

Teacher Labor Markets in Developing Countries

Emiliana Vegas

Summary

Emiliana Vegas surveys strategies used by the world's developing countries to fill their classrooms with qualified teachers. With their low quality of education and wide gaps in student outcomes, schools in developing countries strongly resemble hard-to-staff urban U.S. schools. Their experience with reform may thus provide insights for U.S. policymakers.

Severe budget constraints and a lack of teacher training capacity have pushed developing nations to try a wide variety of reforms, including using part-time or assistant teachers, experimenting with pay incentives, and using school-based management.

The strategy of hiring teachers with less than full credentials has had mixed results. One successful program in India hired young women who lacked teaching certificates to teach basic literacy and numeracy skills to children whose skills were seriously lagging. After two years, student learning increased, with the highest gains among the least able students.

As in the United States, says Vegas, teaching quality and student achievement in the developing world are sensitive to teacher compensation. As average teacher salaries in Chile more than doubled over the past decade, higher-quality students entered teacher education programs. And when Brazil increased educational funding and distributed resources more equitably, school enrollment increased and the gap in student test scores narrowed. Experiments with performance-based pay have had mixed results. In Bolivia a bonus for teaching in rural areas failed to produce higher-quality teachers. And in Mexico a system to reward teachers for improved student outcomes failed to change teacher performance. But Vegas explains that the design of teacher incentives is critical. Effective incentive schemes must be tightly coupled with desired behaviors and generous enough to give teachers a reason to make the extra effort.

School-based management reforms give decisionmaking authority to the schools. Such reforms in Central America have reduced teacher absenteeism, increased teacher work hours, increased homework assignments, and improved parent-teacher relationships. These changes, says Vegas, are especially promising in schools where educational quality is low.

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Emiliana Vegas is senior education economist at the World Bank. Rekha Balu provided excellent research assistance.

Developing countries in Africa, Asia, and Latin America are struggling, just as the world's industrialized countries are, to fill classrooms with qualified teachers.¹ But the challenges they face are even more complicated. Demographers have projected that developing countries have the fastest-growing populations of people aged six to twenty-four in the world.² The swelling ranks of school-age populations are driving up demand for teachers. In accordance with the Millennium Development Goals set forth by the United Nations, every country must ensure universal primary education by 2015.³ Although the majority of children in all regions of the world except sub-Saharan Africa attend primary school, the quality of education is low and disparities in student learning outcomes are large.⁴ Children in developing countries have the lowest mean test scores in international assessments of student learning, and they often show the largest variation in test scores as well.⁵ The severe challenges facing the developing world are not unique, however. In many ways, in fact, they resemble those facing the U.S. schools with the lowest-income student populations. Could strategies used by developing countries offer lessons to policymakers in the United States seeking to improve their nation's lowest-performing schools?

Budget constraints and a lack of teacher training capacity have led developing nations to try a wide variety of reforms. Some are hiring part-time, contractual, or assistant teachers. Others are using pay incentives to attract and retain qualified teachers. Still others are trying to attract more teachers and raise the quality of teaching by experimenting with school-based management or the devolution of decisionmaking authority, including

teacher hiring and firing, directly to schools. The results in terms of student achievement vary widely, depending on the context and the country.

Teacher Labor Markets

The supply of teachers in developing countries, as in developed countries, depends on working conditions and teacher salaries, as well as on how salaries and entry requirements in the teacher labor market compare with other labor markets. Many teachers work in schools that lack adequate teaching materials or basic infrastructure. Pupil-teacher ratios, as shown in table 1, can be large: an average of 43:1, for example, in sub-Saharan Africa, though in some countries the ratio is even larger. Many teachers in developing countries cite lack of resources, such as adequate facilities, textbooks, and teaching materials, as a primary obstacle to effective teaching.⁶ Location also affects teacher supply. In most developing countries, unlike in the United States, working conditions tend to be better in urban schools and teachers prefer to work there.

