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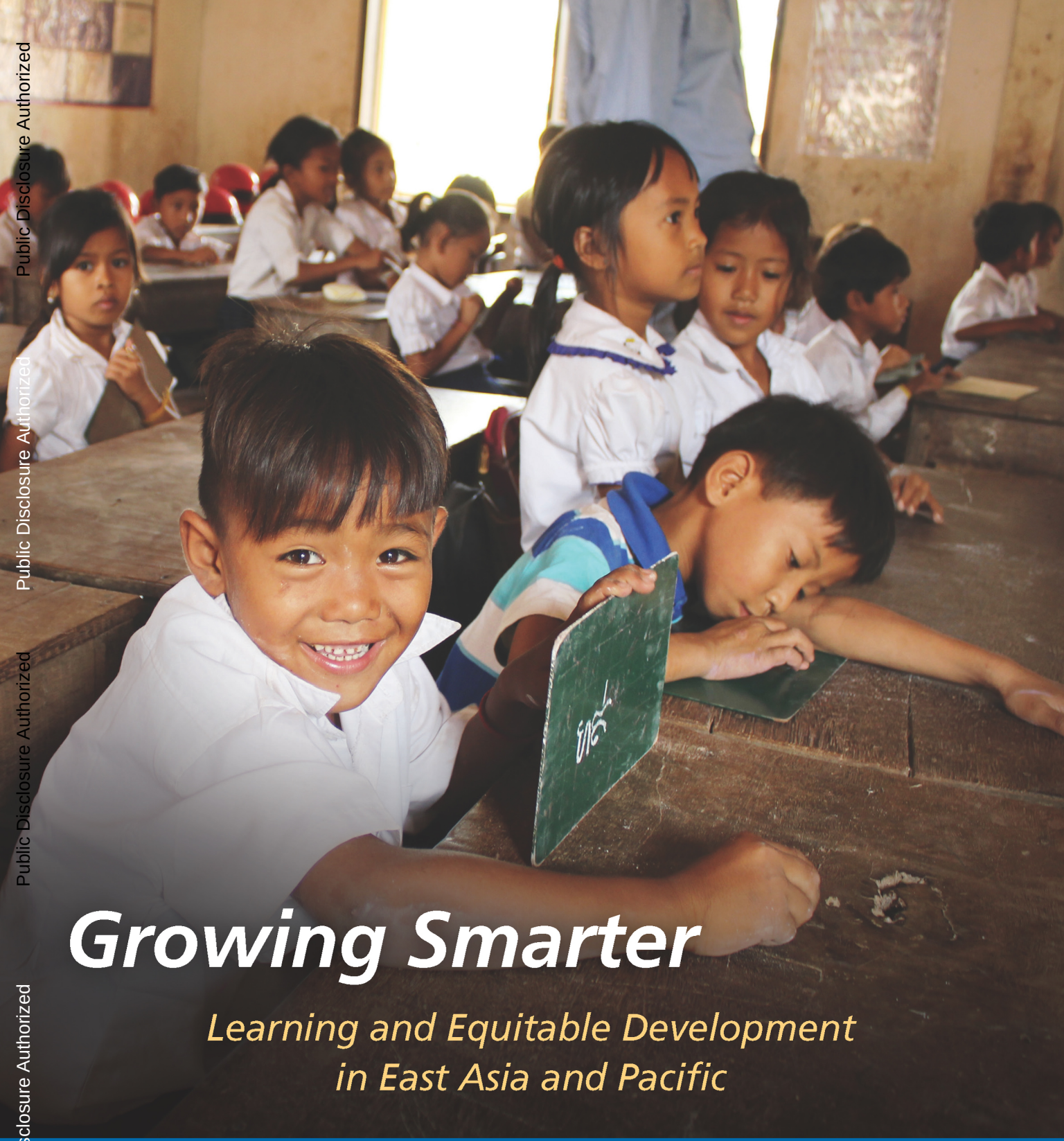

Growing Smarter

Learning and Equitable Development in East Asia and Pacific

WORLD BANK EAST ASIA AND PACIFIC
REGIONAL REPORT

WORLD BANK GROUP

Growing Smarter

WORLD BANK EAST ASIA AND PACIFIC REGIONAL REPORTS

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World Bank East Asia and Pacific Regional Report

Growing Smarter

Learning and Equitable Development in East Asia and Pacific

WORLD BANK GROUP

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Contents

Boxes

Figures

Tables

Foreword

Since 1960, economies in the East Asia and Pacific region have had both faster economic growth and greater human capital accumulation than any other. They have made large investments in improving the amount and quality of schooling to promote rapid and continual economic progress. For a handful of the region's economies, success raised both the supply of and demand for skilled labor and transformed many into prosperous and inclusive middle-income societies. Too many countries in the region, however, have fallen short of their economic aspirations and have failed to take advantage of education's promise.

Both groups are eager to learn how they can do better. Understanding the elements of success is a critically important policy priority. Countries wanting to learn so as to fuel economic growth ask themselves, What policies and practices help to promote superior learning outcomes? And, what can governments do to consistently and equitably raise aggregate learning in their national school systems? *Growing Smarter: Learning and Equitable Development in East Asia and Pacific* provides answers to these questions.

The developing world is in the midst of a global learning crisis: in an unacceptably high number of countries, schooling is not leading to learning. The *World Development Report 2018: Learning to Realize Education's Promise* focuses attention on the typical education system in the developing world—where inequalities in learning outcomes are wide and improvements in systemwide learning are often slow. These two reports complement each other, with the present report centering on policies and practices that have led national education systems in East Asia and Pacific to produce graduates with consistently high learning outcomes, and to do so equitably.

Education holds promise for macroeconomic growth and for individuals' opportunities, especially among the bottom 40 percent of income earners. Knowledge of successful policies and practices is vitally important for the World Bank's Twin Goals of inclusive growth and poverty reduction. *Growing Smarter: Learning and Equitable Development in East Asia and Pacific* focuses on the lessons that have allowed the region's economies not only to avoid learning crises but also to build and maintain high-performing education systems.

Victoria Kwakwa
Vice President
East Asia and Pacific Region
The World Bank

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Abbreviations

BKKBN	National Board on Family Planning (Indonesia)
B-S-J-G (China)	Beijing, Shanghai, Jiangsu, and Guangdong (China)
CHIP	China Household Income Project
CLASS	Classroom Assessment Scoring System
ECED	early childhood education and development
ECERS-R	Early Childhood Environment Rating Scale-Revised
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
ESC	Educational Service Contracting
FIMS	First International Mathematics Study
FISS	First International Science Study
FSQL	Fundamental School Quality Level
GDP	gross domestic product
HSEP	High School Equalization Policy
IDEO	Intergenerational Deaf Education Outreach
LUCS	Liaoning Urban Construction School (China)
MEXT	Ministry of Education, Culture, Sports, Science, and Technology (Japan)
MICS	Multiple Indicator Cluster Survey
OECD	Organisation for Economic Co-operation and Development
PASEC	Programme d'Analyse des Systèmes Éducatifs de la CONFEMEN
PEARL	Pacific Early Age Readiness and Learning
PEMANDU	Performance Management and Delivery Unit (Malaysia)
PETS-QSDS	Public Education Expenditure Tracking and Quantitative Service Delivery Study (the Philippines)
PILNA	Pacific Islands Literacy and Numeracy Assessment
PIRLS	Progress in International Reading Literacy Study

PISA	Programme for International Student Assessment
PPP	purchasing power parity
R&D	research and development
S&E	science and engineering
SABER	Systems Approach for Better Education Results
SABER-EPS	Systems Approach for Better Education Results-Engaging the Private Sector
SAR	special administrative region
SEA-PLM	Southeast Asia Primary Learning Metrics
SIMS	Second International Mathematics Study
SIRS	Second International Reading Study
SISS	Second International Science Study
STEP	Skills Toward Employability and Productivity
TALIS	Teaching and Learning International Survey
TIMSS	Trends in International Mathematics and Science Study
TVET	technical and vocational education and training
VNEN	Vietnam Escuela Nueva

Overview

Introduction

One-quarter of the world's school-age children live in East Asia and Pacific. About 40 percent of the region's students are in school systems that perform well and allow them to learn as much as or more than students anywhere in the world. But tens of millions of others are in school but not learning. Up to 60 percent of students in the region are in poorly performing school systems where performance in key subjects is either low or unknown. Many of these students have learning outcomes that are below basic proficiency levels and are greatly disadvantaged as a result.

The impressive achievements of some low- and middle-income countries in the region show that schooling in resource-constrained contexts can lead to learning for all. The policy lessons from countries that have improved education quality while expanding access are relevant and valuable to low- and middle-income countries—in East Asia and Pacific and elsewhere—to ensure that their students learn. These lessons are all the more relevant given the learning crisis facing many countries in the region and across the globe (box O.1).

Education remains a long-term process of acquiring knowledge, skills, habits, and behaviors. Current labor market conditions require new types of knowledge and skills, but they do not fundamentally alter the basic need for foundational skills or the processes for acquiring them. Reading is still the foundation for acquiring all other types of knowledge—the cognitive equivalent of the opposable thumb. Students still must master the fundamentals of math, logic, and data analysis. Being able to communicate effectively requires mastery of grammar and vocabulary—and years of practice in oral and written expression. Behavioral skills and the ability to work in teams improve through structured practice and feedback. Resilience and grit remain the glue that supports the ongoing acquisition of skills and their effective application in the workplace.

Policies that promote learning: analytical framework for this report

What policies and practices promote learning in schools? What should a country do if it wants to achieve high and equitable learning outcomes? No single explanation covers all cases, but when countries focus on five policy domains and align 15 elements within them (figure O.1), learning improves most. These policies and practices promote learning by improving the teaching and learning experience in classrooms.

BOX O.1 Complementing the 2018 *World Development Report* with regional lessons of success

The *World Development Report 2018: Learning to Realize Education's Promise* (WDR 2018) documents the dire state of learning in low- and middle-income countries, noting poor learning outcomes, high inequality, and slow progress (World Bank 2018b). It provides evidence on the myriad ways in which education systems in low- and middle-income countries are failing to ensure that students learn and calls for renewed efforts to assess learning, act on the evidence that assessments provide, and align actors for change.

Several national and subnational education systems in East Asia and Pacific fit the characterization of a learning crisis. But others offer clear examples of performance at the highest international levels—far above their predicted performance given their levels of gross domestic product (GDP) per capita.

This report complements the WDR 2018 in two ways. It focuses on the experiences of countries that expanded schooling and learning, and it showcases systems that implemented reforms at scale. By examining these experiences, the report provides both diagnosis and detailed prescriptions for improving education systems within the region and across the globe.

The WDR 2018 provides a three-tiered model of the ways in which countries can address the learning crisis: assessing learning, acting on evidence, and aligning actors to make the system work. This report presents a complementary framework that covers five policy areas. It begins with an alignment of institutions, which creates an enabling environment that cuts across the remaining policy areas: effective and equity-minded public spending, selection and support of teachers, preparation of students for learning, and systematic use of assessments to inform instruction.

Institutional alignment

The level of institutional alignment—the coherence of objectives and responsibilities especially as they relate to public spending, teachers, readiness to learn, and assessment—determines how completely and effectively policies are designed, implemented, adjusted, and evaluated. The experience of high-performing education systems in the region underscores the critical role that institutional alignment and sound administrative systems play in delivering good-quality education. Institutional alignment facilitates policy coherence and ensures that policies, goals, and incentives across key domains are in sync, so that education systems achieve their core task of producing graduates with relevant knowledge and skills rather than just credentials. The same reform may succeed in a country where institutional alignment is strong but fail in another where it is weak.

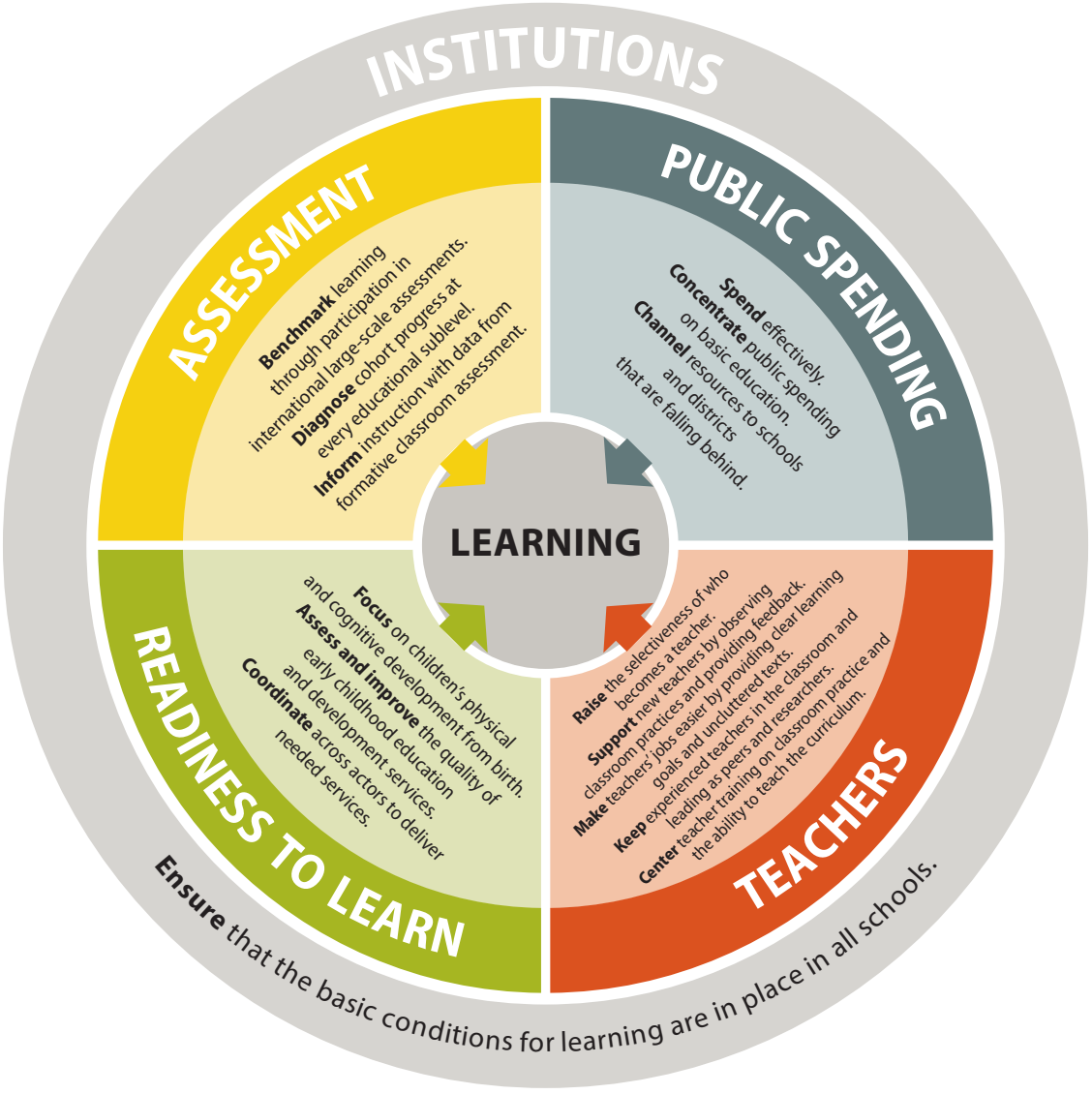
Institutional alignment allows sound administrative systems to develop and deliver the basic inputs and infrastructure needed for schools to function well. It may seem intuitive that all school systems should achieve such alignment, but too often inputs do not make it into schools and classrooms. Students who lack a desk or a textbook and teachers who lack a coherent curriculum or a chalkboard cannot be expected to engage in meaningful classroom interactions that produce learning.

When goals and incentives are not aligned, efforts to achieve learning are undermined. By contrast, when different aspects of the education system are in alignment, well-designed reforms that focus on teaching and learning can raise learning outcomes. Progress may sometimes be slow, but East Asia and Pacific provides evidence that success can accrue if reform efforts are sustained.

Public spending

Effective spending means that resources are spent to produce expected outcomes. When fewer resources can produce the same outcomes, the spending is called cost-effective or efficient. In education, effective spending is about outcomes in terms of access, learning, and equity. Top Performing Systems in East

FIGURE O.1 **Five policy domains promote learning**



Asia and Pacific all adopted three principles for effective spending of public resources: prioritizing public spending on basic education, managing essential inputs efficiently, and enhancing the equitable distribution of resources.

Teachers

A common theme across high-performing education systems is their investment in and focus on teachers. Over time, systems perform best when they have teachers who are respected, prepared, selected and advanced in their careers on the basis of merit, have clear learning goals and performance expectations for students, and are supported in their work. Teachers are a core element of East Asia and Pacific's Top Performing Systems, which have established competent, qualified, and motivated teaching forces that promote sustained learning. East Asia and Pacific systems provide many lessons for teacher recruitment, selection, support, retention, and professional development.

Readiness to learn

Readiness to learn, a multifaceted construct, is as much about children's readiness for school as it is about schools' readiness for children. This holistic concept is essential to a student's success not just in primary school but throughout life. This domain encompasses both the supply and the quality of services for children's physical and cognitive development. Strong support for families' efforts to assist in their children's academic and socioemotional development pays high dividends at low cost. Top Performing Systems in East Asia and Pacific have increasingly focused on children's physical and cognitive development, assessed and improved the quality of the services they offer, and coordinated actors to deliver needed services.

Assessment

Because the quality, not just the quantity, of schooling is crucial for growth and development, countries need to measure learning to ensure that the benefits of education reach all students. It is not enough that children are in the classroom—it is imperative to make certain that they are learning. This domain entails not only using assessments, but also having the right policies and frameworks to support a system of assessments. The Top Performing Systems in East Asia and Pacific have systematically used a mix of assessments and their data to develop their education systems, placing significant value on obtaining and using information about student learning and on employing multiple methods to assess student learning.

No single formula exists for how to achieve success. But high-performing systems share common elements and overlap in key areas in their approaches to and implementation of policies (box O.2). Increased student learning does not immediately follow from the mere presence of any or all of these elements—indeed, their quality and the degree to which they are aligned are critical.

BOX O.2 Elements of policies and practices that promote learning

The success of some education systems in East Asia and Pacific shows that students learn most when efforts focus on five policy domains and align 15 elements. These *domains* and elements are as follows:

Align institutions to ensure basic conditions for learning:
- Ensure that the basic conditions for learning are in place in all schools.

Concentrate effective, equity-minded public spending on basic education:
- Spend effectively.
- Concentrate public spending on basic education.
- Channel resources to schools and districts that are falling behind.

Select and support teachers throughout their careers to allow them to focus on the classroom:
- Raise the selectiveness of who becomes a teacher.
- Support new teachers by observing classroom practices and providing feedback.
- Make teachers' jobs easier by providing clear learning goals and uncluttered texts.
- Keep experienced teachers in the classroom and leading as peers and researchers.
- Center teacher training on classroom practice and the ability to teach the curriculum.

Ensure that children are ready to learn in school:
- Focus on physical and cognitive development from birth.
- Assess and improve the quality of early childhood education and development services.
- Coordinate across actors to deliver needed services.

Assess students to diagnose issues and inform instruction:
- Benchmark learning through participation in international large-scale assessments.
- Diagnose cohort progress at every educational sublevel.
- Inform instruction with data from formative classroom assessment.

This overview is structured as follows. The next section analyzes the state of education in East Asia and Pacific and describes performance on international assessments. The sections that follow examine each of the five framework domains, elaborating on the experience of Top Performing Systems and describing the challenges of other countries in the region. The last section discusses how countries can translate these findings into strategies and actions that improve learning.

The state of education in East Asia and Pacific

A quarter of the world's school-age children live in East Asia and Pacific—and most of them are enrolled in school

The 331 million school-age children in East Asia and Pacific represent about a quarter of the world's school-age population. Most school-age children are enrolled in school. At the primary level, the 6 million primary-age children not in school represent just 3 percent of all primary-age students. Out-of-school rates are higher at the secondary level, and some countries have troublingly high secondary-school dropout rates. But the region has made good progress in getting children into school. Just 13 percent of the world's out-of-school children live in East Asia and Pacific.

The largest education system in the region is China's, with 182 million students in basic education (National Bureau of Statistics of China 2016). National systems in five countries (China, Indonesia, Japan, the Philippines, and Vietnam) each enroll more than 10 million students. Ten countries have systems with fewer than 100,000 students. Tuvalu has the fewest students, with just 3,000.

East Asia and Pacific has made considerable progress in preschool enrollment. The region is home to roughly 119 million children of preschool age (3–6 years). In 1980, the gross enrollment rate for preschool was 13 percent; by 2014, it had risen to 76 percent. This is a much faster rate of progress than the global gross enrollment rate in preschools, which rose from 21 to 48 percent over the same period.

Improvements in outcomes for women have also been positive. In 1950, the average woman in the region had completed less than a year of schooling—well below the world average for women of 2.5 years. Six decades later, the population was more than double, and the average attainment of women had increased to 7.4 years of schooling, catching up to the global average for women. Today, girls in most countries in the region enroll and stay in school as long as or longer than most boys and learn as much or more on average.

Education systems fall into four groups

Discussions of education quality sometimes rely on assessment scores as measures of student learning. Of students in East Asia and Pacific, 55 percent are enrolled in countries or regions that have participated in at least one international standardized assessment since 2000. The Programme for International Student Assessment (PISA) of the Organisation for Economic Co-operation and Development (OECD) and the Trends in International Mathematics and Science Study (TIMSS) provide comparable information on learning outcomes in reading, math, and science. Early Grade Reading Assessments (EGRAs) provide information on children's ability to read, but their results are not comparable across countries.

Countries can be divided into four performance groups (box O.3 and table O.1):

- Top Performing Systems consistently score more than half a standard deviation above the average score for OECD member countries (equivalent to 1.6 years of schooling).
- Above-Average Performing Systems consistently score up to half a standard deviation above the average score for OECD member countries.
- Below-Average Performing Systems consistently score at least half a standard deviation below the OECD average.
- Emerging Systems do not regularly participate in globally comparable standardized tests, but evidence from other sources suggests that learning is very modest.

BOX O.3 Nomenclature in this report

This report uses several terms with meanings that may not be familiar to some readers. The term *economies* refers to nonstate areas and regions. It includes entities such as Hong Kong SAR, China; Macao SAR, China; Taiwan, China; and the four regions of China that participated in the Organisation for Economic Co-operation and Development's (OECD's) 2015 Programme for International Student Assessment (PISA) exams. *Countries*, by contrast, refers to recognized World Bank member nations.

The terms *Top Performing Systems*, *Above-Average Performing Systems*, and *Below-Average Performing Systems* refer to the education systems of economies and countries that have participated in PISA and the Trends in International Mathematics and Science Study (TIMSS) since 2000 and are categorized by their scores. The term *Emerging Systems* refers to systems with no globally comparable standardized test scores. These terms are capitalized throughout the report to highlight the specific designations of systems with regard to test scores. When references to performance are not capitalized, they do not refer to this grouping by test score.

China has not participated in PISA as a country. In 2009 and 2012, only the province of Shanghai participated. In 2015, the more economically advanced regions of China—Beijing, Shanghai, Jiangsu, and Guangdong (B-S-J-G)—participated. For convenience, this group is referred to as B-S-J-G (China). The B-S-J-G provinces have only 15 percent of China's pretertiary student population.

TABLE O.1 Education systems in East Asia and Pacific can be categorized into four performance groups

Group	Economy	Total number of students (millions)	Number of students assessed by PISA/TIMSS[a] (millions)	Number of students assessed by EGRA (millions)	Share of cohort tested (%)[b]
Top Performing Systems (average score = 556)	Hong Kong SAR, China; Japan; Korea, Rep.; Macao SAR, China; Singapore; Taiwan, China	24.1	24.1	—	100
Above-Average Performing Systems (average score = 512)	China, Vietnam	198.7	39.7[c]	—	20
Below-Average Performing Systems (average score = 406)	Indonesia, Malaysia, Philippines, Thailand	92.3	92.3	21.7	100
Emerging Systems	Brunei Darussalam; Cambodia; Fiji; Kiribati; Lao PDR; Marshall Islands; Micronesia, Fed. Sts.; Mongolia; Myanmar; Palau; Papua New Guinea; Samoa; Solomon Islands; Timor-Leste; Tonga; Tuvalu; Vanuatu	16.3	0.5	5.1	35
Subtotal			156.6	26.8	
Total		**331.4**	**161.7[d]**		**48**

Sources: OECD 2015; TIMSS 2015; data from World Bank EdStats (World Bank, various years). Data are the latest available data for each economy.
Note: The average score in Organisation for Economic Co-operation and Development countries was 497. — = not available. EGRA = Early Grade Reading Assessment; PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.
a. PISA is taken by 15-year-olds (typically grade 10). TIMSS is taken by students in grades 4 and 8.
b. When sample-based tests are used, the share refers to the sample base measured.
c. China as a country has not participated in PISA. Scores are for the more economically advanced regions of Beijing, Shanghai, Jiangsu, and Guangdong, which are home to 15 percent of China's pretertiary student population.
d. This figure combines the number of students tested by PISA/TIMSS with the 5.1 million students tested by EGRA. Countries are not double counted in totals.

About 40 percent of tested students in the region are enrolled in systems that have high learning outcomes

High-quality test data suggest that roughly 64 million students in East Asia and Pacific are learning at high levels, but that 98 million are in systems in crisis (figure O.2). These data are based on a composite constructed average of PISA and TIMSS performance on the nine iterations of these assessments since 2000 (for PISA) and 2003 (for TIMSS).[1] As of these dates, the two tests used a common scoring system (an average of 500 points, with a 100-point standard deviation). For PISA, 30 points is equivalent to one year's worth of learning.

