IMPROVING QUALITY AND EQUITY IN WORLD EDUCATION: A REALISTIC ASSESSMENT

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The main feature of the past generation of educational change in all but the lowest income countries has been a rapid increase in the proportion of young people attending secondary school and going on to postsecondary education. Between 1985 and 2005, for example, the gross enrollment rate in secondary education—the proportion of the secondary school age cohort enrolled—increased in the Middle East and North Africa (MENA) and East/Southeast Asia from 53 to 75 percent and in Latin America, from 58 to more than 90 percent. Although net enrollment rates were considerably lower, they were still high, increasing from less than 30 percent in 1985 to 70 percent in Latin America. The gross enrollment rate in post-secondary education rose from about 15 to more than 30 percent in MENA/East/Southeast Asia and in Latin America, from 20 to more than 30 percent.

However, even as middle-income countries made these gains in the average level of secondary and tertiary schooling attained by young people,[1] questions were raised about the quality of the education being delivered in many of these countries. In taking more years of schooling were youth in some countries learning as much as in other countries? There was considerable evidence from international tests such as TIMSS and PISA that the quality of education varies greatly from society to society—that a year of education may not represent the same amount of learning in Brazil as in Korea.

The questions about the quality of education are part of a shift in emphasis worldwide from just expanding access to education to increasing how much students learn at each level of schooling. This shift is being driven largely by international agencies, which are pushing hard for educational evaluation and educational reform driven by performance measures and educational accountability.

Just as expanding access to more schooling was supposed to increase economic growth and reduce poverty and social inequality in those countries investing in more schooling, the same arguments are now being made for improving educational quality. Analysts claim, for example, that the payoff to higher test scores in terms of higher incomes is about 12 percent (Hanushek and Kimko, 2000; EFA, 2005). This corresponds to the claims in the 1970s and 1980s that investment in more *years* of schooling would increase productivity and economic growth, and if the investment were in primary schooling, social equity would be promoted at the same time (Psacharopoulos, 1985). Since the poorest schooling is allegedly provided to low-income students (this applies to developed countries as well), raising the quality of education would supposedly make the

[1] Secondary enrollment in high income countries was almost universal even at the beginning of this period, and tertiary enrollment increased rapidly between 1985 and 2005.

greatest contribution to those at the bottom of the economic ladder (Chiu and Khoo, 2005).

Within this context, and as part of international agency goal-setting, both poor and rich countries are undertaking a number of reforms claimed to increase access to education for low-income students and to increase educational quality, especially for the poor. The main reforms, in addition to continued expansion of secondary and tertiary enrollment, have been direct income transfers to poor families to increase school attendance, decentralized school management to promote greater local control, and increased subsidies to private education to promote greater competition among schools and increased efficiency of school management. Some countries have promoted more parental involvement in monitoring teacher attendance, and almost all countries have begun regularly testing students as a way to stimulate efforts to make schools and entire systems more accountable for student performance.

Many of these educational reforms are intended to improve the quality of education and to make educational delivery more efficient cost-wise. They are also intended to help equalize access to quality education for the poor. Income transfer programs such as *Progresa* in Mexico and *Bolsa Escolar* in Brazil seem to be having a small positive effect on school attendance, but we have no evidence that this is resulting in achievement gains for the poor or in longer term increases in attainment. Despite their continued promotion by international agencies, organizational reforms such as decentralization and privatization have not had significant impacts on educational quality, although they may be redistributing the financing of education from general taxes to user fees and distributing the control of spending from central governments to local governments and schools.

In this paper, I am going to argue that the efforts to improve the quality of education for the poor and especially the quality of education more generally are well intentioned and certainly merit attention, but that the cost of implementing such reforms are much higher than international organizations promoting them recognize. I will argue that improving the quality of education necessarily requires improving the quality of teaching, the quality of educational management, and the opportunity for students to learn, and this in turn requires increasing academic subject coverage, improving the teaching of subject matter, improving the capacity of educational managers to be instructional leaders, and *distributing this improved capacity more equitably.*

Unfortunately, making such improvements is not just a matter of decentralizing and privatizing educational delivery or giving incentives to poor families to send their children to school or getting parents more involved in their children's schools or providing some short course in-service teacher training—the most common reforms proposed by quick fix-oriented international agencies.

The key elements to improve education require a major financial and political effort—an effort that demands significant upgrading in the pre-service and in-service training of teachers, radical changes in the concept of educational management, an

overhaul in supervising the delivery of the school curriculum, a new strategy for recruiting the teachers who can be trained to raise the level of student learning, and, in addition, the effort needed to assure that disadvantaged children get access to the same quality of teaching resources and educational management as advantaged children.

This is a tall order. Yet, unless policy analysts are honest about the kinds of changes required to improve the quality of education, politicians and the public will be seduced by a series of half measures that do not work, effectively using up political capital that could be used to begin implementing the harder reforms that would work.

Furthermore, I will argue that expanding enrollment successfully (the percentage of an age cohort attending a particular level of schooling) can still be considered a very important 'reform' of the educational system and a way to increase the average achievement levels of those who attend school. Such expansions of enrollment usually have major implications for what occurs in schools, forcing the system to address changing needs as new kinds of clientele enter schools in large numbers.[2] They also have implications for teacher recruitment and teacher improvement-the *sine qua non* of providing a decent education to the growing mass of children from low-income families taking higher levels of schooling. Improving achievement through increased attainment is a valid means of increasing achievement; at the same time, if countries want to improve the quality of each year of attainment, they will have to do a lot more about the quality of the teaching corps than they have in the past.