Large cities in the United States have only recently begun using housing subsidies to recruit teachers to difficult-to-staff urban schools, but developing countries have long made use of housing incentives, especially for teachers in rural schools. In many poor countries, however, these subsidies have not been effective, in part because most teachers are women and most single women choose not to live alone or to transfer to rural areas for safety-related reasons.⁷

Recent research in Pakistan, however, suggests that placing secondary schools in rural areas—rather than the urban areas where they are now concentrated—may attract some teachers, as many female secondary graduates

Table 1. Teacher Characteristics, by Region

| Region | Pupil-teacher ratio | | Trained teachers (percent) | | Teacher salary (percent of GDP per capita) |
|---------------------------------|---------------------|-----------|----------------------------|-----------------|--|
| | Primary | Secondary | Primary | Secondary | Secondary |
| Sub-Saharan Africa | 43:1 | 24:1 | 69 | 78 ^a | 6.7 |
| Middle East/North Africa | 23:1 | 18:1 | 96 | 85 ^b | |
| Latin America and the Caribbean | 26:1 | 19:1 | 87 | 77 | 1.4 |
| South Asia | 42:1 | 33:1 | 62 ^a | ... | ... |
| East Asia | 22:1 | 19:1 | 96 | 71 ^a | ... |
| Eastern Europe and Central Asia | 17:1 | 12:1 | 93 ^a | ... | ... |
| OECD | 16:1 | 14:1 | ... | ... | 1.3 |

Source: UNESCO Institute for Statistics, *Global Education Digest 2003—Comparing Education Statistics across the World* (Montreal, Canada: 2002). Countries with populations of less than 1 million are excluded.

a. Data are based on 10–25 percent of the total population of the country group or region.

b. Data are based on 25–50 percent of the total population of the country group or region.

who aspire to teach higher grades can then teach in their native villages instead of moving to the cities.⁸ The strategy of recruiting local teachers and assigning them to schools close to home may also be effective in the United States, where, as researchers have shown, teacher labor markets are mostly local.⁹

Turning to compensation, in Latin America, at least, teachers do not appear to be severely underpaid compared with similar workers in other occupations.¹⁰ Lucrecia Santibáñez examined urban professional salaries in Mexico during the late 1990s.¹¹ Controlling for education, experience, and hours worked, she estimated that the hourly wage premium in 1998 was 13 percent for male secondary teachers and 30 percent for female teachers. She also analyzed salary differences among states in Mexico and found that, on average, teachers in more developed northern states earned relatively less compared with other professions than did teachers in the rest of the country.

In Chile, teachers' wages were higher, on average, than those of nonagricultural employ-

ees, but much of this difference could be attributed to the teachers' higher levels of schooling. One study demonstrated that although entry-level wages for teachers are low, teachers are compensated as well as other professionals who work in similar locations or have similar levels of education and experience.¹² And in Bolivia, a study found that the concentration of teachers in the public sector and the influence of union-negotiated contracts on teacher wages for the entire country reduced geographic variation in teacher salaries, which meant that teachers in rural areas, in particular, were better compensated than other professional workers in similar locations. In addition, union influence set teachers' wages in a way that minimized the salary differences by gender, ethnicity, and marital status that are apparent for some private sector professionals subject to market wages.¹³

In many developing countries, teacher salaries make up a large share of total public education spending—as much as 95 percent of total education costs. Governments in countries such as Uganda, Kenya, and Tanza-

nia, which have recently expanded access to primary schools, cite high spending on teacher salaries as the biggest constraint on improving the supply and quality of teacher recruits. Education advocates have suggested a variety of strategies to minimize this constraint, such as de-linking teacher salaries from civil service salaries or changing the pace at which teachers progress along the salary scale. But research has centered primarily on subsidies and incentives, such as merit-based pay and supplementary allowances (housing, transport), as discussed below.

Alternatives to Hiring Regular Teachers

Many developing countries are upgrading the training credentials required of teachers at the same time as their governments are resorting to hiring part-time, uncredentialed, or contract teachers to meet demand or cut costs. For example, in the Kyrgyz Republic, policymakers emphasized teacher training requirements even as teacher training colleges were being closed for lack of funding. One approach, which Tajikistan has tried, has been to shorten the length of teacher training programs.¹⁴ To limit expenses while responding to increased demand in the 1990s, India hired more than 200,000 “para-teachers,” while Pakistan hired contract teachers who were excluded from training and other benefits.