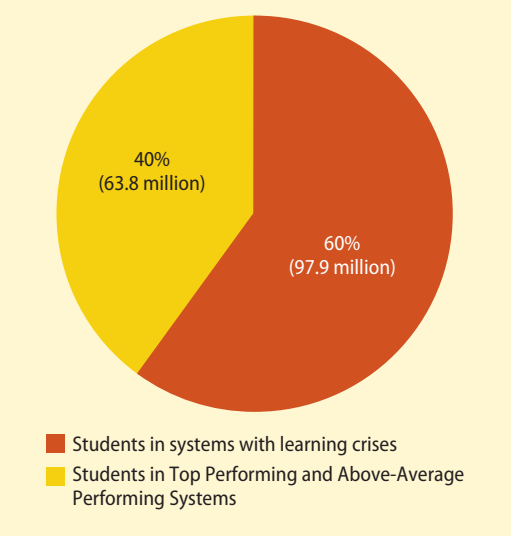
Figure O.3 shows the distribution of test scores. It reveals that students in both developed and developing systems perform well on PISA and TIMSS.

East Asia and Pacific dominates the ranks of top scorers, with 6 of the top 10 and 8 of the top 20 scores since 2000. The Top Performing Systems include seven economies with an average score above 550 points—equivalent to 1.6 more years of learning than the average OECD member country. These systems enroll 24 million students, or 7 percent of the region's students.

All of the highest scorers are middle- or high-income countries. But some low- and middle-income countries perform well, too. Average performance in Vietnam and in B-S-J-G (China) surpassed OECD member countries (table O.2). These systems enroll about 40 million students, or 12 percent of the region's students.[2] Their performance is proof of concept that a low- or middle-income country can produce students who learn as much as or more than students from high-income countries.

The average score of students in Below-Average Performing Systems was 106 points lower than that of their low- and middle-income peers in the Above-Average Performing group—a difference equivalent to more than three years of learning. Indonesia, Malaysia, the Philippines, and Thailand form this group. Their 92 million students represent 27 percent of all students in East Asia and Pacific.

FIGURE O.2 Sixty percent of students in East Asia and Pacific are in education systems that are in crisis



Source: Calculations based on a composite constructed average of PISA and TIMSS performance on the nine iterations of these assessments since 2000 (for PISA) and 2003 (for TIMSS).
Note: PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

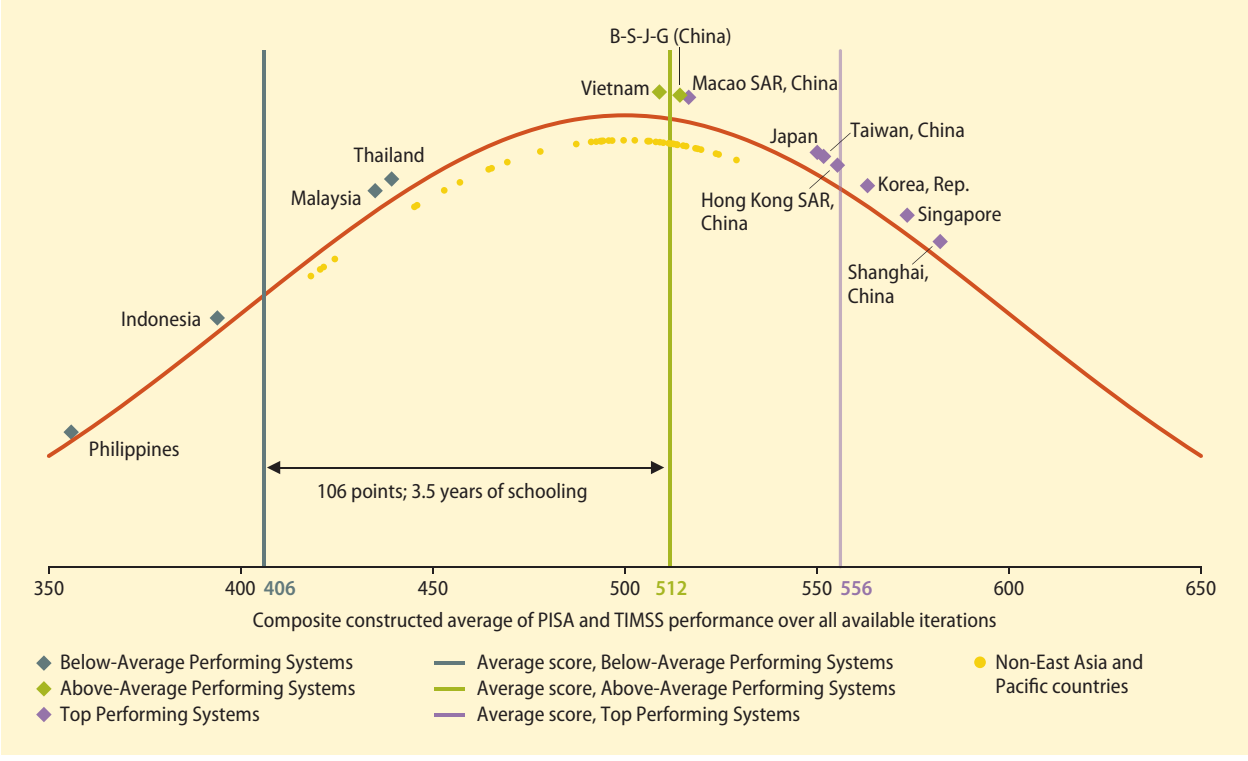
A disproportionate share of students who perform at the highest PISA levels are from East Asia and Pacific

Only 1 of 20 test takers attains the two highest proficiency levels on PISA. Students from East Asia and Pacific represent 34 percent of test takers, but 48 percent of students who reach the two highest levels of proficiency in science and 40 percent of students who do so in math. Vietnam and B-S-J-G (China) combined have slightly fewer students than the United States, but twice as many top math performers (figure O.4).

Learning outcomes in East Asia and Pacific are distributed across income quintiles more evenly than they are in the OECD

Students in every income quintile in Top Performing Systems and Above-Average Performing Systems score better than their

FIGURE O.3 Students in China and Vietnam are among the top performers in developing East Asia and Pacific



Sources: Calculations based on PISA and TIMSS scores on nine assessments since 2000 (for PISA) and 2003 (for TIMSS).
Note: Figure shows composite constructed average performance score with mean of 500 points and standard deviation of 100 points. The Philippines has only participated in TIMSS. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

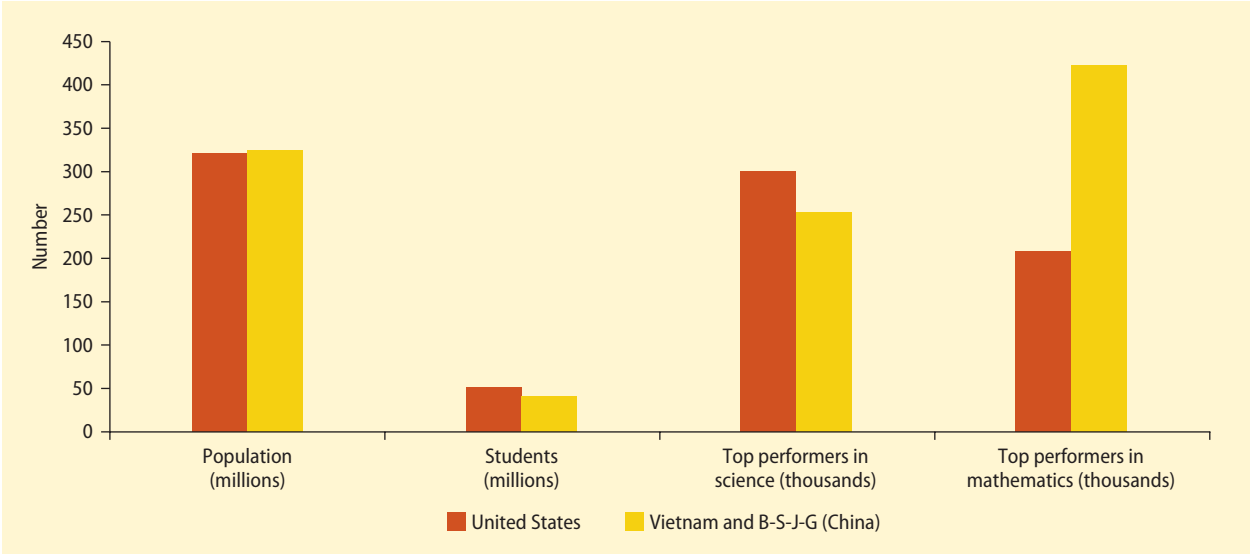
TABLE O.2 PISA scores on science in East Asia and Pacific are higher than predicted based on per capita income

Economy	GDP per capita in 2015 or latest (2011 international dollars)	Mean PISA science score in 2015		Difference between actual and predicted	
		Actual	Prediction based on income	Score	Equivalent years of schooling
Top Performing Systems					
Japan	35,804	538	479	59	2.0
Korea, Rep.	34,387	516	477	39	1.3
Singapore	80,192	556	516	40	1.3
Above-Average Performing Systems					
B-S-J-G (China)	22,037	518	457	61	2.0
Vietnam	5,668	525	394	131	4.4
Below-Average Performing Systems					
Indonesia	10,385	403	422	–19	–0.6
Malaysia	25,308	443	463	–20	–0.7
Thailand	15,345	421	440	–19	–0.6

Source: OECD 2016–17.
Note: The Philippines is not included because the country has not participated in PISA. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); GDP = gross domestic product; PISA = Programme for International Student Assessment.

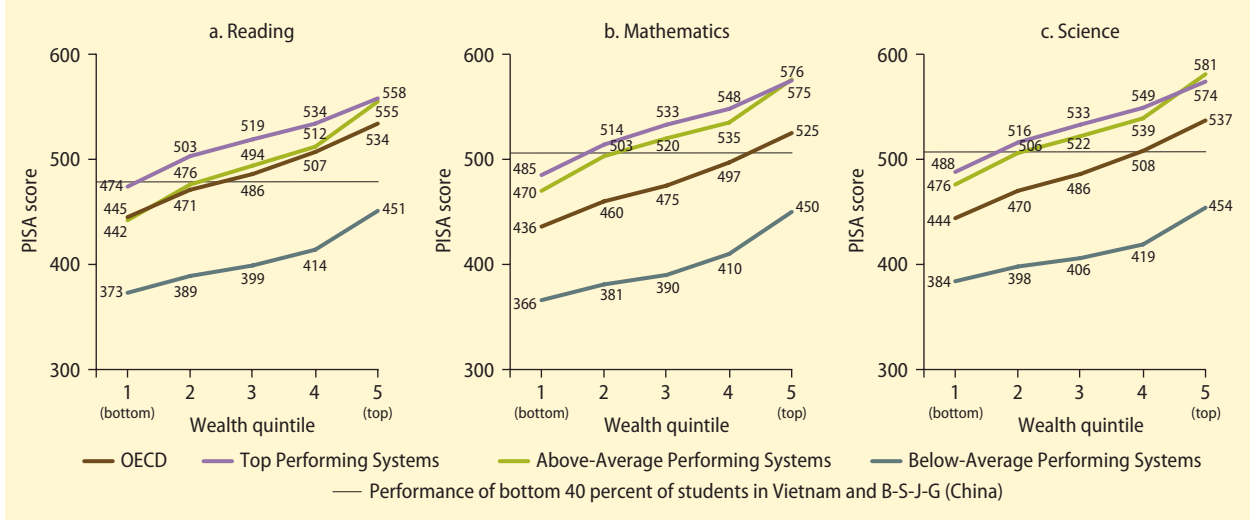
counterparts in the OECD in math and science. For Vietnam and B-S-J-G (China), this achievement is remarkable, given their lower incomes and scarcer resources for education. Students from the second-lowest income quintile scored above 500 on the 2015 math and science assessments (figure O.5). These results indicate that, for many students in East Asia

FIGURE O.4 Vietnam and Beijing, Shanghai, Jiangsu, and Guangdong (China) have more top performers than the United States on PISA mathematics assessments



Source: OECD 2016–17.
Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment.

FIGURE O.5 In Vietnam and Beijing, Shanghai, Jiangsu, and Guangdong (China), even poor students learn more than their OECD counterparts



Source: OECD 2016–17.
Note: The economies included in Top Performing, Above-Average Performing, and Below-Average Performing Systems are listed in table O.1. The horizontal line in each panel indicates the performance of the bottom 40 percent of students in Vietnam and B-S-J-G (China), which exceeded or matched the OECD average in mathematics and science. The top and bottom wealth quintiles refer to children who come from families with the top 20 percent and the bottom 20 percent of household income, respectively. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment.

and Pacific, poverty is not educational destiny. The quality of policies and practices and what happens in school—rather than spending or students' socioeconomic background—determine how much students learn.

High PISA subscores belie the myth of rote learning

Casual observers and stylized facts have sometimes conspired to attribute the region's high

scores to overreliance on rote learning and a lack of deep understanding of what is learned. The empirical evidence shows these assertions to be false. The three PISA subscores in math measure the ability to recognize and set up problems, perform mathematical operations, and interpret the meaning and significance of results. Vietnam scored above the OECD average on all three subscores in 2012. These scores indicate mastery of a full range of superior math abilities for complex problems. They are incompatible with rote learning without conceptual understanding.

Roughly 60 percent of students in East Asia and Pacific are in systems facing a learning crisis

The 92 million students in Below-Average Performing Systems have both low scores and low measured levels of learning. Students in the 90th percentile in these countries struggle to score as high as students in the 10th percentile in China and Vietnam. The distribution of scores does not overlap with that of countries in the Top Performing Systems. In the worst cases, scores are little better than would be obtained by random guessing.

Early Grade Reading Assessments indicate serious learning challenges in Emerging Systems

Information on countries that do not participate in international tests can be gleaned from the results of reading assessments conducted in early grades, usually first to third grade. EGRA scores are not comparable across countries, but the number of students who cannot read a single word at a given age provides a general picture of educational performance in the early primary years. In Cambodia, Timor-Leste, and Vanuatu, more than 30 percent of second graders cannot read a single word.

Differences in performance emerge after students enter primary school

PISA performance at age 15 represents the accumulation of high-quality schooling over many years rather than rote learning or test-taking skills. Data from the Young Lives initiative, which closely follows cohorts from birth through secondary school, show that when they start primary school, Vietnamese children have cognitive skills and abilities that are similar to peers in three comparator countries. By third grade, however, Vietnamese students are way ahead of their low- and middle-income peers in math. At ages 10 and 12, the average Vietnamese student performs better than all but the top students in Ethiopia, India, and Peru.

Continuous improvement of performance has accompanied "progressive universalism"

A recurring theme among top performers is continuous improvement, a trend that is evident from internationally comparable standardized tests. Altinok, Diebolt, and Demeulemeester (2014) calculate long-term trends on quality of schooling for 24 mostly high-income economies with sufficient data. The three highest average annual growth rates of achievement belong to East Asian economies: Singapore (0.98 percent); the Republic of Korea (0.90 percent); and Hong Kong SAR, China (0.55 percent). All of these rates are three to six times the average rate of improvement (0.165 percent). Japan improved at about the average rate. Thailand's scores declined at an average annual rate of 0.26 percent. Box O.4 details the region's successes in sustaining economic growth and in improving educational outcomes.

BOX O.4 Education and the extraordinary record of growth in East Asia and Pacific

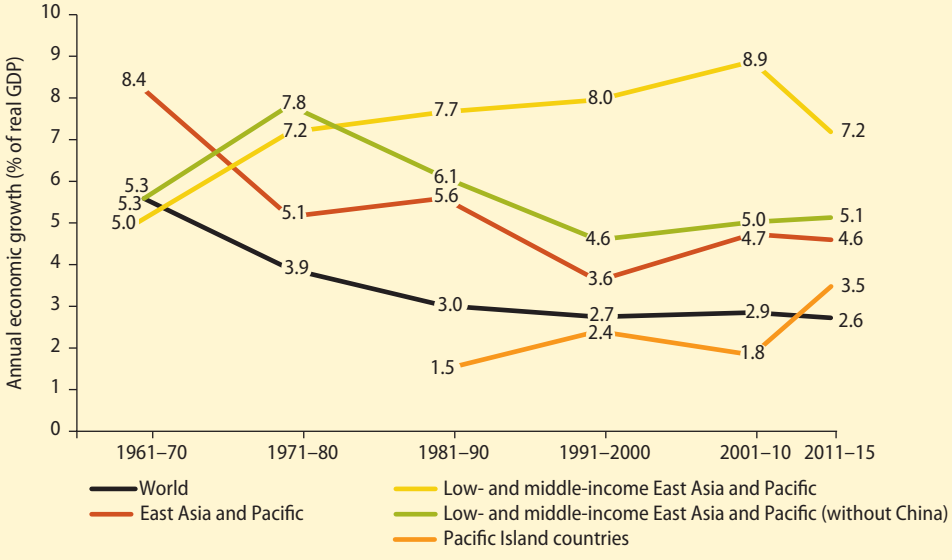
Continuous robust economic growth has made East Asia and Pacific a high- and middle-income region. Since 1960, East Asia and Pacific has grown faster and sustained high growth longer than any other world region (figure BO.4.1). Progress has been remarkable, especially among the region's low- and middle-income economies, which grew at more than twice the world average in 1960–2015 (7.2 vs. 3.5 percent). Even excluding China's spectacular growth, low- and middle-income countries in East Asia and Pacific grew more than 2 percentage points faster than the world average for nearly half a century. In 1970–2010, growth among low- and middle-income countries in East Asia and Pacific was almost twice the world average (5.9 vs. 3.1 percent). No other low- or middle-income region comes close to matching this record of steady and rapid long-term growth.

In some cases, growth transformed countries from poor agricultural societies to modern knowledge economies. Their success deeply shaped the core advice from economists and policy makers on how to achieve prosperity. Nine of the 13 economies studied by the Commission on Equitable and Sustainable Growth (the Growth Commission) were in East Asia and Pacific. This stellar growth raised per capita income by a factor of at least 10. The East Asia and Pacific region's economy in 2015 was 10 times larger than it would have been if it had grown at average world rates since 1960. Today, these economies account for 30 percent of global output (up from just 7 percent in 1990).

As recently as 1991, two-thirds of East Asians worked in agriculture, most as low-income smallholders; by 2012, that figure had dropped to one-third. Rising formal employment, wages, and productivity have made the typical East Asian an educated urban dweller rather than a farmer with little schooling.

Countries pursued a broad set of complementary policies to accelerate growth, with education at the forefront. To sustain high growth rates, governments insulated technocratic policy makers from politics and allowed a set of policies to be consistently pursued. Policy makers tried to reduce inequality, first by boosting rural incomes and then by promoting educational opportunity and outcomes. Policies also improved labor force abilities and skills, mostly through increased schooling, and made education

FIGURE BO.4.1 Growth in East Asia and Pacific has exceeded global averages for decades, 1961–2015



Source: Data from World Development Indicators (World Bank, various years).
Note: Figures are based on real gross domestic product (GDP) in U.S. dollars. Base year is 2010. Low- and middle-income East Asia and Pacific includes all countries and economies in the region except Japan, the Republic of Korea, and Singapore. Pacific Island countries include Fiji, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, Palau, Samoa, the Solomon Islands, Tonga, Tuvalu, and Vanuatu.

box continues next page

BOX O.4 Education and the extraordinary record of growth in East Asia and Pacific *(continued)*

broadly relevant to current and expected future economic challenges. Governments also sequenced reforms and took action for the next phase before the benefits of the current phase were exhausted.

Some countries went from rural agricultural societies to high-tech knowledge economies. Japan, the Republic of Korea, and Singapore set their education policy goals within a larger framework that sought to eliminate technology gaps with the world's most advanced countries. Their goal was to create domestic capacity to produce knowledge and technology that was new to the world. Long-term increases in productivity depend on continuously improving and applying new technologies, which in turn increases demand for more highly skilled workers. Once countries imparted basic skills to one cohort of workers and put them successfully to work, they raised the skills bar for the next cohort.

Education raised productivity among farmers and promoted structural transformation. Investments in education paid off at all education and income levels, not just for people who worked in high-tech jobs and industries. Countries pursued policies in agriculture to create environments for the poorest and most vulnerable to lift their income by raising their productivity. Rural dwellers with education—even when limited to a few years of primary school—consistently outproduced and outearned their less educated neighbors.

Poverty rates dropped substantially as jobs and income-earning opportunities grew. Growth has been accompanied by unprecedented drops in poverty rates and the near elimination of extreme poverty in many countries. In 1981, as many as four of five people in East Asia and Pacific lived on less than the extreme poverty threshold of US$1.90 a day purchasing power parity (PPP). In 2017, fewer than 2 percent of people lived in extreme poverty, and three of five were economically secure. Still, gains are fragile, and further progress is needed to consolidate them. Even though national poverty rates have declined sharply, many people risk slipping back into poverty.

Educational attainment increased dramatically to converge with the global average. In 1950, the average adult in East Asia and Pacific had only 1.3 years of schooling—less than half the prevailing world average of 2.9 years. By 2010, average attainment was more than six times higher than it had been and converged on the world average, which had risen to eight years. This increase in average schooling occurred as the population more than doubled.

Trends in attainment continue to climb, with more and more students completing secondary school and proceeding to tertiary studies. Schools today provide twice as many students with more than six times as much instruction. For 40 percent of the region's students, this expansion was accompanied by high levels of learning. For the remaining 60 percent, the systems in which they study still struggle to ensure that more schooling equals more learning.

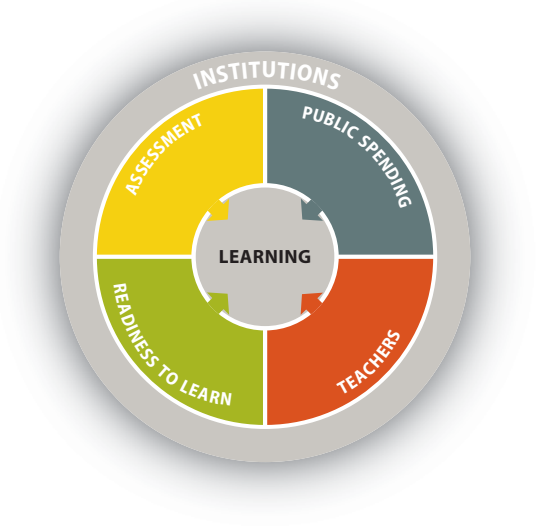
Demand for educated workers has increased more rapidly than supply. Income and the ability to earn it are the keys to poverty reduction. Nowhere has this been truer than in East Asia and Pacific over the past several decades. Much of the value of education lies in its ability to make workers more productive, raising their incomes. As educated workers become more numerous and common, their wages will fall if all other things remain equal. But all other things have not remained equal. Amid the massive increases in educational attainment, the demand for educated workers has risen more rapidly than the supply. Wage premiums have remained stable or risen, even though many more educated workers are seeking work.

The legacy of equitable growth is now under threat. Since 1990, Gini coefficients and other measures of inequality have shown a growing gap between rich and poor. In countries such as China and Indonesia, distorted access to high-quality education is driving inequality. Additional efforts to make high-quality education available to everyone will help to stem and reverse rising inequality.

Policies of "progressive universalism" were key to ensuring equitable distribution of educational opportunities at the outset. If investments in education do not keep pace with demand, technological change promotes inequality, as income accrues to a small group of highly skilled workers. Economies were able to reduce inequality while they grew rapidly partly because of the equitable distribution of basic educational opportunities. Policies of progressive universalism—focusing on primary and lower-secondary education for all—were a key means of ensuring that skills grew in response to increased demand.

Sources: Barro and Lee 2013; Dollar and Kraay 2002; World Bank 2014; World Bank 2018a.

Align institutions to ensure basic conditions for learning



The experience of high-performing education systems in East Asia and Pacific underscores the critical role of institutional alignment and sound administrative systems at a variety of levels to implement policies and reforms that ultimately raise learning outcomes in schools. Institutional alignment is a critical component of ensuring that policies across domains are synchronized and then implemented, adjusted, evaluated, and revised to foster continuous improvement. From ensuring safe, adequate physical space for students to developing curricula with a framework for learning, institutional alignment can be a key determinant of how much the ideas that underpin policies are translated into reality for teachers and students in classrooms. Students who lack desks or textbooks or teachers whose training is unrelated to the demands of delivering the curriculum cannot reasonably be expected to engage in meaningful classroom interactions that produce learning.

Political support for investment in education should be anchored on jobs and social mobility

High-performing economies in East Asia and Pacific had great success in creating industries that offered employment at scale and thus were able to accelerate the structural transformation of their economies, but they also had few social safety nets. Secure employment in the modern industrial sector served as both a ladder for social mobility and a cushion against the lack of government-provided social safety nets. Policies offered a vision in which parents saw their children securing jobs after completing increasing years of school. Initial successes in employment of graduates in these newly created industries reinforced both the demand for schooling and the value parents placed on achievement for their children.

Sound administrative systems start by putting in place the basic conditions for learning

Research shows a positive and statistically significant relationship between basic inputs such as blackboards, libraries, and school infrastructure (including walls, ceilings, and roofs) and learning outcomes.

Experience in the region indicates that a single national curriculum was critical to the success of the Top Performing Systems. These curricula generally focused on a clear and unambiguous set of learning goals. Unified curricula were part of the trend of simplifying the educational endeavor, especially when capacity was low, allowing these systems to focus on a narrower set of goals.

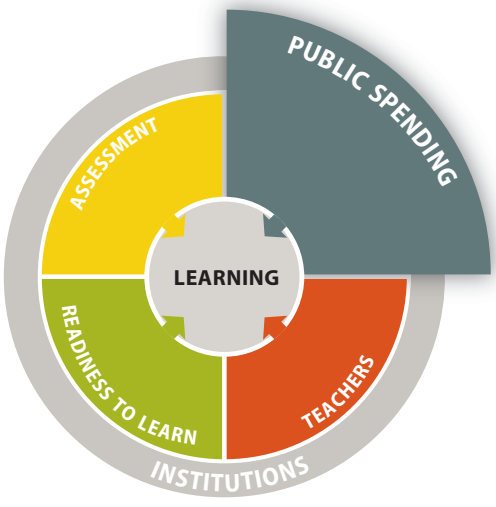
Just as governments exercised firm control over the curriculum and dictated qualification standards for teachers, many mandated a single set of textbooks, which some experts believe helps to ensure that the prescribed curriculum is implemented across the system. This approach better fulfills the promise of equity and quality in education when teacher competency is low and the capacity to train teachers is limited.

Strong institutions allowed systems to expand access and improve quality

Korea and Singapore established goals for compulsory education in the 1950s and 1960s, respectively. They took no more than five years to achieve universal primary education.