Put another way, with all the rhetoric (and in some cases, real effort) about raising the quality of education during the 1980s and 1990s, it would seem that many countries should have witnessed major improvements in overall student academic performance in primary and secondary schools. Although improvement occurred in some cases—for example, 4th and 8th graders' mathematics scores in the United States have risen substantially since 1990—many other examples suggest that sustained reform may not increase student performance: In Chile, for example, during the period when tests scores were comparable (1994-2006), results suggest minimal increases in results (Bellei, 2001; Bellei, 2007). Furthermore, international tests such as the Second and Third International Mathematics and Science Surveys (SIMS and TIMSS) suggest relatively small changes in test results over a generation. I would propose that the missing element in these reforms is serious efforts to improve teacher knowledge, teacher pedagogy, and the capacity for instructional leadership—probably the most difficult and expensive resources to buy in education. Where these resources have been purchased, I will argue, improvements in student performance have taken place.

The Current Efforts to Improve Quality

[2] For example, Carnoy and Loeb (2003) show that the *most* important explanation for whether *a* U S state has implemented 'strong' accountability measures is the percentage of minority students in the state's schools The need to implement accountability systems is therefore partly the result of expanded proportions of minority students in secondary education Another example of this process is Chile. As a result of its enormous expansion of secondary education since 1980, Chile was pushed to make important curricular reforms in secondary education in the 1990s.

What do the past twenty years of educational reform tell us about the reforms we should emphasize in pursuing the goals implicit in the new emphasis by international agencies on improving quality? If we are to make education "better" and more equitable, what are the main reforms countries should invest in? Does the general failure to raise test scores in most countries mean that nothing has changed? Or rather, should reformers have a better conception of where the reforms are taking them? In this essay, I suggest that some reforms have worked and that they teach us a great deal about how we should allocate effort in the future. I make several key arguments:

- The decentralization and privatization reforms of the 1980s and 1990s have not succeeded in improving students' educational performance but may have increased the inequality of performance between low-income and high-income students.
- In some countries, even if average educational performance (test scores) is not improving, the performance of some groups—namely disadvantaged students—may be improving. This is important, especially if their improvement corresponds to particular reforms that can be identified as responsible for the change.
- Certain other "supply side" strategies also are likely to lead to eventual improvement in student performance in school, especially for low-income students. High among these is increasing student attendance in school. Student attendance may be a function of parent participation in school and the perceived quality (by parents) of schooling, including teacher attendance, school organization, and the quality of teaching (Marshall, 2003).
- Most analysts agree that educational systems cannot make large improvements in ***average*** student performance without improved teaching. Improved teaching requires a combination of measures, including improving teacher attendance in school, recruiting better trained, more able individuals into the teaching occupation, distributing these more able individuals more equitably among schools, creating a level of commitment among teachers to improving student performance, and improving teachers' content knowledge and pedagogical content knowledge of subject matter, even at the primary level. Based on current research, I will show that we can be quite specific about the kinds of strategies to improve teaching that work.

The evidence suggests that structural reforms have had relatively little impact on overall educational "effort" in terms of investment in education or on student performance. Two countries in Latin America with "federal" systems decentralized their education financing and management in the 1990s/ Argentina transferred control of primary schools entirely to provincial governments in the late 1970s and of secondary schools in 1993. Increased control of educational resources in the Argentine provinces put educational decision making into the individual political contexts of each province, with very varied results. If we rank provinces by educational "necessity," as defined by their retention, drop out, educational attainment, and gross product per capita, we find that more educationally disadvantaged provinces increased spending per student about the same percentage as more advantaged provinces after the 1993 transfer. Neither did

more educationally disadvantaged provinces increase secondary enrollment significantly more or less than the better off provinces (Cosse, 2001). Secondary enrollment gains in the 1980s, before the 1993 transfer, were about the same as in the 1990s (Carnoy, Cosse, Cox, and Martinez, 2001). So educational effort, enrollment growth, and enrollment growth equity among provinces in Argentina did not seem to be affected by decentralization. Average student performance in secondary education between 1993 and 1999 is more difficult to assess because the tests are not comparable, but there is no sense in Argentina that student performance is rising (Carnoy, Carnoy, Cosse, Cox, and Martinez, 2001). Much the same can be said about educational effort and enrollment growth in Mexico after the decentralization of the early 1990s. The states are not increasing their educational investment as a result of gaining control of their schools (Paulin, 2001).

Many countries, such as India, the United States, and Germany, have long been federal systems, with states in charge of managing the educational system, and with only some specific financial involvement by the central government. There is no evidence that such decentralized systems are either more efficient or more equitable than centralized systems. Indeed, students in the United States and Germany, given their high income per capita, do particularly poorly on international tests such as TIMSS and PISA (India had not participated in these tests before 2006). We cannot argue that decentralization is the cause of this poor performance (students in other countries with decentralized systems, such as Australia, do reasonably well on these tests), and there may be other (political and philosophical) reasons to support educational decentralization, but students in countries with decentralized educational systems certainly fare no better *academically* than student in countries with highly centralized systems.

In the case of the Chilean voucher plan, initiated in 1981 by Chile's free-market oriented military, available evidence suggests that the hoped for increases in efficiency from increased competition among schools and from an increased role for privately managed schools did not make schooling more effective than before the voucher reform (McEwan and Carnoy, 2000; Hsieh and Urquiola, 2006; Bellei, 2001). The one major effect that the reform may have had is to bring more private resources into education, but that came mainly from making families pay a high fraction (70 percent) of the costs of sending their children to university (Gonzalez, 2001). With new legislation in 1993, it became legal for subsidized private schools to charge tuition. Private contributions for primary and secondary schooling increased over the next eight years, but that contribution is small compared to family investments in higher education. We should remember that even before the 1981 reform, 20 percent of students attended private primary schools, and 6 percent of those were in private paid schools that received no government subsidies. United States data for the effects of privatization, either through shifts of students to privately managed schools or through the competition impact on public schools, suggest very small effects, at best (Carnoy et. al, 2005; Carnoy et al, 2007b). The impact of vouchers and other privatization schemes in other countries is generally mixed (Plank and Sykes, 2003).

