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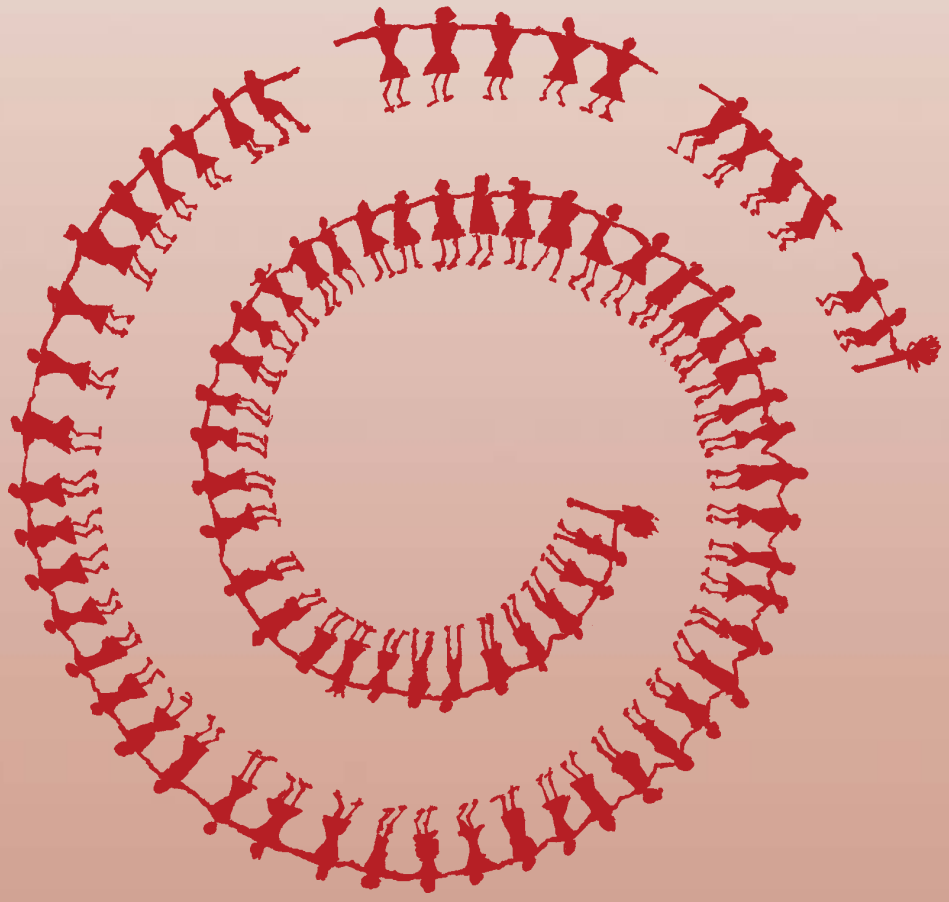
South Asia Human Development Sector

Are Countries' Investments in Tertiary Education Making a Difference?

February 2012



Discussion Paper Series

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Are Countries' Investments in Tertiary Education Making a Difference?

Benoît Millot

February 2012

Discussion Paper Series

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ABBREVIATIONS AND ACRONYMS

ARWU	Academic Ranking of World Universities
GER	Gross Enrollment Rate
HIC	High Income Country
LIC	Low Income Country
MIC	Middle Income Country
QS	Quacquarelli Symonds
SAR	South Asia Region
THE	Times Higher Education
TIMSS	Trends in International Mathematics and Science Study
UIS	UNESCO Institute of Statistics

ABSTRACT

Although the relationship between education spending and outcomes has been the topic of a fairly rich body of research at the primary and secondary levels—and has been found fairly ambiguous—it has been poorly documented at the tertiary level, despite ever rising expenditures at this level. This paper is exploring the impact of various measures of spending on a range of outcomes of tertiary education, using cross-country comparisons. It finds that public expenditures are only loosely linked with outcomes in terms of access and participation, but that they are positively associated with proxies of quality. Private expenditures appear to have no impact on either quantity or quality. This exploratory research shows very different patterns for the group of high-income countries and less developed countries. Data allowing, it also sheds a special light on the South Asia Region, where patterns largely echoes the situation of the low income countries.

Introduction

1. The relationship between tertiary education spending and outcomes is as important as it is elusive. Quantifying and understanding this relationship is highly contingent upon the definition and the measures of both terms of the equation. Capturing the nature and assessing the value or the "amount" of outcome for tertiary education systems is especially difficult. Using simple statistics at a macro level, this paper identifies trends and patterns in this relationship, and aims to contribute to the efforts to benchmark the performance of tertiary education systems. Following a brief introduction, the paper describes the methodology used and then presents the results and their interpretation. The final section provides a conclusion and draws some lessons from the analysis, with a specific perspective on countries in the South Asia Region (SAR).

2. A large body of empirical research has addressed the question of the impact of public education financing on participation and learning outcomes. Rates of return studies show that the social benefits of investing in education by far outstrip the costs, and indirectly suggest a positive impact. These studies suggest also that the impact is less at higher levels of education, and is minimal at the university level (Psacharopoulos and Patrinos 2004). Secondly, there are studies that have analyzed the link between spending and education attainment. Most of these studies are focused on primary education, either at the country level or at the sub-national level (province/district/state). Outcomes in primary education can be relatively easily measured, including at the cross-country level thanks to the availability of large panel data series and to international studies such as the Trends in International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA). Yet, the results of these studies are mixed, spanning from substantial impacts (Baldacci et al. 2008) to a quasi absence of effect (Filmer and Pritchett 1999). Introducing governance attributes strengthens the relationship between spending and education outcomes (Rajkumar and Swaroop 2008). A study of government expenditures in African countries shows that for delivery and quality of education to improve, more resources is a necessary condition, but must be complemented by increased efficiency (Gupta and Verhoeven 2001). In SAR, a recent study of the relationship at the state level in India finds no significant effect of expenditures per primary school student on enrollment rates, transition rates or student performance (Iyer 2009). Hanushek and Wosmann (2007) report that studies within and across countries (whether developed or developing) tend to converge to the same weak relationship between inputs and school outcomes.

3. Despite the growing sophistication of statistical models, the complexity of dealing with the non-linearity of the relationship between spending and education performance has not been overcome. A number of exogenous factors are at play in determining spending and its influence on education outcomes; hence the wide variety of studies and of results should not be a surprise. One of the lessons learned is that the volume of expenditures is not in itself conducive to better educational performance. Studies based on the most recent PISA survey suggest that money plays a modest role in accounting for the variation in 15 year-old pupils' performance. Similar studies do not appear to have been performed in a systematic way for

tertiary education, a level at which the challenges alluded to at the general education level are multiplied. In a modest way, this paper reports on one of the first attempts to fill this gap.

The Method

4. In order to test the strength of the relationship between investments and the performance of the tertiary education sector at a cross-country level, one-to-one single correlations between alternative measures of investments and various measures of performance were undertaken. While this is a simple methodology that does not account for interaction between the many variables at play, it has the potential to suggest some intriguing trends and patterns.

5. There is a trade-off between the accuracy of the indicators and their availability for comparison purposes. Internationally comparable data are rare, so the choice of variables was mostly driven by availability, consisting mostly of the data provided by the UNESCO Institute for Statistics (UIS). Despite some limitations, these data constitute the largest pool of comparable statistics regarding tertiary education and can therefore be used to undertake simple linear regressions.[1] Unfortunately, while data are usually available for India and Bangladesh, they are rarely so for Pakistan, Sri Lanka let alone for Afghanistan. As a consequence, regional averages are even more elusive and do not easily lend themselves to comparisons with those of other regions. In addition, despite fundamental similarities between the eight countries of the SAR Region, there are also striking differences in size, geopolitical situation, economic structure and performance, and in the recent evolution of their tertiary education system, which make generalizations at the regional level a risky enterprise.

Expenditures: Several Possible Measures

6. The independent variable is the investments made by countries in tertiary education. The first issue here is to define what is meant by "investments by countries". States are (still) the major source of financing in most countries, so the analysis concentrates mostly on *public* spending. The next step is to decide on which aggregate to select to measure public spending for the purpose of meaningful international comparisons. The proportion of a country's wealth (as measured by the GDP) allocated to tertiary education is a reasonable approximation.[2] However, even though this indicator signifies the total effort of a state for tertiary education, it does not indicate how much is spent per student. So, the total public expenditure per student on tertiary education as a percentage of GDP per capita (GDP/c) is a more acceptable proxy of the effort made to fund tertiary education—and the most widely used. Therefore, it is used here as the main indicator to measure the independent variable.

[1] UIS data are produced by governments and the definitions sometimes vary from country to country.

[2] This indicator is available for a small number of countries in the UIS database. As an alternative, the OECD database is used, even though this data base is obviously limited to OECD countries (and, in particular, does not cover any SAR countries).

7. In order to relate investments in tertiary education to those made at other levels of education, the share of total education spending allocated to tertiary education was selected. This measure is available from the UIS database for many countries and it provides an understanding of possible trade-offs between tertiary education and lower levels of education.

8. That being noted, the growing private contribution to the financing of tertiary education cannot be ignored, but again data availability limits the choice. The main indicator used for public spending, namely per student expenditure on tertiary education as a percentage of GDP/c, is not available from the UIS for private expenditures. To overcome this problem, the share of GDP allocated to private spending on tertiary education is used. In addition, the share of private institution enrollments in total tertiary enrollments is used in the analysis. Even though it does not measure the size of the investment itself, this indicator does reflect the involvement of the private sector in tertiary education.