As in the United States, research findings on how teacher training programs affect the quality of education are, at best, inconclusive. A survey of case studies in Latin America found that several different methods of teacher preparation and training—for example, stopgap training that covers only missing skills and competences—achieved consistently poor results, thus sounding a cautionary note for U.S. education programs. The

study also found that professionalizing teacher training by elevating its status to a university degree had the paradoxical effect of causing qualified teachers to move to more remunerative professions.¹⁵

In addition, a UNICEF strategy paper warns of the cost consequences of expanding alternative teacher hiring. Even if alternative hires start at lower salaries or with fewer benefits, the study finds, they will eventually demand or qualify for higher salaries. Salary increases for a large pool of teachers can financially strain the system over the long term as much as hiring regular teachers would.¹⁶

Contract Teachers

Many developing countries are addressing shortages by turning to contract teachers—graduates of regular teacher training institutes who receive lower wages than do regular teachers (just 40 percent of civil salaries) and no benefits. Togo recently reported that as much as 55 percent of its teaching force was contractual. The strategy, though, does not appear to have been successful, as the advent of contractual hiring in Togo reduced the supply of high-quality candidates, while also raising absenteeism and creating resentment over unfair pay. A retrospective evaluation found that the performance of students taught by contractual teachers lagged behind that of students taught by regular teachers, even after controlling for prior achievement, household characteristics, and school, classroom, and teacher variables.¹⁷ Not surprisingly, schools whose limited budgets forced them to hire contractual teachers also had less pedagogic supervision and poor facilities.

Assistant Teachers

Some countries are also experimenting with hiring assistant teachers, who often have

fewer qualifications than do regular teachers and are paid at substantially lower rates. In rural areas in India, a remedial education program reached more than 15,000 students who had not attained basic literacy and numeracy skills by third grade by hiring as teachers young women from the community who lacked teaching certificates. A randomized evaluation found that after two years, the program had increased student learning by 0.39 standard deviation, with the highest gains among the least able students. This finding suggests that it is possible not only to keep poorly performing students in school but also to ensure that they do not fall behind. It is conceivable that a similar catch-up program could help U.S. cities maintain high net enrollment rates in the grades when students are most likely to drop out. Because the program in India hires local high-school-educated girls to teach classes of approximately twenty students, the average cost is less than \$5 a year for each child—far less than the average cost of outfitting classrooms with regular teachers.¹⁸ While these findings are compelling, the validity of the evaluation has been called into question on several points and it was also found that the children's gains began to fade out within one year of leaving the program.

Teacher Pay

Although some disagreement exists about the importance of the absolute level of teacher salaries in attracting qualified people to and retaining them in the profession, there is broad consensus that teacher salaries influence the type of people who enter the field and how long they remain in it. At the same time, research indicates that working conditions and regulations can counteract or amplify the influence of wages on teachers. In this section I describe how salary levels, salary structures, and scholar-

ship programs have influenced teacher recruitment, quality, and retention in developing countries.

Salary Levels

During the 1990s in Chile, teachers' real wages increased and the quality of applicants to the teaching profession improved. Between 1990 and 2002 real salaries grew 156

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percent, while the government launched a publicity campaign to encourage college students to become teachers and also created a scholarship program for outstanding students to study pedagogy. Simultaneously, the government allocated substantial additional resources to schools, in the process improving overall working conditions for teachers. Although the individual effect of each of these reforms on student outcomes remains unclear, during the period the number of teacher education applicants increased 39 percent, and the average university entrance exam score of applicants to teacher education programs increased 16 percent. Even though the number of applicants to other degree programs, such as engineering, also increased, the average exam scores of these applicants remained more or less constant. These patterns suggest that changes in salary level can affect an individual's choice to become a teacher.¹⁹

Some evidence also suggests that salary levels and salary equalization for teachers can improve student outcomes. In Brazil, a finance equalization reform that targeted redistributed funds to teachers resulted in smaller class sizes, fewer overaged children in primary and secondary schools, and a diminishing gap between high- and low-performing students. Brazil, like the United States, is a vast country characterized by large inequalities in educational spending and educational outcomes not only among states but also among different municipalities within each state. The *Fundo de Manutenção e Desenvolvimento do Ensino Fundamental e de Valorização do Magistério* (Fund for the Maintenance and Development of Basic Education and Teacher Appreciation, or FUNDEF) is a federal fund that addresses spending inequalities within states. State and municipal governments contribute a share of their tax and transfer revenues to the fund, which then redistributes revenues to the state and municipal governments in each state on the basis of the number of students enrolled in their basic education systems. The federal government also promotes funding adequacy across all states by providing supplemental funding in states where FUNDEF revenues per student are below a yearly established spending floor. These “top-ups,” which have benefited the poorer states of Brazil, located primarily in the Northeast, point to the importance of additional federal financing when state and local revenues fall short.