Privatization in the 1980s and 1990s may not have lowered or raised overall student performance, but evidence suggests that it may have had a negative effect on low-income students. Indeed, research shows that low-income student performance in nonreligious subsidized private schools in Chile, which enroll 21 percent of ail basic education students in the country, is significantly lower than in public municipal schools (McEwan and Carnoy, 2000). So structural reforms seem to have made little overall improvement in student performance, and probably had relatively little impact on enrollment expansion in primary and secondary education, even though privatization may have made it possible to expand university at lower public expense.

There are a number of "popular" educational reform strategies that may be important in developed countries but that have questionable relevance for the low- and middle-income country context. For example, there is considerable evidence now in the United States (based on the Tennessee class size experiment) that class size may have a significant effect on student achievement and, more important, on student attainment (Finn and Achilles, 1999). But in the developing country context, reducing class size is probably not a relevant reform for increasing quality. It is too entangled with peer effects resulting from widespread school choice in urban areas, teacher and student absenteeism in rural and urban areas, and pedagogical techniques that do not become more effective as the number of students in the class diminishes.

Thus, smaller class sizes often result from a series of factors that make the schools that have these smaller class sizes less desirable places to learn. In rural areas, for example, small classes may be due to student absence due to consistent teacher absence. In urban areas, where families can, to some degree, choose among public schools outside their neighborhoods, so at least partially sidestep residential segregation, "better" public schools—those with higher levels of student performance, representing higher value added or larger "peer group" effects (McEwan, 2001)—and many private schools attract more students, filling classes to maximum capacity. Less well-regarded schools tend to have classes with fewer students because the schools operate at less than capacity. This is precisely what we would expect in a system governed by choice. If teaching were generally organized around individual attention and small group work in developing countries, fewer students in a class could mean higher value added in schools with smaller classes, hence an offset to higher performance in schools with already better students and greater "peer group" effects. However, most teachers in developing countries still teach using the "chalk and talk" method, or frontal teaching, in which a larger or smaller class size seems to have little effect on how much children learn.

Another popular focus of reformers is reducing repetition and drop out rates. Whereas this goal is laudable as an object of reform, it is often confounded with the conditions of entry at the next level of education. For example, in some poorer countries, repetition and drop out rates in the first years of primary school are rather high. Does this mean that improving the "quality" of primary school will reduce repetition and drop out rates? Almost certainly, the answer is yes—if reformers could in fact improve primary school quality. But let us assume that primary enrollment in the next ten years is universalized and secondary enrollment sharply expanded in, say, South Asia (India and

Pakistan), and repetition and drop out rates in primary school fall substantially. Does that mean that the quality of South Asian primary education has risen? Perhaps it has. But, more likely, lower repetition and drop out reflect the changed *function* of primary education. Instead of acting in part as a sorting institution for access to relatively limited places in secondary schools, the expansion at that next level would allow many more entering first graders to continue into seventh grade. More rural primary school classrooms and perhaps even a number of rural secondary schools would have been built, creating places for more pupils (particularly girls) in the higher grades of primary school and in basic secondary school. These places would need to be filled. Children would be passed into higher grades when in the past they would have been held back.

The rapid expansion of access to secondary education also almost automatically implies lower repetition and drop out rates in secondary schools. How access to university is determined also affects secondary drop out rates. For example, in Uruguay the drop out rates in the second cycle of secondary education *(preparatoria*) are higher than in neighboring Argentina and Chile (Carnoy, Cosse, Cox, and Martinez., 2001). The same is true comparing Costa Rica and Panama (Costa Rican drop out rates are higher than in Panama's secondary schools). Does this mean that the quality of Uruguayan and Costa Rican secondary education is lower? Almost certainly it is as high or higher. Uruguayan *preparatoria* and Costa Rican *secundaria* are a very traditional Latin American upper secondary schools, organized to select students for university education. Students who graduate have automatic entrance to free public university, and this is limited to about one-fourth of the age cohort. Unless the function of *preparatoria* (*secundaria*) changes in Uruguay (Costa Rica), either because access becomes limited to university education by other means, such as high fees (as in Chile), or less limited because of an expansion of public university places (as in Argentina and Panama), drop out rates will have to remain high, even if quality were to rise, making average repetition and drop out rates across all schools an objective for educational reform. They are much better measures of educational access, particularly for low-income groups, and therefore work better as an objective for increasing educational equity.

This is why care should be used in making average repetition and drop out rates across all schools an objective for educational reform. They are much better measures of educational access, particularly for low-income groups, and therefore work better as an objective for increasing educational equity.

In contrast to structural reforms, targeted reforms—specific programs aimed at disadvantaged groups—appear to have been much likely to succeed in improving academic performance for the targeted groups. A famous example in Latin America is the *Escuela Nueva,* in Colombia, now found in other countries under other names. The *Escuela Nueva* targets low-income rural students and seems to have had a positive impact on student performance, largely through providing a support network for rural teachers and increasing their commitment to teaching in isolated rural schools (McEwan, 2000). The program also focuses on improving teaching in rural schools, at least in those places where it is implemented fully. .