9. In sum, several alternative measures of spending are used in this analysis to examine their relationship with outcomes of tertiary education. A common limitation to all these measures is that they do not differentiate the kinds of expenditures (recurrent/investment, pedagogic/administrative/financial aid, salaries/physical inputs, and so on).

Outcomes: The Two Core Dimensions

10. It is customary to distinguish between two dimensions of outcomes: quantity and quality. Quantity refers to participation (or access), which is measured by enrollments and is formulated in relative terms for cross country comparisons. Net enrollment rates are not relevant at the tertiary level because of the wide range of students' ages, so the gross enrollment ratio (GER), which is available from the UIS for almost all countries, is used.

11. Completion is an intermediate output of tertiary education worth analyzing. Yet, accurate measures of completion, although standard at the primary and secondary levels, are hardly meaningful at the tertiary level because of its structure (modules and credits vs. number of years). Fortunately, the number of graduates as a percentage of the population of relevant age is available for a reasonable number of countries and is an acceptable alternative to help gauge the performance of a tertiary education system (although whether it is a proxy of its outcome or still a process indicator could be debated).

12. Measuring the quality of tertiary education is the greatest challenge. Firstly, tertiary education institutions produce multiple outputs—they are often involved not only in teaching students but also in conducting research. Secondly, there is no universal metric to assess students' academic performance. Thirdly, a comprehensive concept of quality should include market relevance. However, until current endeavors to define appropriate indicators for benchmarking quality are successful, the only option left is to use proxy indicators to assess the

quality of tertiary education.[3] The results of two major international rankings are used in this analysis, namely the Academic Ranking of World Universities (ARWU) published by the Institute of Higher Education of Shanghai Jiao Tong University (China), and the Quacquarelli Symonds (QS) which until 2010 powered the Times Higher Education (THE) ranking, itself one of the most popular rankings.[4] The scoring methodologies used by the two major leagues are quite different.[5] In particular, while the ARWU is heavily biased towards research activities and is based on statements by the institutions themselves, the QS ranking is based on the tertiary education institutions' reputation for research and teaching within the academic community.

13. The rankings have their pitfalls, and many of them are serious.[6] They include, for example: an elitist approach (only 500 universities[7] out of a world total of approximately 18,000 are ranked); an excessive weight given to research; a bias towards medicine and natural sciences, and language (English); subjectivity (the inclusion of peer reviewers' opinions); and the use of composite scoring.[8] Notwithstanding these weaknesses, since there is currently no definitive and indisputable alternative, these rankings were examined to determine their reliability by testing the relationship between them. This relationship between the two rankings was found to be overwhelmingly positive, and therefore they were selected for the analysis as a proxy of quality. Had the results of the two rankings been substantially different, they could not have been used confidently in the analysis.[9] In addition, linear regressions were performed separately for each of the two leagues' data, and the results were systematically compared in order to test the robustness of the analysis. To add to this, the analysis triangulates the results of the two leagues with those from a third league—Webometrics. This league follows an alternative approach and uses very different ranking criteria (based on Internet visibility). Yet, its results are very similar to those of the QS and ARWU, thus supporting the use of the measures in the analysis. For each of the three leagues, the number of "world class universities" (in the top 500 across the world) for each country was divided by the population of tertiary education age.[10]

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[3] Earlier attempts to measure the quality of tertiary education include those made by Finnie and Usher (2005) and Brandenburg et al. (2008). The OECD-led Assessment of Higher Education Learning Outcomes (AHELO) Program is currently in the process of developing an instrument to measure actual learning outcomes and to compare them internationally (Green 2011 and OECD 2011).

[4] Since then, it is powered by Thomson Reuters.

[5] A detailed review of these—and other— rankings can be found in Rauhvargers (2011).

[6] As rankings grow in number, visibility and influence, the literature comparing their pros and cons grows proportionally (Salmi 2009, EUA 2011 and Hazelkorn 2011).

[7] THE ranks only 200 universities, while QS ranks 500. This is the reason why the QS ranking is used in preference to the THE in this analysis.

[8] A further critique relates to the unexpected consequences of rankings, namely the tendency of some institutions to align their strategies towards achieving/maintaining their position, and the parallel tendency of policy makers to focus on the number of ranked institutions in the country (versus the whole system).

[9] The ARWU and QS rankings are very similar in the number of top universities per country, but they tend to differ in terms of which universities make it within the top 500, and even more in terms of the position of the universities within a country (Levin and Ou 2006).

[10] For a comprehensive discussion of the concept and examples of world class universities, see Altbach and Salmi (2011).

14. The analysis of the relationship between spending and outcomes singles out the OECD/high-income countries (HIC) on the one hand and the other countries, whether middle-income (MIC) or low-income (LIC). SAR countries belonging to the latter group are singled out whenever sufficient data are available.

The Results

Expenditure: Trends and Patterns

15. Before investigating the links between performance and investments in higher education, it is useful to briefly examine the patterns of investments. A simple way to do this is to determine how countries' spending on tertiary education is linked to their economic development. The two variables used to examine this are: (1) expenditure on tertiary education as a percentage of GDP—mostly available for OECD countries only; and (2) per student expenditure as a percentage of GDP/c, which is available for a much larger group of countries from UIS.

16. In 2007, OECD countries spent on average 1.5 percent of their GDP on tertiary education, of which 1.0 percent was from public funds and the remaining 0.5 percent was from private funds[11]. The relationship between these two sources of financing and countries' wealth differs widely: while public funding regularly increases with GDP/c, private funding is inelastic and insensitive to this measure of spending (table 1).[12]

Table 1: Correlation Between Expenditure on Tertiary Education as a Percentage of GDP and GDP/c: OECD Countries, 2007

	Public	Private	Total
Tertiary education expenditure as a % of GDP			
Mean (%)	1.0	0.5	1.5
Standard deviation (%)	0.3	0.6	0.5
Coefficient of variation	0.3	1.2	0.3
Coefficient of correlation (R^2)	0.43*	-0.03	0.19
Number of observations	29	29	28

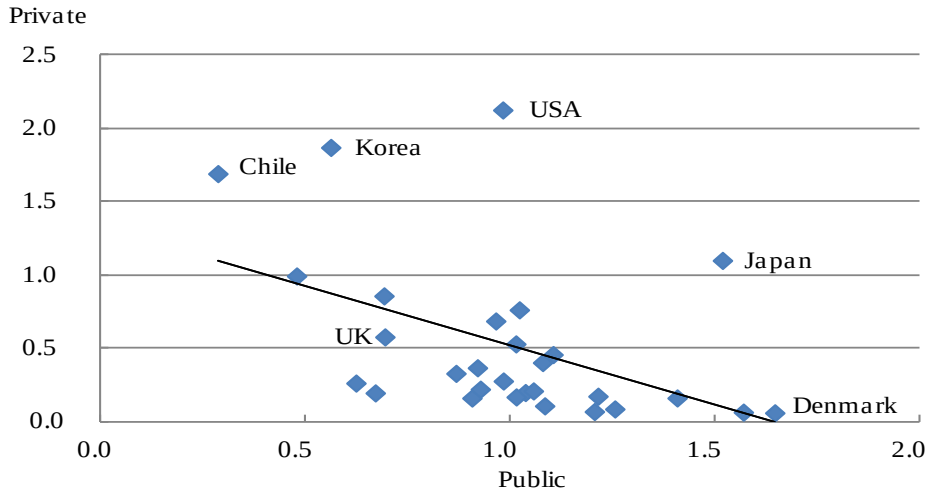
Notes: Includes OECD countries and the Russian Federation.
Correlation calculations are based on log GDP/c.
*p<0.05
Source: Author's calculations based on OECD 2009.

[11] MICs and LICs devoted an average 0.8 percent of their GDP finance tertiary education from public sources. The three SAR countries for which data are available (Bangladesh, India and Nepal) were below this level (respectively 0.3, 0.6 and 0.5 percent). There are no data as far as private spending is concerned.

[12] The pattern for MICs and LICs is similar for public spending (with a more pronounced positive relationship). A weak positive relationship is noted for private spending. However, the sample of countries for which data are available (UIS dataset) is small, and does not allow generalization.

17. *A (little) slice of the cake for tertiary education.*—There is a weak negative correlation (R^2= -0.47) between public and private expenditure on tertiary education as a percentage of GDP (figure 1). This can be interpreted as a clue that private funding pitches in when public monies are shrinking. A more in-depth analysis would be needed to confirm this interpretation, however.