Unlike teacher incentive programs in several states in the United States, FUNDEF earmarks 60 percent of funds specifically for teachers, with funds going to hire new teachers, train underqualified teachers, and increase teachers’ salaries. A 2005 study found that governments that increased mandated per-pupil spending lowered average teacher-

pupil ratios; the study inferred, because there was no decrease in enrollment, that the governments hired new teachers.²⁰ The share of teachers who had completed only primary education also fell dramatically, most noticeably in Brazil’s poorer regions and in the earlier primary school grades, where higher shares of teachers had previously been underqualified. That the reform was introduced at about the same time as legislation requiring teachers to have at least a secondary education degree complicates any assessment of the results. But the 2005 study found that funds received from FUNDEF were not significantly linked with the steep decline in underqualified teachers, though FUNDEF revenue was used to train and educate teachers.²¹

The FUNDEF-related changes in educational inputs have, in turn, generated changes in student outcomes. More students are now attending school in the poorer states of Brazil, particularly in the higher grades of basic education. The reform is also linked with lower levels of overaged students in the classroom. Having qualified teachers thus appears to help students stay on track in school, repeat grades less often, drop out and reenter less often, and perhaps also enter first grade on time. Because low-performing students suffer most from inequalities in per-pupil spending, finance equalization reforms that decrease these spending inequalities may also narrow the performance gap between high-performing and low-performing students and between white and nonwhite students. Studies of school finance reform in the United States, however, have not shown consistent effects on student outcomes.²²

Salary Structure

Although teacher pay in developing countries is seldom linked to teacher performance, a few countries have recently experimented

with performance-based pay to raise teaching quality and student outcomes (see the article in this volume on performance-based pay by Victor Lavy). Because few large-scale pay-for-performance programs have been implemented in the United States, programs in developing countries provide particularly valuable evidence of the extent to which incentives affect performance.

The effect of performance-based pay depends critically on how it is designed and linked to teacher performance. Chile and Mexico, for example, have instituted different types of performance-based incentives for teachers. In Chile's Sistema Nacional de Evaluación de Desempeño de los Establecimientos Educacionales (National System of School Performance Assessment, or SNED), top-performing schools within predetermined groups earn a financial bonus for student performance; the bonus is distributed among the teachers in the winning schools. Initially Chile's school-based bonus had no effect on student performance, but a recent study found that in schools that have some likelihood of receiving the prize in each of the three years they apply, average student test scores increase slightly.²³

Mexico's Carrera Magisterial (Master Training, or CM) program, instituted in 1993, allows teachers to move up consecutive pay levels based on year-long assessments of their professional development and education, years of experience, a peer review, and, importantly, their students' performance. The awards are substantial—they can represent between 25 and 200 percent of the teacher's annual wage—and last throughout a teacher's career, just as a salary increase does. Since 1993, more than 600,000 teachers have received the lowest level of award. The Carrera Magisterial reform resembles an across-the-

board wage increase for "good" teachers and may thus be expected to have led to an increase in the quality of entering cohorts of teachers in the past decade.

A study by Patrick McEwan and Lucrecia Santibáñez examined how effective the Carrera Magisterial incentives were in improving students' test scores.²⁴ The study compared a

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group of teachers who had participated in the program but whose characteristics put them far below or above the threshold for a bonus payment with a small group of teachers who were close to, but not assured of, receiving the bonus. The study found that the mean test scores of students of teachers in the latter "incentivized" group rose by a small to moderate amount, roughly 0.15–0.20 points (less than 10 percent of a standard deviation), relative to teachers without the incentive. The effect was robust to a variety of alternative specifications and subsamples.

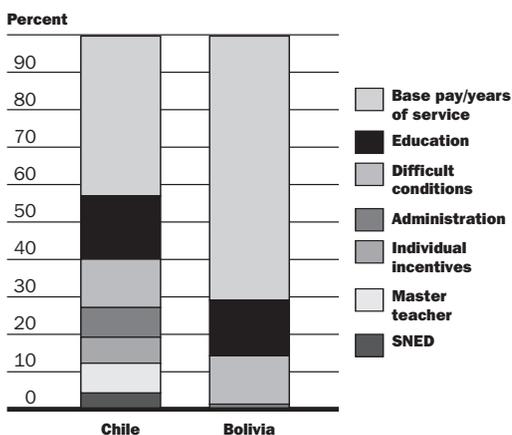
Although Mexico's Carrera Magisterial and Chile's SNED are both nationwide programs involving most of the country's teachers, only a minority of teachers has any real likelihood of receiving a promotion (in the case of Car-

raera Magisterial) or a bonus (in the case of SNED) each time they apply.²⁵ Thus, most teachers who apply have no real incentive to improve performance. To be effective, as Victor Lavy explains in his article in this volume, an incentive scheme must give all or most teachers a reason to exert extra effort.