Direct financial interventions by central ministries into improving outcomes for low-income students were also effective in both Argentina and Chile. The P-900 program, begun in 1990 in Chile and extended to almost 2,500 schools by the end of the decade raised test scores of pupils significantly in low scoring schools (Cox, 2001; McEwan and Carnoy, 1999). Elements of the Plan Social in Argentina, directed at rural schools and low-income students attending secondary schools, also seemed to have positive effects on student outcomes. Uruguay's direct financial assistance to low-scoring schools (based on the 1996 6th grade evaluation) probably contributed to a significant increase in test scores among the countries lowest-income students (Filgueira and Martinez, 2001). A targeted voucher plan in Colombia in the 1990s seemed to have a positive effect on low-income student attainment students who received vouchers and used them to attend private (religious) secondary schools stayed in school into the higher grades and were less likely to drop out (Angrist et.al., 2000; Angrist et al, 2006).

Such equity-driven reforms are more successful in raising student performance than system-wide reforms, primarily because targeted reforms are usually aimed at groups that receive fewer or lower quality educational resources until they receive special attention. That special attention seems to pay off. It would also seem easier to raise school productivity by bringing existing technology and resources already used for higher income students into a low-income situation than developing new methods to raise productivity throughout the educational system. Similarly, bringing a relatively few low income students into each of many already existing private schools through a limited targeted voucher program as in Colombia is much more likely to benefit low-income students through "peer effect" than a Chilean-type plan that creates many new for-profit private schools of questionable quality.

Targeting high repetition and dropout rates among low-income basic education students, especially in urban areas where secondary education opportunities are readily available, may also work to improve educational quality. Providing low performing schools in Lima, Rio de Janeiro, or Johannesburg—schools marked by high repetition and drop outs—with some new methods and materials for teaching, or focusing on improving student attendance through incentives, could work to improve quality and student performance. Thus, although it would be difficult to use such methods to lower the average drop out rate in all schools, we can change the repetition and dropout rates in certain schools among certain groups, making the quality of schooling at least more equitable.

I want to put special emphasis on strategies that improve student attendance in school. Many developing countries are past the stage in which simply increasing the percentage of children enrolled in primary school is a major objective of educational reform. Having passed this stage, however, does not eliminate the problem of how often students actually come to school. Recent research suggests that parents are more likely to send their children to school and adolescents more likely to attend school when schooling is higher quality (Hanushek and Lavy, 1994; Bedi and Marshall, 1999; Marshall and White, 2001)**.** This higher quality could represent high teacher attendance, good teaching, and more interesting, challenging curriculum.

Student attendance rates may be a good proxy measure for school quality, and the interaction of higher attendance rates and higher school quality, a good predictor of higher student achievement. One of the interesting side effects of this interaction is that 'better' schools in urban areas tend to have more students in classes than do 'worse'' schools. Motivated parents try to send their children to these better schools even if they do not live in the school's immediate neighborhood. One reason that cross-section studies measuring the effect of class size on student achievement show no significant impact is probably due to the greater demand for places in schools that are known to be good. A school's reputation may be the result mainly of peer effect, but as I have argued, such schools also tend **to** attract better teachers. This 'clustering' effect of good teachers and good students fills classrooms. Less attractive schools will have smaller positive or even negative peer effect, less effective teachers, fewer students in their classes, poorer attendance rates, and lower average performance.

Another reason for focusing on improving student attendance is that it is relatively easy to measure and represents a concrete objective for educators and reformers. For example, *Bolsa Escola***,** the Brazilian direct payment scheme for very low-income parents, or *Progreso*, a similar program in Mexico, are specifically designed to subsidize families to keep children attending school. Chile's teacher pay incentive system (SNED) also includes student attendance as one of its objectives.

In addition to student attendance, making reading materials available to students should be an inexpensive way to improve reading. Most Latin American and Asian countries now provide free textbooks to students. But in many African countries textbooks are still not available to primary and secondary students. And we have observed a strange phenomenon in several countries—Peru, Costa Rica, and Panama—where the government distributes free textbooks: they are often not made available to the students. Schools fear that they will be lost, or that they will not get another shipment the following year. In poor communities, these are the only books students will ever get to read. Achieving high levels of literacy requires readily available reading material, and this is a relatively inexpensive investment for governments.

Improving Teaching

Educational analysts have long stressed that improved teaching can have an important impact on student performance. Can we identify indicators of good teaching that should lead to eventual student academic achievement gains? Can we identify reforms that seem to lead to improved teaching?

Before focusing on the major issue of improving teacher education, I will discuss issues of incentives and counter incentives that may affect the level of teacher productivity in schools. We know it is possible to achieve high levels of learning in developing countries because there are examples of lower income countries where students do very well on international tests. For example, Cuba appears to be much closer than others to international levels of achievement in mathematics. Even if the test scores

in the 1997 OREALC thirteen country survey of Latin American third and fourth graders overestimate the level of Cuban achievement, there is little doubt that Cuban children are scoring much higher than children in other countries (Willms and Somers, 1999**;** Carnoy and Marshall, 2005; Carnoy, Gove, and Marshall, 2007a**).** One of the elements in Cuba's success is the higher average education of parents in Cuba, and the lower level of abject poverty, as reflected in the low proportion of children who work outside the home. But school factors also play a role. For one, educational expectations are high in Cuba, as reflected in the curriculum and textbooks used in mathematics. Secondly, and this is what I want to focus on here, Cuban teachers with university level education are paid salaries much more like the salaries of other professionals, so entering teaching as a profession has, until recently with the influence of the tourist industry, required little financial sacrifice. Teachers also have similar social status as most other university graduates. Thus, it appears that Cuban schools can implement more demanding curricula in part because even primary teachers have the capacity to teach those curricula.