Figure 1: Public and Private Expenditure on Tertiary Education as a Percentage of GDP, OECD Countries, 2007

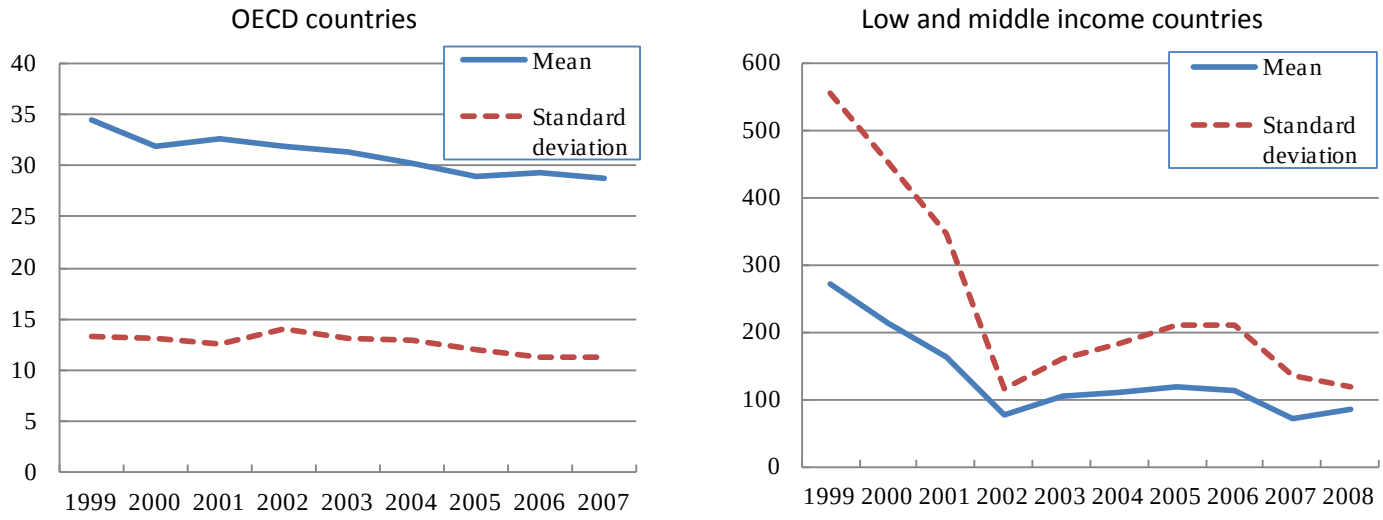


Note: Includes OECD countries and the Russian Federation.
Source: OECD 2009.

18. *Per student public spending.*—Using total public expenditure per student on tertiary education as a percentage of GDP/c allows a better understanding of the dynamics of funding. There has been a general decrease in tertiary education expenditure per student as a percentage of GDP/c over the last decade, but the range and the speed of the decrease is different depending on the wealth category of the country. On the one hand, between 1999 and 2007 in OECD and HICs, tertiary education spending per student as a percentage of GDP/c has been slowly dwindling and is currently contained in a relatively narrow band of 9 percent (Korea) to 54 percent (Denmark), with an average close to 30 percent. On the other hand, in transitioning and developing countries this ratio has dropped dramatically. Yet, it still varies vastly between 9 percent (Azerbaijan) to over 600 percent (Ethiopia), with an average almost triple that of HICs (figure 2). The limited data available for SAR countries show that the average level of spending in this region (90 percent) is higher than in many countries of East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean and twice as much than in Upper Middle Income Countries. However, the patterns[13] in SAR are consistent with those observed for all other LICs, namely a downward trend and a narrowing of the distance between the extremes (Annex A). Actually, independent measures suggest that public spending per student in several SAR countries have fallen at very low levels (World Bank 2006, 2009).

[13] Because they are based on different calculation methods, these measures are not amenable to strict international comparisons.

Figure 2: Per Student Public Expenditure on Tertiary Education as a Percentage of GDP/c, 1999/2007



Source: UIS database.

19. Indeed, as documented long ago (for example, Psacharopoulos 1981), the determinants of public spending on tertiary education are many, and enrollments are only one of them.[14] Trends in GDP, demographic changes, and costs each influence levels of public tertiary education spending in different directions.

20. *"Massification" paths: The rich and the rest*.—The stark difference in the range and rate of decrease of per student tertiary education expenditure (as a percentage of GDP/c) between HICs and transitioning and developing countries over the last decade is a reflection of the fact that rich countries have achieved a "mature" stage of development in their education systems: they have passed the point of expansionary enrollments and heavy investments and have reached the point from which the differential between the pace of enrollment growth and that of spending is no longer insurmountable. Hence, despite the rising costs of tertiary education, the net result is a leveling of public contributions per student. In LICs and MICs, however, the combination of low but increasing GDP/c and exploding student populations has triggered a rapid decline of public funding per student. In these countries, spending typically cannot catch up with the spiraling increase of enrollments during the transition period. Countries in SAR participated in this evolution, even though the increase of enrollments has been more modest (in relative terms) than in LICs from other parts of the world.

21. Regression analysis of per student tertiary education expenditure (as a percentage of GDP/c) against the wealth of countries (as measured by GDP) confirms the earlier findings. While there is a strong and positive correlation for OECD countries, the relationship is stronger and negative for the non-OECD countries (table 2). Per student spending relative to GDP/c is

[14] Using longitudinal data for countries, without making international comparisons, would allow the effect of each factor to be determined.

about three times higher in LICs than in HICs. Still, by spending only 10 percent of its $20,000 GDP/c per university student, a rich country spends twice as much as a poor country that devotes 100 percent of its $1,000 GDP/c to each student.

Table 2: Correlation Between Per Student Public Expenditure on Tertiary Education as a Percentage of GDP/c and GDP/c, 2007

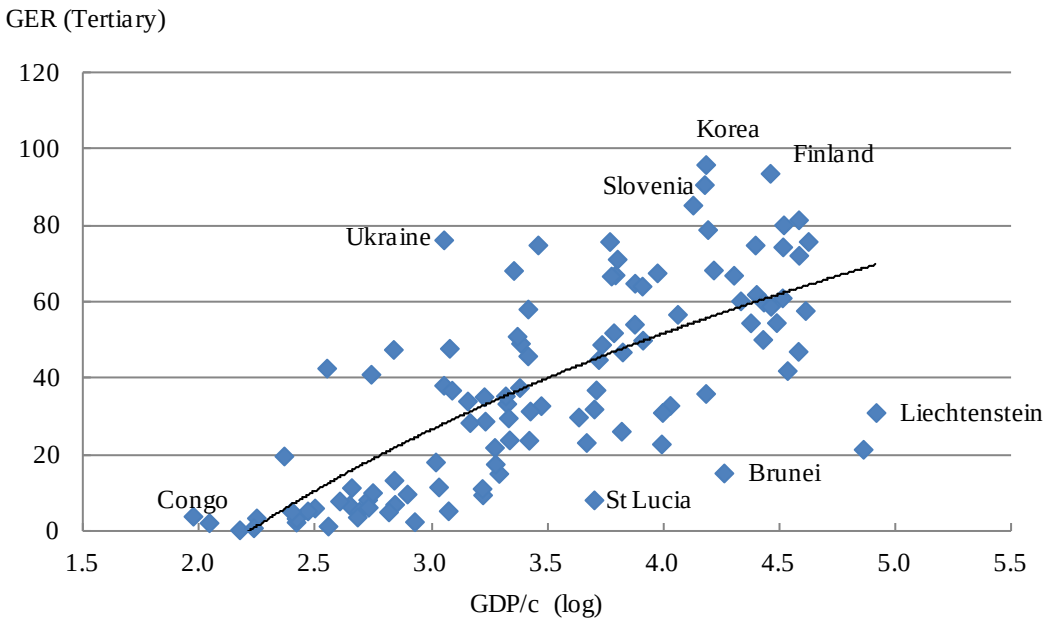
	OECD countries	Low income countries	All countries
Public expenditure on tertiary education per student as a % of GDP			
Mean (%)	29	83	54
Standard deviation (%)	11	153	107
Coefficient of variation	0.4	1.8	2.0
Coefficient of correlation (R^2)	0.42*	-0.60*	-0.48*
Number of observations	29	30	65

Note: Correlation calculations are based on log GDP/c.
*p<0.05
Source: Author's calculations based on the UIS database.

Expenditure and Access

22. Before investigating the impact of spending on access to tertiary education (as measured by the GER), an additional preliminary observation regarding enrollments in tertiary education is warranted. As widely documented, there is a positive relationship between access to tertiary education and the wealth of a country which has remained stable over time. Between 2000 and 2008, the average GDP/c increased by 45 percent worldwide. During the same period, however, the tertiary education GER increased even more rapidly and reached a worldwide average of 40 percent, up from 26 percent. The correlation between the two aggregates is positive and strong, whichever combination of years is considered during the period (figure 3).

Figure 3: Tertiary Education Gross Enrollment Ratios by GDP/c, 2007



Source: UIS database.

23. The pattern is more mixed for the SAR, where, on average, wealth per person (GDP/c) increased slightly faster than GERs, and followed trends more characteristics of upper middle income countries, and East Asia, India, in particular was in that case, while Pakistan and Bangladesh mirrored the worldwide trends (Annex B).

24. Also widely recognized is that the relationship goes both ways: the richer the country, the higher the enrollments (bar oil-rich HICs), and the higher the enrollments, the wealthier the country. Not surprisingly, the relationship is much weaker –and hardly significant- for OECD countries which constitute a more homogeneous block with relatively little dispersion in the level of wealth and in the level of enrollments (table 3).

Table 3: Correlation between Tertiary Education Gross Enrollment Ratios and GDP/c, 2007

	High income countries	Low income countries	All countries
Tertiary education GERs			
Mean (%)	67	26.4	38.1
Standard deviation (%)	14.4	21.2	26.2
Coefficient of variation	0.2	0.8	0.7
Coefficient of correlation (R^2)	0.26	0.64**	0.72 **
Number of observations	30	75	109

Note: Correlation calculations are based on log GDP/c.
**p<0.01
Source: Author's calculations based on the UIS database.

