from the UNESCO database.

12. The enrollment figures in UNESCO include enrollments of private schools but the expenditure data may or may not include some or all of the expenditures of private schools. The ambiguity of the data cannot be solved except by observation of expenditures on a local level. An omission of expenditures on private schools leads to an underestimation of the costs of secondary education. To the extent that private schools are subsidized, those subsidies may appear as government expenditures.
The Problem with Budgetary Data

13. There are additional problems to be aware of when looking at unit cost estimates\(^5\). The use of budgetary data creates several problems in estimating cost. Normally, the statistics that are available in education costs are in the central government's budget data. Budgetary data relate to expenditures not costs. Many important costs are ignored, above all the opportunity costs of education. Moreover, the method of reporting varies across countries.

14. For example, in some countries, teacher salaries are paid at the local level, yet the funding for teacher salaries comes from the central government. The UNESCO data base often treats these expenditures as local and does not report them with other central government expenditures. Also, expenditures on education can come from several ministries. Ministries of Public Works are often responsible for upkeep and construction of school buildings. However, UNESCO data may include only education ministry expenditures. Also, budgetary data, if current, are often provisional. The actual expenditure data are difficult to ascertain and reported with a delay of several years. UNESCO data files then correct the original estimate of education expenditure. This lag in reporting correct expenditures leads to jumps in the time series data for any single country from provisional to actual data. Lastly, central government budgetary data do not include an important source of financing for developing countries, foreign aid. Foreign aid can provide as much as 25 percent of the funds for developing countries education.

THE IMPACT OF THE STRUCTURE OF SCHOOLING

15. A major problem in using the available unit cost estimates to compute the cost of enrollment expansion is that secondary education is separated into lower and upper secondary. As stated in the initiating memorandum, "the importance of the division between lower and upper secondary is more than a difference of level. The significance lies in the fundamentally different objectives of the two levels\(^6\)." If countries treat the lower and upper secondary as separate systems, then using unit costs that are an average of both lower and upper secondary will either over- or underestimate the cost of expansion.

16. Lower secondary is, frequently, an extension of primary schooling. It is more general and has fewer specialized classrooms and teachers than upper secondary. The typical lower secondary system does not contain special function schools such as general (or academic), vocational, and teacher training, as does upper secondary. Thus, we expect


lower secondary to have lower unit costs than upper secondary. Unfortunately, there is very little expenditure data that separates lower and upper secondary levels. From individual country reports, however, we have data for a few examples.

**TABLE 2**

<table>
<thead>
<tr>
<th>Country</th>
<th>Lower Sec UC*</th>
<th>Average Sec UC</th>
<th>Upper Sec UC</th>
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<tbody>
<tr>
<td>Jordan</td>
<td>$146</td>
<td>$170</td>
<td>$222</td>
</tr>
<tr>
<td>Indonesia</td>
<td>$64</td>
<td>$81</td>
<td>$105</td>
</tr>
<tr>
<td>Madagascar</td>
<td>$53</td>
<td>$74</td>
<td>$165</td>
</tr>
</tbody>
</table>

* UC=Unit Cost

17. We can see from these examples that lower secondary unit costs are indeed less than average unit costs. These lower costs in turn distort our estimates of the costs of expansion using average cost information. Figure 1 can illustrate the difficulties that arise using these average unit cost.

![Figure 1](image-url)
18. In Figure 1, AB represents the total age cohort, relating to the age of entry into secondary education. There are two scenarios: a small initial enrollment EF which continues without significant erosion through the secondary education system and high initial enrollment CD that erodes dramatically overtime until GH students graduate from upper secondary education. In both cases the overall GER is the same; however, the costs of expansion toward universal secondary enrollment will probably be quite different. The reason is the following.