There are other key factors that distinguish Cuba's schools from schools in other Latin American countries. Teachers in Cuba are unlikely to take frequent absences, excused or unexcused. Cuban primary schools offer more hours of school and even more hours of math per week than schools in most Latin American countries, although this varies among countries (OREALC, 2001**,** p. 45). And the distribution of "good" teachers in Cuba among rural and urban schools and among schools serving more disadvantaged and more advantaged populations is likely to be more equal than in other Latin American countries. Although we have no hard data on absences or teacher distribution in Cuba, anecdotal evidence suggests that such assertions are correct (Carnoy, 1989).

South Korea in the early 1960s (relatively low income per capita), and Botswana, in Southern Africa, are also countries where students have scored high on international tests relative to students under similar conditions in other countries. They share with Cuba some of the same factors that are likely to have major impact on educational quality, especially in schools attended by lower-income children.

- The time per day and per year that teachers actually teach the academic curriculum in a classroom—what is referred to as "opportunity to learn"—is obviously a crucial variable when the total number of hours per year is low. In Argentina, a highly developed country in many respects, primary school students attend school an average of four hours per day, or less than 750 hours per year. However, teacher absences are relatively frequent in many provinces, and many days per year are lost in teacher strikes. At the other end of the economic spectrum, Honduras loses approximately half its already low number of "official" hours of primary schooling per year through teacher absences, mainly but not only in rural areas (Carnoy and McEwan, 1997**).** Many states in India are marked by very low numbers of days when teachers are actually teaching in school. Teacher absence is a pervasive problem worldwide (see Kremer et al, 2004), yet until recently was rarely discussed or used as an indicator **of** educational quality. Reforms to improve teacher attendance are politically difficult since they confront either corrupt teacher employment policies (for Mexico, see Bayardo, 1992**)** or

the opposition of the teachers' unions or both. Teacher strikes, which also account for many lost days in some countries, might be reduced by better coordination of reforms and educational policies with teacher organizations, but often reflect wider conflictual politics in the country concerned.

- The distribution of teacher "quality" (as measured by education, experience, and test score on evaluations of teacher knowledge in subject areas) among schools serving lower and higher-income students appears to be highly unequal even in developed states of developed countries, such as New York state in the United States (Langford, Loeb and Wykoff , 2001). Recent findings for Mexico (Lastra, 2001 ; Santibanez, 2001; Luschei, 2005) suggest that there is even greater polarization of teacher quality among schools in developing countries. This makes logical sense for two reasons: more educated and higher social class teachers are likely to reside in higher income neighborhoods and regions so are more likely to teach in a school with higher income students; and more able teachers are in greater demand, so may have greater choices in where they work, hence, everything else equal, will tend to shift to schools with better conditions and "easier" students. Since salaries are generally set by salary schedules negotiated at the national or regional level, teachers get paid essentially the same salary no matter where they work. Rural teachers or those working in "hardship" areas get higher salaries, but these usually are not high enough to compensate individuals who have normal lifestyle preferences. It has been politically difficult almost everywhere in the world to pay teachers systematically and significantly more to teach in low-income schools, since this represents a transparent shift of public resources to the poor, a move greatly resisted by middle classes everywhere..[3] The effect of these equal payment regimens is that higher-income children not only benefit from their own higher cultural capital, but from a substantial peer effect of attending schools where the other students are also from higher income families, and from being taught by more capable, more experienced teachers.

If we believe that this distribution of resources is efficient, then a more *unequal* distribution of peer and school resources should produce better average results than a more equal distribution. Yet, recent research suggests that in countries with more equal income distribution, higher teacher salaries relative to other professions, and more equal distribution of certification among teachers, students have higher average academic achievement on international tests (Chiu and Khoo, 2005, Carnoy et al, 2007e). This research implies that equalizing teacher resources among schools with lower and higher-income students would increase average outcomes. The main arguments are

- That higher income parents can offset most of the bad effects of a poor teacher, but lower income parents cannot, and

[3] Holland is an exception to this rule. The Dutch voucher plan subsidies low-income children with a voucher 25 percent larger than the normal voucher amount.

- That it takes only small increments of high quality resources to produce positive effects at the low student performance end of the spectrum, but much greater increases in resources to produce increases in student performance among already high performing students. Chilean estimates of cost-effectiveness comparing public schools, subsidized private schools, and paid (high tuition) private schools suggest that students in paid private schools achieve the highest test scores, but that the schools are by far less cost-effective than schools serving much lower-income, lower achieving children (McEwan and Carnoy, 2000).

From an efficiency standpoint, a case can therefore be made for resource shifts, but the case needs more research to be completely convincing.

From an equity standpoint, it is likely that shifting better teachers to lower-income schools should work to equalize outcomes.

The question is how to accomplish such a shift. There are advantages and problems with incentive schemes based on increasing value added in the school based on student test scores. The main advantage is that the goal is clear and the school can organize around that goal. This can create a positive organizational effect of "aligning" the school around academic achievement (Benveniste, Carnoy, and Rothstein, 2003**).** The downside is that such incentives can push schools and teachers to spend a disproportionate amount of time teaching the test. It is also likely that small schools will have a greater variance in performance from year to year because of the greater statistical variability of their student body, hence will have a greater likelihood of being rewarded at least once in a while (Kane, 2000).

Teacher incentive schemes such as the SNED in Chile and the *Carrera Magisterial* in Mexico are both bad examples of incentive schemes if the goal is to improve student academic improvement as they progress through the grades. Although the *Carrera Magisterial* is supposed to reward teachers with higher pay based in part on their students' performance, once teachers accumulate the points needed for the pay increase, they are guaranteed that increase for the rest of their career. The SNED awards increases on the basis of gains on the 4^{th} and 8^{th} grade SIMCE tests, but these are gains across cohorts, not for the same students moving from grade to grade. Thus, teachers have little or no incentive to help fifth, sixth, and seventh graders to make gains. Indeed, there is evidence that students in schools receiving more SNED awards make smaller gains from 4^{th} to 8^{th} grade in 1996-2000 than students in schools that received no awards (Carnoy et al, 2007).