For Korea, evidence of progressive universalism is apparent in its sequential expansion of first primary and then junior-secondary school. China and Vietnam launched similar goals almost a decade apart and fulfilled them in 2000. Public spending signified the state's desire to ensure that basic education was provided broadly and was high quality.

Concentrate effective, equity-minded public spending on basic education



Across the region, countries that spent educational resources effectively concentrated on three key tasks: prioritizing basic education, managing essential inputs, and spending to promote equity. They also recognized that the quality of spending, rather than the quantity, has the greatest impact on learning. They therefore avoided setting artificial or arbitrary targets for allocating a certain share of GDP or public expenditure to education.

Public spending on education does not correlate with learning

Public spending on education as a share of GDP varies widely, worldwide and within East Asia and Pacific. No clear patterns emerge among the four groups of countries, although historically the region's high-performing countries spent a large share of government resources on basic education. Public spending per student continued to grow in real terms, even as it moderated as a share of GDP and government spending.

Solid initial public investment among high-performing economies ensured strong foundations for education systems later. Singapore spent almost a third of its national budget on education in 1952. This share declined steadily as income rose. It now stands at just over a fifth. In Korea, education accounted for 14.3 percent of the total budget in 1963; spending grew to 20.4 percent by 2000 before falling to 12.8 percent in 2013 (OECD 2016b; Wong 2017). In Japan, 14.5 percent of government expenditure went to education in 1955. Spending stayed at that level for much of the next 30 years, before declining to 8.1–9.3 percent in 2009–13, one of the lowest rates among OECD countries (OECD 2016a; Wong 2017).

High-performing economies prioritized public spending on basic education

High-performing economies in East Asia and Pacific sequenced their investment focus from basic to tertiary education over time. Jimenez, Nguyen, and Patrinos (2012) argue that countries that aim to build strong human capital for economic growth should prioritize spending public resources on basic education to deliver good-quality and universally available education at that level before devoting more spending to higher levels of education.

As the economies of the Top Performing Systems grew and demand for highly skilled workers rose, they directed increasing shares of education spending to higher levels of education. Their central control of the education budget enabled them to ensure sustained investments and often provided direct input into how resources were spent. This influence helped to keep schools and districts accountable for results.

Historically, most wealthier countries used to allocate more to lower levels of education. However, Vietnam still prioritizes public investment in primary and secondary education more than the Top Performing Systems do. China also prioritizes investment in primary, vocational, and preschool education (OECD 2016c).

Even as they increased spending on higher levels of education, high-performing economies continued raising per student spending on primary and secondary education in absolute terms to enhance the quality of education at those levels. Korea and Singapore doubled real spending per student on basic education, and absolute spending per student rose in Japan between 2000 and 2013. In Japan and Korea—where tertiary education is largely privately financed—public per student spending on tertiary education has never exceeded spending for basic education.

High performers managed essential inputs efficiently

High-performing East Asia and Pacific systems manage two essential financial inputs efficiently: spending on teachers and spending on school infrastructure. They allocate enough resources to attract and retain the best staff, with salaries and benefits that appropriately reward experienced teachers with proven classroom performance.

Singapore adjusts salaries for teachers frequently, offers other compensation, and links bonuses to performance appraisals. In Korea, teachers with more than 15 years of experience outearn their peers in many private sector jobs. In both Japan and Korea, teachers with more than 15 years of experience (and whose performance has been routinely assessed) enjoy salaries that are, respectively, 125 and 140 percent of per capita GDP—far higher than the OECD average of 107 percent. The high reward for experience is a likely reason for the extremely low annual teacher attrition rates in high-performing economies in East Asia and Pacific—less than 3 percent on average, against 6 percent in most Western European countries and 8 percent in the United States (Wong 2017).

Teachers' salaries correlate with student performance in economies with per capita GDP above US$20,000 a year. Vietnam has been a much better performer in PISA than Thailand, where teachers are better paid than in Vietnam. In Indonesia, to meet the 2002 constitutional mandate to allocate 20 percent of the government budget to education, teacher salaries increased sharply over the last decade, but without observable gains in learning outcomes (World Bank 2013). In Malaysia, teachers earn more than twice as much as GDP per capita, but student performance is worse than in Thailand, where teachers earn 25 percent more than GDP per capita.

Class sizes in high-performing systems tend to be larger than the global average, but student-teacher ratios are not higher than the corresponding OECD average. Countries that lowered student-teacher ratios well below OECD averages did not enjoy improved student performance. Since 2000, both Indonesia and Malaysia have reduced their ratios by more than 50 percent—to below the OECD average of 16 students per teacher in secondary school—without improving learning outcomes.

A lack of basic school facilities remains a challenge throughout East Asia and Pacific, except among its top performers. Reasons for poor school conditions may include insufficient public spending on school infrastructure, limited access to water and electricity in rural areas, and difficult and costly construction conditions. Many schools in Indonesia and the Philippines do not meet basic standards for sanitation facilities, desks, chairs, or sufficient space per student.[3] In the Lao People's Democratic Republic, only 32 percent of schools have handwashing facilities and only 29 percent have working electricity (light) in classrooms (Demas, Khan, and Arcia, forthcoming). Rural schools in Thailand that serve the most disadvantaged

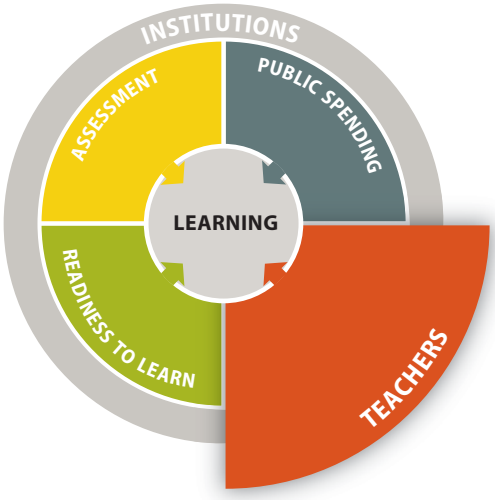
students fall dramatically short of having the adequate facilities and conditions that urban schools have (World Bank 2015).

Top Performing Systems spent to promote equity

In the East Asia and Pacific region's Top Performing Systems, the central government plays a key role in equalizing education funding across the country. In Japan, the central government subsidizes prefectures (equivalent to states or provinces) to equalize public resources. For nine-year compulsory education, prefectures fund two-thirds of the cost of teachers' salaries, and the central government subsidizes the remaining third, to help to equalize the quality of teachers across municipalities and schools. Disadvantaged schools have the same share of qualified teachers as advantaged schools and more teachers per student. At the upper-secondary level, students from low-income families are exempt from tuition fees for public schools; they receive financial support to pay tuition fees for private schools and scholarships to cover financial obligations other than tuition costs, such as school trips and textbooks. In Singapore, the government provides merit-based scholarships and other financial assistance for all students as well as tuition subsidies for students from low- and middle-income families to attend independent schools (National Center on Education and the Economy, n.d.).

Of the Above-Average Performing Systems, Vietnam allocates more spending per capita to geographically disadvantaged provinces and districts and pays teachers serving in disadvantaged areas higher salaries than teachers in cities, through various types of allowances. In China, reducing inequalities in education is a government priority. The government has gradually integrated the compulsory education funding guarantee in rural areas. By 2010, 97 percent of the total educational investment in rural compulsory education came from the government budget (OECD 2016c).

Select and support teachers throughout their careers to allow them to focus on the classroom



At the heart of high-performing education systems is coherence in the recruitment, development, and support of teachers. Policies and practices start from the premise that teaching is a difficult but learnable skill. Recruitment and selection of talented individuals are considered the beginning of a process in which new teachers learn their craft. Observation, collaboration, and feedback are integral parts of career-long professional development centered on acquiring and refining pedagogical and content knowledge to improve continuously the quality of instruction. Career advancement depends, among other things, on evaluation of teaching performance. Career paths allow teachers to be promoted and increase their salaries while remaining in the classroom. Curricula and textbooks align in ways that enhance a teacher's ability to deliver high-quality instruction.

Top Performing Systems are more selective in recruiting and retaining teachers

As universal access to basic education has become the norm, low- and middle-income

countries have had to increase massively the size of their school systems and the number of teachers. Despite the need for more teachers, effective systems raised selectivity, making salaries and working conditions attractive, so that talented individuals would apply. Candidates are usually screened and filtered both when selected into preservice teacher training programs and when hired.

In Japan, only 14 percent of all applicants to education programs are accepted, and only about 30–40 percent of graduates are hired (Center on International Education Benchmarking, n.d.). As a result, newly hired teachers represent only 5 percent of the applicant pool. In Singapore, the government recruits the top third of graduates of universities and polytechnic schools to become teachers (Tan and Wong 2007). In Korea, teacher education programs admit only the top 10 percent of high school graduates, and only 1 in 20 passes the arduous exams to become a teacher (Ferreras, Kessel, and Kim 2015). In Taiwan, China, teacher education programs are highly competitive. Typically, only the top third of applicants ranked by performance on high school and university entrance exams are selected.

Low pay and delayed or irregular payments to teachers make teaching less attractive elsewhere in East Asia and Pacific, discouraging talented applicants. In the Philippines, monthly pay for a secondary teacher is less than US$400 (Ager 2014). In Lao PDR, preliminary results of a World Bank survey find that 53 percent of teachers report delays in receiving their salary at least once a year (Demas, Khan, and Arcia, forthcoming).

Indonesia took steps to raise the quality of teachers by doubling salaries as part of its 2005 teacher reform. The higher salaries led to a fourfold increase in enrollment in teacher education programs and increased the average national exam scores of entrants (de Ree and others 2017). Indonesia did not systematically link increased pay to observed teaching performance, however, or put in place other elements of successful teacher development.

Teachers regularly collaborate with others and receive feedback on their performance

Teaching is a "closed-door" profession in many OECD countries, where 40 percent of teachers never teach alongside another teacher, observe another teacher, or receive feedback. Top Performing Systems—and increasingly Above-Average Performing Systems—treat the classroom as a public space and make teacher observation and feedback routine quality-promotion activities. Special attention to observation is part of teachers' induction into the profession—the time when it is most critical to refine, improve, or correct teaching practices.

Japan's induction period is designed around observation, with many demonstration lessons conducted in front of panels for evaluation and feedback. Shanghai schools have lesson observation rooms where lessons can be videotaped and demonstrations conducted with an audience.

Collaboration and teamwork are required of teachers from induction onward. In Shanghai, teachers are not promoted unless they can prove that they work collaboratively; mentors are not promoted unless they can show that their mentees improve. Teachers are given ample time for these collaborative activities. They teach only 10–12 hours a week, less than half the U.S. average of 27 hours (Liang, Kidwai, and Zhang 2016).

Surveys of teacher professionalism indicate that East Asia and Pacific economies score high on collaborative peer networks (OECD 2014). On the Teaching and Learning International Survey (TALIS) teacher professionalism index of 37 education systems, 4 of 5 Asian participants scored near the top in 2013. The peer network index is based on opportunities for the exchange of information and support needed to maintain high standards of teaching. It includes participating in induction, mentoring, networking with other teachers, and receiving feedback from direct observations.

Top Performing Systems establish clear learning goals and provide uncluttered texts

Countries with fewer content standards and topics in their textbooks tend to have higher international assessment scores. The United States covers all 79 of the TIMSS science topics in its content standards. In contrast, Korea covers only 8, Japan covers 19, and Hong Kong SAR, China, covers 22. Textbooks cover 78 topics in the United States, 38 in Korea, and 17 in Japan (Liang, Kidwai, and Zhang 2016). Having fewer topics suggests a narrower focus and deeper study of topics, which could lead to much deeper understanding.

A streamlined curriculum allows for uncluttered, focused textbooks. Chinese textbooks are typical for the region. They tend to be thin, narrowly focused on specific topics, and significantly more demanding than textbooks in the United Kingdom (Qin 2017). Normal practice is for students to cover all textbook content, making study more efficient and allowing students to master topics. The mastery approach is believed to have been important in propelling students in Hong Kong SAR, China; Shanghai; and Singapore to the top of the PISA rankings (Qin 2017).

Teachers have adequate time for lesson preparation

Time spent in class is only one part of a teacher's job. Teachers also prepare lessons, grade homework, write tests, and provide after-hours support to students. A large proportion of time spent in class provides less opportunity for other activities.

In Top Performing Systems, a surprisingly small proportion of total working hours is spent in class. In Japan, for example, teachers spend only 18 hours a week teaching on average, although they have the highest total working hours (54 hours a week). With nearly two-thirds of their working time spent outside of class, they spend much more time on lesson preparation and other quality-enhancing activities to make in-class time much more effective.

Teachers have adequate time for professional development, which centers on improving instructional practice

Case study research on successful education systems (such as Ontario, Canada; Finland; Japan; Korea; and Singapore) suggests that high-performing systems devote considerable time to activities related to instructional improvement, especially analysis of instructional practice (Darling-Hammond 2010; Darling-Hammond and Rothman 2011; Levin 2008). These systems also tend to devote a smaller share of teachers' time to contact with students and more time to on-site (in-service) professional development and research on the effectiveness of various teaching strategies. In Japan, for example, teachers devote about 40 percent of their working time to these types of activities; in Ontario, they spend 30 percent of their time on them (Darling-Hammond and Rothman 2011).

Centering teacher professional development on the analysis of instructional practice is most effective when embedded in a support system that also incorporates active learning and on-the-job collaboration, uses models of effective practice, provides coaching and expert support, offers opportunities for feedback and reflection, and is of sustained duration.

These principles inform teacher professional development in Top and Above-Average Performing Systems in East Asia and Pacific more than they do in other countries in the region or the rest of the world. This type of integrated support is at its apex in Shanghai, where "teaching-research groups" promote continuous improvement of instructional practice. These groups form a professional development network consisting of same-subject teachers at the school, district, and provincial levels. In larger schools, the groups are often divided by grade. Each group

has a leader, who is responsible for organizing activities and introducing novice teachers to the learning community. The "teacher-as-researcher" model builds on Japan's "lesson study" approach as a vehicle to improve instructional practice.

Career paths allow experienced teachers to stay in the classroom

Efforts to develop experienced, effective teachers pay dividends if those teachers remain in the profession, delivering instruction and mentoring peers. High-performing East Asia and Pacific economies have developed career paths that allow teachers to advance in their careers and remain as classroom teachers. In other countries, promotion, advancement, and higher pay are likely to come through moving to administrative positions and leaving the classroom. Japan and Singapore have separate career tracks for teachers, so that the best do not leave the classroom. In Shanghai, teachers have opportunities to advance professionally throughout their teaching career through a five-level ranking system. Under this system, schools regularly evaluate teachers for promotion to a higher rank, accompanied by a salary increase, based on their years of service and teaching performance. This policy helps to ensure maximum benefit from the investment in teachers' career-long professional development.

Coherent policies and practices make teachers' jobs easier

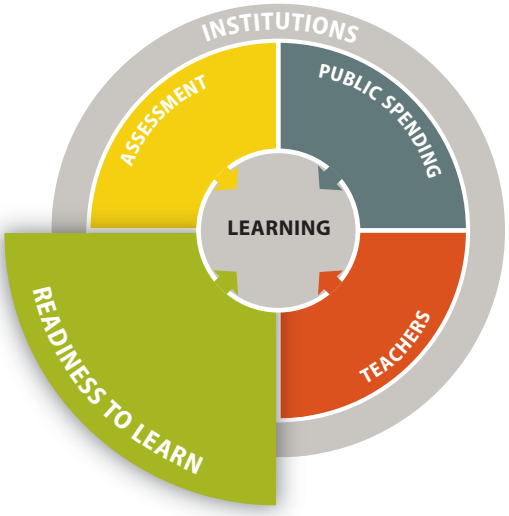
Policies and practices that center on promoting improved instruction help to develop effective teachers (table O.3). Selectivity in recruitment is followed by induction periods in which observation, collaboration, and feedback are routine. Systems promote professional collaboration around continuous improvement and require observation and positive evaluation of teaching practice for career advancement. Curricular alignment, uncluttered teaching materials, and adequate preparation time allow teachers to focus on execution in the classroom. Specific career paths recognize excellence in teaching and reward it with increased pay and prestige,

TABLE O.3 A coherent system covers all aspects of the teacher career cycle

Goal	Instrument
Attraction and selectivity	• Good pay • Effective filtering • Mechanisms to increase the attractiveness of teaching as a profession
Good preservice	• Government control and quality assurance • Filtering at various stages
Smooth induction	• Open-door culture • Mentoring and extensive support • Time and space for learning
Continuous improvement	• Teacher support networks • Teamwork and collaboration • Lesson study • Culture of continuous improvement
Career development	• Promotion policy • Multiple career pathways, including pathways that allow promotion while leaving good teachers in the classroom
Making teaching easier	• System coherence • Aligned, streamlined curriculum and textbooks • Adequate nonclass time

while encouraging the best and most experienced teachers to remain in the profession. A professional, supported teacher can work well when she or he knows precisely what parts of the curriculum students know and where they are struggling.

Ensure that children are ready to learn in school



Intellectual, social, and emotional development early in life all affect how well children perform academically in primary school and get along with their peers and teachers. Governments in high-performing school systems help to support children's readiness to learn.

Parents are also critical to learning readiness. They are their children's first teachers and supporters. They provide proper nutrition, health care, and a supportive, nurturing environment. Parents can support their children's readiness for primary school by sending them to preprimary programs, providing emotional support, and creating a stimulating learning environment at home.

Investments in readiness to learn appear to generate lasting returns

High-performing systems in the region appear to have focused on children's physical and cognitive development, assessed and improved the quality of the services they offer, and coordinated across actors to deliver needed services. Their efforts to universalize preschool progressively appear to have borne fruit. Throughout the region, children who had access to early childhood education and development services posted higher PISA test scores than children who had no such access—even after controlling for socioeconomic differences (OECD 2013–14).

Nutritional challenges will impede efforts to improve readiness to learn

Efforts to improve readiness in East Asia and Pacific are beset by nutritional challenges in several countries. In a third of the region's countries, stunting remains highly prevalent, despite decades of improvement (figure O.6). Evidence from many countries shows that stimulation of a child is consistently and significantly beneficial to child development and school readiness. Inadequate nutrition undermines efforts to provide stimulation.

Gaps in readiness to learn manifest early and can linger if unaddressed

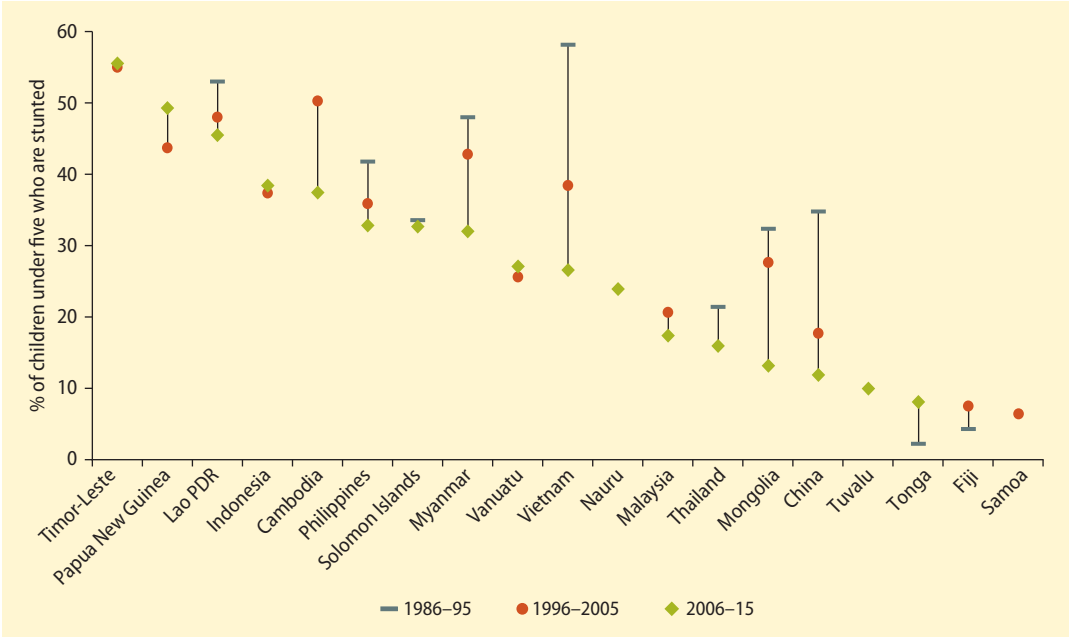
Gaps in children's readiness to learn manifest themselves early. If unaddressed, they can affect children's cognitive and noncognitive skills over the long term.

There are large cross-country differences in young children's ability to read, as measured by EGRA. In every country in the Emerging Systems group, the majority of students do not meet national standards—and many cannot read any words at all. Even in countries where "zero-word" rates are relatively low, reading fluency is not very high and a large portion of students are still struggling with basic subtasks.

EGRA data cover different languages, making comparability a challenge, and they do not cover all students in some countries. But the overall message is still clear. In many systems throughout the region, most children arrive at school unready to learn. By second grade, too many of these children are still unable to read a single word.

If students are not ready to "read to learn" going into early grades of primary school,

FIGURE O.6 Stunting remains prevalent in many countries in East Asia and Pacific, despite decades of improvement, 1986–2015



Sources: Estimates by the World Health Organization, United Nations Children's Fund, and the World Bank.
Note: Some data are unavailable for each of the three time frames.

there is little chance that they will attain a high level of functional literacy by the time they complete primary school. When examined alongside EGRA data, PISA results suggest that the countries with low early reading ability also have low functional literacy (conceptualized as the inability to comprehend the main message in grade-appropriate texts in late primary school). If students do not learn to read fluently in the early grades, there is little hope that they will develop the skills to succeed on tests like PISA or, more important, in a professional workplace.

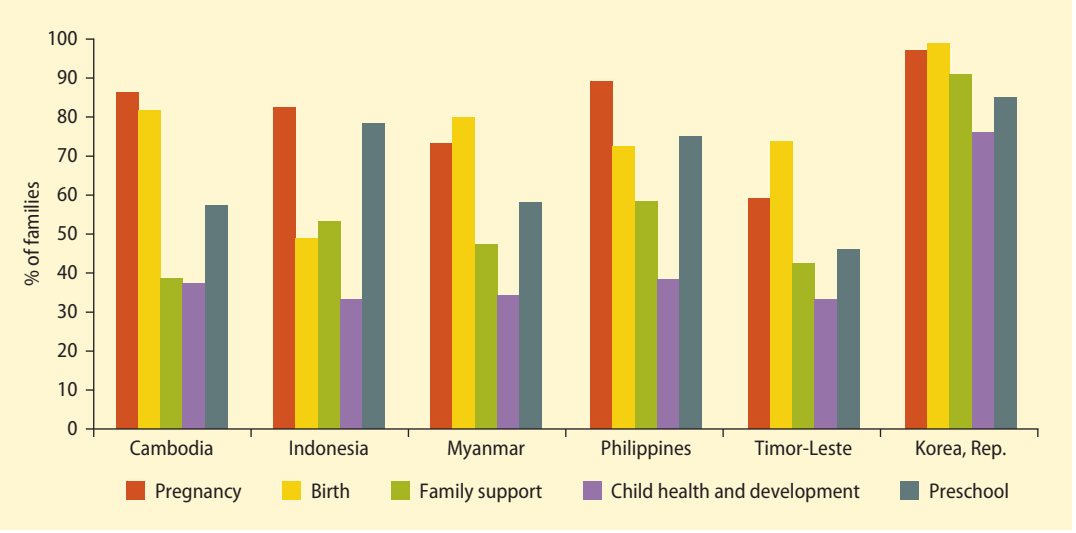
Low- and middle-income countries in the region lack key packages of services

Despite growing evidence of the efficacy of early childhood education and development programs, some education systems still do not deliver key packages of services. Governments in parts of the region with Below-Average Performing or Emerging Systems are supporting readiness to learn in a variety of ways, but disparities in coverage across five key packages are wide (figure O.7). Most countries provide broad service coverage during pregnancy and birth, but there is a large drop-off in coverage rates for services for families and children before preschool age. Coverage of services for family support and for child health and development tends to be low even in countries where preschool coverage rates are high. In contrast, coverage of all of these service packages is high in Korea.

Just how important are interventions aimed at parents? Research from across the globe, including East Asia and Pacific, suggests that both parenting practices and children's participation in preschool services are very important for children's development. Both have the potential to increase young children's exposure to developmental essentials such as opportunities for stimulating play, rich language experiences, and practice in developing executive function skills.

The stimulation young children receive at home is often a foundation for the formal stimulation they receive in preschools, yet many new parents lack the information and tools they need to enrich their children.

FIGURE O.7 Families do not have consistent service coverage between pregnancy and preschool



Sources: Data from Demographic and Health Surveys. Preschool attendance data were supplemented by the World Bank EdStats database (World Bank, various years).
Note: As described in Denboba and others (2014), *pregnancy* includes at least four care visits, iron supplementation, and diet counseling during pregnancy. *Birth* includes doctor or nurse present at delivery and breastfeeding. *Family support* includes mother having completed at least primary education, last birth interval greater than two years and last pregnancy desired, at least three types of stimulating activities at home, health care facility not too far and visited within 12 months, vitamin A and iron supplementation in last six months, and safe water source and improved sanitation. *Child health and development* includes at least three types of food besides breast milk from six months on; zinc supplement in case of diarrhea; children with weight, height, and height-weight ratio less than 2 standard deviations below the mean; and access to deworming medicine. *Preschool* measures enrollment in preprimary education. No data were available on non-breast milk nutrition for the Philippines. Only Cambodia had information on the provision of diet counseling during pregnancy and availability of deworming medicine.

Given proper support, parents can help to improve their children's basic literacy.

The lack of key service packages leads to gaps in outcomes. For instance, substantial gaps exist between the ability of children from poor and wealthy families to perform basic functions, such as counting from 1 to 10. These gaps are also apparent in the use of preschool services, with a gap of 65 percentage points in Lao PDR and 54 percentage points in Mongolia. Gaps are similar in access to high-quality care at home. In Cambodia, the gap in access to preschools by the richest and poorest quintiles is 31 percentage points, and the gap in access to high-quality care is 24 percentage points.

