Economic outcomes and school quality

Eric A. Hanushek

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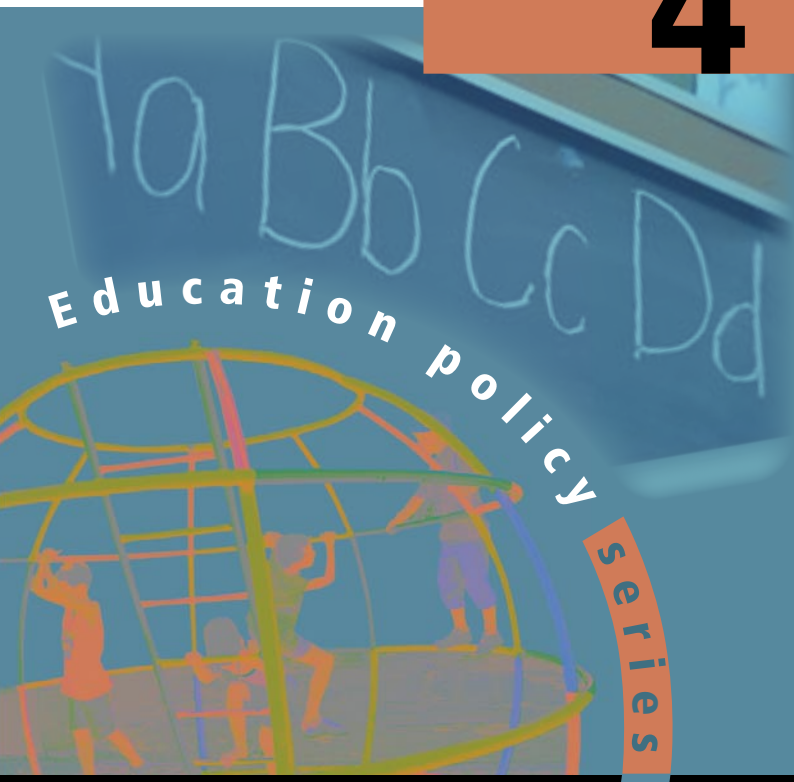

Education policy series

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Preface
Education policy booklet series

The International Academy of Education and the International Institute for Educational Planning are jointly publishing the Education Policy Booklet Series. The purpose of the series is to summarize what is known, based on research, about selected policy issues in the field of education.

The series was designed for rapid consultation "on the run" by busy senior decision-makers in Ministries of Education. These people rarely have time to read lengthy research reports, to attend conferences and seminars, or to become engaged in extended scholarly debates with educational policy research specialists.

The booklets have been (a) focused on policy topics that the Academy considers to be of high priority across many Ministries of Education – in both developed and developing countries, (b) structured for clarity – containing an introductory overview, a research-based discussion of around ten key issues considered to be critical to the topic of the booklet, and references that provide supporting evidence and further reading related to the discussion of issues, (c) restricted in length – requiring around 30-45 minutes of reading time; and (d) sized to fit easily into a jacket pocket – providing opportunities for readily accessible consultation inside or outside the office.

The authors of the series were selected by the International Academy of Education because of their expertise concerning the booklet topics, and also because of their recognized ability to communicate complex research findings in a manner that can be readily understood and used for policy purposes.

The booklets will appear first in English, and shortly afterwards in French and Spanish. Plans are being made for translations into other languages.

Four booklets will be published each year and made freely available for download from the web site of the International Institute for Educational Planning. A limited printed edition will also be prepared shortly after electronic publication.

This booklet

Huge sums of money are spent on education each year and there are those who ask if it really is necessary for people to have so much education. Although it would seem fairly self evident that education is required if the human capital in a country is to be adequate for the economic tasks required of it, there has been widespread concern that more extensive evidence is required to support this viewpoint.

This booklet takes up the two-fold challenge of establishing the linkages between educational quality and national economic productivity, and then identifying those aspects of educational reform that are most likely to deliver enhanced levels of educational quality.

The booklet presents arguments in favour of improved teacher quality as the key pathway to improved student performance – and offers sound advice concerning the planning and timeframe required to develop and evaluate progress towards a more effective teaching force.