A more profound problem for most developing countries is the average level of capacity in their teaching force. This is not just the result of the quality of teacher pre-service education, which is notably poor (Lockheed and Verspoor, 1988**).** Nor is it necessarily an issue of the current level of teacher salaries, which are low relative to the pay in other professions in some countries, but relatively high for women teachers in many countries compared to women workers with similar levels of education (Vega, Experton, and Pritchard, 1999**;** Carnoy and McEwan, 1997**;** Santibanez, 2001; Carnoy et

al, 2007e). A recent study of secondary school teacher salaries in twenty countries by gender and level of education compared to the salaries of mathematics-oriented professions such as scientists and engineers, show considerable variation among countries of how much teachers are paid, with Chile, Taiwan, Finland, Hong Kong, Korea, and Singapore rewarding their secondary teachers relatively well, and France, Norway, Thailand, and the United States paying secondary teachers relatively poorly (Carnoy et al, 2007e).

In periods of recession, such as the 1980s**,** teacher salaries generally fall in real terms. Yet, the relative salaries of teachers compared to workers with similar levels of education probably rise (because public sector salaries are sticky downward compared to private sector salaries). In periods of economic crisis, it is easier to attract individuals into teaching, even individuals with more education than required. This happened in Mexico in the 1980s when many university graduates trained for other professions chose to go into teaching because of the crisis in the private sector. But in periods of economic growth and rapid expansion of secondary education--characteristic of the 1990s throughout Latin America and in much of Asia until the financial crisis of 1997, recruiting teachers with post-secondary degrees is more difficult, and might mean a decline in the quality of individuals being drawn into teaching. This could be mitigated by an increased supply of higher educated women entering the labor market because of changes in values concerning women's work, for example. It also could be mitigated by the much lower cost of obtaining a teaching degree compared to other university degrees. Finally, it could be mitigated by large increases in teachers' salaries as in Chile in the 1990s,[4] which apparently had the effect of increasing the quality of university entrants choosing teaching as a profession (OECD, 2004).

Unless teachers' work is highly regarded on other grounds, countries in which the salaries of teachers with post-secondary education remain relatively low compared to those with higher education degrees in other professions, could face a shortage of well-qualified teachers, particularly in secondary education. Many of the most important educational reforms in developing countries in the past ten years and in the next decade concern secondary education. Thus, the relative salaries of post-secondary trained teachers (and the supply of newly certified secondary school teachers) are important indicators of the potential success of other reforms to raise student achievement and attainment.

Aside from the problem of recruiting higher quality high school students into teacher education programs, the main policy issue for the improvement of education generally and especially for socio-economically disadvantaged students, is the quality of teacher pre-service and in-service education. In two recently completed studies in Panama and Costa Rica, we were able to measure teacher mathematical content

[4] In real terms, actual teacher base monthly salaries in municipal (public) schools increased an average of 8.4 percent annually from 1990-2000, but slowed to 3.9 percent annually in 1996-2000. The minimum salary in private subsidized (voucher) schools increased at a lower rate in the decade as a whole, but also at about a 4 percent rate in 1996-2000 (OECD, 2004, Figure 6). Salaries have continued to increase at the slower rate after 2000.

knowledge and pedagogical content knowledge, and to observe teachers' teaching in third and seventh grade classrooms. Although we cannot compare student performance in the two countries because neither has published scores from any international tests, Costa Rican third grade teachers score much higher on mathematics content and pedagogical content knowledge than Panamanian teachers and their lessons deliver a more profound and mathematically complex content to students. Primary school student teachers in Costa Rica also do much better on content and pedagogical content tests than do Panamanian student teachers. Differences among seventh grade teachers in the two countries are much smaller. We infer that teacher pre-service education for primary teachers in Costa Rica is far better than in Panama, and that primary teachers in Costa Rica display this better preparation in their teaching practice (Carnoy et al, 2007d).

Since Costa Rica and Panama are two countries with equal per capita gross domestic product and economic growth rates, the poorer teacher preparation in Panama is not a function of fewer available dollars. Rather, it is a function of Panama's devoting fewer dollars to education and tending to spend its dollars on expanding higher education rather than improving primary and secondary. Panama still prepares its primary teachers mainly with secondary education (plus a one year teaching certificate) and provides wholly inadequate preparation in the specialized knowledge needed to teach mathematics in primary school. Both Costa Rica and Panama also do an inadequate job of preparing their lower secondary school teachers in mathematical pedagogy. This is reflected in mathematics scores that decline in lower secondary school in Costa Rica and Panama. The comparative study also provides considerable evidence that teachers teach the way they were taught by their teachers and the way they learned to teach in their teacher education programs. This suggests that improving teacher education can improve classroom teaching, but it would require a radical overhaul of pre-service teacher education to achieve such change. In essence, a whole new group of teacher educators would have be brought into the teacher training institutions to produce new teachers with higher levels of teaching skills.

One major obstacle in most countries to reforming teacher education is that autonomous universities, not the Ministry of Education, control much of what happens in teacher education. Where teacher education is highly decentralized, it is more difficult to change than it would be were one institution in charge of producing teachers. Ministries can test new teachers as a condition of public employment, and if the test were difficult enough, as it is in France or Taiwan, it might force teacher education institutions to raise standards to meet the requirements of the test, particularly if the Ministry published results by institution.