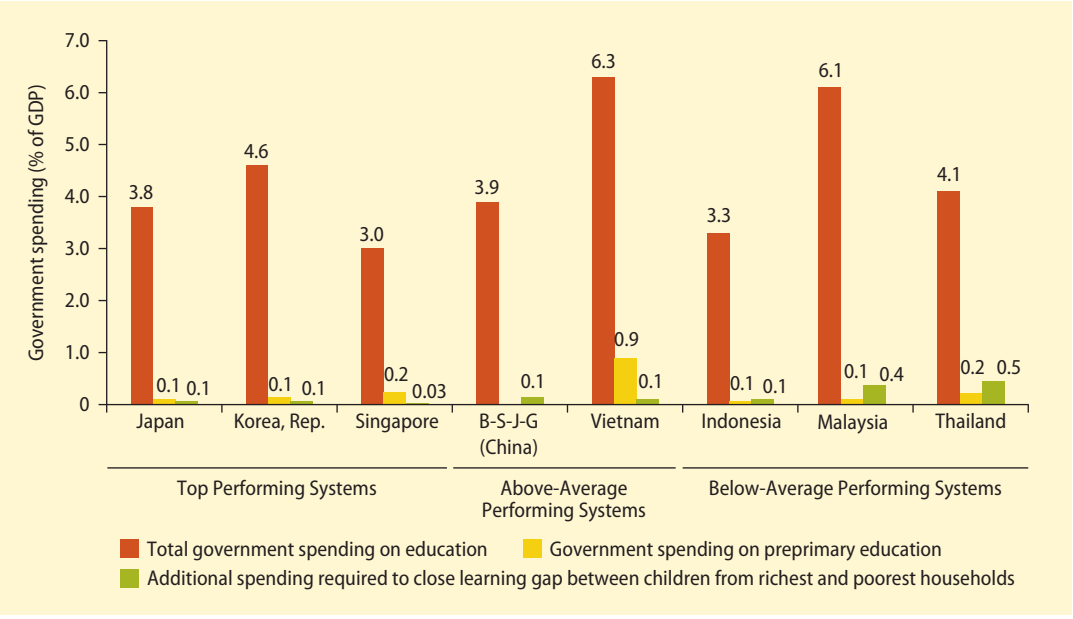
The costs of inaction during the early years are high—yet, action is affordable

The social and economic costs of inaction during the early years are high. Most governments in the region can afford to close gaps in achievement between children from the top and bottom wealth quintiles (figure O.8). Closing wealth gaps in access to preschools would cost just a small fraction of total education spending; in most countries, it would cost only a small fraction of spending on preprimary education. Estimates for a few countries—particularly Indonesia, Malaysia, and Thailand—are larger.

Tested and proven solutions exist

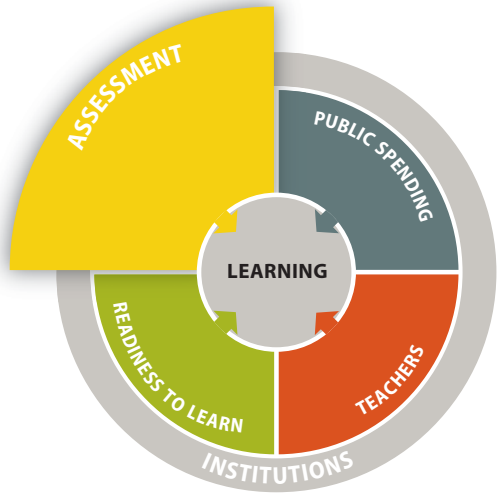
Merely increasing the supply of services focused on children's physical and cognitive development is not the answer. Countries need to assess and improve the quality of these services and coordinate their delivery across actors, if they are to reap the full benefits. A host of proven solutions exists, including center-based community-managed activities that focus on play as learning, home-based programs, reading interventions, and programs that engage parents.

FIGURE O.8 **Closing the achievement gap between socioeconomic groups is affordable**



Sources: Authors' calculations based on data from PISA 2015 (OECD 2015), UIS, and World Bank and Government of Vietnam 2017.
Note: Data on total government spending are the latest available between 2011 and 2014, except 2016 for Indonesia and 2015 for China and Singapore. Cost of inaction is for closing the socioeconomic gap in the percentage of students falling below basic proficiency in science. Data on percentage of government spending on preprimary are from UNESCO Institute for Statistics, Vietnam Ministry of Economy, and Vietnam Ministry of Finance for 2013, except 2012 for the Republic of Korea and Vietnam and 2014 for Japan. No data available for preprimary spending by B-S-J-G (China). B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment; UNESCO = United Nations Educational, Scientific, and Cultural Organization.

Assess students to diagnose issues and inform instruction



A systemic approach to assessment drives high-quality learning outcomes in the classroom. Efforts to assess student learning in the Top Performing Systems have been integrated with specific ways of taking action—linked closely with policies and practices relating to teachers, students, and curricula. The mix of assessments varies across countries, but all Top Performing Systems have well-defined ways of feeding the information on student learning outcomes gained from such assessments back into the system to drive quality. At the classroom level, good practice involves training teachers to use such assessments and to incorporate classroom assessment into curricula. At the school level, it involves informing principals' decisions and educational strategies. And at the system level, it involves using assessment data to create a broad commitment to quality and spur policy decisions.

High-stakes exams can be useful—but they can have undesirable effects

Experience in high-performing East Asia and Pacific economies shows the value of

meritocratic, standardized selection exams when coupled with good teachers, a strategic vision, and labor markets that value productive workers. For decades, these exams were an integral part of education strategies and were used to allocate limited learning opportunities in Hong Kong SAR, China; Japan; Korea; Singapore; and Taiwan, China (Wong 2017). Exams played a central role in the push for quality, through mechanisms that indirectly gauged teacher effectiveness and influenced how teachers were trained. Such exams worked well, especially as education resources were developing. At the time, the focus was on cognitive development in basic education and technical and vocational education and training, with considerable absorption into lower-skill production-based factory jobs.

Most countries in the region still use exams for entrance decisions at the secondary level. But many high performers have removed or adapted high-stakes exams at lower levels of education, partly because excessive focus on exams can lead to stress, a shifted or narrowed focus of education, and reduced equity. Korea removed middle school entrance exams in the 1960s, and high school entrance exams in the 1970s, as part of its high school equalization policy. In 2001, Hong Kong SAR, China, removed public assessments after primary school completion. In 2013, Malaysia replaced the high-stakes exam at the end of lower-secondary school with a mix of school-based exams and a centralized exam that included more critical thinking skills. Singapore, however, maintains the primary school–leaving exam at the end of sixth grade.

In response to concerns from parents, Korea introduced test-free semesters as a pilot program at the lower-secondary level in 2013, before expanding the program across the system (OECD 2016b). Taiwan, China, introduced exam-free pathways to secondary school in 2014 (Wong 2017). Shanghai has adopted strategies to reduce the dominance of the *zhongkao* lower-secondary school exam (taken at the end of ninth grade) by increasing the frequency of testing, broadening the domains tested, and reducing the stress and fear of failing by providing alternate routes to different levels and types of education (Liang, Kidwai, and Zhang 2016). Although these efforts are at early stages and their full impacts are not yet known, they indicate policy makers' attempts at balancing the weight of examinations in a country's assessment system.

Classroom assessments increasingly inform instruction

Practices in the region reveal the importance of using ongoing measurements of learning in the classroom to guide instruction. A regional study by the World Bank in 2012—using a version of its Systems Approach for Better Education Results (SABER) benchmarking tool—finds that almost all countries surveyed have a framework for large-scale, system-level assessment and exam activities, and more than half have such a framework for classroom assessment activities (Jimenez, Nguyen, and Patrinos 2012).[4] The study also finds that teachers' preservice training increasingly includes techniques for productive use of classroom assessment. The SABER analysis also shows areas where improvements are needed, including monitoring and ensuring the quality of classroom assessment and raising the priority of its use among teachers.

Top Performing Systems include assessments in teacher training programs and provide guidance and monitoring on their use. In Singapore, educational reform included efforts to support assessment in the classroom, including studying teachers' practices and designing a two-year professional development program to support assessment (Ho 2012).

International large-scale assessments have spurred learning-focused reforms

International benchmarking has most value when it leads to the identification of specific areas for improving education quality. In Top Performing Systems and Above-Average Performing Systems, international assessment data have spurred changes. Taiwan, China's

Happy Reading program, launched in 2008, was a response to low performance on PISA 2006. It used PISA microdata as a benchmark to align teaching methods, increase the amount of time allocated for reading instruction, increase resources, and revise teacher development (Driskell 2014). In response to PISA results, Vietnam changed the legal framework for large-scale exams to diversify testing methods, improve item quality, and pave the way for competency-based assessment. Broadening sample-based national diagnostic assessment of reading, math, and Vietnamese was also a key part of curriculum reform. In Japan, PISA has been important in tandem with the national assessment to drive and monitor education reform.

Use of national assessments varies across the region

Top Performing Systems Japan and Korea reintroduced regular large-scale national assessments about a decade ago. Japan reinstituted a national assessment in 2007, covering three subject areas (Japanese, math, and science) for students in sixth and ninth grades. Korea reintroduced its national assessment in 2008. It is administered in sixth, ninth, and tenth grades. China rolled out a national assessment in 2015. It assessed fourth and eighth graders in six subjects. Uniquely among the high performers, Singapore uses its system of national examinations as the primary means of assessing the education system.

Other countries use national assessments more sporadically. In Vietnam, fifth graders are assessed intermittently. In Mongolia, the National Assessment of Primary Education, begun in 2004, is administered to fifth-grade students. Lao PDR conducts the National Assessment of Learning Outcomes (in 2006 and 2009 testing fifth-grade students and in 2012 testing third-grade students).

Many school systems use test results to implement targeted programs aimed at raising learning outcomes. Results from PISA 2015 show that the majority of school systems in the region use both teacher-developed and standardized tests to guide student learning (OECD 2016–17).

Early Grade Reading Assessments are critical for Emerging Systems

International large-scale assessments such as PISA and TIMSS provide helpful information when a national school system has reached a level of performance compatible with the measured outcomes of the test. Where education systems are still emerging, targeted assessments of foundational skills provide more relevant information. EGRAs and Early Grade Mathematics Assessments (EGMAs) gauge student progress in early primary school.

EGRAs provide a snapshot of—and in some cases a wake-up call about—what students are learning. They have spurred systemic changes in teaching methodologies and curricula. In Tonga and Vanuatu, EGRA analysis in 2009 revealed low reading and comprehension. These results informed the Pacific Early Age Readiness and Learning program, to address both school readiness and early grade literacy through a variety of channels, including community-based groups, public awareness, teacher training, and a roadmap for early years to guide implementation of country priorities. Evaluation of the intervention and tracking of literacy gains showed improvements in reading of a half to a full year (Patrinos 2016).

Below-Average Performing and Emerging Systems should ensure that all students master basic reading and math skills. Widespread use of EGRAs and EGMAs to measure learning should be a cornerstone of their efforts to do so.

A map of countries' current systems

The ability of the East Asia and Pacific region's Top Performing Systems to improve both schooling and learning provides valuable lessons for all countries struggling to address the learning crisis. Although these systems followed different paths, all of them aligned and prioritized common elements across five policy domains to promote learning.

Table O.4 maps the current state of the region's economies for these domains and elements. It provides a starting point for countries to take stock of the current situation in each domain and to envision a path forward. Top Performing Systems distinguish themselves not only by achieving alignment across elements but also by sustaining it. Above-Average Performing Systems attempt alignment, but it is not consistent in all domains. Below-Average Performing Systems strive to emulate the success of the rest of the region. They have devised plans for alignment, but implementation is lacking or plans never materialize. Emerging Systems face the greatest challenges. Resources are scarcest, few measures of learning exist, and just getting all students in school has been difficult.

Charting the course ahead

Providing learning opportunities is imperative for the millions of children who are out of school—or in school but not learning. Lessons from high performers suggest that countries can improve learning outcomes by focusing on improving their performance in the five policy domains and 15 elements within them shown in figure O.1. These efforts require detailed, ongoing reforms.

No one size fits all for reform agendas, but all systems share some priorities (table O.5):

- Emerging Systems should concentrate efforts on ensuring that basic conditions are in place for learning in all schools and on reviewing spending to ensure that basic education is appropriately prioritized. Emerging Systems should also commit to diagnosing cohort progress, especially of early learners using early grade assessments, and using test results to inform and improve basic reading and math instruction. They should continue to explore the use of regional and international assessments for benchmarking. Second-order challenges include channeling resources for equity and considering how to approach the range of teacher support policies that can improve capacities for the long term. As these policies are developed, Emerging Systems are well served to review the extent to which teacher training and professional development focus on improving the quality of instruction.
- Below-Average Performing Systems should review teacher development policies to ensure that training is prioritizing improved instructional quality while building the institutional capacity for deeper and more comprehensive reforms. Introducing selectivity, observation, collaboration, and feedback while creating incentives and career paths for teachers that reward teaching ability are likely to pay off substantially. Ensuring readiness to learn and broadening early childhood education and development services are also critical. Developing and implementing systemwide national assessments of cohort progress should complement programs for classroom assessment; assessment systems should also include regular use of internationally comparable assessments for benchmarking and system accountability. Consideration should also be given to making teachers' jobs easier, through curriculum and other reforms. Simultaneously raising the attractiveness of teaching as a profession and the accountability of teachers for good classroom performance is key.
- Above-Average Performing Systems should not rest on their accomplishments. Deepening the quality of the teaching force and continuing to monitor equity are in order. But these systems should also endeavor to tie learning to new and emerging needs, which includes introducing teaching and measurement of noncognitive and 21st century skills. Redoubling the commitment to internationally comparable assessment can keep public support for excellence in education high, along with public awareness of achievements. Deepening the availability of high-quality early childhood education and development programs, especially for families who cannot afford them, is another step. Also essential is to ensure that good

TABLE O.4 **The status of policies and practices that promote learning varies within the region**

Policy	Practice	Top Performing Systems						Above-Average Performing Systems		Below-Average Performing Systems				Emerging Systems						
		Hong Kong SAR, China	Japan	Korea, Rep.	Macao SAR, China	Singapore	Taiwan, China	B-S-J-G (China)	Vietnam	Indonesia	Malaysia	Philippines	Thailand	Cambodia	Lao PDR	Mongolia	Myanmar	Papua New Guinea	Timor-Leste	Pacific Island countries
Align institutions to ensure basic conditions for learning.	**Ensure** that the basic conditions for learning are in place in all schools.	■				■		■	■	■	■	■	■	■					■	
Concentrate effective, equity-minded public spending on basic education.	**Spend** effectively.		■	■		■		■	■	■	■	■	■		■		■	■	■	
	Concentrate public spending on basic education.		■	■		■		■	■	■	■	■	■				■	■	■	
	Channel resources to schools and districts that are falling behind.		■	■		■		■	■	■	■	■	■				■	■		
Select and support teachers throughout their careers to allow them to focus on the classroom.	**Raise** the selectiveness of who becomes a teacher.	■	■	■		■	■	■	■	■	■	■	■	■	■		■		■	
	Support new teachers by observing classroom practices and providing feedback.	■	■	■		■	■	■	■	■	■	■		■			■			
	Make teachers' jobs easier by providing clear learning goals and uncluttered texts.	■	■	■		■		■	■	■	■	■	■	■	■		■		■	
	Keep experienced teachers in the classroom and leading as peers and researchers.		■	■		■		■		■	■			■	■		■			
	Center teacher training on classroom practice and the ability to teach the curriculum.	■	■	■		■	■	■	■	■	■	■		■	■		■			
Ensure that children are ready to learn in school.	**Focus** on children's physical and cognitive development from birth.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■
	Assess and improve the quality of early childhood education and development services.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■
	Coordinate across actors to deliver needed services.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■
Assess students to diagnose issues and inform instruction.	**Benchmark** learning through participation in international large-scale assessments.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Diagnose cohort progress at every educational sublevel.		■	■					■			■		■	■	■	■	■		■
	Inform instruction with data from formative classroom assessment.							■	■			■		■	■	■		■		■

■ Alignment is successful and sustained. ■ Alignment is attempted, but success is inconsistent. ■ Alignment plans exist in writing, but there is little or no evidence of implementation, or no such plan exists. ☐ No data.

Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China).

TABLE O.5 Concerted policy action and continuity of implementation drive systems improvement

	Action			
Policy	**Emerging Systems**	**Below-Average Performing Systems**	**Above-Average Performing Systems**	**Top Performing Systems**
Public spending	Prioritize public spending on basic education and ensure high completion of primary and lower-secondary school. Increase starting teacher salaries to attract qualified teachers. Build simple but functional school facilities to increase access to basic education. Provide funding to support disadvantaged students in accessing basic education.	Continue investing in basic education to ensure high completion while expanding access to upper-secondary school and above. Strengthen teacher compensation policies to encourage good performance and retain qualified teachers. Build simple but functional school facilities to ensure access to basic education and increase access to preprimary and upper-secondary education. Help disadvantaged students to access basic education; consider mobilizing the private sector to increase access to preprimary and upper-secondary education.	Continue investing in basic and upper-secondary education while diversifying funding for vocational, technical, and tertiary education. Strengthen teacher career development policies and nonfinancial benefits for teachers to continue improving their quality. Provide remedial measures such as extracurricular activities to enhance learning of disadvantaged students.	
Teachers	Start the positive foundational cycle of attracting and ensuring reasonable-quality teachers, while being realistic about the system's capacity to implement quality assurance measures balanced with supply of candidates. Establish teacher networks (with a focus on supporting new, weaker teachers with mentoring and other support), lesson study, and an "open-door" culture as key elements of professional development. Establish a basic framework of professional development and how teachers can reasonably be reached. Establish a mentality of teaching to learn with clear learning goals with curriculum and textbooks. Begin creating a cohesive, aligned system that supports teachers and promotes focused, streamlined learning.	Take incremental steps to increase qualifications and quality, establishing greater quality assurance and filtering measures. Deepen teacher networks in which more-advanced teachers provide greater support through mentoring and coaching. Provide more advanced professional development that develops deeper critical thinking techniques. Create tracks of progression and promotion for expert teachers that allow them to remain in the classroom. Evolve system- and teacher-related policies in ways that reform and move all elements forward with alignment. Decrease classroom hours and increase supplementary activities.	Establish rigorous criteria and multiple filtering mechanisms, while ensuring that teaching is attractive in terms of salary, professionalism, and prestige. Leverage high-performing teachers for professional development and support. Provide more autonomy for high-performing teachers. Create a highly developed professional development framework with tailored, individualized approaches. Deepen critical thinking, elaboration, and cognitive activation techniques.	

table continues next page

TABLE O.5 **Concerted policy action and continuity of implementation drive systems improvement** *(continued)*

Policy	Action			
	Emerging Systems	Below-Average Performing Systems	Above-Average Performing Systems	Top Performing Systems
Readiness to learn	Develop policies and programs to ensure that both cognitive development and physical health are the focus of early childhood school readiness strategies.	Ensure that clear quality standards exist, are disseminated, and are addressed in an evaluative process.	Engage multiple actors in the development and delivery of integrated early childhood services.	
Assessments	Periodically use early foundational skills assessments to spur policy change and target reforms every five years. Integrate assessment policies into reforms of curricula and teacher development systems.	Implement national assessments for diagnostic purposes. Strengthen systems of assessment (enabling environment, quality control, alignment). Integrate the use of assessment data into teacher development, alongside adequate support and quality monitoring. Link assessment use to equity, examining current practices for tracking and accountability. Use internationally benchmarked assessments to check system performance.	Participate in regular international benchmarking (PISA, TIMSS). Engage in a national dialogue and secure commitment to quality. Disseminate assessment data to stakeholders for accountability. Reflect changing curricular priorities (such as noncognitive skills) in assessment design and methodology and provide support for change or research, guidance, training, quality, monitoring, and so forth.	

Note: PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

options exist in the labor market for capitalizing on knowledge and skills acquired in basic and postbasic education. Amid all of these activities, building institutional capacity further cannot be neglected.

- Top Performing Systems provide compelling examples of how the work of producing high learning outcomes in schools is never completed. Looking at how these systems are evolving reveals that promoting creativity and new forms of assessment, ensuring that teachers remain motivated and grow in competency, and learning from other top performers worldwide are core tasks. Their continued efforts demonstrate that conserving and extending existing capacity and expertise are preconditions for staying on top.

Because learning is critical to East Asia and Pacific's strategy for productivity-driven growth, policy makers have continually kept their eyes on the next stage of education development. In today's rapidly changing economies, education systems will need to prepare students for lifelong learning. To draw in all countries and all students across the region, the path ahead will involve keeping pace with rapidly changing circumstances.

Notes

1. The constructed averages provide the best information on the performance of systems as a whole, but they do not provide any information on trends, and the information on all countries is not equally robust.
2. Data from PISA on learning outcomes in China are from only four provinces. However, learning outcomes in the rest of China can be inferred by looking at the distribution of proficiency levels in urban and rural areas of B-S-J-G (China). We use the ratios of urban to rural students at various levels of proficiency in the PISA data to estimate how many urban and rural students across China are at various levels of proficiency. This assumption produces an upper bound on the number of children who might be in a learning crisis. At the lowest levels of proficiency, students are considered functionally illiterate. Using the score threshold for the lowest levels of proficiency to estimate the learning levels outside the four tested Chinese provinces produces estimates of the learning crisis in the region that are unchanged, implying that these estimates are plausible upper bounds of the learning crisis.
3. For Indonesia, World Bank (2009); for the Philippines, World Bank (2016).
4. SABER is a set of tools that enables countries to evaluate and benchmark education policies across 13 areas, including teachers, early childhood development, school autonomy and accountability, and student assessments (see http://saber.worldbank.org/).

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High-Quality Schooling and Economic Growth in East Asia and Pacific

1

Many economies in East Asia and Pacific grew very rapidly over the past few decades, with rates of growth in East Asia consistently twice the global average. Sound macroeconomic environments allowed human capital to drive growth.

The region generated unprecedented and transformative economic growth

The economies of East Asia and Pacific have grown faster and sustained high growth longer than any other region in the world since 1960 (figure 1.1). Progress has been remarkable, especially among the region's low- and middle-income economies, which grew at more than twice the world average in 1961–2015 (7.2 vs. 3.5 percent). Even excluding China's spectacular growth, the region's low- and middle-income countries grew more than 2 percentage points faster than the world average for nearly half a century. In 1970–2010, their rate of growth was almost twice the world average (5.9 vs. 3.1 percent). No other low-income region of the world comes close to matching this record of steady and high long-term growth. The Pacific Island countries did not enjoy the same strong growth (box 1.1; spotlight 1).

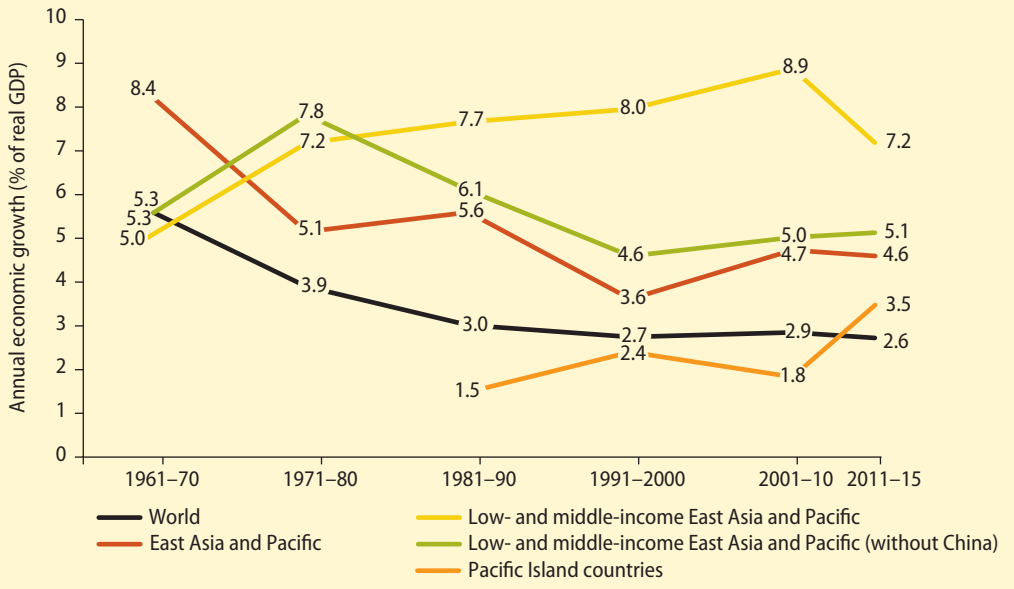
Such sustained, high growth rates are the path to high-income country status. "Of the 71 countries classified by the World Bank in 2010 as high-income countries, only 15 were not already in this category by 1987," note Jimenez and Dobson (2013, 2). Five of these countries were in East Asia and Pacific.

Extraordinary growth performance allowed many East Asia and Pacific economies to transform themselves within two generations or less. The size of the regional economy in 2015 was 10 times larger than it would have been if it had grown at world average rates since 1960 (figure 1.2). In 1990, economic output in the region accounted for less than 7 percent of global output, despite the region having one-third of the world's labor force. Today, the economies of East Asia and Pacific account for 30 percent of global output.

How has sustained high growth changed the region?

A large and growing share of East Asians today live prosperous, productive, middle-class lives. More than 1.4 billion East Asians are considered middle class. This emerging group has access to consumer goods and services as well as career

FIGURE 1.1 Growth in East Asia and Pacific has exceeded global averages for decades, 1961–2015



Source: Data from World Development Indicators (World Bank, various years).
Note: Figures are based on real gross domestic product (GDP) in U.S. dollars. Base year is 2010. Low- and middle-income East Asia and Pacific includes all countries and economies in the region except Japan, the Republic of Korea, and Singapore. Pacific Island countries include Fiji, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, Palau, Samoa, the Solomon Islands, Tonga, Tuvalu, and Vanuatu.

BOX 1.1 Growth has been slower in the Pacific Island countries

The lack of growth in the Pacific Island countries reflects both their geography and the limited size of their populations and economies. Their remoteness from large markets and the dispersion of their populations over vast areas of ocean have impeded broad-based growth through labor-intensive and export-oriented manufacturing, as high transport costs make it difficult for them to compete with countries closer to major international markets. The high costs of service delivery to a widely dispersed population have made it difficult to invest in human capital, expand economic opportunities for the population, support a more diversified economy, and provide basic needs, such as water, sanitation, and electricity.