There are two critical elements in this discussion. First is the requirement for governments to experiment with alternative approaches to providing incentives for teachers – including various forms of teacher compensation and teacher contractual arrangements.

Second is the need to recognise that one of the major impediments to school reform is the lack of regular information about what does, and does not, work. This kind of information needs to be delivered in a timely fashion and must include valid data about student educational achievement and outcomes for new and existing programmes.

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1 Introduction

All governments of the world assume a substantial role in providing education for their citizens. A variety of motivations lead societies to provide such strong support for schooling – some of which come from pure economics and others of which come from ideas of improved political participation, of social justice, and of general development of society. No matter what the motivation, the fundamental question remains of 'how much should society invest?' Public investment in education comes at the expense of other public and private uses of the funds. Analysis of the benefits and costs of school reform summarized here indicates investments that improvements in quality of schools offers exceptional rewards to society.

The underlying notion of human capital is that individuals make investment decisions in themselves through schooling and other routes. The accumulated skills relevant for the labor market from these investments over time represent an important component of the human capital of an individual. The investments made to improve skills then return future economic benefits in much the same way that a firm's investment in a set of machines (physical capital) returns future production and income. In the case of public education, parents and public officials act as trustees for their children in setting many aspects of the investment paths.

Most consideration of economic aspects of education has concentrated on school attainment, or the quantity of education. This is natural. It is easy to calculate the economic return on such an investment – both the costs and benefits are fairly clear. At the same time, relatively limited data have been available on the quality of schools, and there are great uncertainties both about how to change quality and about what it costs. Nonetheless, the

policy issues in most countries at the beginning of the 21st century are ones of quality.

It is commonly presumed that formal schooling is one of several important contributors to the skills of an individual and to human capital. It is not the only factor. Parents, individual abilities, and friends undoubtedly contribute. Schools nonetheless have a special place because they are most directly affected by public policies.

The human capital perspective immediately makes it evident that the real issues are ones of long-run outcomes. Future incomes of individuals are related to their past investments. It is not their income while in school or their income in their first job. Instead, it is their income over the course of their working life.

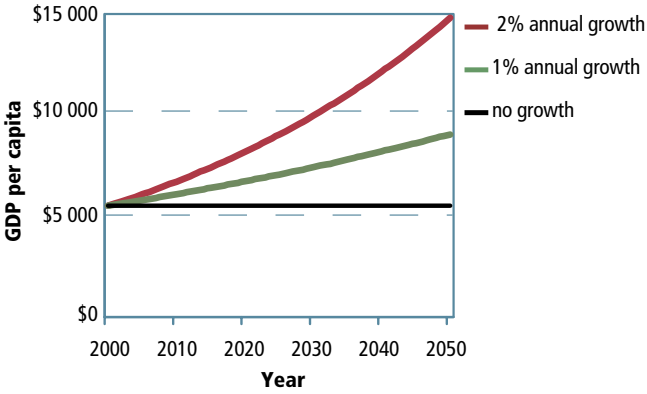
2 Economic growth

The economic well-being of society is deeply influenced by economic growth.

Economic growth determines how much improvement will occur in the overall standard of living of society. Differences in growth rates that appear to be small have huge differences for society if they are maintained over a period of time.

The current economic position of the United States and other developed countries is largely the result of its strong and steady growth over the second half of 20th century. While a variety of models and ideas have been developed to explain differences in growth rates across countries (Barro & Sala-I-Martin, 1995), they invariably include (but are not limited to) the importance of human capital.

Figure 1: Effect of economic growth on GDP per capita (medium income country)



The effect of differences in growth rates on economic well-being is easy to see. *Figure 1* begins with the value of gross domestic product (GDP) per capita for a medium income country in the year 2000 and shows its value in 2050 under different growth rates. If it grows at one percent each year, this measure (in U.S. dollars) would increase from $5,500 to $9,000 – or increasing by almost two-thirds over the period. If it were to grow at two percent per year, it would reach $15,000 in 2050! Small differences in growth rates have huge implications for the income and wealth of society.