The size of the reward relative to a teacher’s base pay also matters. When a teacher’s base salary accounts for a large share of total compensation, incentives for specific behaviors, such as working in rural schools or serving children with special needs, will be relatively less powerful. Figure 1 portrays the share of teacher pay that comes from education and training, years of service, and performance in two Latin American countries, Chile and Bolivia. In Bolivia’s pay structure—one common in both developing and developed countries—by far the largest part of a teacher’s salary depends on experience and education. Chile has tried to increase the share of teacher pay that is related to performance, but even there more than 60 percent of pay continues to depend on characteristics, such as years of service and education, that are unrelated to performance. The mixed findings on the effectiveness of performance-based pay in Mexico and Chile echo findings from the United States (again, see the article by Victor Lavy in this volume) that make clear the difficulty of designing an effective performance-based pay policy.

Some incentive programs, however, have shown some success. A nongovernmental organization (NGO) project in India used a simple financial incentive program to reduce teacher absenteeism and to stimulate teaching and better learning. The NGO initiated the program in 60 informal one-teacher schools in rural India, randomly chosen out of a sample of 120 schools; the remaining 60

Figure 1. Decomposition of Teacher Pay in Chile and Bolivia



Sources: Cristián Cox, “Las políticas educacionales de Chile en las últimas dos décadas del siglo XX,” in *Políticas educacionales en el cambio de siglo: la reforma del sistema escolar en Chile*, edited by Cristián Cox (Santiago, Chile: Editorial Universitaria, 2003); and Miguel Urquiola and Emiliana Vegas, “Arbitrary Variation in Teacher Salaries,” in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Emiliana Vegas (Washington: World Bank Press, 2005).

schools served as comparison schools. Teachers were given a camera with a tamper-proof date and time function, along with instructions to have one of the children photograph the teacher and other students at the beginning and end of the school day. The time and date stamps on the photographs were used to track teacher attendance. Salary was a direct function of attendance.

An evaluation of the program by Esther Duflo and Rema Hanna reported that it immediately reduced teacher absenteeism.²⁶ The absenteeism rate, measured using unannounced visits in all 120 schools, averaged 42 percent in the comparison schools and 22 percent in the schools under study. When the schools were in session, teachers were as likely to be teaching in both types of schools; the number of children present was roughly the same. The program also improved student achievement. A year after its start, test scores in the schools participating in the in-

centive program were 0.17 standard deviation higher than those in the comparison schools, and children were 40 percent more likely to be admitted into regular schools.

The study by Duflo and Hanna demonstrates how random assignment studies can be used to learn about program effects, though the results may be specific to the context in which they are implemented. The scheme in India was tested in a small group of one-teacher schools; the question is whether the results would be similar in different contexts. For example, would the teacher attendance effect be smaller in regular public schools or in larger schools with many other teachers who can substitute for an absent teacher? Another issue of practical importance for public policy is whether the camera mechanism would share the fate of other already existing formal mechanisms for punishing absentees: weak enforcement.

Scholarship Programs

To attract talented students to teaching, several countries in South America's Southern Cone have introduced scholarship programs. In Chile, a scholarship program for talented students covers 100 percent of tuition up to 1 million pesos in exchange for a commitment to teach for three years. Priority goes to candidates in natural sciences, mathematics, English, language arts, and basic education.²⁷ In Uruguay, where teacher education is free, scholarships are provided to talented candidates from disadvantaged backgrounds to cover their living expenses during the three years of intensive training at regional teacher training centers.²⁸ In Asia, during the 1990s Taiwan offered free pre-service education to those who had taught for five years. Researchers cite the combination of the scholarship and generous salaries and benefits for teachers relative to other professions in Tai-

wan to explain why the country's teacher retention rate remains high beyond the five-year threshold.²⁹ Such programs imply that strong relative wages and subsidized costs can have an important effect on the quality of teacher supply.

School-Based Management

Some developing countries have tried devolving directly to schools the authority to make decisions regarding teacher hiring and other administrative matters that are usually made by local, regional, or central governments. The idea behind such decentralization is to bring these decisions closer to the school, and thus to parents and students, to generate incentives and conditions to improve teaching quality and student outcomes and make teachers and schools more accountable to the community.