However, raising standards in teacher education programs assumes that they have the capacity to respond by better preparing student teachers. Most, if not all, probably do not. Thus, simply showing universities or schools that their students are not performing up to high standards usually has only small effects on student performance in those institutions. The hard part is changing the capacity of the institutions to respond to higher demands. There exist major supply constraints on capacity—on the knowledge base and skills available to produce better teachers—and this requires a huge effort to overcome.

Furthermore, the vast majority of teachers is already in the teaching force. Thus, to improve the quality of teaching significantly, countries need to invest considerable resources in changing how already employed teachers teach. Current in-service programs are not up to this task. There are exceptions, such as *Escuela Nueva,* which focuses on rural teachers and on the particular skills required in rural, mainly multi-grade schools. A number of countries, including Panama and Costa Rica, have invested in *Escuela Nueva* programs, but far short of what is needed to make a serious improvement in the many multi-grade schools in those two countries.

It would be possible to implement in-service programs that transform, say, mathematics teaching nationwide, but such programs would have to be intense and several months long, and the cost would be high. Teachers in many countries would actually have to take more mathematics and would have to learn to teach mathematics in a very different and more effective way.

To summarize, reformers should focus on several key factors to improve educational quality for lower-income students:

- *Increasing the number of classroom hours per day and year encountered by an average student and especially low-income students*. Classroom hours have to be estimated using required hours adjusted for three factors -teacher absenteeism, student absenteeism, and loss of days to teacher strikes. The first two are difficult to measure, but are (or should be) important objectives of educational reform. So should the reduction of strike days. If real hours in the classroom are increasing, it is likely that student performance will improve. In some countries or regions where absenteeism or low numbers of required hours is an important issue, increasing contact hours may be the most important objective of educational reform. As a primary school teacher in a low-income school once asked me, "How can we be expected to increase these students' achievement levels when we only have them in class for three and one-half hours per day?"
- *Equalizing the distribution of teachers by education and experience across schools with students of different socioeconomic background*. The more polarized this variable, the more unequal school capacity and the less likely that government programs can raise low-income students' achievement.
- *Paying close attention to the salaries of teachers by level of education compared to non-teachers with the same education.* Comparisons should be made within gender group, men and women separately. The higher the relative salaries of teachers with a given level of education, the more likely reforms aimed at the level of education where those teachers are teaching will succeed.
- *Increasing the content knowledge and pedagogical content knowledge of young people entering the teaching profession.* The quality of teacher pre-service training is one of the biggest problems facing educational reformers. If teachers to not have a high level of understanding of math, language, and science, how are they **to** teach more difficult, challenging curricula in those subjects?

- *Radically changing teacher in-service training.* The current teaching force has to be brought up to higher levels of content knowledge and pedagogical content knowledge.

Educational Quantity and Education Quality

Should we consider a higher percentage of an age cohort finishing higher levels of schooling, as was the case in many developing countries in 1985-2005, a success of educational reform that aims to improve educational quality and educational equity? I believe that we should, for several reasons.

Historically, almost all countries in the world have raised academic achievement in their populations by increasing the average numbers of years of schooling taken by successive generations of students. The OECD literacy survey, which included Chile, suggests how large the changes in achievement from generation **to** generation have been. There is no doubt, the OECD shows, that 25 year-olds in every country surveyed are more literate than their parents. This is largely true because they have higher levels of education, not because they have gone to "better" schools. Thus, incorporating an increasing proportion of an age cohort into ever-higher levels of education may be the most important thing that governments can do in the short and medium run to increase student achievement. Reforms that accomplish that goal should be considered successful even if the average level of performance of students in, say, the eighth grade, does not increase at all over the next ten years. Put another way, assume that eighth graders in Thailand score somewhat higher than eighth graders in Chile on an international math test, but that average education (number of years of schooling) in Chile among 15-24 year olds is much higher than in Thailand. Which fact is more important in determining the potential productivity of the labor force or the level of other social indicators, or even of the quality of the educational system?

To achieve major increases in completion rates at a given level of schooling, governments usually redefine the nature of a given level of schooling. They do more than just build more buildings and supply more teachers, although that, too, is an important accomplishment. They necessarily need to *reform* their education systems to accommodate the notion that a much higher fraction of students will finish a particular level of schooling, whether this is primary schooling or university. These reforms should not be taken lightly. At the same time, their success can be measured by increases in the proportion of young people reaching higher levels of schooling.

One of the most common critiques of enrollment and completion rates as a measure of educational improvement is the claim that quality of education in, say, secondary school automatically declines as these rates increase. Yet, there is considerable evidence that this is not the case. For example, in the United States, the massification of high school completion and an enormous increase in the proportion of high school seniors who take the Scholastic Aptitude Test (SAT) has not led to a significant decline in the average scores on this test (Rothstein, 1998**).** Similarly, in Chile, average scores on the high school version of the SIMCE test have not declined in the 1990s despite

increases in the proportion of the age cohort taking the test (Bellei, 2001). The same seems to be true for the massification of secondary education in Korea, Taiwan, and Hong Kong in the 1970s, 1980s, and 1990s. Even as the proportion of teen-agers enrolled in secondary school increased in those countries (and the average social class declined), test score remained at very high levels.

One reason that achievement scores may not decline significantly even as a higher fraction of the age cohort enters and completes a given level of schooling is that the educational system is probably organized to reach particular goals (standards or quotas) rather than to increase productivity spontaneously or in response to incentives. In that sense of being quota driven, schools are not "entrepreneurial" organizations. This is frustrating to many reformers, but if understood, the goal (standard) orientation of the system can be effective in producing a similar quality of output even as the quality of inputs changes. The system may have to be forced to do this by reforming it, but once given its new marching orders, it is likely to maintain average academic achievement even as the average socio-economic background of the students declines.