Many factors enter into determining growth. For example, the existence of a strong system of property rights, the ability to develop binding contracts, and the maintenance of relatively free labor and product markets all have been seen to establish the basis for a healthy and growing economy. With these conditions, however, the knowledge and skills of the population have a very powerful impact on national growth rates.

3 Economic growth and human capital

Human capital is a powerful force driving economic growth.

The human capital of the population, which is enhanced by a strong education system, enters directly and indirectly into economic growth. Education has the possibility of making both the individual receiving it and others better off. Specifically, a more educated society may lead to higher rates of invention; may make everybody more productive through the ability of firms to introduce new and better production methods; and may lead to more rapid introduction of new technologies. These "externalities" – influences on others of individual education outcomes – provide extra reason for being concerned about the quality of schooling.

The research supporting growth analyses has emphasized school attainment differences across countries and finds it highly related to economic growth rates. But, quantity of schooling is a very crude measure of the knowledge and cognitive skills of people.

Hanushek and Kimko (2000) incorporated the information about international differences in mathematics and science knowledge that has been developed through testing since the 1960s. School quality had a remarkable impact on differences in economic growth. The analysis was very straightforward. All of the available earlier international test scores were formed into a single composite measure of quality. The basic statistical models, which included the level of income, the quantity of schooling, and population growth rates, explained a substantial portion of the variation in economic growth. Most importantly, the quality of the labor force as measured by math and

science scores was extremely important. One standard deviation difference on test performance was related to one percent difference in annual growth rates of per capita GDP. As shown in *Figure 1*, the impact of such a difference in growth rates is very large. One percent higher growth – say, two percent versus one percent per year growth – over a 50-year period yields incomes that are 64 percent higher!!

One common concern in an analysis such as this is that schooling might not be the actual cause of growth but, in fact, may just reflect other attributes of the economy that are beneficial to growth. Hanushek and Kimko (2000) investigated a number of alternative explanations for the relationship between quality and growth but rejected them. For example, the observed relationship does not seem to simply reflect that the East Asian countries consistently score very highly on the international tests, and they also had extraordinarily high growth over the 1960-1990 period. Nor is it just that other factors that affect growth such as efficient market organizations are also associated with efficient and productive schools – so that again the test measures are really a proxy for other attributes of the country. Hanushek et al. (2000) examined this issue for earnings in the United States and found that immigrants who were schooled in countries that have higher scores on the international math and science examinations earned more in the United States. They concluded that the observed relationships were not simply a reflection of reverse causality – that is that countries that are growing rapidly have the resources necessary to improve their schools and that better student performance is the result of growth, not the cause of growth. Specifically, the international math and science test scores were not systematically related to the resources devoted to the schools in the years prior to the tests.

4 Individual productivity and earnings

There is clear evidence that individuals with more skills have higher productivity and earn more.

There is mounting evidence that quality measured by test scores is directly related to individual earnings, productivity, and economic growth. A variety of researchers document that the earnings advantages to higher achievement on standardized tests are quite substantial in the United States and other developed countries. While these analyses emphasize different aspects of individual earnings, they typically find that measured achievement has a clear impact on earnings after allowing for differences in the quantity of schooling, the experiences of workers, and other factors that might also influence earnings. In other words, higher quality as measured by tests similar to those currently being used in accountability systems in various countries is closely related to individual productivity and earnings.

Three recent US studies provide direct and quite consistent estimates of the impact of test performance on earnings (Mulligan, 1999; Murnane et al., 2000; Lazear, 2003). These studies employ different nationally representative data sets that follow students after they leave schooling and enter the labor force. When scores are standardized, they suggest that one standard deviation increase in mathematics performance at the end of high schools translates into 12 percent higher annual earnings.

There are reasons to believe that these estimates provide a lower bound on the impact of higher achievement. First, these estimates are obtained fairly early in the work career (mid20s to early 30s), and other analysis suggests

that the impact of test performance becomes larger with experience. Second, the labor market experiences that are observed begin in the mid 1980s and extend into the mid 1990s, but other evidence suggests that the value of skills and of schooling has grown throughout that period in many countries of the world (and particularly in the US). Third, future general improvements in productivity are likely to lead to larger returns to skill.