25. *Total spending on, and participation in, tertiary education in HICs.*—The analysis starts with the relationship between the share of expenditures on tertiary education in GDP and the GER in tertiary education in OECD countries (the only ones for which there are enough data allowing to observe trends). It appears that both public and private expenditures are positively but moderately correlated with tertiary education GERs, a result which suggests that, in rich countries, participation and access to university are only marginally linked with investments from either governmental or private sources (table 4). [15]

Table 4: Correlation between Expenditure on Tertiary Education as a Percentage of GDP and Tertiary Education Gross Enrollment Ratios: OECD Countries, 2007

	Public Expenditure	Private Expenditure	Total Expenditure
Tertiary education expenditure as a % of GDP			
Mean (%)	1.0	0.5	1.5
Standard deviation (%)	0.3	0.6	0.5
Coefficient of variation	0.3	1.1	0.3
Coefficient of correlation (R^2)	0.22	0.19	0.39*
Number of observations	30	27	27

Notes: Includes OECD countries and the Russian Federation. Correlation calculations are based on log GDP/c.
*p<0.05
Source: Author's calculations based on OECD 2009.

26. *The divergent paths of per student spending and participation in tertiary education.*—However, as indicated earlier, a more relevant measure of investment is per student public expenditures on tertiary education as a percentage of GDP/c. There is a significant negative correlation between this measure and tertiary education GERs. The correlation is particularly strong for LICs (table 5 and Annex C)[16]. A plausible explanation for this counter-intuitive result is that expansion of access is not matched by an apportioned public effort, resulting in a decreasing per student allocation.[17]

[15] Correlations for the small sample of MICs and LICs are stronger, especially for public spending.

[16] Against this background, 2006 India and Bangladesh –the only two SAR countries with enough data for the two variables for a single year—were in the same neighborhood as countries such as Cape Verde, Guatemala or Cameroon.

[17] In labor-intensive tertiary education systems, there are barely economies of scale. Hence it would be hazardous to interpret the results as the consequence of such economies. Additionally, the real costs of inputs in tertiary education tend to follow an ever upward trend. To fully test this hypothesis, however, it would be necessary to analyze the respective impact of investment and recurrent expenditures on quantity (and quality).

Table 5: Correlation Between Per Student Public Expenditure on Tertiary Education as a Percentage of GDP/c and Tertiary Education Gross Enrollment Ratios, 2007

	OECD countries	Low income countries	All countries
Public expenditure on tertiary education per student as a % of GDP/c			
Mean (%)	29	65	54
Standard deviation (%)	11	128	107
Coefficient of variation	0.4	2	2.0
Coefficient of correlation (R^2)	-0.18	-0.46*	-0.44*
Number of observations	28	37	66

*p<0.05

Source: Author's calculations based on the UIS database.

27. *Introducing the time dimension.*—Before rushing to a conclusion, though, the time dimension needs to be taken into account. So far, the analysis has observed spending and tertiary education GER in the same year. Yet, investing in year *t* does not produce an effect in year *t*, but *t+n*. Hence, it is worthwhile investigating the correlations starting with spending in 2007, and observing how the tertiary education GER changes between 2007 and 2008 (*n=1)*. Similarly, the spending levels in 2006 are examined in relation to changes in tertiary education GER between 2006 and 2008 (*n=1, 2)*, and again for each previous year back to investments in 2000 and tertiary education GERs from 2000 to 2008 (*n= 1, 2, 3,…8*), with the expectation that the strength of correlations will start low and increase, as the time lag stretches and as investments mature. The results do not support this hypothesis. Correlations generally remain significantly negative within a relatively narrow range, but without any pattern emerging (table 6). This check on a possible lag effect is therefore a confirmation that public spending per head and enrollment rates follow divergent routes, at least in a medium term time span.

Table 6: Coefficients of Correlation Between per Student Expenditure as a Percentage of GDP/c and Tertiary Education Gross Enrollment Ratio with Time Lags, 2000/2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
2000	-0.43	-0.43	-0.43	-0.43	-0.41	-0.46	-0.44	-0.39	-0.49
2001		-0.40	-0.41	-0.41	-0.39	-0.41	-0.43	-0.37	-0.32
2002			-0.45	-0.45	-0.44	-0.40	-0.40	-0.36	-0.34
2003				-0.49	-0.51	-0.48	-0.44	-0.39	-0.34
2004					-0.47	-0.52	-0.51	-0.44	-0.53
2005						-0.42	-0.39	-0.54	-0.57
2006							-0.43	-0.46	-0.52
2007								-0.44	-0.46
2008									-0.37

Note: Includes all countries for which data is available. All coefficients are significant at the p<0.01 level.

Source: Author's calculations based on the UIS database.

28. *Intra-sectoral trade-offs*.—Another assumption to be tested is whether access, rather than being directly linked to per student spending, is related to the relative effort made for

tertiary education as a proportion of total spending on the entire education sector. On average, this proportion has remained remarkably stable over time, with a worldwide average of 19.1 percent in 2008, down from 20.1 percent in 2000. OECD countries devote a higher share of their total education budget to tertiary education than MICs (22 percent and 20 percent, respectively in 2007) and indeed than LICs (16 percent), a clear reflection that the latter are still in the process of building the base of their education systems, and focus their meager resources on that base. On this account, LICs show again a greater diversity than the more homogeneous group of OECD countries or HICs: while Azerbaijan channels a meager 7 percent of its education budget to university education, Ethiopia channels a substantial 39 percent. SAR is characteristic of this diversity. While India, Nepal and Bhutan started at MIC levels in 2000, and by and large remained at these levels until 2008, Bangladesh entered the new millennium at a low 10 percent, and hovered at this level until it recently rose to 13 percent (Annex D). Because of the selectivity in dispatching resources between competing levels of education, there is a positive (and significant) correlation between the share of sectoral public resources allocated to tertiary education and enrollment rates at this level. Not surprisingly, this correlation is driven by LICs, where the trade-off is more clearly marked than in HICs—whose enrollment rates are no longer rising at a fast speed (table 7).

Table 7: Correlation between the Share of Tertiary Education in Total Public Education Expenditure and Tertiary Education Gross Enrollment Ratios, 2007

	OECD countries	Low income countries	All countries
Tertiary education expenditure as a % of total public education expenditure			
Mean (%)	22.4	17.9	20.2
Standard deviation (%)	4.7	7.6	7.2
Coefficient of variation	0.2	0.4	0.4
Coefficient of correlation (R^2)	0.32	0.37*	0.44*
Number of observations	29	35	66

*p<0.05

Source: Author's calculations based on the UIS database.

29. To test whether there are stronger effects when taking into account the time lag between expenditures on tertiary education (as measured by their share of total education expenditures) and expected outcomes, correlations with a 1 to 8 years lag between spending and GER measures are calculated, spanning the 2000 to 2008 period. Here again, the assumption of a lag effect is not confirmed. The strength of the correlations does vary substantially during the period, but without any discernable pattern.

30. *The contribution of the private sector.*—To fully explore the link between expenditures on, and access to, tertiary education the role of the private sector needs to be analyzed. There are two possible methods of investigation. The first, direct one is to use private spending on tertiary education as a share of GDP. This measure is available mostly for OECD countries. As previously noted for these countries, there is no link between private spending and a country's

level of wealth. Yet, there is a positive correlation between private expenditures and the tertiary education GER, but it is weak and barely significant (R^2 = 0.19).

31. The second method of assessing the impact of the private sector on access to tertiary education is to use the share of this sector in total tertiary education enrollments as a proxy for the financial contribution of the private sector to tertiary education.[18] Over the last eight years, the number of students enrolled in private institutions has increased at the same rate as the total student population. Hence, their share in total enrollments has remained stable over time, and has not really budged from an overall average in the 31 to 33 percent range between 2000 and 2008. The 33 percent gap between LICs and HICs in 2000 closed by the end of the period, and the two groups of countries currently display the same average (32 percent). SAR is following this general pattern and also illustrates a twofold trend observable in other regions: on the one hand, countries which started at a high share of private provision (e.g. Bangladesh: 63 percent) at the beginning of the century, saw these share consistently diminishing (down to 50 percent by 2009) , while, at the other hand, countries where private enrollments started modestly (e.g. Nepal at 25 percent) or even very discreetly (e.g. Pakistan at 7 percent) saw the private sector surging as a major actor within a few years (Annex E). The result of the regressions between the share of private enrollment and the tertiary education GER for 2007 is clear: regardless of the stage of development of countries, there is no relationship between the presence of a private sector in tertiary education and access to the sector (table 8). This is a testimony to the fact that the role of the private sector in the growth of tertiary education is extremely diverse and varies considerably from one country to another, without any significant effect on access one way or another.