The economies of most of these countries have a narrow production base, with semi-subsistence agriculture playing a major role, especially in the livelihoods of the poor. Tourism (in Fiji, Palau, Samoa, Tonga, and Vanuatu); mining and minerals (in Papua New Guinea); logging (in the Solomon Islands); fisheries and commercial agricultural products (coffee in Papua New Guinea and Vanuatu, copra in several of the smaller countries, and sugar in Fiji) bring in foreign exchange.

Limited employment opportunities outside subsistence farming and the smaller government, tourism, and fishing sectors have made international migration an important economic option for many Pacific Islanders. In countries like Samoa and Tonga, where remittances account for more than 20 percent of gross domestic product (GDP), migration helps many households to avoid slipping into poverty.

Sources: World Bank 2016a, 2016b, 2017, 2018a.

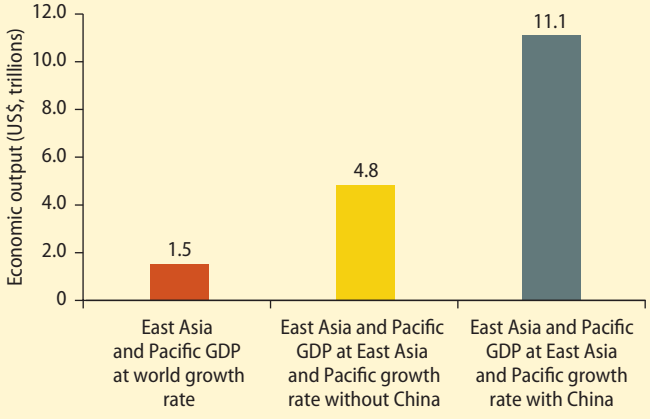
and work opportunities that are increasingly comparable with those in high-income countries.

For the past two generations, opportunities for economic and social advancement and mobility have been maximized. Many parents have seen their children move up the economic ladder to better employment and standards of living. Structural transformation of the region's economies has allowed hundreds of millions of people whose childhoods were marked by deprivation and hardship to move out of poverty. Extreme poverty rates in East Asia and Pacific have fallen dramatically, from 56 percent in 1990 to under 8 percent today.[1]

As recently as 1991, two-thirds of East Asians worked in agriculture, most as low-income smallholders. By 2012, that figure had dropped by half, to one-third (figure 1.3). Rising formal employment, wages, and productivity have made the typical East Asian an educated urban dweller rather than a farmer with little schooling. As overall population increased, megacities and educational and formal work opportunities grew faster (World Bank 2014).

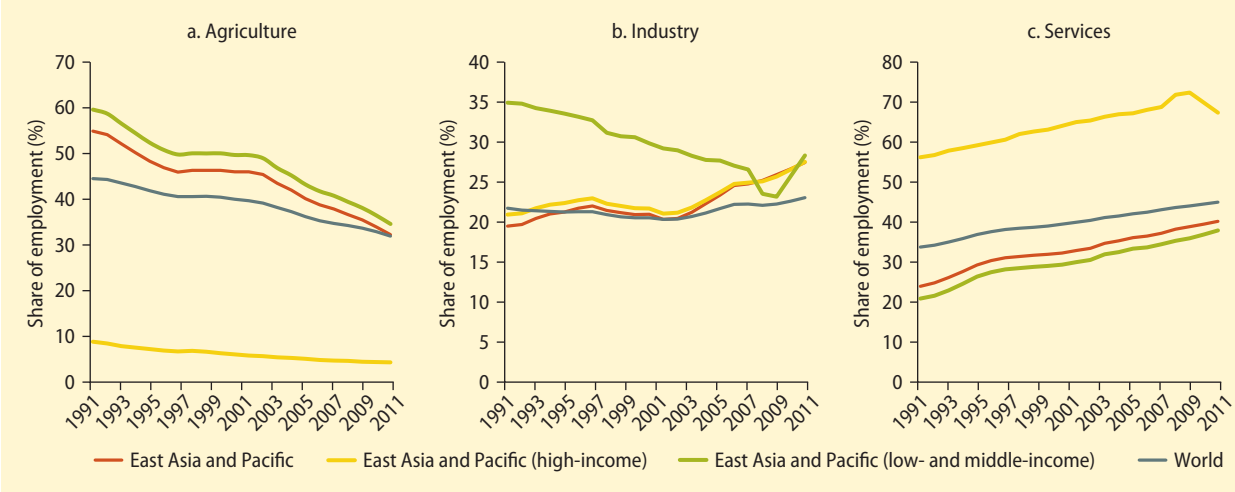
This transformation did not happen by accident, nor was it the result of economies in the region merely being carried along by global trends. From the 1960s through the 1990s and beyond, while the rest of

FIGURE 1.2 Without sustained high growth since 1960, economic output in East Asia and Pacific would have been less than 10 percent of its current level



Source: Data from World Development Indicators (World Bank, various years).
Note: Data cover the years 1960–2015. GDP = gross domestic product.

FIGURE 1.3 The share of people in East Asia and Pacific working in agriculture has fallen, and the share working in services has risen, 1991–2011



Source: Data from the International Labour Organization.

TABLE 1.1 Success stories of sustained high growth

Economy	Period of annual growth of 7% a year or more	Per capita income (constant 2000 US$)	
		Beginning of period	2005
Botswana	1960–2005	210	3,800
Brazil	1950–80	960	4,000
China	1961–2005	105	1,400
Hong Kong SAR, China[a]	1960–97	3,100	29,900
Indonesia	1966–97	200	900
Japan[a]	1950–83	3,500	39,600
Korea, Rep.[a]	1960–2001	1,100	13,200
Malaysia	1967–97	790	4,400
Malta[a]	1963–94	1,100	9,600
Oman	1960–99	950	9,000
Singapore[a]	1967–2002	2,200	25,400
Taiwan, China[a]	1965–2002	1,500	16,400
Thailand	1960–97	330	2,400

Source: Commission on Equitable and Sustainable Growth 2010.
a. Economy has reached high-income countries' level of income per capita.

the low-income world was stuck in patterns of low growth and losing ground to rich countries, the economies of East Asia were converging on rich-country levels (Pritchett 1997).

East Asia's economic success was never assured and was largely unforeseen. Indeed, development economists and other observers in the 1960s despaired over the region's prospects and saw Latin America as the region most likely to prosper (Jimenez and Dobson 2013).

By the 1980s, East Asia's formula for success was an object of increased recognition and admiration. The recent uptick in growth rates throughout the low-income regions of the world can arguably be attributed to average low- and middle-income countries taking more steps and implementing more policies that had been first proven in East Asia (Jimenez and Dobson 2013).

For more and more people, growth is bringing improved consumption opportunities in areas of basic needs and beyond. Perhaps more important, growing numbers of people have left behind low-productivity smallholder agricultural work for formal employment and modern careers. Demand for educated workers has risen as rapidly as supply can respond, and members of every cohort are expected to bring more knowledge and skills to their jobs. The massive increases in schooling in East Asia have vastly increased the supply of educated workers, but returns to investment in ever higher levels of human capital continue to rise.

The Commission on Equitable and Sustainable Growth (the Growth Commission), convened under the auspices of the World Bank, studied 13 cases of sustained high growth after World War II (table 1.1). Nine of the 13 economies were in East Asia and Pacific, which grew, on average, at more than 7 percent a year for 37 years, raising income per capita by an order of magnitude. Although rural agricultural work remains the primary occupation for many people in the region today, economies with decades of high growth are increasingly centered on large modern, urban knowledge bases.

A sound macroeconomic environment allowed human capital to drive growth

Education makes workers more productive when it imparts skills they can use to increase their output. Globally, each additional year of schooling raises individual earnings by 8–10 percent (World Bank 2018b). In East Asia

and Pacific, the average rate of return to an additional year of schooling is 10.9 percent (table 1.2).

Growth-promoting policies increased productivity through education by committing to good plans over decades (more than half a century in the case of some economies). The most successful countries set basic policy directions decades ago. Japan, the Republic of Korea, and Singapore began their transitions to high-income status early and have seen their economies rise furthest. Their output per capita is among the highest in the world; their technological capacities make them full innovation-based economies. They are among a small group of economies—most of them in East Asia—that have gone from low- to high-income status. Other countries, like China and Vietnam, set policy directions for education in the late 1980s and 1990s; strong evidence of their educational success emerged only recently. Benefits abound if governments sustain good policies over the long run.

East Asia and Pacific economies promoted fast and sustained growth in a variety of ways:

- They created stable, market-friendly macroeconomic environments.
- They improved labor force abilities and skills, mostly through increased schooling.
- They made education broadly relevant to current and future expected economic needs.
- They prepared the next phase of reform before they exhausted the benefits of the current phase.
- They ensured benefits across the socioeconomic spectrum and "progressively universalized" opportunities for human capital investments.
- They avoided inequality of income and educational opportunity and outcomes.

These policies—implemented across a variety of sectors—set the stage for increases in the technological sophistication of national industries. With that sophistication came increased demand for educated workers.

TABLE 1.2 Rate of return to an additional year of schooling in selected economies in East Asia and Pacific

Economy	Year	Rate of return (%)
China	2002	16.6
Japan	2007	14.0
Tuvalu	2010	13.4
Korea, Rep.	2010	13.2
Singapore	1998	12.5
Palau	2000	12.4
Malaysia	2010	12.0
Thailand	2011	9.4
Mongolia	2011	9.1
Philippines	2011	8.6
Papua New Guinea	2010	7.7
Timor-Leste	2007	7.3
Lao PDR	2008	5.1
Unweighted average for all		**10.9**
Unweighted average for men		**10.9**
Unweighted average for women		**9.9**

Source: Montenegro and Patrinos 2014.

Promoting positive returns to human capital investment through stable, market-friendly macroeconomic environments

Individuals can use their economically valuable skills best in predictable conditions that favor investment and provide incentives for productive work. In rapidly growing East Asia and Pacific economies, governments practiced macroeconomic management and created price stability and clear rules of the game. These policies favored longer-term investments, especially for physical investments such as manufacturing facilities and equipment. They created the conditions under which a better-skilled labor force can apply its knowledge and skills productively. Favorable business environments and sound basic infrastructure further promoted the ability to develop domestic and export markets and industry.

By the early 1990s, East Asia's experience was being held up as the best path to prosperity. In a major World Bank policy report, *The East Asian Miracle,* Birdsall and others (1993, 234) note,

> Macroeconomic management was unusually good, providing the stable environment essential for private investment. Policies to

increase the integrity of the banking system, and to make it more accessible to nontraditional savers, increased the levels of financial savings. Education policies that focused on primary and secondary schooling generated rapid increases in labor force skills.

The report notes that, although the environments themselves favored wealth creation, adequate labor force skills were still required to realize the potential gains.

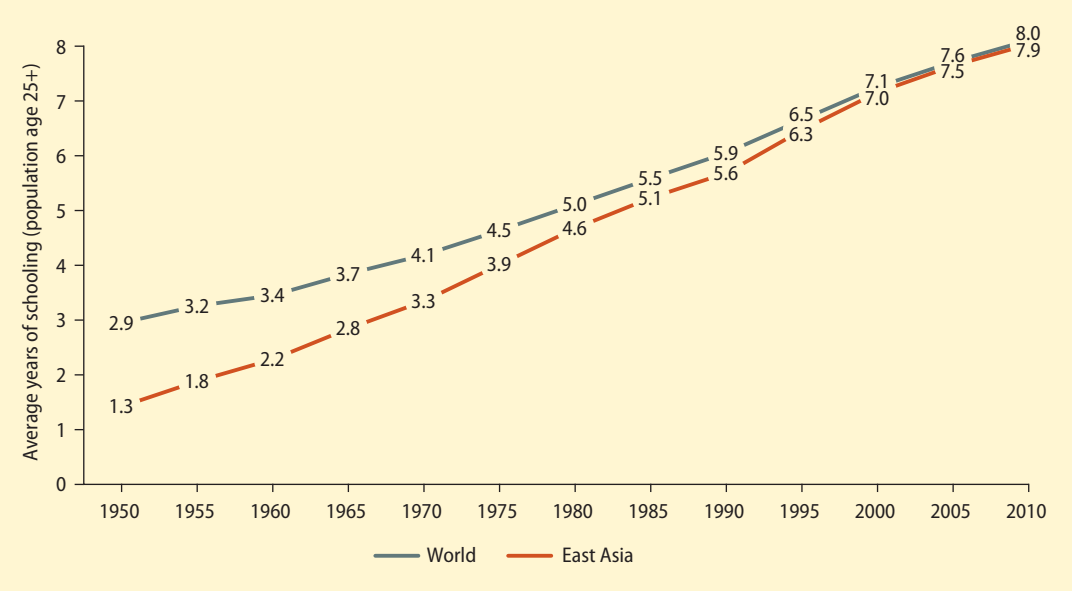
Improving labor force skills and abilities, mostly through increased schooling

In 1950, adults over 25 years of age in East Asia had less than half the world average for educational attainment (1.3 vs. 2.9 years). By 2010, attainment had increased fivefold, converging with the steadily rising world average of 8.0 years of schooling per adult. The feared drop in quality that might have accompanied expansion did not occur. Coverage expanded, and quality was maintained or raised.

Measures of both quantity (figure 1.4) and quality (figure 1.5) show that rapidly growing East Asia and Pacific economies are among the world's best performers—and they are continuing to improve. In 2010, school systems in East Asia and Pacific provided twice as many students with about 10 times as much instruction as they did in 1950, in many cases providing high levels of learning (Barro and Lee 2013). Although many economies in the region transformed schools and the school experience, adjusting attainment years for learning years shows varying levels of success (box 1.2).

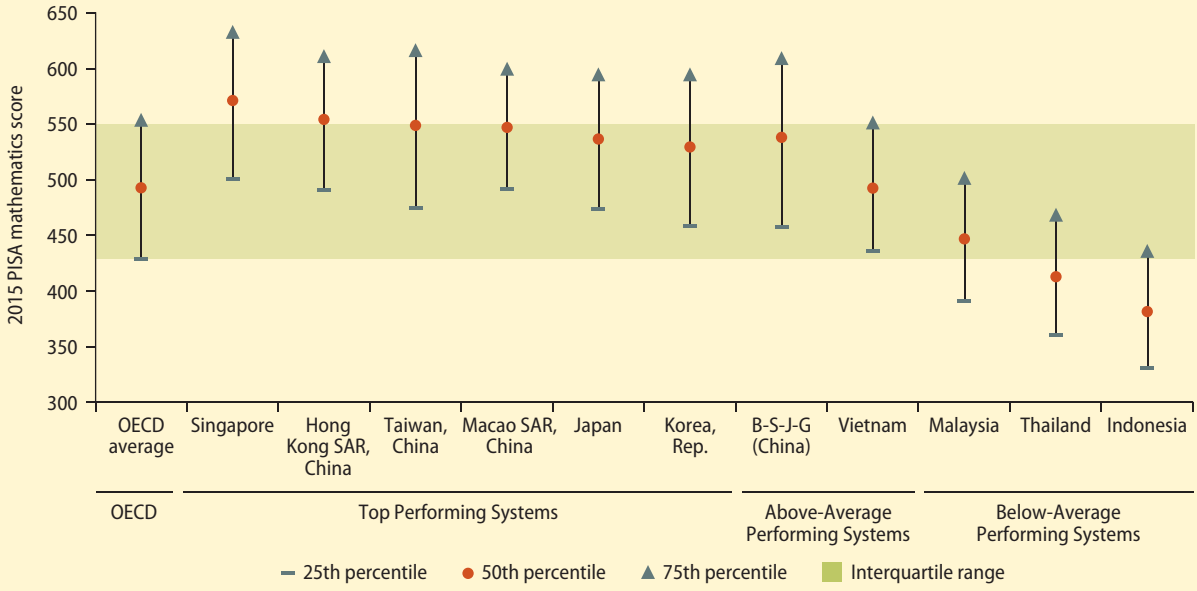
This massive increase in supply and quality has been met with an even larger increase in demand. Returns to tertiary education have overtaken returns to primary and secondary education as growing industries constantly demand more and better skills. Rapidly growing economies in East Asia were the first to realize that modern economies are in a race between education and technology. If workers lack the skills, abilities, and knowledge to use leading technologies—or if the

FIGURE 1.4 Educational attainment in East Asia is many times higher than it was two generations ago



Source: Data from Barro and Lee 2013.
Note: Results are weighted by population. Timor-Leste and Pacific Island countries are missing.

FIGURE 1.5 Fast-growing East Asia and Pacific economies generally score well above the OECD average on PISA



Source: Data from PISA 2015 (OECD 2016).
Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment.

BOX 1.2 Learning-adjusted years of schooling can reveal how effective and efficient school systems are

Average years of schooling are an important indicator that can be used to compare educational attainment across economies. However, one year of schooling can lead to more learning in some economies than in others. Adjusting years of schooling by the amount of learning that takes place within those years can provide valuable insight into how efficient and effective school systems are.

Using data from large-scale international assessments is a way to standardize the measure of student learning across economies. International assessments such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) can provide such measures. These assessments are administered on students of the same grade (grades 4 and 8) throughout all participating economies, allowing for direct international comparisons of learning outcomes after the same number of years in school.

The World Bank's Human Capital Project has compiled globally comparable achievement outcomes in more than 160 countries and regions over the period 1965–2015, allowing for meaningful adjustments of learning internationally and over time. What do these adjustments reveal? An illustration using TIMSS math scores for 2015 shows that years of schooling can often be very different from learning-adjusted years. Singapore, the highest-scoring economy in TIMSS 2015, served as the basis for comparison in the adjustment.

box continues next page

BOX 1.2 Learning-adjusted years of schooling can reveal how effective and efficient school systems are *(continued)*

While young people in Hong Kong SAR, China have similar average years of schooling to young people in the United States (14 and 13.7 years, respectively), students in the United States have almost 2 fewer learning-adjusted years of schooling. And whereas young people in Singapore have close to 4 more years of schooling on average than young people in Thailand (14.4 and 10.5 years, respectively), the learning-adjusted measure shows that Singapore outpaces Thailand by more than 7 years of schooling. While Hong Kong SAR, China; Japan; and the Republic of Korea have learning-adjusted years of schooling within 0.5 year of actual years of schooling, youth in Malaysia and Thailand have learning-adjusted years that are more than 3 years below the actual years of schooling.

Source: World Bank 2018b.
Note: For detailed discussion of learning-adjusted years of schooling and data for more economies, see World Bank 2018b, 48.

institutions that produce, sustain, and facilitate them are ineffective—economies cannot build or sustain a comparative advantage. Technological know-how—broadly defined—raises the value of, demand for, and rewards to skills, abilities, and knowledge. Governments need to ensure that they have the institutions and infrastructure that allow their economies to remain close to the technological frontier. In this race between education and technology in the rapidly growing areas of East Asia, technology has sprinted ahead—but education and skills are largely keeping pace.

Making education broadly relevant to current and future expected economic needs

Increased education leads to increased productivity and income only if graduates find well-paying jobs. For education to drive economic growth, it must provide graduates with relevant skills—the kind they need to confront the challenges in the industries in which they work.

Examining 100 years of data from the United States, Goldin and Katz (2008) show how graduates obtained and used broadly defined sets of skills. They document how and when the skill sets for high school and college graduates were relevant to general trends in production that prevailed in a given era. From the beginning of the 20th century to the end of World War II, most jobs required the skills of a high school graduate. After World War II, most jobs required the skills of a college graduate. From the mid-1970s, too few people obtained college-level skills. Wage inequality increased as education levels stagnated.

Policies in the high-income East Asian economies caused demand for human capital to outstrip supply, driving long-term real increases in wages and incomes (table 1.3). These economies needed more and more diverse high-quality human capital. Their schools, universities, research bodies, and other knowledge institutions now routinely produce this capital, keeping up in the race between education and technology.

Debate continues regarding the size and specifics of the impact of education on growth and the mechanisms through which it acts. A survey of the literature by Permani (2009, 1) concludes that, in East Asia in 1965–2000, "the complementarity between education and other factors is commonly seen as the driving force of economic growth." Using data from household surveys from 1990 to 2005 for several large East Asian economies, Di Gropello and Sakellariou (2010) find rising returns to higher levels of education, despite large increases in the share of the labor

TABLE 1.3 Demand for human capital in East Asia has risen even faster than supply

Indicator	Cambodia, 1997–2007	China, 1999–2005	Indonesia, 1994–2007	Philippines, 1988–2006	Thailand, 1990–2004	Vietnam, 1992–2006
% change in share of workers with						
Upper-secondary education	–22.1	19.3	59.3	45.0	100.0	20.2
Tertiary education	65.0	15.2	190.3	37.1	98.4	94.0
% change in wage premiums to						
Upper-secondary education	286.4	75.3	–1.9	18.5	15.4	—
Tertiary education	394.2	34.1	17.2	5.0	17.2	273.2
Elasticity of demand (sublevel with highest returns)	Positive (tertiary)	Positive (upper- secondary)	Positive (tertiary)	Positive (upper-secondary)	Positive (tertiary)	Positive (tertiary)

Source: Di Gropello and Sakellariou 2010.
Note: — = no data available.

force educated to these levels (table 1.3). Complementarity and two-way causality explain the virtuous circles in which growth raises demand for education, and higher numbers of skilled workers contribute to growth. Policy makers want to understand the steps they can take to initiate or accelerate this process.

The types and sophistication of technologies used in the workplace define what type of skills employers find relevant. Changing or increasing challenges in production determine the size of skills premiums. During the initial phases of growth—from low-income to middle-income status—efficient production usually requires only basic literacy, numeracy, and reasoning skills. In later phases, it requires more advanced, specialized knowledge. Specialized institutions, such as technical and vocational education and training institutes, provide industry-specific skills. The compatibility between school-acquired skills and the demands of modern work makes the broader abilities conferred by rising general education levels increasingly relevant (see spotlight 2).

Early in the East Asian growth miracle, basic literacy and numeracy were compatible with the demands of newly emerging jobs in manufacturing. Uneducated rural dwellers did not make good industrial workers, but lower-secondary-school graduates did. The levels of knowledge and skills of the latter were broadly compatible with the need to read and follow directions in assembly and manufacturing jobs. Later, the bar for skills was raised; growth continued only where governments had taken earlier actions to ensure that such skills could be produced in large quantities. In this policy of "progressive universalism," the initial focus on basic education and basic literacy and numeracy shifted to longer, more complex, and more sophisticated learning programs and educational credentials.

Successful economies systematically decreased the distance to the technological frontier

A fundamental element of success has been the desire to improve technology. Long before the arrival of the Internet, the high-performing economies of East Asia were embracing a proto version of the knowledge economy as the long-term focus of national economic development. Policy makers realized the value of technology and the serious lack of domestic technological capacity and designed policies to address the problem. National development strategies prioritized the acquisition of technology because of its ability to set in motion a series of positive changes. The virtuous circle rested on five convictions:

- Economic growth comes from new ideas, which come from the advance of technology through increased firm capability in the short term and research in the long term.

- The use of technology and other products of science, technology, engineering, and mathematics has changed the world economy (and daily life) and enriched countries that are technology leaders.
- Creating world-class firms systematically generates many high-paying jobs, reducing the number of people competing for low-skill, low-productivity work.
- Countries need larger numbers of highly educated workers to keep up with, adapt to, and use new knowledge.
- Expansion of equitable educational opportunities begins at basic levels but ultimately aims to expand knowledge-generating capacities formed through widespread tertiary education and research.

Japan, Korea, Singapore, and Taiwan, China took advantage of rising global demand for inexpensive manufactured goods and used trade and industrial policies to create national manufacturing industries. Firms in these industries created the jobs that drove national economic development. Industrial policy brought firms like LG, Samsung, and Sony into existence by providing privileges while not protecting them from the need to compete. The aim was to create competitive firms capable of gaining and defending market share in their industries, by both acquiring increasingly sophisticated technologies and linking firm success to continuous technological improvement. This competitive pressure drove the acquisition of technology—and with it a need for ever better knowledge and human capital. Policies created firms that were sources of revenues for the government and profits for the firm, but they also relied on companies' ability to narrow the distance to the technological frontier.

To keep this process moving forward, at some point all rapidly growing East Asian economies used virtually every weapon in the arsenal of industrial development policy, including tariff protection and import restrictions, direct government investment in or ownership of key firms in selected industries, tax incentives, preferential allocation of credit, extensive collaboration with leading firms, technology licensing, and reverse engineering.

Japan, for instance, took several policy actions in the postwar reconstruction period to promote firms with increasing technological capacity, including the following:

- Subsidizing the importation of machinery and capital goods
- Aggressively licensing technology and acquiring new inventions and industrial designs
- Promoting the use of consultants from technologically advanced countries to adapt know-how
- Sending engineers abroad to seek out technologies, especially through overseas graduate education
- Restricting foreign investment to firms with valuable technologies.

Singapore's Economic Development Board granted tax advantages that led to more than 300 multinational firms establishing a presence in the newly independent country. It also built the infrastructure to facilitate the opening of factories, initially in the Jurong Industrial Park. China's growth as the "world's manufacturer" owes much to the role of industrial growth targets in five-year national and regional economic plans. Vietnam has sought to attract foreign investment by firms like Intel and Samsung, but it has struggled to take advantage of the knowledge spillovers that these firms can catalyze.

Increasing national technological capabilities brought myriad benefits. In the short term, it raised the quantity and quality of good jobs, creating modern manufacturing sectors. It also raised demand for more and higher-skilled labor.

Such increased demand is an important rationale for broader investments in basic education. Throughout the region, initial successes in manufacturing industries created jobs that spurred students and families to demand more and better education. Pressure on firms—even state-owned firms—to remain competitive created the continuous need to upgrade technology, skills, and knowledge.

Successful economies prepared early for the next phase in becoming a knowledge economy

Successful East Asia and Pacific economies made great efforts to gain access to and eventually achieve the capacity to produce leading technologies. Firms, research institutes, and universities all invested in improving their technological and research capacities. As the distance to the technological frontier in an industry decreases, the dynamism with which new products and technologies can be produced rises. But firms can remain competitive only if workers can also raise their ability to adapt and use technology in new ways—so demand for education and skills rises as well.