Another part of the return to school quality comes through continuation in school. There is substantial U.S. evidence that students who do better in school, either through grades or scores on standardized achievement tests, tend to go farther in school. Murnane et al. (2000) separate the direct returns to measured skill from the indirect returns of more schooling and suggest that perhaps one-third to one-half of the full return to higher achievement comes from further schooling. Note also that the effect of quality improvements on school attainment incorporates concerns about drop out rates. Specifically, higher student achievement keeps students in school longer, which will lead among other things to higher graduation rates at all levels of schooling.

A second place where the returns to skills are found is farm productivity. Even in developing countries with relatively small manufacturing and skill-intensive service sectors, skills have been shown to have a strong impact on outcomes. Thus, while much of the quantitative research on the importance of skills has come from developed countries, the qualitative picture appears to hold for a wide range of developing countries.

5 Importance of quality

Governmental investments should focus on school quality because they have such powerful economic impacts.

The frequent focus of governmental programs has been an increasing school attainment and expanding the years of schooling of the population. The previous discussion, however, highlights the central importance of quality. While years of schooling attainment are important, that holds only if quality is maintained.

The impact of improved quality can be obtained from the considerations of how quality affects growth rates for economies. Consider the effects of beginning a successful school improvement program in 2005. Of course school reform takes time. And, even if successful, it takes some time before the school graduates work their way into the labour force and thus some time before the impact will be felt.

Figure 2: Improved GDP with moderately strong knowledge improvement

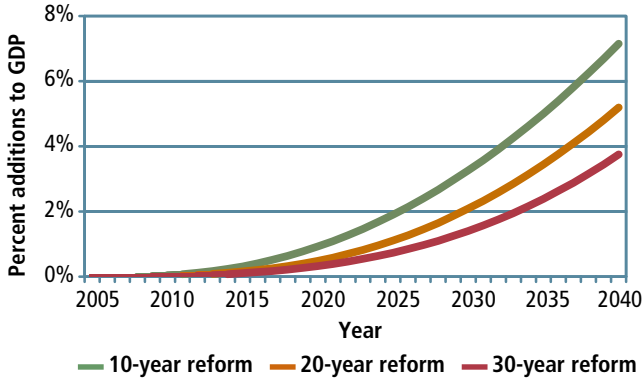


Figure 2 illustrates the impact that reform could be expected to have over time if it is successful at achieving moderately strong knowledge improvement (corresponding to a 0.5 standard deviation increase in test score achievement).[1] The curves sketch out the path of GDP improvement that would occur with a reform plan that reaches its improvement goal within 10, 20, or 30 years.

Consider just the slow improvement of schools over a 30-year period. In 2040, the GDP would be almost four percent higher than projected without the schooling reforms. Of course, faster reforms would yield even greater gains in GDP.

1. These calculations are calibrated to scores on international mathematics and science exams. The "moderately strong" improvement implies an increase in scores by 0.5 standard deviations across the international comparisons. This is equivalent of bringing a country at the 31st percentile of performance up to the median for the world.

6 Difficulty of improving quality

Traditional approaches to improving school quality simply through increasing resources have not generally worked.

Much of school policy is traditionally thought of as an exercise in selecting and ensuring that the optimal set of resources, somehow defined, is available. Matched with this policy perspective has been a line of research considering the relationship between resource usage and student performance. If the effectiveness of different resources or combinations of resources were known, it would be straightforward to define an optimal set of resources. Moreover, we could often decide about policies that would move us toward such an optimal set of resources. Unfortunately, this alludes us.

Schools in the United States have been the focus of extensive research. Both aggregate data about performance of schools over time and more detailed school and classroom data point to a simple conclusion: There is a lack of any consistent or systematic effect of resources on student achievement. While controversial, partly because of the conflict with existing school policies, the evidence is very extensive (Hanushek, 2003).

Most other countries of the world have not tracked student performance over any length of time, making analyses comparable to the United States discussion impossible. Nonetheless, international testing over the past four decades permits an overview of spending across countries. Seven different mathematics and science tests (the data for the growth analysis) were given between the early 1960s and 1995 to students at different grade levels in a varying set of voluntarily participating nations.