Several countries in Central America have introduced such school-based management reforms. In El Salvador, a retrospective evaluation found that the Programa de Educación con Participación de la Comunidad (Education with Community Participation Program, or EDUCO) has affected management practices, teacher behavior, and student outcomes.³⁰ A few important powers, most notably the ability to hire and fire teachers, have been transferred to the school, but many other decisions continue to be made primarily by central authorities. Most of the local decisionmaking power has been given to parents rather than principals. The study also finds important behavioral differences: EDUCO schools have fewer school closings, less teacher absenteeism, more meetings between teachers and parents, and longer teacher work hours than control schools. These changes in teacher behavior, in turn, are related to higher achievement in Spanish in EDUCO schools.

Another retrospective evaluation finds similar effects in Honduras's Proyecto Hondureño de Educación Comunitaria (Honduran Community Education Project, or PROHECO).³¹ Like EDUCO, PROHECO is a school-based management reform for rural primary schools. Comparing PROHECO schools to similar schools in rural areas (using propensity score matching methods to construct a credible comparison group), the study finds that PROHECO teachers are less frequently absent because of union participation, although they are more frequently absent because of teacher professional development. Teachers in PROHECO are paid less and have fewer years of experience than comparison teachers. And, as in El Salvador's EDUCO program, teachers in PROHECO teach more hours in an average week than comparison teachers; they also have smaller classes and assign more homework. In these examples, at least, decentralized schools appear to encourage greater efficiency and teacher effort.

Although the studies found little evidence that teachers in community-managed schools differ from their colleagues in conventional schools in terms of their classroom processes, planning, or motivation, PROHECO students score higher on math, science, and Spanish exams than students in similar non-PROHECO schools. This higher student achievement is, in part, explained by unique qualities and characteristics of PROHECO schools. Specifically, the more hours a week a teacher works, the higher is the mean student achievement in all three subjects. The frequency of homework is associated with higher achievement in Spanish and math. Finally, smaller classes and fewer school closings are related to higher student achievement in science.

In contrast to PROHECO and EDUCO, Nicaragua's School Autonomy program (Autonomía Escolar) was aimed initially at urban secondary schools, in particular those with higher-than-average resources. Unlike their peers in neighboring El Salvador and Honduras, parent associations and teachers in Nicaragua's autonomous schools report little decisionmaking power. A decade after the reform began, autonomous and nonautonomous schools continue to differ in much the same ways as before reform. Differences in student socioeconomic background continue to explain most differences in student achievement. The reform appears to have had no systematic effect on student learning. Although on average students in autonomous schools outscore students in traditional schools in mathematics in third grade, by sixth grade they score lower on both Spanish and mathematics tests. There is little evidence that differences between autonomous and traditional schools are responsible for these differences in test scores.³²

Some Lessons for the United States

Although developing countries differ in many ways from the United States, the inequality and poverty in some of their schools closely resembles conditions in some hard-to-staff U.S. schools. Because of their widely varying circumstances, these countries have tried many and varied reforms, often on a large scale. Their experiences with reform may provide insights for U.S. policymakers.

Clearly, educational reforms of many kinds can affect teaching quality and student learning. Research evidence supports the intuitive notion that teaching quality and student achievement are sensitive to the level and structure of teacher compensation. For example, as average teacher salaries in Chile

more than doubled over the past decade, higher-quality students entered teacher education programs.³³ Similarly, when FUNDEF increased educational resources in Brazil and distributed them more fairly, school enrollment increased and the gap in student test scores narrowed.³⁴

Once a country makes teacher salaries competitive, it can link teacher performance to pay increases to improve teaching quality. Although Chile's school-based teacher bonus for student performance did not initially affect average test scores, it has now begun to increase them modestly, under some circumstances.³⁵

The specific design of teacher incentives can have important consequences for teaching quality and student outcomes. Even in the case of nationwide performance-based-pay programs, such as those in Mexico and Chile, few teachers are likely to receive awards and thus few have any real incentive to improve student performance.³⁶ Effective incentive schemes must be tightly coupled with the desired teacher behaviors and generous enough to give teachers a reason to make the extra effort.

A key lesson from research both in the United States and in developing countries is that teachers do not always respond to incentives in predictable ways. Sometimes, programs designed to reward teachers who adopt specific behaviors or achieve higher student achievement fail to generate the desired behavioral response.³⁷ Bolivia's bonus for teaching in rural areas, for example, failed to produce higher-quality rural teachers.³⁸ And Mexico's new

teacher career system, designed to reward teachers for improved student outcomes, failed to change teacher performance—and thus to change student outcomes.³⁹ These cases highlight the importance of design and implementation issues in teacher incentive reforms.