The region's rapidly growing economies did more than sustain successful implementation of policies; they also took early policy actions to prepare for the next phase of development before the gains from the current phase were exhausted. For national economic development policies, doing so meant taking early action on two fronts: building knowledge institutions and progressively universalizing their national education systems. Building knowledge institutions entailed creating trade missions, reverse engineering, and technological institutes, which grew into world-class research and development (R&D) and science, technology, and innovation systems. Progressively universalizing their national education systems meant that, after building broad skills through primary and lower-secondary education, policy makers began preparing for more sophisticated general education systems and large-scale, high-quality tertiary education.

To achieve mature high-income status, economies continually need to create new globally competitive firms, establish conditions in which leading firms can adapt and remain on top, or both, in a raft of sectors. For this to happen, strong institutions dedicated to creating and adapting knowledge must take root. Reaching the technological frontier requires creating a critical mass of domestic capacity to produce, select, absorb, and use the full range of scientific and technological knowledge, which is gained by spending on R&D and advanced human capital. Measures of success include inputs (such as the share of GDP spent on R&D and the number of researchers per 1,000 people employed), but also, more critically, outputs (such as the number of scientific articles published, citations, patents, and new products and processes).

Countries created various kinds of institutions to accelerate the process of technology upgrading. Japan's Ministry of International Trade and Industry allocated the scarce foreign currency needed to license technology to firms it believed could internalize the technology as they grew. Korea created dozens of government-owned technological research bodies, such as the Korea Institute of Science and Technology and the Korea Institute of Industrial Technology, which focused on applied research, engineering, and technological adaptation.

Korea transitioned from a low-income economy competing for foreign direct investment on the basis of a high skill-to-wage ratio to a world leader in innovation and human capital. Its long-term planning raised investment in R&D from virtually zero before 1980 to 2 percent of GDP (just below the average for the Organisation for Economic Co-operation and Development) by 1999. By 2014 the figure had risen to 4.29 percent, the largest share of GDP spent on R&D in the world. Korea has 50 percent more researchers per 1,000 people employed than the United States (12.8 vs. 8.8) and three times as many patent applications. Seventy-five percent of R&D spending comes from the private sector, and 80 percent of R&D is for applied research or experimental development. Korea also leads the world in the share of population with tertiary education (Zastrow 2016).

In the aftermath of the Cultural Revolution, China embraced the same policy goals and policies that underpinned the success of Hong Kong SAR, China; Japan; Korea; Singapore; and Taiwan, China. Through policies to develop manufacturing, it raised the skills of

TABLE 1.4 China is quickly becoming the world's largest producer of PhDs in sciences and engineering

Degree	1986	2012	Compound growth rate (%)
Bachelor's	227,764	3,038,473	11
S&E bachelor's	109,101	1,258,643	10
Master's	15,221	434,742	14
S&E master's	9,704	191,048	13
PhD	284	51,717	23
S&E PhD	228	27,652	21

Source: Freeman and Huang 2015.
Note: S&E = science and engineering; PhD = doctor of philosophy degree.

its workforce and the demand for skills. As a result of these policies, China became the "world's manufacturer" and achieved unprecedented economic growth.

At the same time, China implemented a long-term strategy to become a high-tech knowledge economy. For more than 25 years, it sent more students to the United States for PhD (doctoral) studies than any country in the world (Freeman and Huang 2015). At home, it encouraged firms to upgrade their technology, and it built deep technological and knowledge infrastructure. Freeman and Huang (2015, 2) highlight China's tremendous success at this endeavor:

> In this short span of time [1990–2010] China leaped from bit player in global science and engineering to become the world's largest source of [science and engineering] graduates, second largest spender on R&D and second largest producer of scientific papers, in both cases behind [only] the United States. The number of patents in China increased so rapidly as to make China the number one country in patents.

China is now the world's second-largest funder of R&D after the United States, spending more than US$200 billion a year on R&D (Freeman and Huang 2015). Between 1990 and 2012, China's output of scientific publications grew twentyfold, from just over 6,000 to close to 120,000. China also quickly increased both the number and the quality of its researchers. In 1986, China produced fewer PhDs than a single large university in a high-income country; in 2012, it produced more PhDs than any other country (table 1.4). This progress is the result of deliberate, long-term policy planning and implementation.

Human capital protects people from falling back into poverty

Progress in poverty reduction has been unprecedented in East Asia and Pacific. As recently as 2002, almost 1 billion people in the region were living in moderate or extreme poverty. Hundreds of millions of them escaped it—but many are vulnerable to falling back into poverty. Close to 74 million people in East Asia and Pacific are living on less than US$1.90 a day, and 350 million are living in moderate poverty (defined as US$3.10 a day) (World Bank 2013).

Estimates from household surveys show that 50–80 percent of workers in the bottom socioeconomic quintile in most East Asia and Pacific economies work in agriculture, often with very little capital or technology (World Bank 2014). Many people who escaped poverty live close to the line and are at risk of falling back into poverty if conditions do not continue to improve (box 1.3). Education's value goes beyond its ability to drive technological change at the upper end of the labor market. It yields benefits for people near or below the poverty line, too.

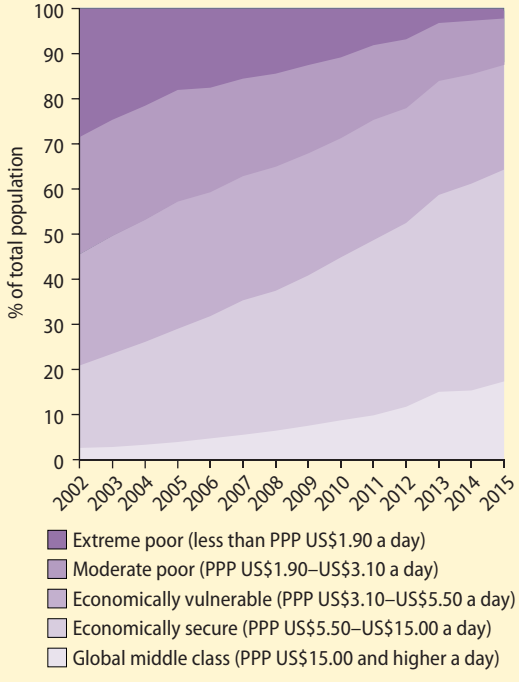
By definition, the poor have few assets and, in most cases, are completely dependent on their human capital to earn income. They usually have the least social capital and face obstacles to accessing and benefiting from higher levels of education and social networks that decrease vulnerability.

To what extent have people in the bottom 40 percent of the income distribution derived concrete benefits from improved educational opportunities? The short answer is that they have derived substantial benefits and continue to do so. Evidence strongly suggests that the same dynamics that generate returns to education at or near the technological frontier and among high-tech firms and industries create strong positive returns to education for the poor. Seminal

BOX 1.3 Gains in poverty reduction are fragile, particularly for people with little human capital

In 2015, the extreme poor accounted for 2.5 percent of the East Asia and Pacific region's population, the moderate poor accounted for almost 10 percent, and the economically vulnerable accounted for about a quarter. The economically secure were the largest group in the region, accounting for almost half of the population. The middle class accounted for 17 percent (figure B1.3.1).

FIGURE B1.3.1 Both extreme and moderate poverty in East Asia and Pacific are decreasing



Source: World Bank 2018b.
Note: PPP = purchasing power parity.

Not surprisingly, households in higher economic classes score higher on several indicators that go beyond income and consumption, including access to services, asset ownership, and employment. They are less likely to be employed in agriculture and more likely to be employed in formal sector salaried jobs, highlighting the importance of structural transformation and better jobs in supporting higher living standards.

Some patterns are less obvious, because they go beyond a simple association with greater consumption as economic class improves. Three stand out:

- The extreme poor are a heterogeneous group along several dimensions, including location and ethnicity.
- Even better-off groups, including the economically secure and the middle class, have low access to some basic services, including good-quality housing.
- Female labor force participation rates vary widely across economic classes, according to household surveys.[a] These rates are less than 40 percent for the extreme poor and about 43 percent for the moderate poor. In contrast, the rates are 55 percent for the economically vulnerable and more than 68 percent for each of the higher economic classes.

Source: World Bank 2018a.
a. Respondents appear to underestimate women's unpaid work in both the care economy and family businesses, with neither viewed as jobs, as captured by time-use surveys. Although a shift to paid employment often does not lead to a parallel decline in time spent in unpaid activities, participation in jobs that are defined as such (usually paid jobs) sets the nonpoor apart from the rest of the distribution.

work by Foster and Rosenzweig (1996) shows that poor farmers face technology selection decisions that sharply influence their income levels. Natural experiments in a range of low- and middle-income country settings show that more-educated poor farmers adopt new technologies earlier and manage them better, producing higher profits. Households led by members with completed primary education may earn returns on investment in agricultural inputs that are 40–70 percent higher than households in which no members completed primary school. The natural experiments

allowed the authors to isolate the source of the returns as the greater "ability to decode information" among the more educated. "Faced with new information," they conclude, "educated individuals are better able to take advantage of technical change" (Foster and Rosenzweig 1996, 941).

Higher returns induce higher rates of household investments in education. School enrollment rates rise with the increase in education's profitability. "Policies resulting in greater technical change are complementary with those increasing investment in schooling: The returns to technical change will generally be higher where primary schooling is more accessible and the returns to investment in schooling will be higher where technical change is more rapid" (Foster and Rosenzweig 1996, 951).

Duflo (2001) analyzes Indonesia's massive investments in school infrastructure in 1973–78, when it built more than 61,000 primary schools. She finds that the effort increased both education and wages.

Evidence from the Lao People's Democratic Republic (Pimhidzai 2017) reveals that this dynamic is at work among smallholders in other parts of the region (table 1.5). The trend toward positive technical and technological change marks the start of a virtuous circle in which education becomes more valuable, produces higher returns, and prompts increased investments by the poor in their own human capital.

The region's legacy of equitable growth is under threat

The massive increases in educational attainment and quality came from policies that sought to provide everyone with good basic education, initially through at least lower-secondary school. These policies were implemented both because of the inherent value of education to the individual and because of the advantages accruing to countries with well-educated workforces across the socioeconomic spectrum. The growth of good jobs demanding improved skills drove prosperity at the top, but investments in educating everyone provided equally large and important returns among the poor and vulnerable. Rising incomes among rural smallholders helped the region to establish its reputation for high growth and relatively high equality.

East Asia's "catch-up" phase in educational attainment lasted roughly two generations. Between 1960 and 1990, increased educational attainment was a prominent feature of the "growth with equity miracle" (Jain-Chandra and others 2016). Economies were able to reduce inequality while they grew rapidly partly because of their equitable distribution of basic educational opportunities. "Progressive universalism"—focusing on primary and lower-secondary education for all—was key.

Since 1990, some countries have struggled to maintain the inclusivity of growth (figure 1.6). For the region as a whole, the Gini coefficient is now above

TABLE 1.5 Education of the household head is related to selected agriculture indicators in the Lao People's Democratic Republic, 2008 and 2013

Highest level of completed education of household head	Output per hectare (kilograms)		Output per person per year (kilograms)		% of produce sold on market	
	2008	2013	2008	2013	2008	2013
No formal education	2,119	2,016	474	532	40.5	39.6
Some primary education	2,437	2,265	529	607	48.7	49.0
Complete primary education	2,644	2,552	660	695	57.7	59.1
Complete lower-secondary or more	2,743	2,700	707	719	59.5	56.7
Weighted average	**2,541**	**2,454**	**610**	**659**	**53.0**	**53.3**

Source: Pimhidzai 2017.

(worse than) the global average, and inequality seems to be rising most among some of the region's largest countries. Increasing inequality in China and Indonesia are of particular concern.

Among the explanations for the post-1990 divergence is the failure to distribute the opportunities for tertiary education as equitably as those for basic education. Skill premiums to tertiary education are rising, and students from poor families are much less likely than others to attend tertiary institutions. Analysis by the International Monetary Fund shows that the contribution of skill premiums to inequality is three times as large in Asia as elsewhere (Jain-Chandra and others 2016). Policy attention to a fair distribution of the now increasingly important tertiary level of education is needed if the region is to continue growing equitably and sustainably.

FIGURE 1.6 Inequality in East Asia has been rising since 1990

Source: Data from the Standardized World Income Inequality Database (SWIID) Version 6.0.
Note: Data for the Philippines are through 2012. Data for Thailand are through 2013. Data for all other economies are through 2014.

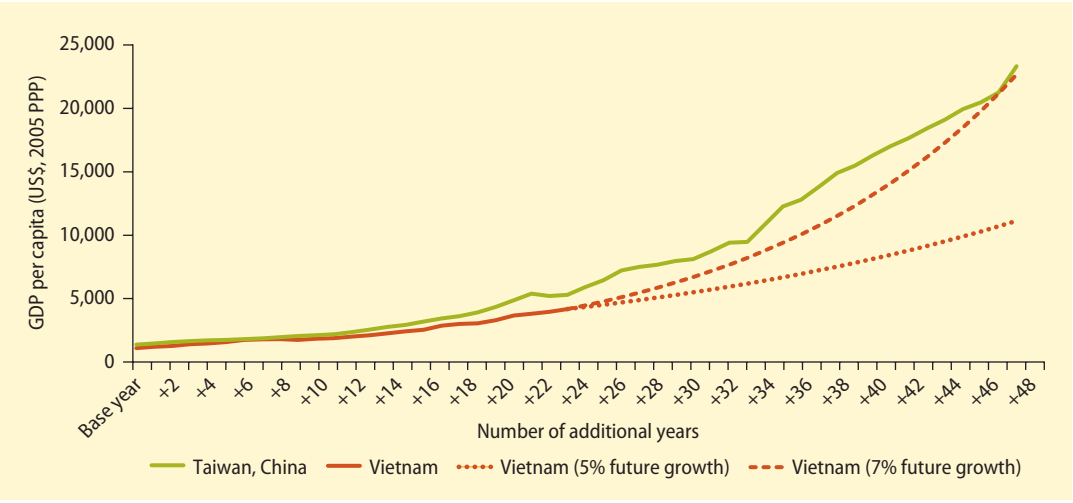
More remains to be done if countries are to avoid the "middle-income trap"

The world's most successful examples of sustained growth in East Asia exist alongside cases of prolonged economic stagnation. Not all economies in the region have experienced the same economic success, and poverty remains even in the most successful economies. Some economies have enjoyed stretches of high growth punctuated by crisis; others have tied their fortunes to the fluctuating value of commodities and primary products or struggled to raise productivity over the long term.

National poverty rates have declined sharply, but many people are at risk of slipping back into poverty. Some economies are struggling with or recovering from periods of fragility, violence, or conflict. Others are still in the early phases of structural transformation. Despite plunging poverty rates, East Asia and Pacific is still home to more than 74 million people living on less than US$1.90 a day. And while strides have been made in creating modern industries and employment, informal work and low-quality jobs are still the norm. Two generations of progress have lifted millions out of poverty, but gains are fragile. Further progress is needed to consolidate them.

The success of Japan, Korea, Singapore, and other economies in the region is the result of sequential implementation of increasingly sophisticated policies over almost four decades. The challenges are formidable, and success is by no means guaranteed. Institutional weaknesses or unfavorable political developments may derail good intentions. Strength in one area may be undermined by weaknesses elsewhere. As the World Bank's *Vietnam 2035* study attests, weak institutions or the inability to adopt and enforce complementary policies can undercut strong progress in education coverage and quality through secondary levels (World Bank and Ministry of Planning and Investment of Vietnam 2016). These deficiencies can slow growth—and a two-point difference in growth can easily translate into another generation missing the benefits of high-income status (figure 1.7).

FIGURE 1.7 To achieve the level of GDP that Taiwan, China, reached in the early 2000s, Vietnam needs to grow at an average rate of 7 percent a year through 2035



Source: Adapted from World Bank and Ministry of Planning and Investment of Vietnam 2016.
Note: The base year is 1951 for Taiwan, China, and 1990 for Vietnam. GDP = gross domestic product; PPP = purchasing power parity.

Conclusions

The record of East Asian economic growth since 1960 is unmatched. Economies that are home to more than two-thirds of the region's inhabitants have grown or are growing in transformative ways. The typical East Asian worker today is less likely to be an agricultural smallholder and more likely to be an urban dweller in formal, modern employment. Massive investments have been made in the quantity of education obtained, and the quality of education has risen during this expansion. In economies where growth is dynamic, demand for educated workers has outstripped fast-rising supply; the highest returns to schooling are going to those with the most education. As in the world's high-income countries, the demand for more and better skills is not exhausted or saturated. On the contrary, a main risk for countries is that failure to produce adequate numbers of competently educated and trained workers will stifle growth.

Success relied first on sets of policies that ensured stable and market-friendly macroeconomic environments. Countries implemented a variety of industrial policies, including protection, subsidies, and directed finance, but on the whole firms were required to compete in export markets where technological prowess and continuous technological upgrading were rewarded. Growth of firms—especially in manufacturing—set in motion continually increasing demand for better-educated workers. Attention was paid to the relevance of education; policies promoted technical and vocational education and training to match skills to industry needs, while preparing for a future in which the capacity to innovate would be of fundamental importance.

Successful economies provided good-quality basic education to the broadest possible range of school-age children before investing in expansion at tertiary and preprimary levels. Initially, virtually all children were educated through the lower-secondary level. Later, targets were set for universal secondary completion.

Education's value was not limited to formal employment. Education also improved the lives of people in the bottom 40 percent,

including people in the most precarious economic circumstances. More and better schooling raised the productivity and income of the poorest, providing both the resources and the opportunity for a structural transformation toward widespread middle-class incomes and jobs.

Progress has been remarkable—but it has been neither equitable nor sufficient. Some countries have stagnated, fluctuated, or failed to convert periods of high growth into sustained changes and prosperity. Poverty rates have dropped dramatically, but far too many people in the region still live in danger of falling back into poverty. Education outcomes for 40 percent of the region's students are unambiguously as good as in any country or region—at any income level. But up to 60 percent of the region's students are in schools in which internationally comparable test scores point to serious deficiencies in learning or in which no such information is available.

The rise in inequality after more than three decades of growth with equity attests to the failure of investments in education to keep pace with demand. Rapid technological change exerts a strong pull for more and better-educated workers, and rates of return rise with years of education, despite rising supply. Finishing the work of providing all young people in the region with good-quality basic education is as important as ever.

Note

1. See World Bank Poverty and Equity Data Portal: East Asia (http://povertydata.worldbank.org/poverty/region/EAS).

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The State of Education in East Asia and Pacific

2

East Asia and Pacific is home to a quarter of the world's school-age children, most of whom are enrolled in school

The world's most successful education systems are in East Asia. In small and large economies, and at high and moderate levels of gross domestic product (GDP) alike, school systems in the region achieve high average performance, boast large shares of top performers, and yield largely equitable learning outcomes. Students in many of the region's low- and middle-income economies score better than their peers in high-income countries, especially when scores are adjusted for socioeconomic status.

Yet up to sixty percent of students in East Asia and Pacific are in poorly performing school systems where performance in key subjects is either low or unknown. Students in rural Cambodia, Indonesia, or the Lao People's Democratic Republic may perform farm duties before having to undertake a long walk to an ill-equipped rural school and sit in a classroom staffed by an underprepared teacher. In contrast, a student in Shanghai, China, may take a city bus to a modern school where a teacher has prepared a lesson integrating computer-aided instruction that draws on the latest education research. Policy makers throughout the region are rightfully gratified with the large amount of high-quality schooling, while still recognizing how much more needs to be done.

The size of national education systems in the region varies

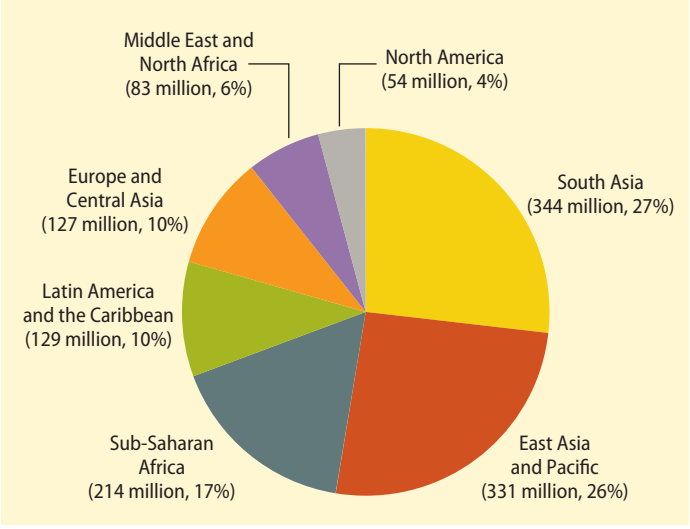
As noted, a quarter of the world's school-age children live in East Asia and Pacific (figure 2.1). More than 331 million students are enrolled in basic education in its 29 economies—more than in any other region except South Asia.

National systems employ more than 20 million teachers, according to the World Development Indicators for 2016 (World Bank, various years). China has the largest system, with 182 million students in basic education (primary plus lower- and upper-secondary); Tuvalu has the smallest, with fewer than 3,000 students (table 2.1).

Most economies in the region have achieved universal primary enrollment

Access to education in the region—especially primary education—is widespread. Rates of coverage improved over the past two decades, and most economies have achieved universal

FIGURE 2.1 A quarter of the world's 1.3 billion school-age children live in East Asia and Pacific



Source: World Bank EdStats (World Bank, various years).
Note: Figures show number of students enrolled in primary and secondary school and percentage of global enrollment.

primary enrollment. East Asia and Pacific has 26 percent of the world's school-age children but only 13 percent of the world's out-of-school children (table 2.2). Some 180 million of the region's 187 million primary-school-age children are enrolled in school.

Among countries with Emerging Systems—the categorization into four groups is discussed further in the pages ahead—the two countries with the largest share of primary-school-age children not enrolled are the Solomon Islands (21 percent) and the Marshall Islands (19 percent) (table 2.3). Eighteen countries have greater than 95 percent enrollment in primary. Pacific Island countries are the only subregion with rates of out-of-school primary children above 10 percent, with a total out-of-school population amounting to about 200,000 students. Indonesia and Thailand, each with roughly 8 percent of students out of school at primary level, account for 3.1 million unenrolled students.

TABLE 2.1 Education systems in East Asia and Pacific vary widely in size

Number of students in system	Economies
Fewer than 100,000	Brunei Darussalam; Kiribati; Macao SAR, China; Marshall Islands; Micronesia, Fed. Sts.; Palau; Samoa; Tonga; Tuvalu; Vanuatu
100,000–1 million	Fiji; Hong Kong SAR, China; Mongolia; Singapore; Solomon Islands; Timor-Leste
1–10 million	Cambodia; Korea, Rep.; Lao PDR; Malaysia; Myanmar; Papua New Guinea; Taiwan, China
More than 10 million	China, Indonesia, Japan, Philippines, Thailand, Vietnam

Source: World Bank EdStats (World Bank, various years).

TABLE 2.2 East Asia and Pacific has 26 percent of global enrollment but only 13 percent of the world's out-of-school children

Region	% of world's students	% of world's out-of-school children	% of age group not enrolled	Number of out-of-school children (millions)	Number of students (millions)
South Asia	27	38	22	99.7	344.3
East Asia and Pacific	**26**	**13**	**9**	**34.8**	**331.4**
Sub-Saharan Africa	17	35	30	93.1	214.4
Latin America and the Caribbean	10	5	10	14.0	129.5
Europe and Central Asia	10	2	5	6.4	127.5
Middle East and North Africa	6	5	13	12.3	83.2
North America	4	1	5	2.7	53.7
World			17	263	1,284

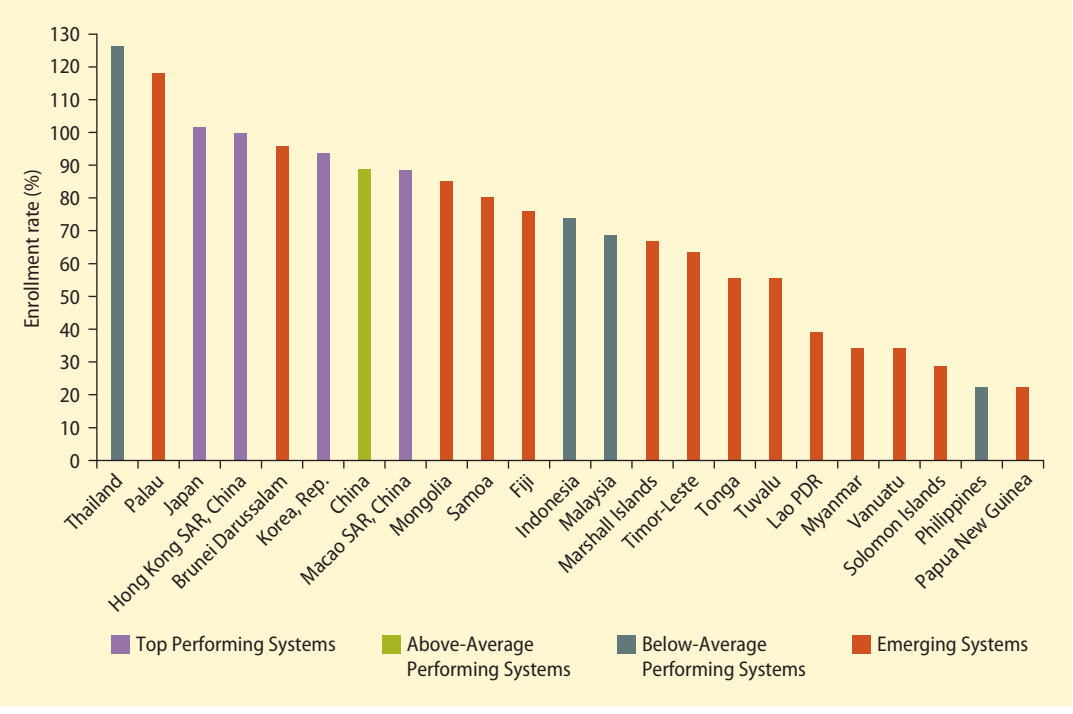
Source: World Bank EdStats (World Bank, various years).