Table 8: Correlation between Private Enrollment Share in Tertiary Education and Gross Enrollment Ratios, 2007

	OECD countries	Low and middle income countries	All countries
Private enrollments as a % of all tertiary education enrollments			
Mean (%)	31.1	32.7	32.1
Standard deviation (%)	30.4	22.3	26.3
Coefficient of variation	1.0	0.7	0.8
Coefficient of correlation (R^2)	-0.17	0.03	-0.04
Number of observations	31	50	85

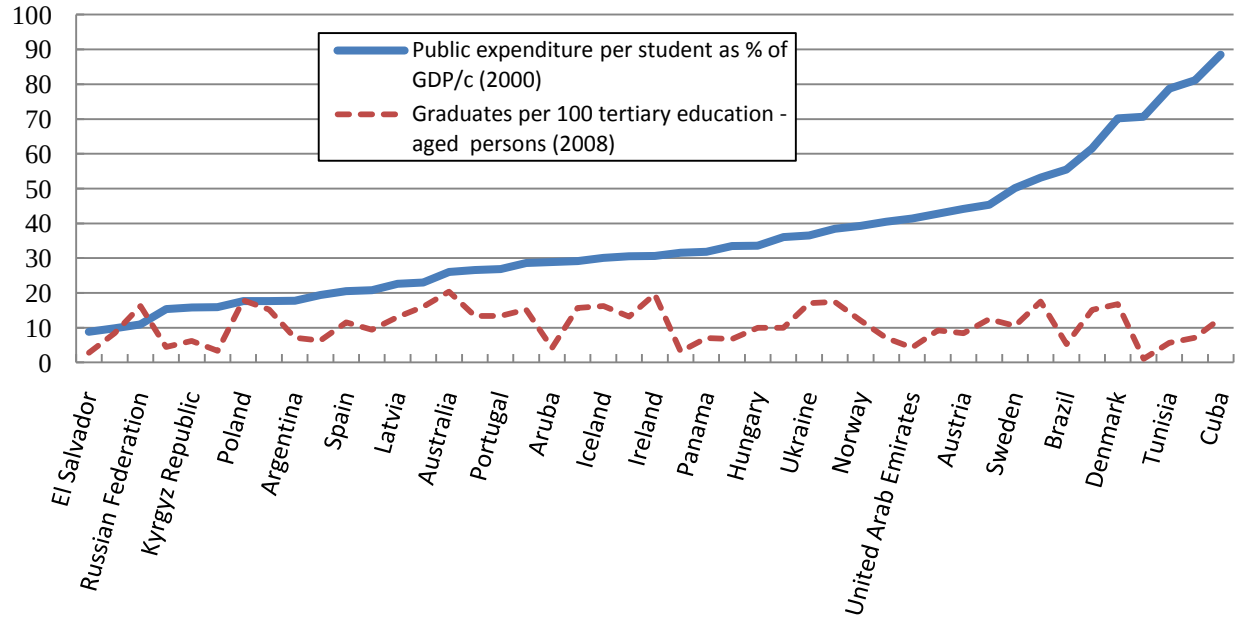
Source: Author's calculations based on the UIS database.

32. Given the nature of the two variables under scrutiny, there is no reason to expect any time lag effect. The tests made on the 2000 to 2008 period confirm the absence of such an effect.

[18] Even though provision and financing do not always coincide, the private share of the expenditures on tertiary education and the share of private enrollments in tertiary education are strongly and positively correlated (R^2= 0.51*).

33. *Investing in the output.*— Graduation in tertiary education can be seen as a sort of equivalent of completion in primary and secondary education. Hence, it is used to test the degree of dependence of tertiary education completion on investments in the system. Graduation rates are available from the UIS database. Using per student public expenditures as a percentage of GDP/c as the measure of investment and testing 5 and 7 year lags between the two variables, the analysis finds no strong relationship (figure 4)[19].

Figure 4: Public per Student Expenditure on Tertiary Education as a Percentage of GDP/c (2000) and Number of Tertiary Graduates per 100 Persons of Tertiary Education Age (2008)



Source: Author's calculations based on the UIS database.

Expenditure and Quality

34. Turning to the quality dimension of tertiary education and linking this dimension to the financial resources funneled to the sector is a risky exercise because there are no indicators allowing trustable international comparisons of quality, especially if the latter is defined in terms of learning achievements. As mentioned earlier, it was necessary to resort to the results of the two highly popular international league tables, ARWU and QS. Since the two leagues use different methodologies, albeit both putting a premium on research, there is a risk that they yield significantly different results, thus casting doubts on their usefulness for representing quality. This risk is assessed by comparing the results of the two rankings. For each of the two leagues, the number of universities ranked among the top 500 worldwide in each country is considered.

[19] There are no available data on graduation for the SAR countries in the UIS data set.

35. *Different methods, similar results.*—Using 2010 data, the 500 top universities are concentrated in 39 countries in the ARWU ranking and in 49 countries in the more inclusive QS ranking. A first observation—and the most important in the context of this study—is that the overlap between the two lists is almost perfect. Only one country on the short ARWU list is not present in the longer QS list, and all countries in the latter are to be found in the shorter ARWU list.[20] A second, well known feature of both rankings is that the number of top universities in any country is highly influenced both by the economic level and the size of the country, and therefore the rankings are an almost exact reflection of these two parameters. Among the 20 countries with the highest number of 500 top universities, only three are not an HIC/OECD country, but each of them (China, India, and Brazil) belongs to the same group of high growth—emerging countries with a large population (table 9). Of the 11 countries that are on the QS list but not the ARWU list, only one is an HIC (UAE), and all 11 are concentrated in the lower part of the list.

36. Given the methodology used by the rankings, it is not surprising not to find many SAR countries (none of them in the upper income range) in these rankings. Only India makes it to the newest QS and ARWY leagues, while Pakistan is present only in the QS pack with only one institution (Annex F).

[20] Note that Hong Kong is included as part of China in the ARWU ranking.

Table 9: Number of Top Universities: 20 Countries with the Highest Number (2010)

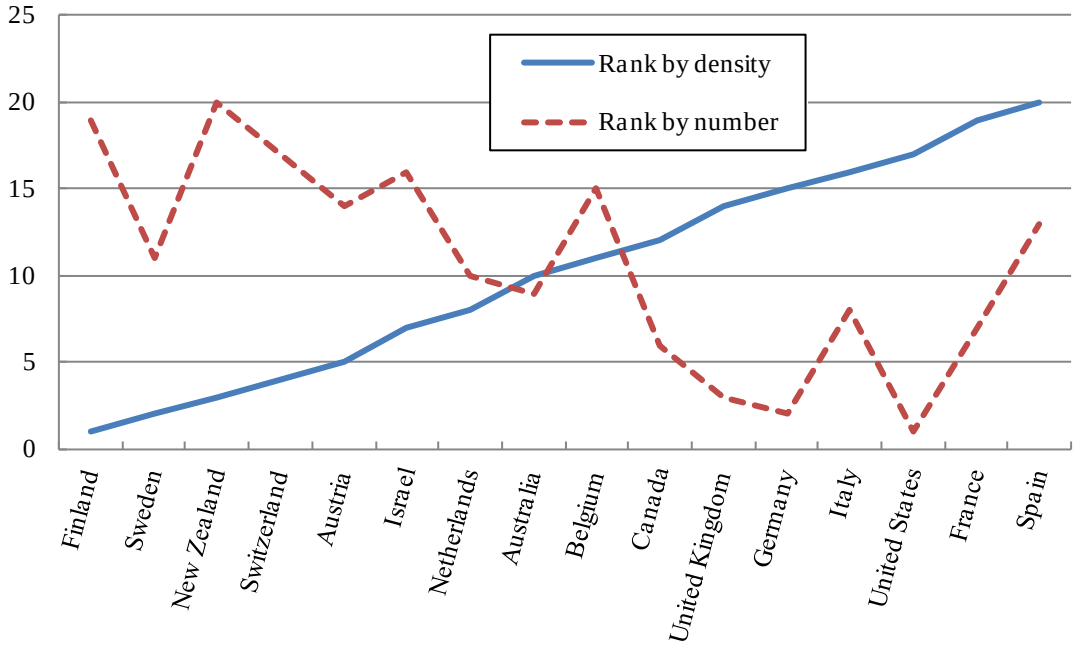
	QS		ARWU	
1	United States	108	United States	154
2	United Kingdom	51	Germany	39
3	Germany	42	United Kingdom	38
4	Japan	25	China	34
5	Australia	24	Japan	25
6	France	21	Canada	23
7	Canada	20	France	22
8	Italy	15	Italy	22
9	Korea, South	13	Australia	17
10	Netherlands	12	Netherlands	12
11	China	10	Sweden	11
12	Spain	10	Korea, South	10
13	India	8	Spain	10
14	Ireland	8	Australia	7
15	Sweden	8	Belgium	7
16	Switzerland	8	Israel	7
17	Belgium	7	Switzerland	7
18	Finland	7	Brazil	6
19	Hong Kong	6	Finland	6
20	New Zealand	6	New Zealand	5

Source: QS and ARWU data sets.

37. For comparison purposes, the effect of country size needs to be neutralized, and the number of top universities in each country is to be weighted by the population of the country. To make the comparisons meaningful, the "tertiary population" is selected as the weighting factor. The tertiary population is defined as equivalent to half the population of 15-24 year olds, the potential clientele of universities.[21] The resulting ratio—number of top universities per million potential users—is a measure of the "density" of universities ranked among the world best. The ranking of countries by density is indeed very different from the one produced using raw numbers of universities. Actually, with a few exceptions, it is the opposite of the latter (figure 5).