Performance bears little relationship to the patterns of expenditure across the countries. Hanushek and Kimko (2000) estimate models that relate spending, family backgrounds, and other characteristics of countries to student performance for the tests prior to 1995. This estimation consistently indicates a statistically significant negative effect of added resources on performance after controlling for other influences. Similar findings hold for the OECD countries.

Existing statistical analyses in less developed countries have shown a similar inconsistency of estimated resource effects as that found in the United States (Hanushek, 1995). In general, a minority of the available studies suggests much confidence that commonly identified resources – class size, teacher experience, and teacher salaries – positively influence student performance. There is generally somewhat stronger support for these resource policies than that existing in United States analyses, hinting that the importance of resources may vary with the level of resources. Nonetheless, the evidence does not indicate that pure resource policies can be expected to have a significant effect on student outcomes.

In sum, a wide range of analyses indicate that overall resource policies have not led to discernible improvements in student performance. It is important to understand what is and is not implied by this conclusion. First, it does not mean that money and resources never matter. There clearly are situations where small classes or added resources have an impact. It is just that no good description of when and where these situations occur is available, so that broad resource policies such as those legislated from central governments may hit some good uses but also hit bad uses that generally lead to offsetting outcomes. Second, this statement does not mean that money and resources cannot matter. Instead, as described below, altered sets of incentives could dramatically improve the use of resources.

The evidence on resources is remarkably consistent across countries, both developed and developing. Had there been

distinctly different results for some subsets of countries, issues of what kinds of generalizations were possible would naturally arise. Such conflicts do not appear particularly important.

7 Teacher quality

The most likely way to improve student performance is to improve the quality of teachers.

Many countries have of course attempted to improve their schools. While some have succeeded, many have not. One explanation for past failure is simply that insufficient attention has been paid to teacher quality. By many accounts, the quality of teachers is the key element to improving student performance. But the research evidence also suggests that many of the policies that have been pursued around the world have not been very productive. Specifically, the chosen policies of individual countries may have led to changes in measured aspects of teachers such as degrees or teacher qualifications, but they have not tended to improve the quality of teachers – at least when quality is identified by student performance.[2]

Rivkin, Hanushek, and Kain (2005) describe estimates of differences in teacher quality on an output basis. Specifically, the concern is identifying good and bad teachers on the basis of their performance in obtaining gains in student achievement. An important element of that work is distinguishing the effects of teachers from the selection of schools by teachers and students and the matching of teachers and students in the classroom. In particular, highly motivated parents search out schools that they

2. For a review of existing U.S. literature, see Hanushek and Rivkin (2004). This paper describes various attempts to estimate the impact of teacher quality on student achievement. Similar studies are currently much less available in other countries.

think are good, and they attempt to place their children in classrooms where they think the teacher is particularly able. Teachers follow a similar selection process (Hanushek, Kain, & Rivkin, 2004). Thus, from an analytical viewpoint, it is difficult to sort out the quality of the teacher from the quality of the students that she has in her classroom. The analysis of teacher performance in Rivkin, Hanushek, and Kain (2005) goes to great lengths to avoid contamination from any such selection and matching of kids and teachers.

Estimates that the differences in annual achievement growth between an average and a good teacher are large. Within one academic year, a good teacher can move a typical student up at least four percentiles in the overall distribution (equal to a change of 0.12 standard deviations of student achievement). From this, it is clear that having a series of good teachers can dramatically affect the achievement of any student. In fact, a series of good teachers can erase the deficits associated with poor preparation for school.

The difficulty, as pointed out in the preceding discussion, is that hiring good teachers is not easily done. Teaching ability is not closely related to training or experience. Moreover, common salary systems do not target particularly high quality teachers.

From a policy viewpoint the primary objective should be improving the overall quality of the teaching force. If one were simply to redistribute existing teachers, the overall policy goals would not be achieved. The following sections discuss objectives and approaches to achieve teacher quality improvement.

8 Magnitude and speed

In entering into a reform of teacher quality, it is important to be clear about goals and to be realistic about how fast goals can be achieved.