19. We assume that the unit costs for each scenario are identical. We further assume that the unit costs for the lower secondary portion are less in each case than the unit costs for the upper secondary portion. From these assumptions, it follows that the more pyramidal-shaped scenario will have lower average (both lower and upper) unit costs than the rectangular scenario. This lower average cost in the pyramidal scenario is due to the fact that the majority of the pyramidal scenarios enrollments are in the lower cost portion. Yet, if expansion took place to universal secondary enrollment in the two scenarios, the cost of expansion would be higher in the pyramidal-shaped scenario. The higher cost of expansion in the pyramidal-shaped scenario is because more of the expansion takes place in the more expensive upper secondary area. Using average unit costs to compute the costs of expansion would erroneously provide identical costs of expansion for the two scenarios.

**STRATEGIES FOR EXPANSION**

**Increasing Access**

20. There are two possible strategies for expanding secondary education. The first type of expansion can be called increasing access to the secondary system. Enrollments could increase by allowing more graduates from primary to lower secondary. Increasing access also can be further subdivided. New enrollees could be confined to lower secondary and not permitted to proceed on to upper secondary or new enrollees could be permitted access may be expanded throughout the secondary system. Generally speaking, expansion through increased access assumes that the number of students in each subsequent grade would increase as the entry group works through the secondary system. Many countries treat the expansion of upper secondary as of lower priority in an effort to develop "basic" education. (Basic education comprises the lower secondary and primary systems). Such countries would restrict access to upper secondary. Some countries, like Jordan discussed below, cannot expand lower secondary because they have achieved universal lower secondary enrollments: all expansion must occur in upper secondary.

**Increasing Internal Efficiency**

21. The second type of expansion can be described as increasing the internal efficiency of the secondary system. Enrollments could increase in the secondary system by increasing the number passing from one grade to the next. This type of expansion of the secondary education system is possible in countries with high drop-out rates. The countries
of Latin America, in the sample, have high enrollment ratios for grade one of lower secondary but enrollment ratios drop rather fast from grade to grade thereafter. The implications for costs of these two types of expansion can be seen in Figures 2 and 3.

22. Figure 2 represents the scenario where access to secondary education is increased by admitting more people into grade one of lower secondary. As they advance through the system the unit cost figures rises: the dotted line represents the effect of the entry group on unit costs. Initially unit costs are lower than average because of the extra weight of the new entrants in lower secondary. The unit costs rise until the system has passed the new entrants and they expand into upper secondary. This scenario assumes that access has not been restricted to lower secondary. It implies that the end result is an education pyramid that is wider than the original.

23. The results of an expansion in secondary education generated by an increase in internal efficiency also, can be represented by Figure 2. However, the path of unit costs depends critically upon the timing. If pass rates rise simultaneously in all grades, then the unit cost does not vary with time. The use of the average unit cost to calculate expansion
costs does not generate an error. If internal efficiency rises first at lower levels, the unit cost estimation over time is represented by the dotted line, as in the case of an increase in access.

24. Figure 3 represents the scenario where expansion takes place either in upper or lower secondary. Line A represents the unit cost of expansion if expansion occurs only in lower secondary, line B represents the converse. The basic difficulty with combining unit costs for upper and lower secondary education to measure the cost of expansion lies in the expansion of total enrollments. But the estimation of the cost of gender equalization is also affected by the differences between upper and lower secondary education. To the extent to which female enrollment ratios are more likely to decline as they advance up the education system. The costs of gender equalization are underestimated. For example, if lower secondary has achieved gender equalization, then the efforts to increase female participation must occur at the more expensive upper secondary level. These efforts fall under the scenario depicted in Figure 3.

Some country examples
Figure 4
Jordan 1990

Figure 5
Indonesia 1990

Figure 6
Madagascar 1989
25. To understand the importance of separating unit costs between lower and upper secondary, we may take the examples of Jordan, Indonesia, and Madagascar. Jordan has almost universal enrollment in the lower secondary system (called the "preparatory system" in Jordan). Hence, any expansion of the secondary education system must occur at the upper secondary level. If estimates of the costs of expansion used the average unit cost figure, the estimate would be 52 percent smaller than the appropriate estimate using the correct, unit costs for upper secondary education (Table 2). The costs of expansion to universal enrollments would be $11.1 million with average unit costs but $17.0 million with upper secondary unit costs.