Finally, reforms that are not specifically designed to affect teachers can nevertheless in-

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fluence—sometimes even more than changes in compensation can—the characteristics of those who choose to enter and remain in teaching, as well as their work in classrooms. School-based management reforms that devolve decisionmaking authority to the schools, for example, have had important effects on teacher performance and student learning by making teachers (and schools) more accountable to their communities. Devolution of decisionmaking authority to schools in Central America has, in many cases, led to lower teacher absenteeism, more teacher work hours, more homework assignments, and better parent-teacher relationships. These are promising changes, especially in schools where educational quality is low.

Notes

1. In this article, “developing countries” are low- and middle-income countries with high inequality or high poverty, or both.
2. United Nations Population Fund, *State of the World's Population 2005* (New York, 2005).
3. The Millennium Development Goals grew out of the agreements and resolutions of world conferences organized by the United Nations during the 1990s. The goals were accepted as a framework for measuring development progress. The eight goals are to eradicate extreme poverty and hunger; to achieve universal primary education; to promote gender equality and empower women; to reduce child mortality; to improve maternal health; to combat AIDS, malaria, and other diseases; to ensure environmental sustainability; and to build a global partnership for development. For most countries, the self-imposed deadline for achieving these goals is 2015. World Bank, “Achieving the Millennium Development Goals,” available at www.web.worldbank.org.
4. For example, though 93 percent of children in East Asia are enrolled in school, only 56 percent have progressed through grades at the expected pace.
5. As an example, while the share of students deemed to have low skills in the Program for International Student Assessment (PISA) is only 0.9 percent in Korea, 4.2 percent in France, and 6.8 percent in the United States, it is 23 percent in Brazil and 54 percent in Peru. Some countries do not participate in such assessments, however, and these findings do not reflect their outcomes. India, for instance, has not participated in the Trends in International Mathematics and Science Study or PISA.
6. Mary H. Futrell, presidential speech delivered to Fourth World Congress of Education International, Porto Alegre, Brazil, July 22, 2004.
7. Donald Warwick and Fernando Reimers, *Hope or Despair? Learning in Pakistan's Primary Schools* (Westport, Conn.: Praeger, 1995); Ya Ping Wang and Alan Murie, “Social and Spatial Implications of Housing Reform in China,” *International Journal of Urban and Regional Research* 24, no. 2 (2000): 397–417; P. J. McEwan, “Recruitment of Rural Teachers in Developing Countries: An Economic Analysis,” *Teaching and Teacher Education* 15 (1999): 849–59.
8. Tahir Andrabi, Jishnu Das, and Asim Ijaz Khwaja, “Students Today, Teachers Tomorrow? The Rise of Affordable Private Schools in Pakistan,” mimeo (World Bank, 2005).
9. D. Boyd and others, “Explaining the Short Careers of High-Achieving Teachers in Schools with Low-Performing Students,” *American Economic Review* 95, no. 2 (2005): 166–71.
10. Werner Hernani-Limarino, “Are Teachers Well Paid in Latin America and the Caribbean? Relative Wage and Structure of Returns of Teachers,” in *Incentives to Improve Teaching: Lessons from Latin America*, edited by E. Vegas (Washington: World Bank Press, 2005).
11. Lucrecia Santibáñez, “¿Están mal pagados los maestros en México? Estimando de los salarios relativos del magisterio,” *Revista latinoamericana de estudios educativos* 32, no. 2 (2002): 9–41.
12. A. Mulcahi-Dunn and G. Arcia, “An Overview of Teacher's Salaries and Living Standards in Ecuador. Center for International Development,” mimeo (North Carolina: Research Triangle Institute, 1996).
13. C. Piras and W. D. Savedoff, “How Much Do Teachers Earn?” Working Paper 375 (Washington: Inter-American Development Bank, 1998).