[21] The reason for using this measure is that, although data on the "tertiary education population" are available in the UIS database, they are missing for many countries. Demographic data, however, are abundant and more reliable. Tests on countries for which both data exist, show that indeed the tertiary population is extremely close to half of the 15-24 age group and the coefficient of variation is only 0.11.

Figure 5: Ranking of Countries by Number and Density of Top Universities, ARWU, 2007



Source: Author's calculations based on ARWU ranking.

38. Having eliminated the size effect, the focus of the analysis is now on the ranking of countries based on the density of top universities. Despite the fact that the two rankings are very close, this analysis explores them separately in order to ensure confidence in the results.

39. A first observation is that 23 of the 25 countries with the highest density of top universities are to be found in both the QS and the ARWU rankings. Secondly, the rankings of countries by density of top universities are very similar for the two leagues (table 10), and are very closely correlated (R^2=0.95). Hence, despite their different approaches, the two leagues yield converging results. This allows confidence in using density of top universities as a reasonably good proxy of quality—notwithstanding the already noted caveats attached to its measure.

Table 10: Number of Top 500 Universities per Million Tertiary Age Persons, Countries with the Highest Density, 2010

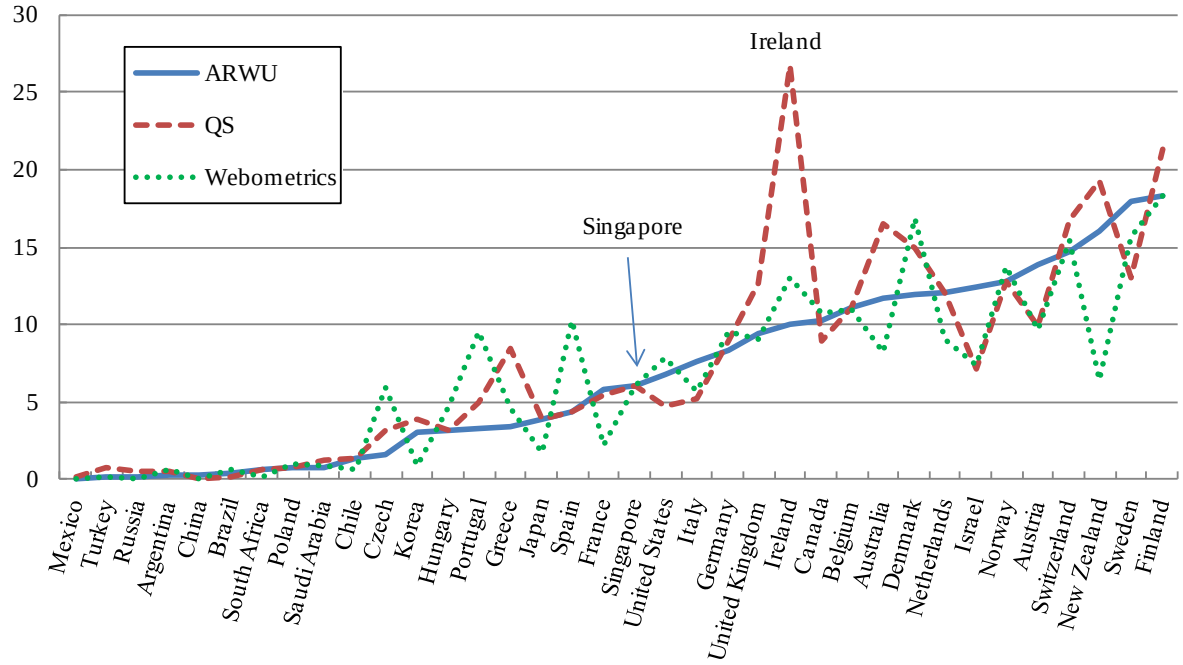
ARWU			QS			ARWU			THE		
Rank	Country	Density	Rank	Country	Density	Rank	Country	Density	Rank	Country	Density
1	Finland	18.3	1	Ireland	26.7	20	Spain	4.3	20	Portugal	5.0
2	Sweden	17.9	2	Finland	21.3	21	Japan	4.0	21	United States	4.8
3	New Zealand	16.1	3	New Zealand	19.3	22	Greece	3.4	22	Spain	4.3
4	Switzerland	14.7	4	Switzerland	16.8	23	Portugal	3.4	23	Japan	4.0
5	Austria	13.9	5	Australia	16.5	24	Hungary	3.2	24	South Korea	3.9
6	Norway	12.8	6	Denmark	14.9	25	South Korea	3.0	25	Hungary	3.2
7	Israel	12.5	7	Sweden	13.0	26	Czech	1.6	26	Czech	3.2
8	Netherlands	12.0	8	Norway	12.8	27	Chile	1.4	27	Chile	1.4
9	Denmark	11.9	9	UK	12.7	28	Saudi Arabia	0.8	28	Saudi Arabia	1.2
10	Australia	11.7	10	Netherlands	12.0	29	Poland	0.8	29	Poland	0.8
11	Belgium	11.1	11	Belgium	11.1	30	South Africa	0.6	30	Turkey	0.7
12	Canada	10.2	12	Austria	9.9	31	Brazil	0.4	31	South Africa	0.6
13	Ireland	10.0	13	Germany	8.9	32	China	0.3	32	Argentina	0.6
14	UK	9.5	14	Canada	8.9	33	Argentina	0.3	33	Russia	0.5
15	Germany	8.3	15	Greece	8.4	34	Russia	0.2	34	Mexico	0.2
16	Italy	7.6	16	Israel	7.1	35	Turkey	0.1	35	Brazil	0.2
17	United States	6.8	17	Singapore	6.1	36	Iran	0.1	36	Iran	0.1
18	Singapore	6.1	18	France	5.5	37	Mexico	0.1	37	China	0.1
19	France	5.8	19	Italy	5.2	38	India	0.02	38	India	0.1

Source: Author's calculations based on ARWU and QS rankings.

40. As an additional precaution, the ARWU and QS rankings are also compared with those from Webometrics, the methodology of which is considerably different from the two "majors" and relies essentially on the visibility of universities on the Internet.[22] Surprisingly, the comparison made on the 500 top universities of the three leagues again shows strikingly similar results, with the exception of Ireland. (figure 6). The Webometrics ranking does not limit itself to the 500 top universities, however, and it actually covers 12,000 institutions worldwide. In such a large group, all SAR countries (with the exception of the Maldives) are represented, even though they are concentrated in the cluster of countries with universities in the subset of ranks between 5,000 and 10,000 (Annex G).

[22] Webometrics is produced by the Cybermetrics Lab, under the Spanish National Research Council (Webometrics 2011).

Figure 6: Density of Top Universities: Results from QS, ARWU and Webometrics



Source: Author's calculations based on ARWU, THE, and Webometrics databases.

41. *"World Class Universities": not evenly distributed.*—Before moving to the analysis of the possible links between spending and quality, a small digression is worthwhile. Even within the selected club of the 40 countries which harbor the top world universities, there is a huge gap between those leading the flock and those at the lagging end: while in Finland, two world class universities "serve" 100,000 tertiary age persons, in India, they cater to 100 million potential clients, a 1 to 900 ratio.[23] The supply of excellence is not evenly distributed. The strong and positive correlation between the density of top universities and the GDP/c clearly confirms this observation.[24] It also substantiates the critique addressed to the international rankings, according to which their methodology is putting a premium on well resourced universities. Sorting out the part of reality and the part of artifact is a whole different kind of exercise, and for the sake of this study, it is enough to stick to the obvious: being in a rich country helps to boost the supply of high quality universities (Green 2011).

42. Attention now turns to the core question: how much quality does spending on tertiary education buy? To do that, the same indicators of spending are used as those used to analyze the impact of spending on access. The difference in the statistical treatment in the case of quality is that, unlike the methodology used for quantity, there is no need to break down countries by their level of income since more than the bulk of the countries hosting the top universities are HICs.

[23] Figures based on the ARWU rankings. The respective ratio for the QS league is approximately 1 to 400.
[24] R^2=0.70 with the QS data and 0.75 with the ARWU data ($p<0.01$ for both).

43. The first observation is that using data from the two leagues (QS and ARWU) yield dramatically close results: not surprisingly, the correlation coefficients have similar values, similar signs and similar levels of significance (table 11). This observation contributes to give credence to the use of either of the two competing rankings.

Table 11: Correlation between Various Measures of Spending on Tertiary Education and Density of Top 500 Universities

	Average (spending variables)		Coefficient of correlation (R^2)		Number of observations	
	QS	ARWU	QS	ARWU	QS	ARWU
Public expenditure as % of GDP	1.0	1.0	0.52*	0.61*	31	30
Private expenditure as % of GDP	0.6	0.6	-0.34*	-0.31*	25	25
Total expenditure as % of GDP	1.6	1.6	-0.11	0.01	25	25
Public expenditure per student as % of GDP/c	28.0	29.2	0.45*	0.54*	33	27
Private expenditure per student as % of GDP/c	34.1	33.6	0.14	0.28	38	33
Expenditure as % of total public expenditure	22.0	22.2	0.50*	0.58*	42	33
Private enrollment share (%)	30.9	30.8	-0.29	-0.20	38	30

*p<0.05

Source: Author's calculations based on the UIS, THE, and ARWU databases.