The estimates of the importance of teacher quality permit some calculations of what would be required to yield the reforms discussed earlier. To begin with, consider what kinds of teacher policies might yield a "moderately strong" improvement in student performance. Obviously a wide range of alternative hiring plans could be used to arrive at any given end point. A particularly simple plan is employed here to illustrate what is required.

Consider a steady improvement plan where the average new hire is maintained at a constant amount better than the average existing teacher in any given year. To be clear, the average teacher in the current distribution is found at the 50th percentile. Consider a policy where the average of the new teachers hired is set at the 56th percentile and where future hires continue to be at this percentile each year of the reform period. By maintaining this standard for replacement of teachers exiting teaching (set here at seven percent annually) but retaining all other teachers, this policy would yield a moderately strong improvement in student performance after a 20 year period. If instead we thought of applying these new standards for high teacher turnover (set here at 14 percent), the same improvement in student performance could be achieved in 10 years.

Figure 3: Annual required hiring percentile for moderately strong improvement in student achievement

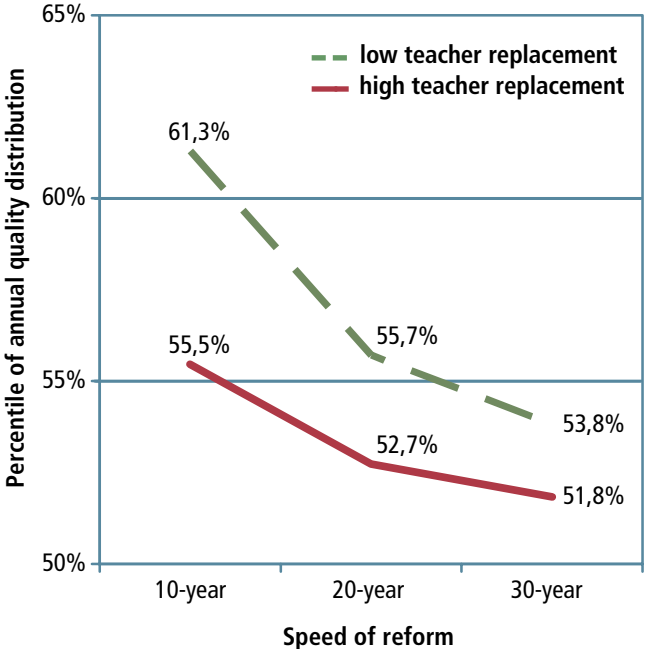


Figure 3 displays the annual hiring improvement that is necessary to achieve the improvements considered above under a 10-, 20-, and 30-year reform plan and based on either low or high turnover rates of teachers.[3] As is obvious, the stringency of the new hiring is greater when there is a shorter reform period and when fewer new (higher quality) teachers are brought in each year. Achieving this reform in achievement in 10 years by upgrading just seven percent of the teachers per year implies hiring at the 61st percentile, but this declines to the 52nd percentile for a 30-year plan when the higher 14 percent turnover rate is subject to these new hiring standards. These calcula-

3. These calculations assume the variations in teacher quality estimated for the United States.

tions demonstrate the challenge of achieving substantial improvements in achievement. It requires significantly upgrading the quality of the current teacher force.

Several aspects of these scenarios deserve note. First, the improvements that are required apply to the teacher distribution that exists each year. In other words this standard requires continual improvement in terms of the current teachers. The continual improvement comes from the fact that the distribution of existing teachers improves each year because of the higher quality teachers hired in prior years. At the same time, it does not imply that all new teachers reach these levels, only that the average teacher does. There will still be a distribution of teachers in terms of quality.

The calculations also freeze many aspects of teaching. They assume no change in teacher turnover. Of course, teacher turnover will be affected by a variety of other policies such as salary policy, tenure, etc.

The calculations also assume that turnover is unrelated to quality – as it largely is with today's passive teacher management approach. An active selection and teacher retention policy could, however, lead to improvements in overall teacher quality would offer relief from the stringency of hiring standards that are required. For example, a policy that retained the best teachers two years longer and dropped the least effective teachers two years sooner would by itself lead to substantial improvements in the average quality of the teacher force.

9 Continuous improvement

Improving the teacher force takes time.