A major problem with most educational systems is that educators prefer to track students into different levels so that educational goals can be adjusted to the human capital the student brings to the school. It seems to make sense that some young people are not that interested or good at academic work so should be shunted into less demanding and more "practical" courses of study. Yet, recent experience in the United States has shown that it is possible to teach algebra to lower socio-economic background students if teachers are determined to do so. Eighth grade math results for Hispanic students in Texas, where academic standards have been raised for lower income students, are a reflection **of** this possibility (Carnoy, Loeb, and Smith, 2003**).** Analysis of the TIMSS results across countries also suggests that tracking probably reduces average test scores because so many students (those in lower tracks) are not exposed to math and science concepts important to developing proficiency in these two subjects. Lower standards allow teachers to avoid teaching these concepts to students from lower socioeconomic backgrounds (Schmidt et al, 2001).

This logic suggests that increasing educational *attainment* is a valid way of increasing educational achievement in the labor force. Increasing educational attainment can also be an important way to improve educational equity. The way that education is expanded has an important influence on this equity effect. For example, Colombia and Bolivia have relatively high percentages of 15-24 year-olds with ten or more years of schooling, but also relatively high percentages of the same age group with less than 5 years of schooling. Mexico has a lower percentage with ten or more years, but a very low percentage with less than five years of schooling. It appears that Mexico may have achieved greater equity by essentially universalizing primary education, even in rural areas (OREALC, 2001**,** p.90).

Since many developing countries are at the stage of trying to universalize secondary education, the expansion of this level necessarily is accomplished by incorporating students whose parents have much lower levels of education. It is evident

in countries as different as China, Chile, Tunisia, and Mexico that the "new" enrollment in secondary education over the past twenty years is urban working class and rural, and that the main challenge of educational reform is to bring these lower socioeconomic class students to successful completion of secondary schooling. Besides raising the average level of educational achievement in the society, as I have argued above, reforms that significantly increase average levels of educational attainment generally tend to increase educational equity because they incorporate an increasing fraction of lower socioeconomic class youth first into primary schooling, then secondary, and eventually university.

Nevertheless, it is important to reiterate that in countries with a larger pool of skilled teachers and more equal distribution of teacher skills among schools, such as in Korea and Taiwan (or earlier on historically, Sweden and Finland) , the working class and rural children brought into secondary school are more likely to have access to equal quality education as well as a greater quantity of education, further contributing to greater equity. Secondly, it should be noted that greater educational equity does not mean economic equity. Chile's educational system can be regarded as highly equitable compared to Brazil's, for example, but the income distributions in the two countries are similarly unequal. Uruguay's, Costa Rica's, and Thailand's educational systems may be less equitable than Chile's in terms of access to secondary education, but their income distributions are far more equal than Chile's.

One "reason" (not causal, just correlative) for Chile's greater income inequality than Uruguay, Costa Rica's, or Thailand's even with greater educational equity in Chile, is that the payoff to completing university is much higher in Chile than in Uruguay, Costa Rica, or Thailand (Carnoy et. al., 2001, Carnoy et al, 2007d**).** Access to university in Chile is lower than it might be because of high tuition charges. But access to university is also restricted in Uruguay, Costa Rica, and Thailand by an upper secondary system that induces students to drop out before completing. In all four countries, less than about 30 percent of the age cohort is (on net) is enrolled in university. The much higher payoff in Chile, however, means that those that do complete university are distant, income-wise, from the mass of students who compete secondary education but do not continue. In Uruguay and Costa Rica, the incomes of those who complete university are not much higher than the incomes of secondary school graduates. The difference may be due to higher growth rates in Chile and a more "dynamic" economy, but it may also be due to past policies that allowed those with higher incomes to gain ground on the poor and middle class. In any case, even as secondary school education incorporated the working class in Chile, income distribution became more unequal.

Summary

Based on what we know about how educational systems increase societies' knowledge, I have recommended several ways countries can improve educational equity and how much children—particularly lower-income children—learn.

- Expanding access to more years of education is still the most common way that societies increase young people's math and language skills. Countries with higher average schooling are better at complex production and have children who are easier to teach even higher levels of academic skills in the next generation. Increasing the number of years of education taken by students does not have to wait until achievement rises in lower grades, and historically, it has not. So a rising average level of schooling is an objective in and of itself and a measure of the success of education reforms.

- Policy makers should aim at raising the average number of years of schooling attended and maintaining average test scores in the level of schooling that is raising its enrollment and completion rates rapidly. This would mean that schools are *increasing* their effectiveness. That level would have, in effect, absorbed students with less cultural capital and brought the new student body to similar levels of achievement as past groups.

- Increasing growth of enrollment and completion of lower levels of schooling—first primary, then secondary, provides benefits for lower socioeconomic class children, since these are the groups that are absorbed into these levels of schooling when they are universalized. Furthermore, educational improvement programs that target these groups generally seem to work.

- Increasing contact time for students with teachers through increasing student and teacher attendance, longer school days in countries with only half day schools, and free reading materials, either through book giveaways or building school libraries or improving internet access may be the least expensive strategies for developing countries of improving educational quality for lower-income students. By focusing on these "simple," easy-to-measure objectives, educational strategies have the best chance to improve low-income student attainment, which will have the single greatest educational impact on economic and social opportunities.

- Beyond these increases in pupils' opportunity to learn, the principal way to improve quality of education at each level of schooling is to improve the quality of classroom teaching. This will require a major effort by countries which lack large numbers of highly skilled teachers, since it means a radical reform of pre-service education, a radical reform of in-service education, and radically improving management capacity to monitor and guide instruction in the educational system. None of this is cheap, either financially or politically. Nor will it be accomplished simply through testing systems or organizational changes in educational management, such as decentralization or privatization.

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