44. Secondly, the density of top universities in a country increases with the level of public investments in tertiary education. This is true whether public investments are estimated as the proportion of the GDP allocated to tertiary education, as a proportion of total public education expenditures, or as per student expenditures as a percentage of GDP/c. Therefore, the results are much clearer than in the case of access. This result is consistent: since quality is measured by a proxy closely linked with the resources of universities, it is to be expected that the relationship between expenditures and quality at the aggregate level would be a positive one. Introducing the time dimension and, more specifically, a 1 to 8 year lag between the investment and the year at which the quality is observed does not make the correlation stronger. From that point of view, quality and quantity react the same way.

45. Third, the presence of private investment in tertiary education as measured by its share in the GDP is negatively related (albeit not in a significant manner) with the density of world-class universities. The same goes for the presence of private provision of tertiary education as measured by the share of private enrollments in total enrollments. This confirms the result reached in the case of the relationship between private spending and participation in tertiary education.

Conclusion

46. *Methodological Limitations.* Before concluding, some of the limitations of the above statistical treatment need to be reiterated. A first set of those come from the fact that: (1) the analysis is completed at an aggregate level; (2) it is based on simple pair to pair regressions; (3) it does not directly control for the many factors at play in determining quantity or quality of tertiary education; and (4) it is heavily determined by data availability –a fact that strongly penalizes SAR countries, for which data are particularly patchy. Aggregation is a deliberate choice. It is linked to the focus on national tertiary education systems (rather than institutions) and allows international comparisons of outcomes of these systems. The other three caveats are mitigated by the use of alternative variables, by the use of multiple correlations, and by the fact that they yield consistently similar results, thus providing solid hints. Secondly, the data used do not allow differentiating expenditures by nature; yet, development expenditures have a more direct link to quantity, while recurrent expenditures are more generally associated with quality, and combining the two types of expenditures may obliterate this "specialization". It would be important to undertake further studies both using non-linear regressions and breaking down expenditures by type. Thirdly, the analysis ignores the critical efficiency and equity sides of expenditures. This choice was also made for the purpose of a first attempt to sort out the main trends and patterns. Finally, the use of density of top universities based on international rankings as a proxy of quality in tertiary education may be seen as controversial. Yet, the fact that the two main rankings give exceptionally close results despite their different methodologies allows to consider them a reasonable second best. In addition, there is currently no credible alternative to make international comparisons of quality at the tertiary education level. Hence, and while the use of international ranking does not amount to an endorsement of their methodologies, they allow useful observations at the country level to be drawn. Lastly, it is important to stay mindful of this truism: correlations do not imply causality.

47. *The reality of the quantity-quality tradeoffs*. With these reminders, the following summarizes what can be made of the diversity of signals and the absence of clear, uniform patterns that the findings of this study suggest.

48. First, the patterns of public spending on tertiary education are quite different in HICs than in other countries. In HICs, public spending increases with the wealth of countries, whether measured as a share of GDP or in per student terms. Governments in these countries continue to invest in their tertiary education systems. On the other hand, in LICs and MICs, public investment in per student terms decreases sharply with wealth, reflecting the fact that governments cannot catch up with the explosive expansion of enrollments which most of these countries experience, and cannot offer to each student the same amount of resources as they did when tertiary education was still an elitist sector, catering for a happy few.

49. Secondly, the two variables representing the outcomes of the systems of tertiary education exhibit a common behavior: both access to tertiary education and the density of highly ranked universities are consistently associated with the countries' economic level. Indeed, in both groups of countries (HICs and others), participation in tertiary education is

increasing. However, while it is rapidly expanding in most LICs and MICs—where it started at abysmally low levels—it is doing so at a much slower pace in most HICs—which have passed the massification threshold. As a consequence, access to tertiary education and HICs' wealth become decoupled.

50. The contrast is much more pronounced in the case of quality as measured by the density of world class institutions, since the vast majority of such institutions is to be found only in rich countries, leaving other countries with a very low level of density of top universities.

51. These results confirm a well known fact: as countries get richer, both enrollments in tertiary education and supply of world class universities increase. In not-so-rich countries, by contrast, it is difficult to face the challenges of quantity and quality simultaneously.

52. Thirdly, whether as a proportion of GDP or even more in per student terms, public investment is either not, or is negatively, associated with access in tertiary education, and especially so in LICs, and allowing several years for the investment to mature does not change this result. At first sight, this result seems puzzling. However it can be understood in the same way as the one proposed to interpret the lack of correlation between investment and countries' wealth, namely the fact that during periods of rapid growth of the tertiary education sector, spending on a per capita basis and enrollments follow diverging paths. There is simply no way that public budgets can sustain the same amount of resources for each student when the total number of students is sky-rocketing. It remains that the relative share of total public expenditure on education allocated to universities is accompanied by higher enrollment rates, as a result of intra-sectoral tradeoffs in a budgetary zero-sum game.

53. Fourth, and opposite to what is observed with quantity, it appears that quality, as measured by the density of top tier universities, is clearly associated with public investments. Since the majority of countries that are home to top tier universities are either members of OECD, are approaching the HIC status, or are at the high end of the upper middle income cluster, this result reflects the fact that having reached the threshold of mass tertiary education, governments can afford to prioritize investments on quality. And investments pay off, as shown by their consistent and positive association with measures of quality. Conversely, the sparse density of world class institutions in LICs alludes to the fact that, in these countries, the choice to cater for the exploding demand for tertiary education is made at the expense of quality.

54. Private investment, regardless of how it is measured, is only moderately correlated with participation in tertiary education in LICs and MICs, and not at all in HICs. Similarly, on the quality side, the density of top universities is insensitive both to the level of private spending and to the penetration of private services. This is indeed a troubling finding given the increasing weight of the private sector in tertiary education, and a more thorough investigation is needed to understand its meaning better.

55. It must be kept in mind that this analysis captures the relationships between spending and outcomes in a short term horizon –even with the introduction of a time lag of up to 8 years. If a longer, "historical" perspective were to be adopted, it is likely (notwithstanding even trickier data issues) that the relationship would be quite different.

56. *"How" more important than "how much".* In sum, the results tend to confirm earlier studies conducted at the pre-tertiary level showing that the impact of financial resources on the outcomes of education is mixed. Hence, these results are not conducive to clear conclusions from a policy point of view. The considerable diversity of situations regarding the level, type and source of spending is probably a determinant factor behind the scattered feature of these results. The two dimensions of the tertiary education outcomes—quantity and quality—respond very differently to investments. That noted, there are two critical messages emerging from this exercise. The first one is that spending does not guarantee either a high level of participation or a high quality system of tertiary education. As it has been demonstrated for lower levels of education, the efficiency of spending is more important than the amount of expenditures, and this may be even more true at the tertiary education level where the number of actors and factors is even greater and the interference with the "outside world" even more frequent and diversified. Similarly, institutional settings and governance structure play a considerable role in the way a given quantum of resources is spent and how it translates into efficient service delivery.[25] A second lesson is that there is no real uniform route to achieve either high levels of participation or high levels of academic excellence. Far from being discouraging, this message should be interpreted as the absence of fate and the opportunity for each country to follow its own path.

57. This message is particularly relevant for the SAR countries which are in the midst of a critical transition. The wide disparities of situations within the region notwithstanding, it appears that while many of the SAR countries have already reached a low – MIC type- level of public spending on tertiary education, they have not yet managed to widen access at the level that these MIC countries have attained. It can even be argued in some cases that the level of public investment is so low that it threatens the sustainability of the tertiary education system. Even though it is difficult to define a threshold of public support below which a system cannot operate, there are obviously cases of underinvestment in the SAR countries and that there is in fact dangerous underinvestment. The loose relationship which has been found between spending and quantity is not a justification to spend less, it is indeed a reason to look at possible inefficiencies. And indeed the positive relationship between expenditure and quality of outcomes is an additional reason to focus resources on activities known to improve quality of teaching and learning. The challenge is indeed enormous for the SAR countries, which, in order to succeed in their transition from LIC to MIC status, will need to upgrade their tertiary education institution and mobilize all public and private resources in an efficient way. They will have to do that in their own, innovative way.

[25] It has been claimed that the way finance systems operate prevents larger investments in pre-tertiary education to generate higher levels of student learning (CRPE 2008).