Most existing evidence indicates that quality improvements are more likely to come from selecting and retaining better teachers rather from re-training the existing teachers. While some in-service training and development programs have had success, in general they have been disappointing. Moreover, existing evidence on in-service programs gives insufficient means for selecting a program that is likely to yield significant gains in teaching performance. In other words, research has not established the characteristics of an effective program. Thus, concentrating on selecting better teachers appears to be the much better way to go.

There are clear limits on how large the changes in the teacher force can be at any point in time. It is simply not feasible to turn over the stock of teachers completely while maintaining a coherent teaching program. Many nations currently do not have active policies toward retention of teachers but instead leave most of the decision making up to the individual teachers. That is, within broad limits once a teacher is hired into the educational system, decisions about when to leave are made by that teacher and not by the school institutions. This approach would limit the speed of replacement to the existing turnover in teachers. (This speed is also generally captured by the range of turnover in *Figure 3*).

Policy changes may affect this speed – both slowing and speeding up the rate of turnover. For example, changes in the teacher contracts and the salaries and benefits offered may induce more or less teachers to leave teaching. Ex-

plicit changes to allow more institutional decision making also have obvious impacts on the turnover. In any event, the rate of turnover of teachers essentially establishes a bound on the possibilities for change that exist.

Moreover, the ability to improve the teaching force will depend on the types of people who can be attracted into teaching. If the teaching force is to be improved, it is necessary that the hiring selects better teachers or that retention is skewed toward the better teachers. If better hiring is an important element of the plan, it may well take time before new kinds of people are attracted toward teaching. Entering teaching is generally a career choice that requires a prior commitment on the part of prospective teachers. That commitment in turn depends on the career expectations of these people, and expectations take some time to be affected by general policies.

This perspective argues for building a plan of improvement over time. One time adjustments or changes in programs are unlikely to be effective.

10 Experimentation

The best way to create incentives and to reform the quality of teaching is not well known, and policy will have to include experimentation with different approaches.

The best way to promote improvements in the teaching force depends upon local circumstances. Existing laws, regulations, and policies directly affect the options that are available to improve the quality of the teaching force.

Further, since most countries have done little experimentation with alternative policies and approaches, the potential approaches and their effects are generally unknown. For example, one often suggested change is to align incentives faced by teachers and school personnel with student outcomes. Fixed teacher contracts do not provide strong incentives to improve student performance and achievement. But the general alternatives of providing merit awards to teachers who perform well or school rewards to all of the personnel in schools that perform well have generally not been tried in a way that provides sufficient information for policy purposes.

Most school systems also pursue a regulatory model aimed at ensuring high quality. They mandate such things as the characteristics of teachers or aspects of school operations. This regulatory model may work in situations where there is sufficient information about the characteristics of a high quality teacher and school. Unfortunately, current knowledge generally will not support aggressive regulatory approaches designed to improve teacher quality.

The most feasible approach given the currently available information is to experiment with alternative incentive schemes. These might involve new contracts and approaches to teacher compensation, introduction of parental choice across schools, merit awards for schools, and the like. The unifying theme is that each should be designed to improve student achievement directly. For example, merit wards to teachers would be directly linked to objective information about student performance.

11 Need for evaluation

Schools cannot be improved without regular and systematic evaluation of school policies and programs.

A major impediment to reform and improvement of schools is a lack of regular information about what is working and what is not working. Too often no regular evaluation of policies and programs exists. When evaluations are conducted, they frequently focus on inputs to the system and not on student achievement and outcomes.

The previous discussions about the current state of knowledge in key areas underscores the need to assess student outcomes that are related to both new and existing programs. Without information about student performance, it is very difficult to alter programs in ways that will promote truly successful school improvement.

The key element is measuring student performance directly. Without objective data about student achievement, programs and policies often proceed in unproductive directions. Specifically, past research amply demonstrates that many good guesses about policies do not prove successful. Thus, regular monitoring is essential.