TABLE 2.3 Access and coverage are significantly lower in countries with Below-Average Performing and Emerging Systems

Type of system	Number of primary out-of-school children	Number of primary school students	% of primary school-age children not in school	Share of region's out-of-school children
Top Performing	38,559	11,369,954	0.3	0.6
Above-Average Performing	2,244,573	102,541,968	2.1	34.6
Below-Average Performing	3,559,394	52,659,532	6.3	54.9
Emerging	646,140	10,471,391	5.8	10.0

Source: World Bank EdStats (World Bank, various years).
Note: The economies included in Top Performing, Above-Average Performing, Below-Average Performing, and Emerging Systems are listed in table 2.6. Figures for China are estimated from regional totals. Data were not available for Brunei Darussalam; Hong Kong SAR, China; Singapore; or Taiwan, China.

FIGURE 2.2 Upper-secondary enrollment rates are high in Top Performing and Above-Average Performing Systems



Source: World Bank EdStats (World Bank, various years).
Note: The enrollment rate for some economies exceeds 100 percent because the statistic is calculated from the number of enrolled students versus size of population of a grade's age cohort. Thus, for example, if there are enrolled students who repeated a year, or who are from regions not calculated in the census, the rate will exceed 100 percent.

Progress is also notable in secondary enrollment, although more remains to be done to ensure that all children complete both lower- and upper-secondary school and have the chance to develop their skills through postsecondary education (figure 2.2). Enrollment and completion rates are high in Top Performing as well as Above-Average Performing Systems, but mediocre or low in others. These rates in the Pacific Island countries are especially troubling.

The region has made tremendous progress in improving preschool access

East Asia and Pacific is home to roughly 119 million children of preschool age (3–6 years). In 1980, the gross enrollment rate for preschool was 13 percent. By 2014, it had risen to 76 percent (figure 2.3). This progress is particularly notable if one considers that globally the gross enrollment rate in preschools rose from 21 to 48 percent in the same period.

The achievement is striking given that only 4 of East Asia and Pacific's 29 economies have compulsory preprimary schooling (all of them make one year of preprimary schooling compulsory starting at age five). In contrast, 14 of the 30 countries in Latin America and the Caribbean have such laws; their current gross enrollment rate is just below that of East Asia and Pacific. In Latin America and the Caribbean, most countries' laws cover children starting at ages four to five and make one year of preprimary schooling compulsory. Some make up to three years of preprimary schooling compulsory and start as early as age three.[1]

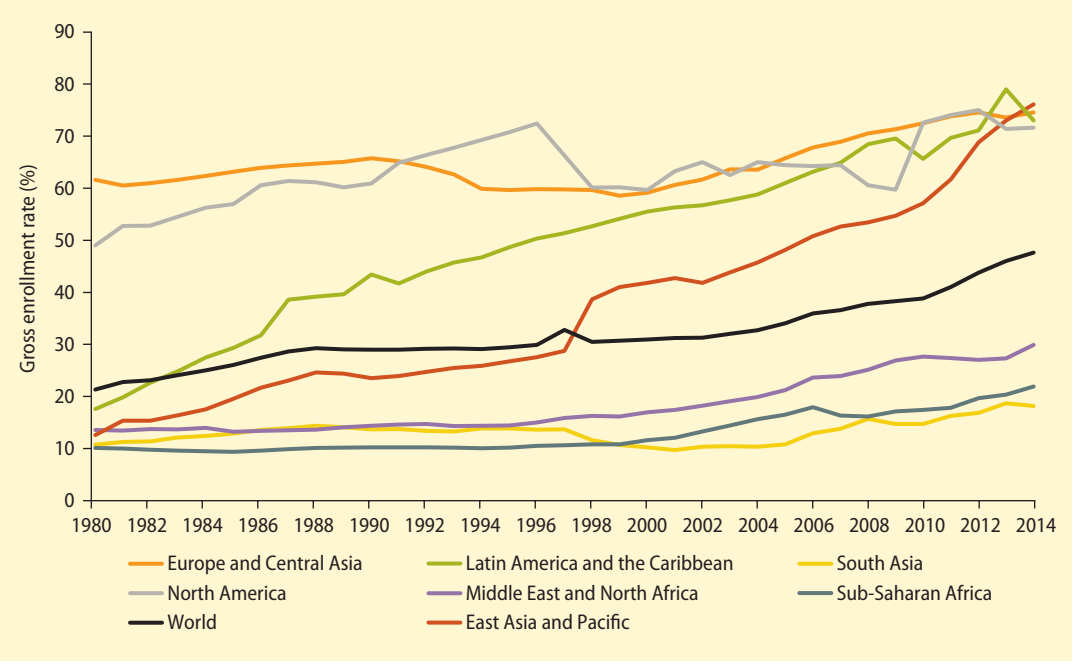
Coverage is unequal across and within countries, but it is improving

In multiple countries, including countries as diverse as the Philippines and Palau, more than half of children of preschool age are enrolled. Yet in too many countries—overwhelmingly in countries with Emerging Systems—as few as one in three children is enrolled (figure 2.4).

Educational attainment among women has increased

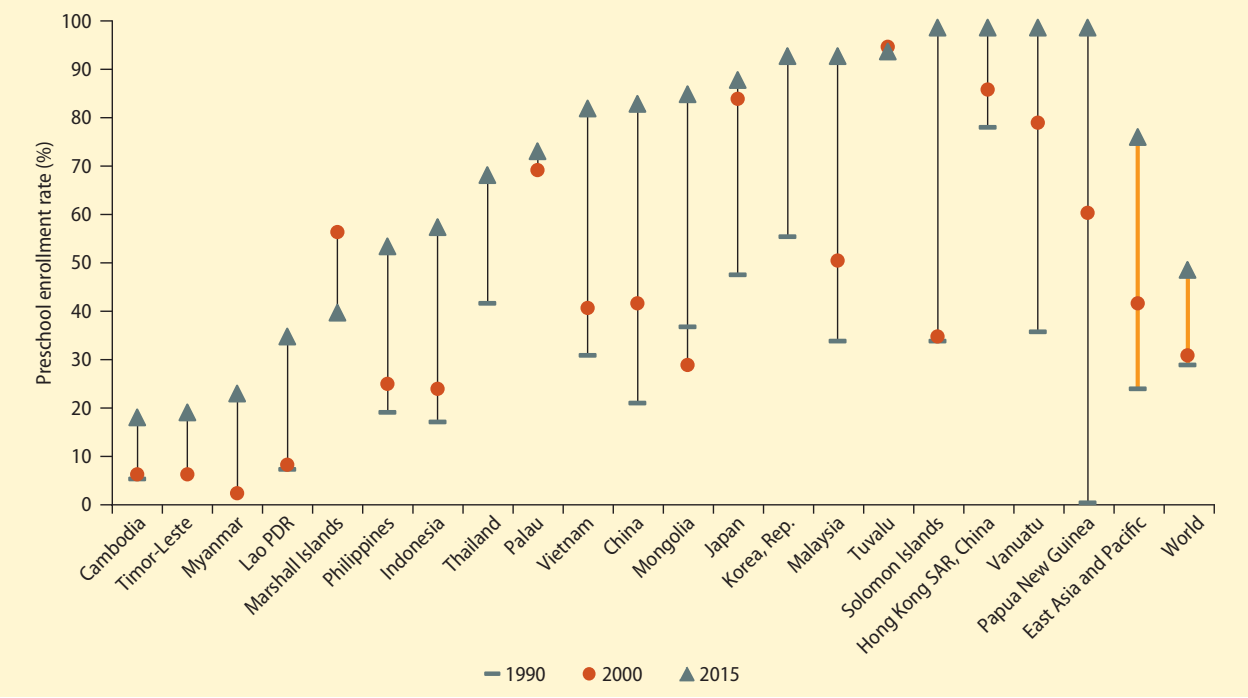
In 1950, women in East Asia had completed, on average, less than a year of schooling, compared with the world average of 2.5 years. Six decades later, as the population more than doubled, average attainment of women increased to 7.4 years of schooling—catching up to the global average for women (figure 2.5).

FIGURE 2.3 **The gross enrollment rate in preschools in East Asia and Pacific has surged since 1980**



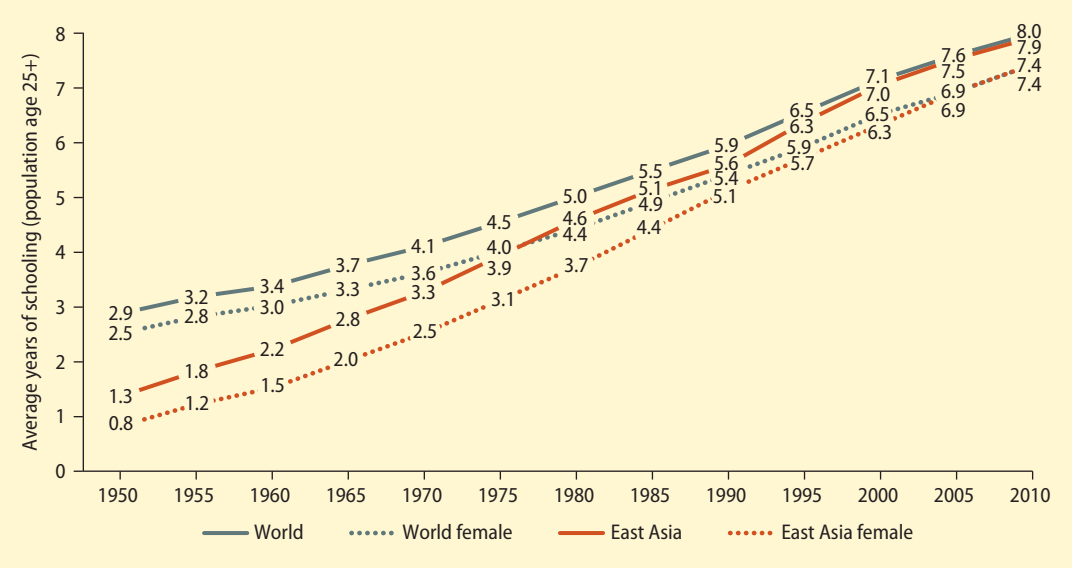
Source: World Bank EdStats (World Bank, various years).
Note: Figures include high-income countries in each region.

FIGURE 2.4 **The increase in preschool enrollment has not been even everywhere for everyone**



Source: World Bank EdStats (World Bank, various years).
Note: The starting data for Vanuatu are 1992. The midpoint is 1999 for the Marshall Islands and Myanmar; 2001 for Tuvalu and Vanuatu; and 2002 for Hong Kong SAR, China; Palau; Papua New Guinea; and Timor-Leste. The ending data are 2008 for Papua New Guinea; 2009 for the Philippines; 2011 for Hong Kong SAR, China; 2012 for Mongolia; and 2014 for Indonesia, Japan, and Palau. Some starting and midpoint data are missing.

FIGURE 2.5 **Average years of schooling among women in East Asia rose sharply between 1950 and 2010**



Source: Data from Barro and Lee 2013.
Note: Results are weighted by population. Timor-Leste and Pacific Island countries are missing.

Returns to schooling are rising, and labor markets for young people are changing

Increased schooling makes a concrete difference for job prospects and earning among youth in East Asia and Pacific. Many young people in the region now complete secondary school and progress to various types of post-secondary studies. Job prospects for graduates are vastly better than they used to be: the population 20–24 years old in Vietnam has, on average, 8.6 years of schooling compared with 7.5 years of schooling in the working-age population in general. This age group also has by far the largest probability of working in the wage sector and obtaining high returns to additional years of schooling (Barro and Lee 2013).

Some economies in the region benchmark learning outcomes using international assessments

Internationally comparable standardized tests are both the best and, from some perspectives, the only technically sound way to measure education quality across economies and school systems. These test scores only assess reading, math, and science knowledge and ability; debates about their value as proxies are vigorous. Although no measure is perfect, scores on these tests reveal more about the relative quantity and quality of learning across countries than any other measure or combination of measures.

Many countries in the region have benchmarked their systems internationally since the tests appeared (table 2.4). Nine economies have records of frequent participation, dating back to 1995, on the two main international large-scale assessments: Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA).

Japan participated in all nine iterations since the two tests adopted a common scoring system (500 points as the average, with a 100-point standard deviation). Hong Kong SAR, China; Indonesia; the Republic of Korea; Macao SAR, China; Malaysia; the Philippines; Singapore; Taiwan, China; and Thailand have repeatedly benchmarked learning outcomes against those of other countries. China and Vietnam have lately joined the group of East Asia and Pacific economies that regularly participate in PISA. Lower-income countries such as Cambodia, Lao PDR, Myanmar, Papua New Guinea, and Timor-Leste as well as Pacific Island countries have not participated in either PISA or TIMSS. Some are making plans to start benchmarking. Cambodia, for example, plans to take part in the first iteration of the Organisation for Economic Co-operation and Development (OECD) PISA for Development exam in 2018.

Education systems fall into four groups

In East Asia and Pacific, economies across the income spectrum have participated in internationally comparable exams. Samples of students representing about 55 percent of the region's enrollment have taken internationally comparable exams.[2] The picture that emerges is positive: an average composite constructed PISA score based on all instances of PISA from 2000 to 2015 for the region comes in above the OECD average (table 2.5).[3]

Figure 2.6 aggregates scores from the nine iterations of PISA and TIMSS administered since 2000 and 2003, respectively. Averaging the two scores has some drawbacks. It eliminates trend information, combines scores of varying robustness (based on how many times a country participated), and may change the meaning of a score because the two exams do not test exactly the same content or abilities. For gauging overall system quality, however, the average scores give the clearest picture of a system's performance.

A 100-point standard deviation is the equivalent of a difference of three years of learning. Figure 2.6 shows that, on average, 15-year-old students in China and Vietnam have the equivalent of three to four more quality-adjusted years of schooling than their counterparts in Indonesia and the Philippines. Students in Shanghai and Singapore are as many as seven to eight years ahead of students from lagging countries.

TABLE 2.4 East Asia and Pacific economies have participated in various international assessments since 1995

Type of system	PISA (mathematics, science, and reading)						TIMSS (mathematics and science)						EGRA/EGMA						PILNA (mathematics and reading)	
	2000	2003	2006	2009	2012	2015	1995	1999	2003	2007	2011	2015	2009	2010	2011	2012	2013	2014	2012	2015
Top Performing																				
Hong Kong SAR, China	■	■	■	■	■	■	■	■	■	■	■	■								
Japan	■	■	■	■	■	■	■	■	■	■	■	■								
Korea, Rep.	■	■	■	■	■	■	■	■	■	■	■	■								
Macao SAR, China			■	■	■	■														
Shanghai, China				■	■	^														
Singapore				■	■	■	■	■	■	■	■	■								
Taiwan, China			■	■	■	■		■	■	■	■	■								
Above-Average Performing																				
B-S-J-G (China)[a]						■														
Vietnam					■	■							■	■			■	■		
Below-Average Performing																				
Indonesia	■	■	■	■	■	■	+	■	■	■	■	■						■		
Malaysia				■	■	■		■	■	■	■	■								
Philippines							+	■	■				■	■		■	■			
Thailand	■	■	■	■	■	■	>	■	■	■	■	■								
Emerging																				
Brunei Darussalam																				
Cambodia														■						
Fiji																			■	
Kiribati																			■	■
Lao PDR																■				
Marshall Islands																			■	■
Micronesia, Fed. Sts.																			■	■
Mongolia										■										
Myanmar																				
Palau																			■	■
Papua New Guinea															■	■	■		■	■
Samoa																			■	■
Solomon Islands																			■	■
Timor-Leste													■							
Tonga													■							■
Tuvalu																			■	■
Vanuatu														■					■	■

Sources: EGRA/EGMA data from Graham and Kelly 2017. PILNA data from PILNA 2016. PISA data sets and results reports are from http://www.oecd.org/pisa/. TIMSS data sets and results reports are from https://timssandpirls.bc.edu.

Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); EGMA = Early Grade Mathematics Assessment; EGRA = Early Grade Reading Assessment; PILNA = Pacific Islands Literacy and Numeracy Assessment (see spotlight 1); PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study; ^ = Shanghai is counted in B-S-J-G (China) in 2015; + = Indonesia and the Philippines participated in TIMSS in 1995 (math) but did not complete the steps necessary for the 1995 data to be reported comparably with those of other countries (see Mullis and others 2000); > = Thailand participated in the fourth-grade TIMSS in 1995 but did not satisfy guidelines for sampling procedures at the classroom level.

a. See box 2.1 for definition and explanation of B-S-J-G (China).

TABLE 2.5 Economies in East Asia and Pacific routinely score above 500 on PISA

Economy	Average composite constructed PISA score of test takers (2000–15)	Total population of 15-year-olds
Shanghai, China	582	108,056
Singapore	550	48,218
Hong Kong SAR, China	541	65,100
Korea, Rep.	537	620,687
Japan	531	1,201,615
Taiwan, China	526	295,056
Macao SAR, China	517	5,100
B-S-J-G (China)	514	2,084,958
Vietnam	509	1,803,552
Thailand	439	895,513
Indonesia	386	4,534,216
East Asia and Pacific average	**505**	
OECD average	**497**	

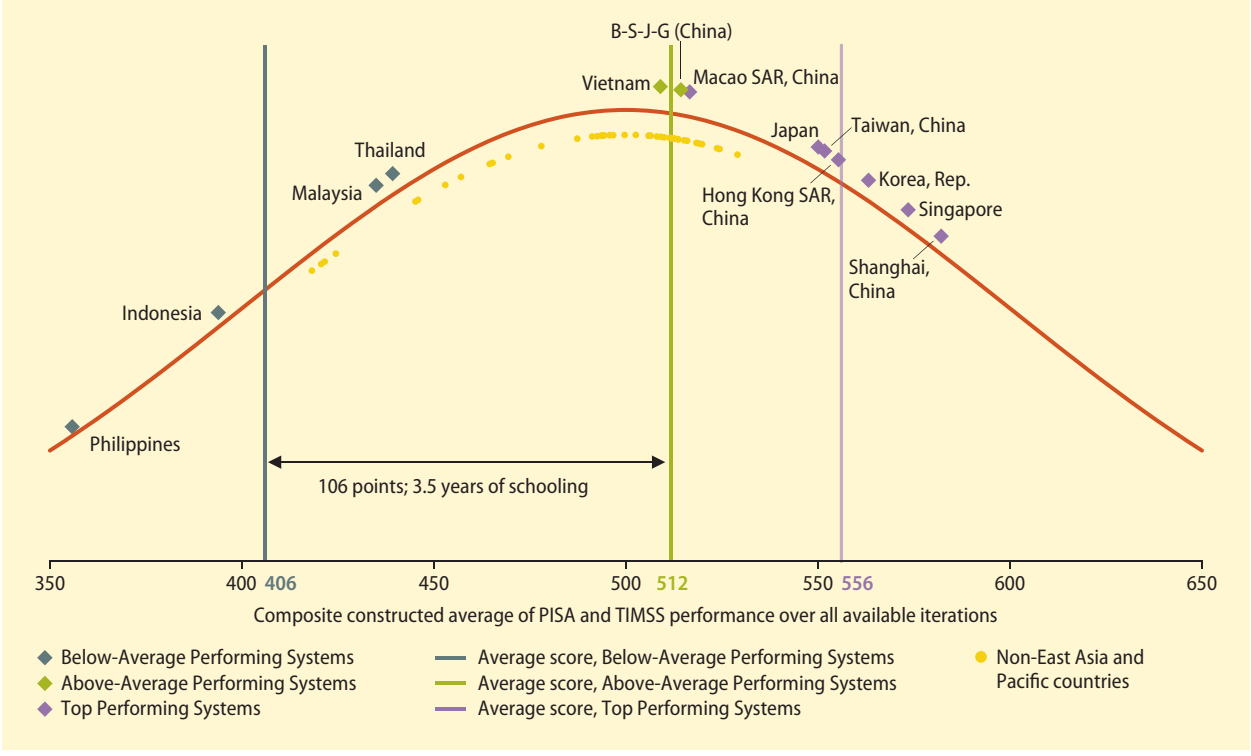
Sources: PISA 2012 (OECD 2013). Total population of 15-year-olds is from OECD 2016. Total population of 15-year-olds in Shanghai is from PISA 2012 (OECD 2013).
Note: Excludes Malaysia's 2015 score. Includes all economies participating in PISA 2015. Shanghai's score is from PISA 2012. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment.

Grouping economies by their scores on PISA and TIMSS sheds light on the roots of high performance. Although test scores never tell the whole story, they are the best available comparative indicator.

Scores from internationally comparable tests suggest a division of countries into four categories: three performance levels plus a group of countries designated as having emerging education systems because they do not participate in standardized international assessments (table 2.6). Table 2.7 shows the number of students enrolled at various levels in each type of system.

Top Performing Systems consistently score more than half a standard deviation above the OECD average score of the tests they have taken. Comparator countries participating in these tests have almost always included the world's top education systems and wealthiest

FIGURE 2.6 Students in China and Vietnam are among the top performers in developing East Asia and Pacific



Sources: Calculations based on PISA and TIMSS scores on nine assessments since 2000 (for PISA) and 2003 (for TIMSS).
Note: Figure shows composite constructed average performance score with mean of 500 points and standard deviation of 100 points. The Philippines has only participated in TIMSS. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

TABLE 2.6 Education systems in East Asia and Pacific can be categorized into four performance groups

Group	Economy	Total number of students (millions)	Number of students assessed by PISA/TIMSS[a] (millions)	Number of students assessed by EGRA (millions)	Share of cohort tested (%)[b]
Top Performing Systems (average score = 556)	Hong Kong SAR, China; Japan; Korea, Rep.; Macao SAR, China; Singapore; Taiwan, China	24.1	24.1	—	100
Above-Average Performing Systems (average score = 512)	China, Vietnam	198.7	39.7[c]	—	20
Below-Average Performing Systems (average score = 406)	Indonesia, Malaysia, Philippines, Thailand	92.3	92.3	21.7	100
Emerging Systems	Brunei Darussalam; Cambodia; Fiji; Kiribati; Lao PDR; Marshall Islands; Micronesia, Fed. Sts.; Mongolia; Myanmar; Palau; Papua New Guinea; Samoa; Solomon Islands; Timor-Leste; Tonga; Tuvalu; Vanuatu	16.3	0.5	5.1	35
Subtotal			156.6	26.8	
Total		**331.4**	**161.7[d]**		**48**

Sources: OECD 2016; TIMSS 2015; data from World Bank EdStats (World Bank, various years). Data are the latest available data for each economy.
Note: The average score in Organisation for Economic Co-operation and Development countries was 497. — = not available. EGRA = Early Grade Reading Assessment; PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.
a. PISA is taken by 15-year-olds (typically grade 10). TIMSS is taken by students in grades 4 and 8.
b. When sample-based tests are used, the share refers to the sample base measured.
c. China as a country has not participated in PISA. Scores are for the more economically advanced regions of Beijing, Shanghai, Jiangsu, and Guangdong, which are home to 15 percent of China's pretertiary student population.
d. This figure combines the number of students tested by PISA/TIMSS with the 5.1 million students tested by EGRA. Countries are not double counted in totals.

TABLE 2.7 Enrollments in East Asia and Pacific, by level of education and type of system
Millions

Item	Preprimary	Primary	Secondary	Total enrollment, kindergarten through grade 12
East Asia and Pacific	58.8	177.1	154.4	331.5
Top Performing Systems	4.3	11.3	12.8	24.1
Above-Average Performing Systems	42.6	102.5	96.2	198.7
Below-Average Performing Systems	8.0	52.7	39.6	92.3
Emerging Systems	0.9	10.5	5.8	16.3

Sources: World Bank EdStats (World Bank, various years); Singapore Department of Statistics 2015; Taiwan Ministry of Education 2016; National Bureau of Statistics of China 2016.
Note: Group totals do not equal East Asia and Pacific total because of rounding and the exclusion of Australia and New Zealand from system groups but not from East Asia and Pacific. The group of Beijing, Shanghai, Jiangsu, and Guangdong (China) represents 16 percent of China's primary enrollment and 11 percent of its secondary enrollment (see box 2.1).

economies, so performing consistently above this average is a notable accomplishment. This group includes Hong Kong SAR, China; Japan; Korea; Macao SAR, China; Singapore; and Taiwan, China.

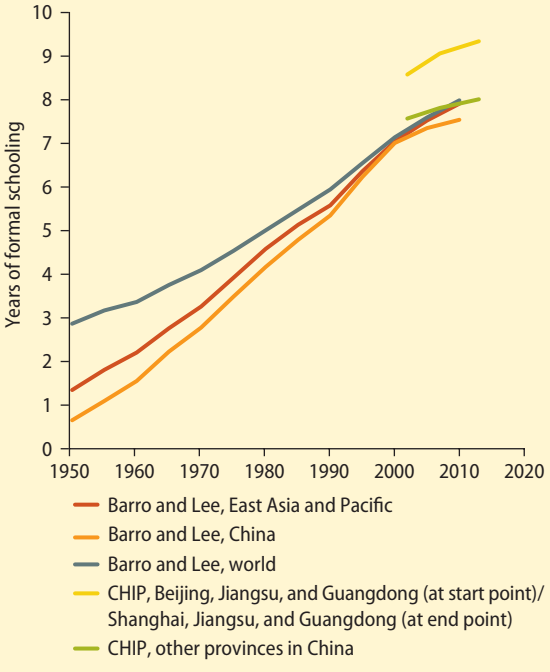
Above-Average Performing Systems consistently score up to half a standard deviation above the OECD average despite having GDP per capita that predicts much lower performance. This group includes the Beijing, Shanghai, Jiangsu, and Guangdong (B-S-J-G) regions of China, and Vietnam. (Together, China and Vietnam account for 70 percent of enrolled students in the region.) Their success is a testament to how school-related policies and practices can lead to high learning

BOX 2.1 Educational attainment, achievement, and learning in provinces in China that do not participate in international assessments

China as a whole has not yet participated in the Programme for International Student Assessment (PISA). In 2009 and 2012, only the municipality of Shanghai participated. In 2015, four provinces and municipalities of China participated and published the results: Beijing, Shanghai, Jiangsu, and Guangdong. On average, these four provinces performed 1.3 years ahead of the Organisation for Economic Co-operation and Development (OECD) average in math, 0.8 year ahead of the OECD average in science, and 0.1 year behind the OECD average in reading in 2015.