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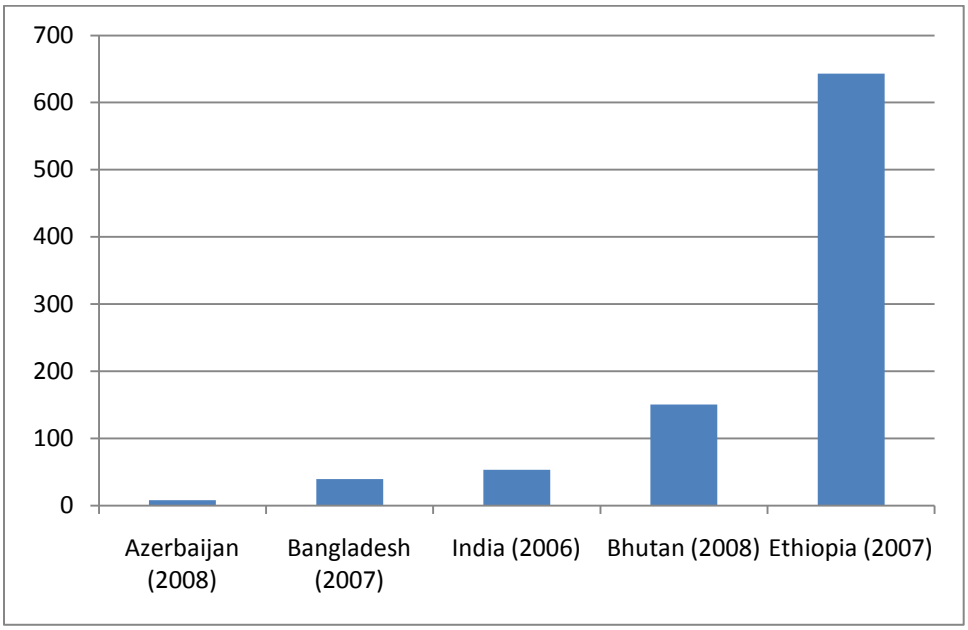
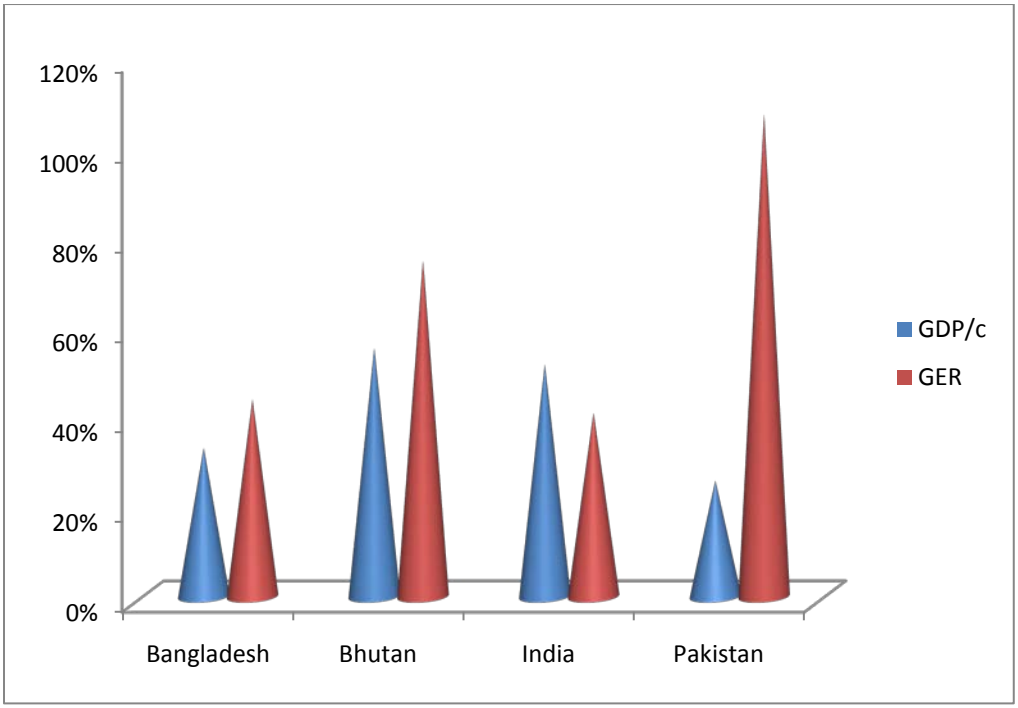
Annex A

Public Expenditure per Pupil as a Percentage of GDP per Capita. Tertiary



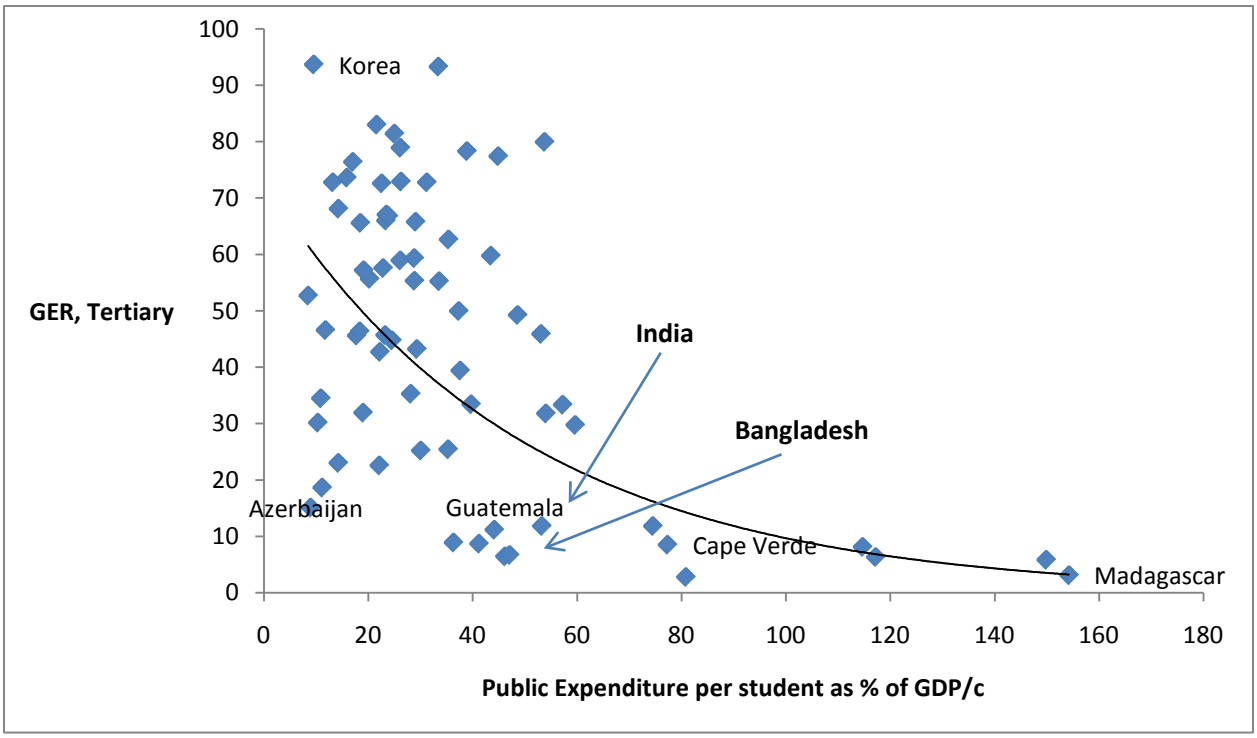
Annex B

GDP/c and Gross Enrollment Rates (Tertiary)
Selected SAR Countries (2007)



Annex C

Public Expenditure per Student as a Percentage of GDP/c and Gross Enrollment Rate (Tertiary), 2007



Source: UIS

Annex D

Share of Expenditure for Tertiary Education, Percentage of Total Education Expenditure. Selected Countries and Groups of Countries (2000/2008)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	10.1	10.1	11.1	9.1	11.5	..	12.9	11.5	13.3
Bhutan	19.6	..	..	..	..	14.1	..	..	19.4
India	20.3	..	..	20.1	20.0	19.6	20.3	..	..
Nepal	18.8	11.9	12.1	10.3	..	..	..	..	13.0
Malaysia	32.1	34.3	33.3	35.0	33.4	..	36.1	33.0	..
Korea, Rep.	..	..	8.1	13.6	13.0	14.0	15.0	14.2	..
South Asia	18.8	..	..	10.3	..	..	..	..	..
Latin America & Caribbean (developing only)	18.9	20.5	18.2	..	18.1	..	16.9	17.0	..
Upper middle income countries	..	19.4	17.5	17.1	18.8	18.2	17.5	20.0	

Source: UIS

Annex E

Percentage of Private Enrollment (Tertiary)
Selected Countries (2007/2009)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Afghanistan										20.5
Bangladesh	62.7	63.5	58.5	58.3	53.3	46.8	48.8	49.2		50.2
Nepal	25.5		29.7	33.0						56.1
Pakistan				6.5	12.0	8.0			32.9	
Indonesia		62.8	62.7	61.0	65.2	61.2				59.4
Malaysia	35.2	32.2	31.8	31.1	32.6	35.5	32.5	36.1	40.4	
Thailand	19.5	18.9	18.8		18.5	16.9	16.3	16.6	17.3	17.5
Turkey		3.2	3.3	3.3	3.9	4.4	4.8	5.1	5.5	
Vietnam	13.1	10.6	9.1	8.8	10.2	10.2		11.8	11.4	12.3

Source: UIS

Annex F

Number of Top 500 Universities.
Selected Countries: QS and ARWU Leagues

	QS 2011/12	ARWU 2011
China	16	34
Hong Kong	6	
India	7	2
Indonesia	3	
Korea,	12	10
Malaysia	5	
Pakistan	1	
Philippines	2	
Singapore	2	2
Taiwan	10	
Thailand	3	
Turkey	2	1
Total	**69**	**49**

Source: QS and ARWU Rankings

Number of Top Universities.
South Asia Region Countries: Webometrics League

	Top 1000	Top 1000 to 5000	Top 5000 to 10000	Top > 10000	Top All
Afghanistan	0	0	0	1	1
Bangladesh	0	4	9	7	20
Bhutan	0	0	0	2	2
India	3	69	201	107	380
Nepal	0	0	1	4	5
Pakistan	0	10	31	33	74
Sri Lanka	0	4	5	5	14

Source: Webometrics 2011