14. D. W. Chapman and others, "The Search for Quality: A Five-Country Study of National Strategies to Improve Educational Quality in Central Asia," *International Journal of Educational Development* 25, no. 5 (2005): 514–30.
15. Juan Carlos Navarro and Aimee Verdisco, "Teacher Training in Latin America: Innovations and Trends," Sustainable Development Department Technical Paper Series (Washington: Inter-American Development Bank, 2000).
16. Santosh Mehrotra and Peter Buckland, "Managing Teacher Costs for Access and Quality," Staff Working Paper EPP-EVL-98-004 (UNICEF, 1998).
17. Joost De Laat and Emiliana Vegas, "Do Differences in Teacher Contracts Affect Student Performance? Evidence from Togo," mimeo, 2005, Harvard University and The World Bank.
18. Abhijit Banerjee and others, "Remedying Education: Evidence from Two Randomized Experiments in India," Working Paper 11904 (Cambridge, Mass.: National Bureau of Economic Research, 2005).
19. Cristián Cox, "Las políticas educacionales de Chile en las últimas dos décadas del siglo XX," in *Políticas educacionales en el cambio de siglo: la reforma del sistema escolar en Chile*, edited by Cristián Cox (Santiago, Chile: Editorial Universitaria, 2003).
20. Nora Gordon and Emiliana Vegas, "Educational Finance Equalization, Spending, Teacher Quality, and Student Outcomes: The Case of Brazil's FUNDEF," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
21. The study used an instrumental variables approach to estimate the causal effect of FUNDEF.
22. For example, David Card and A. Abigail Payne, "School Finance Reform, the Distribution of School Spending, and the Distribution of Student Test Scores," *Journal of Public Economics* 83 (2002): 49–82, find evidence that equalization of educational expenditures across U.S. school districts led to less dispersion in SAT test scores among children of diverse socioeconomic backgrounds. But Melissa A. Clark, "Education Reform, Redistribution, and Student Achievement: Evidence from the Kentucky Education Reform Act" (Princeton, N.J.: Mathematica Policy Research, 2003), finds no evidence that the education expenditure equalization resulting from the Kentucky Education Reform Act narrowed the gap in test scores between rich and poor districts.
23. Alejandra Mizala and Pilar Romaguera, "Teachers' Salary Structure and Incentives in Chile," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
24. Patrick McEwan and Lucrecia Santibáñez, "Teacher and Principal Incentives in Mexico," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
25. *Ibid.* and Mizala and Romaguera, "Teachers' Salary Structure and Incentives in Chile" (see note 23).
26. Esther C. Duflo and Rema Hanna, "Monitoring Works: Getting Teachers to Come to School," Working Paper 11880 (Cambridge, Mass.: National Bureau of Economic Research, 2005).
27. Paula Pogre and Graciela Lombardi, *Schools That Show How to Think: Teaching to Understand, A Theoretical Mark for Action* (Argentina: Consorcio de Editores, 2004).
28. Denise Vaillant, "Reforma Del Sistema Formación Inicial De Docentes En Uruguay," paper presented at Los Maestros en América Latina: Nueva Perspectivas Sobre su Desarrollo y Desempeño, San Jose, Costa Rica, 1999.

29. Bih-Jen Fwu and Hsiou-Huai Wang, "The Social Status of Teachers in Taiwan," *Comparative Education* 38, no. 2 (2002): 211–24.
30. Yasuyuki Sawada and Andrew Ragatz, "Decentralization of Education, Teacher Behavior, and Outcomes: The Case of El Salvador's EDUCO," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
31. Jeffrey Marshall and Emanuela Di Gropello, "Teacher Effort and Schooling Outcomes in Rural Honduras," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
32. Caroline E. Parker, "Teacher Incentives and Student Achievement in Nicaraguan Autonomous Schools," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
33. Mizala and Romaguera, "Teachers' Salary Structure and Incentives in Chile" (see note 23).
34. Gordon and Vegas, "Educational Finance Equalization, Spending, Teacher Quality, and Student Outcomes" (see note 20).
35. Mizala and Romaguera, "Teachers' Salary Structure and Incentives in Chile" (see note 23).
36. Ibid.; McEwan and Santibáñez, "Teacher and Principal Incentives in Mexico" (see note 24).
37. See, for example Paul Glewwe, Nauman Ilias, and Michael Kremer, "Teacher Incentives," Working Paper 9671 (Cambridge, Mass.: National Bureau of Economic Research, 2003); Charles T. Clotfelter and others, "Do School Accountability Systems Make It More Difficult for Low Performing Schools to Attract and Retain High Quality Teachers?" *Journal of Policy Analysis and Management* 23 (2004): 251–71. Brian A. Jacob and Steven D. Levitt, "Rotten Apples: An Investigation of the Prevalence and Predictors of Teacher Cheating," *Quarterly Journal of Economics* 118, no. 3 (2003): 843–78, present some evidence of the behavioral reactions to teacher incentive mechanisms in the United States.
38. Miguel Urquiola and Emiliana Vegas, "Arbitrary Variation in Teacher Salaries," in *Incentives to Improve Teaching: Lessons from Latin America*, edited by Vegas (see note 10).
39. McEwan and Santibáñez, "Teacher and Principal Incentives in Mexico" (see note 24).