26. Indonesia has had more success in enrolling students into the lower secondary system than the upper secondary system. The GER for lower secondary is 49 percent while for upper secondary is 28 percent. Using the average unit cost figure to estimate the costs of expansion in Indonesia also underestimates the costs, however, there estimation of expansion is contingent upon the method whereby they expand the system.

27. In the case of an Indonesian secondary expansion through increased access, the lower secondary system achieves universal enrollments ahead of the upper secondary system. A path of universal secondary enrollment expansion will follow the dotted line (Figure 2) as access to lower secondary is opened. However, once universal enrollment is achieved in basic education then further expansion of the secondary system occurs only in the more expensive upper secondary system. The estimate of the cost of expansion using average unit costs, first over- then underestimates the costs. Whether this leads to an overall over- or underestimation depends upon the timing of the expansion and the extent to which efficiency gains materialize.

28. Madagascar represents the case most like the first scenario in Figure 1 (represented by EF). The secondary system experiences relatively low drop of enrollments between lower and upper secondary. In this case, we can use the average unit cost to compute the cost of expansion. However, if Madagascar follows the path of other countries in their expansion of the secondary system then we would expect their education triangle to become more pyramidal. In which case again, utilizing average unit costs in our estimation of the costs of expansion will overestimate those costs.

29. If we assume, as is likely, that unit costs are lower for lower than upper secondary, we can make some observations about expansion costs from the education triangles alone. Table 3 divides the 30 countries, for which we have averages unit cost information, into three groups based upon their education triangles.

30. The first group are countries that are effectively operating lower and upper secondary as two different systems. Access to lower secondary is much higher than upper secondary. Using average secondary unit costs to estimate the cost of expansion in these countries will underestimate the costs of universal secondary enrollment. If the policy goal is to concentrate on achieving universal enrollments in lower secondary, then these objectives
Table 3

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<thead>
<tr>
<th>Benin</th>
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<tr>
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<td>Mexico</td>
<td>Venezuela</td>
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<th>Burkina Faso</th>
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<td>Burundi</td>
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<td>Malawi</td>
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<td>Niger</td>
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<tr>
<td>Rwanda</td>
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<tr>
<td>Tanzania</td>
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<tr>
<td>(Madagascar)</td>
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are close to being achieved. However, expanding lower secondary generates a demand to increase upper secondary enrollments. The costs of expansion will initially be lower than the estimate using average unit costs but future expansion is expected to be more costly.

31. The second group represent countries where internal efficiency is low throughout the secondary education system. Access must be increased but enrollments can be raised by improving the internal efficiency. The unit cost estimation of expansion is similar to Figure 2. The third group are countries that very low enrollments in lower and upper secondary. If the policy makers decide to expand the whole secondary education system, the use of average unit costs to calculate the costs of universal secondary expansion does not create problems with estimation of expansion costs. However, it is likely that expansion of these secondary systems will follow the path of expansion that occurred in other education systems. These countries with very low secondary enrollments will expand mainly in lower secondary so using lower secondary unit costs may be more appropriate.

CONCLUSIONS AND RECOMMENDATIONS

32. The problems with the derivation of units costs do not imperil many observations that can be made using the figures available. They allow the researcher roughly to compare the commitments that must be made in various countries to expand the education systems. The errors should affect all the observations in the sample. Also, the unit cost figures can highlight some of the differences across regions. (Most notably the high unit cost in Sub-saharan Africa). These observations can be used by policy makers to evaluate the progress of a system vis-a-vis other education systems. But to truly understand the vitally important question of education costs more thorough study is required. Ideally data from surveys made at the school level would give an accurate picture of the cost of inputs. These surveys may be prohibitively costly but further effort is needed in that direction.