Conclusion

This booklet highlights what is known about investments in school quality. It then attempts to provide some bounds on the economics of school reform. The central messages are: first, the economic impact of reforms that enhance student achievement will be very large; second, reform must be thought of in terms of both the magnitude of changes and the speed with which any changes occur; third, based on current knowledge, the most productive reforms are almost certainly ones that improve the quality of the teaching force; and, fourth, such policies are likely to be ones that improve the hiring, retention, and pay of high quality teachers, i.e., selective policies aimed at the desired outcome.

In making decisions about schools, countries always face limited budgets. If there are the commonly accepted two objectives of expanding access and of improving quality, these objectives will conflict because they must compete for the same budget. Thus, by this standard policy makers are faced with a particularly unpleasant dilemma: choose between broad availability of schools and good schools.

An alternative view, while apparently different, is actually quite closely related. Analyses of labour market implications and the rate of return to schooling in developing countries suggest strongly that schooling is a very good investment. A year of schooling typically shows a 25-30 percent real rate of return. Such a return often looks noticeably better than other investment alternatives. At the same time, school completion rates in low-income countries are very low. These two facts do not go together. If it is such a high rate of return activity, why aren't people taking advantage of those high returns?

Work on school quality has something to say about both elements of education policy. First, the simple trade-off

story about access and quality is very misleading, if not wrong in important ways. In fact, in many circumstances there may not really be the trade-off suggested. Second, the unifying idea is that school quality may be an important explanation for the "strange" investment behaviour that does not take advantage of the available high returns.

School quality is directly related to decisions about attending schools and to promotion through schools. High quality schools raise student achievement and speed students through primary (and perhaps secondary) schools, thus limiting costs. Additionally, students respond to school quality in deciding whether or not to drop out of school. They tend to stay in high quality schools and drop out of low quality schools.

Both of these mechanisms indicate a direct relationship between the quantity of schooling attained and the quality of that schooling. Thus, studies of the rate of return to schooling which only consider quantity of schooling produce a misleading estimate of the potential gains. Estimation of the rate of return to schooling that does not account for quality differences will systematically overstate the productivity gains that are associated with additional years of schooling, because the estimates will include quality differences that are correlated with quantity. If policy simply pushes people to stay in school longer, without changing the fundamental quality of the schools, the newly-induced school completers will only get the returns associated with years of schooling and not with quality. Thus, they will not be able to gain as much as the rate of return estimates suggest.

In sum, existing research strongly points to focusing policies on quality improvements in schools. National growth plus individual earnings respond strongly to increased school quality.

References and sources of information

Barro, R. J., & Martin, X. (1995). *Economic Growth*. New York: McGraw-Hill, Inc.

Hanushek, E.A. (2003). The failure of input-based schooling policies (2003). *Economic Journal, 113* (485), F64-F98.

Hanushek, E. A. (1995). Interpreting recent research on schooling in developing countries. *World Bank Research Observer, 10(2)*, 227-246.

Hanushek, E. A., Kain, J.F., & Rivkin, S.G. (2004). The revolving door. *Education Next, 4(1)*, 77-82.

Hanushek, E. A., & Kimko, D.D. (2000). Schooling, labor force quality, and the growth of nations. *American Economic Review, 90(5)*, 1184-1208.

Hanushek, E. A., & Rivkin, S. G. (2004). How to improve the supply of high quality teachers. In Diane Ravitch (Ed.), *Brookings Papers on Education Policy 2004* (pp.7-44). Washington DC: Brookings Institution Press.

Lazear, E. P. (2003). Teacher incentives. *Swedish Economic Policy Review, 10*, 179-214.

Mulligan, C. B. (1999). Galton versus the human capital approach to inheritance. *Journal of Political Economy, 107(6)*, S184-S224.

Murnane, R. J., Willett, J. B., Duhaldeborde, Y. & Tyler, J. H. (2000). How important are the cognitive skills of teenagers in predicting subsequent earnings? *Journal of Policy Analysis and Management, 19(4)*, 547-568.

Rivkin, S.G., Hanushek, E. A., & Kain, J.F. (2005). Teachers, schools, and academic achievement, *Econometrica, 73* (2), 417-458.

Rivkin, S.G., Hanushek, E. A., & Kain, J.F.(2004). Why public schools lose teachers. *Journal of Human Resources, 39* (2), 326-354.