These four provinces account for 17 percent of China's total population and 15 percent of the country's pretertiary student enrollment. Within China, the provinces and municipalities of B-S-J-G are among the wealthiest and most urban. They are not representative of all of China.

FIGURE B2.1.1 Estimated mean years of formal schooling in China among adults 25 and older are converging to world and regional averages



Sources: Data from Barro and Lee 2013; CHIP, various years.
Note: CHIP = China Household Income Project.

This box characterizes the state of attainment, achievement, and learning in provinces for which no international assessment data exist. In addition to comparing B-S-J-G with the rest of China, it highlights the educational gaps in attainment, access, and learning between rural and urban parts of the country.

Data on years of attainment are available for all of China as well as for a selection of provinces. Figure B2.1.1 shows mean years of formal education for the population 25 and over using data from Barro and Lee (2013) and the China Household Income Project (CHIP, various years) for 2002, 2007, 2013. It shows that attainment is more than a year higher in these four provinces than in other provinces surveyed by CHIP.[a] It also shows that, among the provinces surveyed by CHIP, mean years of formal schooling are close to, or above, world and regional levels. Given that the Barro and Lee data on mean years of formal schooling for the whole of China are below the mean presented from CHIP data, it is possible to infer that, for the remaining provinces, mean years of formal schooling are below those of the East Asia and Pacific region and the rest of the world. Further disaggregating CHIP 2013 data by region shows that, on average, rural people have 3.4 years less formal schooling than their urban counterparts.

Another way to capture the state of education is by looking at enrollment and completion rates. China has made strides in improving access and closing the education gap in the past decade. The net enrollment rate in primary schools reached 99.9 percent in 2015, and the gross enrollment rate in junior-secondary school stood at 104 percent. Gaps in educational achievement emerge after the compulsory education cycle. In the 2013 CHIP survey data, dropout rates after completing the nine-year compulsory education cycle are higher for students outside of Beijing, Jiangsu, and Guangdong (Shanghai was not surveyed) than for students in these provinces. In Beijing, Jiangsu, and Guangdong, 70 percent of adults age 20–36 who completed junior-secondary school go on to complete senior-secondary school; for their counterparts in other provinces, the figure is just 55 percent.

box continues next page

BOX 2.1 Educational attainment, achievement, and learning in provinces in China that do not participate in international assessments *(continued)*

Differences in educational achievement between rural and urban students are even more pronounced. As rural children from poor provinces progress throughout the education system, an estimated 20 percent will transition to college, a rate 11–15 percentage points below the national average and 30 percentage points below Beijing and Shanghai. Upon completing senior-secondary school, rural youth from poor counties are 8 times less likely to attend four-year colleges, 11 times less likely to attend elite "key" colleges, and 43 times less likely to attend the top two national universities (Peking University and Tsinghua University) than urban youth.

Educational access is a function of wealth and urbanicity. There is also evidence of fundamental gaps in the level of learning between rural and urban children. For the 45 percent of China's population living in rural areas, gaps in learning manifest early. Starting in early childhood, China's rural children receive fewer and lower-quality services than their urban peers. Results from educational readiness testing show that, among children four to five years old, the average urban child surpasses 94 percent of rural children in measures of educational readiness. By the end of the nine-year compulsory education cycle, gaps in learning have magnified. On the PISA 2015 in science, the difference in scores of students in the top and bottom socioeconomic quintile in B-S-J-G equaled 4.4 years of schooling. The difference between urban and rural students equaled 2.4 years of schooling.

In the absence of PISA data, one way of assessing the state of learning in the rest of China is to extrapolate the urban-rural distribution of students who perform below basic proficiency to the rest of China. This exercise suggests that some students in both urban and rural areas face a learning crisis. Rural students constitute a disproportionate share of students performing below basic proficiency.

Sources: CHIP household data for 2002, 2007, and 2013 (CHIP, various years); Barro and Lee 2013; Luo and others 2012; National Bureau of Statistics of China 2016; Wang and others 2011; Yang, Sicular, and Lai 2014.
a. CHIP has data on the following provinces or municipalities: Anhui (2002, 2007, 2013); Beijing (2002, 2013); Chongqing (2002, 2007, 2013); Gansu (2002, 2013); Guangdong (2002, 2007, 2013); Hebei (2007); Henan (2002, 2007, 2013); Hubei (2002, 2007, 2013); Hunan (2013); Jiangsu (2002, 2007, 2013); Liaoning (2002, 2012); Shandong (2013); Shanghai (2007); Shanxi (2002, 2013); Sichuan (2002, 2007, 2013); Yunnan (2002, 2013); and Zhejiang (2007).

outcomes even when overall resources for education are far behind those of rich countries.

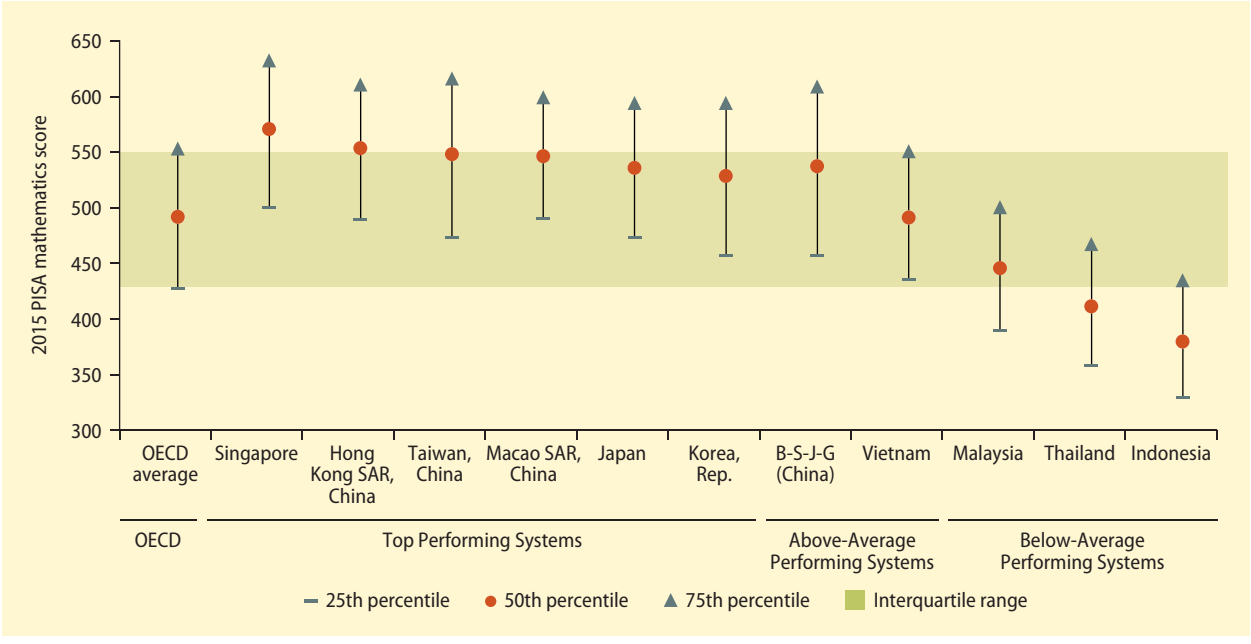
Below-Average Performing Systems score half a standard deviation or more below the OECD average and below their predicted score based on the level of GDP per capita. Many of these countries have put significant resources and policy efforts into improving their education systems, but results have been mixed. Indonesia, Malaysia, the Philippines, and Thailand constitute this group.

Emerging Systems do not participate regularly in globally comparable standardized tests, although many are preparing to begin benchmarking themselves against comparator countries. These countries tend to be smaller and lower-income countries, some of which have recent experience with fragility, violence, or conflict. The group comprises Brunei Darussalam, Cambodia, Lao PDR, Mongolia, Myanmar, Papua New Guinea, Timor-Leste, and the Pacific Island countries. There is reason to believe that levels of educational achievement would be low if benchmarked internationally, but many promising educational initiatives are taking place in these countries.

Parts of the region are facing a learning crisis

Reliable test data exist for about half of the region's 331 million students. They show that roughly 50 million students are performing below basic proficiency in tests (figure 2.7). These poorly performing education systems are contributing to the global learning crisis (World Bank 2018).

FIGURE 2.7 **Some economies in East Asia and Pacific outperform the OECD, but others face a learning crisis**



Source: Data from PISA 2015 (OECD 2016).
Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment.

About 40 percent of students tested in the region are enrolled in systems that produce high learning outcomes

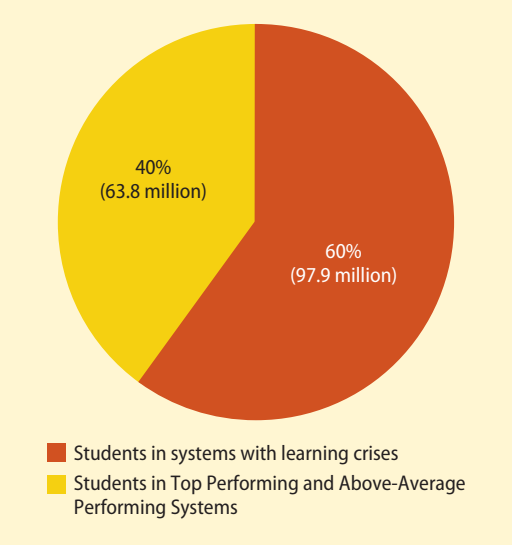
High-quality test data suggest that roughly 63.8 million students in the region are learning at high levels (figure 2.8). The data used are a composite average of PISA and TIMSS performance, constructed based on the results of the nine iterations since 2000 (for PISA) and 2003 (for TIMSS). After these dates, the two tests used a common scoring system: 500 points as the average, with a 100-point standard deviation. For PISA, 30 points is equivalent to a year's worth of learning. The constructed averages have the advantage of providing the best information on the performance of systems as a whole. As mentioned earlier, combining scores in this manner means that the composite scores do not provide trend information and that the scores by country are not equally robust (figure 2.6 shows the distribution of test scores in East Asia and Pacific).

East Asia and Pacific dominates the ranks of top scorers: 6 of the top 10 and 8 of the top 20 scores since 2000 are from East Asia and Pacific. The Top Performing Systems represent seven economies with an average score of more than 550 points or 1.6 more years of learning than the average OECD member country. Top Performing Systems enroll some 24 million students, or 7 percent of the region's students.

The Above-Average Performing Systems—B-S-J-G (China) and Vietnam—also exceeded OECD average performance. Together they account for 39.7 million students. Their performance is significantly above what is predicted based on their GDP per capita. They represent 12 percent of the region's students.

Together, Top Performing and Above-Average Performing Systems have about 63.8 million students. Below-Average Performing and Emerging Systems combined have about 97.9 million students. Students in these systems are performing at levels below proficiency or whose learning outcomes are unknown. Up to 60 percent of students in East Asia and Pacific are thus enrolled in systems in a learning crisis.

FIGURE 2.8 Sixty percent of students in East Asia and Pacific are in education systems that are in crisis

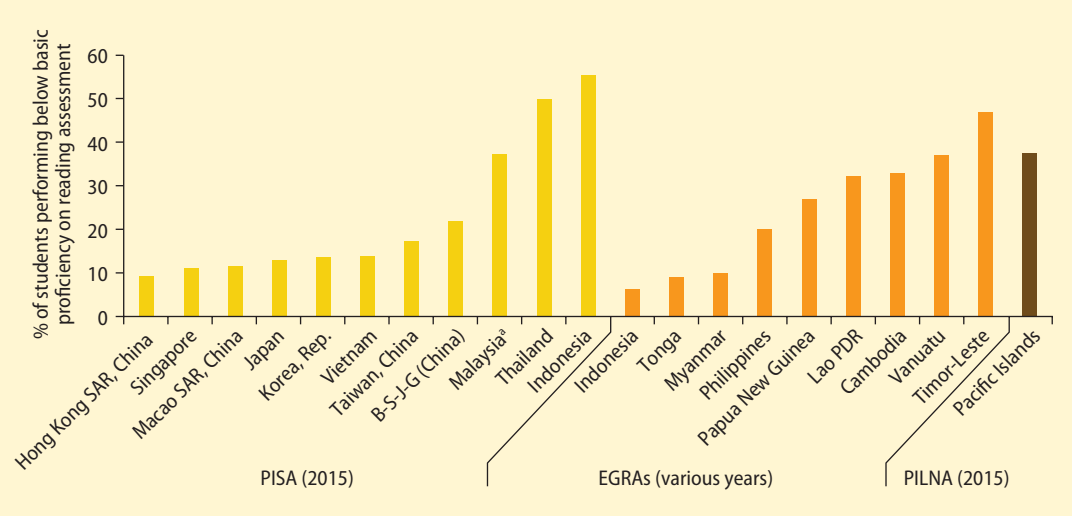


Sources: Calculations based on a composite constructed average of PISA and TIMSS performance on the nine iterations of these assessments since 2000 (for PISA) and 2003 (for TIMSS).
Note: PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

Figure 2.9 assesses the scale of the learning crisis in East Asia and Pacific by showing the share of students performing below basic proficiency on the most common assessment available—reading. The results reflect all reading assessments conducted as part of PISA, the Early Grade Reading Assessments (EGRAs), or the Pacific Islands Literacy and Numeracy Assessment (PILNA). Including all of these results increases the number of countries that can be analyzed, but it has the drawback of putting together tests that are not strictly comparable. Levels are defined here as similarly as possible. For EGRAs, figure 2.9 reports the percentage of students in second grade who are unable to read a word. PISA students scoring below level 2 on the reading assessment are considered below basic proficiency.[4] PILNA scores represent the percentage of fourth-grade students scoring below level 3 on the reading assessment.[5]

Figure 2.9 shows that all East Asia and Pacific economies struggle to varying degrees

FIGURE 2.9 East Asia and Pacific economies struggle to varying degrees to ensure that students reach basic proficiency levels



Sources: PISA 2015 (OECD 2016); national EGRAs (EGRA, various years); PILNA 2016.
Note: For PISA (Programme for International Student Assessment), percentage of students scoring below level 2 on the reading assessment. For EGRA (Early Grade Reading Assessment), percentage of students in second grade unable to read a word. EGRAs were given in the following years: Cambodia (2012), Indonesia (2014/15), Lao PDR (2012), Myanmar (2015), Papua New Guinea (2012–14), the Philippines (2014), Timor-Leste (2011), Tonga (2009), and Vanuatu (2010). For PILNA (Pacific Islands Literacy and Numeracy Assessment), percentage of fourth-grade students scoring below level 3 on the reading assessment. PILNA data are not broken down by country. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China).
a. Weighted response rate in Malaysia fell short of standard PISA response rate. Coverage in Malaysia is too small to ensure comparability.

to ensure that students are learning enough to demonstrate basic proficiency. These levels are far higher in the Below-Average group than in the Top Performing and Above-Average groups. In countries with Emerging Systems, a substantial share of students are unable to demonstrate basic proficiency (the share is roughly as large as in the group with below-average performance on PISA).

Developing and high-income countries from the region rank among the world's top performers

Japan, Korea, and Singapore are perennially top scorers on PISA and TIMSS. And the outstanding recent performance of B-S-J-G (China) and Vietnam shows that top performance is not limited to high-income countries.

When PISA and TIMSS scores are aggregated—combining reading, math, and science for all age groups and years—6 of the top 10 and 8 of the top 20 countries are from East Asia and Pacific. East Asia and Pacific economies also dominate the ranks of countries that routinely score above 500 on PISA. Although only 35 percent of test takers come from East Asia and Pacific, 96 percent of students routinely scoring above 500 are from the region.

Average years of learning of students in Top Performing and Above-Average school systems are significantly above predictions based on GDP per capita

East Asia and Pacific economies in Top Performing and Above-Average school systems score significantly above the regression line for scores by per capita income. Newcomers like B-S-J-G (China) and Vietnam are performing much higher than their predicted levels. High-income countries have one or two years more learning than predicted by their GDP per capita. The provinces of B-S-J-G (China) and Vietnam have two to more than four years more (table 2.8).

The region has more than its share of top performers

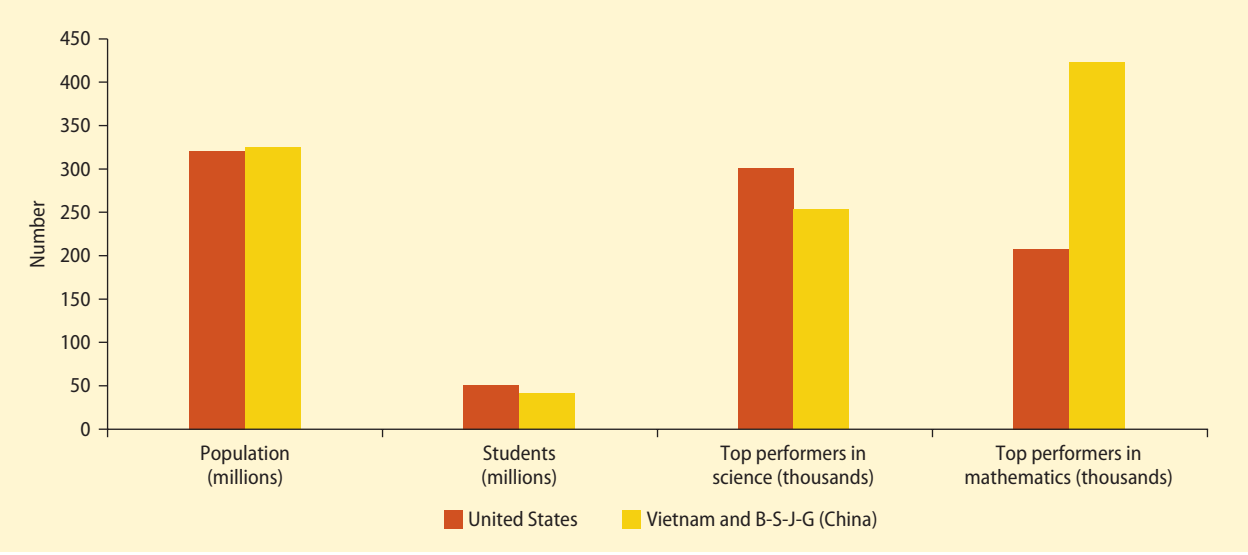
The PISA scoring system consists of seven levels (from 0 to 6). Students who score at levels 5 and 6 are considered "top performers."[6] Of all test takers, only 4.7 percent score at level 5, and only 0.7 percent score at level 6. Students from East Asia and Pacific represent 34 percent of all PISA test takers but account for 48 percent of level 5 and 6 performers in science and 40 percent in math.

TABLE 2.8 PISA scores on science in East Asia and Pacific are higher than predicted based on per capita income

Economy	GDP per capita in 2015 or latest (2011 international dollars)	Mean PISA science score in 2015		Difference between actual and predicted	
		Actual	Prediction based on income	Score	Equivalent years of schooling
Top Performing Systems					
Japan	35,804	538	479	59	2.0
Korea, Rep.	34,387	516	477	39	1.3
Singapore	80,192	556	516	40	1.3
Above-Average Performing Systems					
B-S-J-G (China)	22,037	518	457	61	2.0
Vietnam	5,668	525	394	131	4.4
Below-Average Performing Systems					
Indonesia	10,385	403	422	–19	–0.6
Malaysia	25,308	443	463	–20	–0.7
Thailand	15,345	421	440	–19	–0.6

Source: OECD 2016.
Note: The Philippines is not included because the country has not participated in PISA. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); GDP = gross domestic product; PISA = Programme for International Student Assessment.

FIGURE 2.10 Vietnam and Beijing, Shanghai, Jiangsu, and Guangdong (China) have more top performers than the United States on PISA mathematics assessments



Source: PISA 2015 (OECD 2016).
Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment.

Although B-S-J-G (China) and Vietnam have about the same size population and pool of students as the United States, they have more than twice as many top math performers. The United States has 19 percent more top performers in science (figure 2.10).

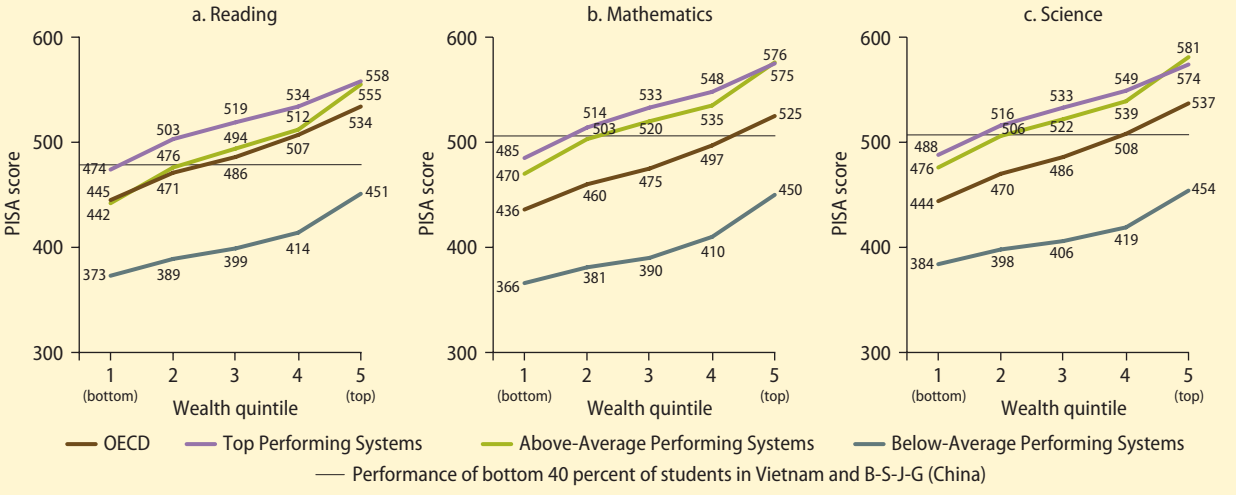
The equity of learning outcomes is greater in East Asia than in the OECD

The region has a low spread of learning outcomes. In B-S-J-G (China) and Vietnam, for example, average performance is high, and many poor students do well (figure 2.11). The region also has a disproportionately large number of top scorers, well above what national income would predict.

In 2015, the scores of the region's high-income Top Performing Systems were higher and less dispersed than the OECD average, indicating high average learning with equity. In both math and science, Above-Average Performing Systems had scores that were higher at every socioeconomic quintile than the corresponding average for the OECD as a whole, and the spread of learning outcomes was comparable. Only in reading in the bottom quintile did performance fail to equal the score for the corresponding OECD income group—and it was only three points lower. China's concentration of high performers tilts up the scores of students from the richest quintile in this group. China and Vietnam are two large middle-income countries whose education systems produce high and equitable learning outcomes for all students, outcomes that equal the superior performance of the region's high-income top performers (box 2.2).

Girls consistently outperform boys in East Asia. In reading, they are one year of learning ahead of boys—a trend consistent with that of the OECD on average. In science and math, with a few exceptions, girls do better than boys, although the gaps are smaller. In Macao SAR, China and in Thailand, boys perform better than girls in science, but the difference is only a quarter of a year of learning (table 2.9).

FIGURE 2.11 In Vietnam and Beijing, Shanghai, Jiangsu, and Guangdong (China), even poor students learn more than their OECD counterparts



Source: PISA 2015 (OECD 2016).
Note: The economies included in Top Performing, Above-Average Performing, and Below-Average Performing Systems are listed in table 2.6. The horizontal line in each panel indicates the performance of the bottom 40 percent of students in Vietnam and B-S-J-G (China), which exceeded or matched the OECD average in mathematics and science. The top and bottom wealth quintiles refer to children who come from families with the top 20 percent and the bottom 20 percent of household income, respectively. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment.

BOX 2.2 Vietnam's 2015 PISA performance and the Escuela Nueva initiative

Vietnam ranks among the top 10 scorers on the Programme for International Student Assessment (PISA) 2015 (OECD 2016). Its performance continues to be significantly above average for its income group and above that of many high-income countries. Its science score remains 1.1 year of schooling ahead of the Organisation for Economic Co-operation and Development (OECD) and 0.7 year ahead of the regional average. These scores were 21 points lower in reading and 17 points lower in math than in 2012; students in this round were 0.67 year of schooling behind in reading and 0.5 year of schooling behind in math relative to students who participated in PISA 2012 (OECD 2013). The difference between the top and bottom socioeconomic quintiles in science equates to 2.1 years of schooling. The difference between urban and rural students in science is equivalent to 1.3 years of schooling. Girls do as well as boys. Students with some early childhood education and development perform 0.7 year ahead of those with no such experience.

To be ready to be productive citizens of a prosperous industrial economy, which Vietnam seeks to become by 2035, primary school students must not only master traditional knowledge and facts, they must also develop competencies for independent and innovative thinking. Research shows that noncognitive and cognitive skills are causally linked and related. Children who develop strong socioemotional skills are more likely to persist with effort in the face of hardship and to achieve high test scores.

To impart these skills, the Vietnam Escuela Nueva (VNEN) project was implemented in 2013–16, with financial support of US$84.3 million from the Global Partnership for Education. The project initially focused on 1,447 schools in disadvantaged areas with ethnic minority populations. By the time the project closed, in May 2016, 2,671 additional primary schools had implemented the VNEN model without financial support from the project. Almost twice as many additional schools applied the VNEN model than was initially envisaged.

An impact evaluation was conducted over three school years (2013–16), with funding from Dubai Cares. The evaluation followed a randomized cohort

box continues next page

BOX 2.2 Vietnam's 2015 PISA performance and the Escuela Nueva initiative *(continued)*

of VNEN and regular students in 651 schools. Comprehensive sets of data were collected from students, parents, teachers, principals, and schools. A qualitative research part of the study implemented video recording of lessons and conducted stimulated recall interviews in 15 schools.

The test scores of students from VNEN as well as control group schools moved up as they moved through the grades. However, students from VNEN schools already had a higher mean score at the baseline of the study, which was 18 months after initiation of the project. This difference was retained throughout the years, although it narrowed over the evaluation period. Regression analyses show statistically significant effects of the VNEN program, with preferred specifications showing effect sizes of about one-fifth of a standard deviation, about 15 points in Vietnamese and 18 points in math.

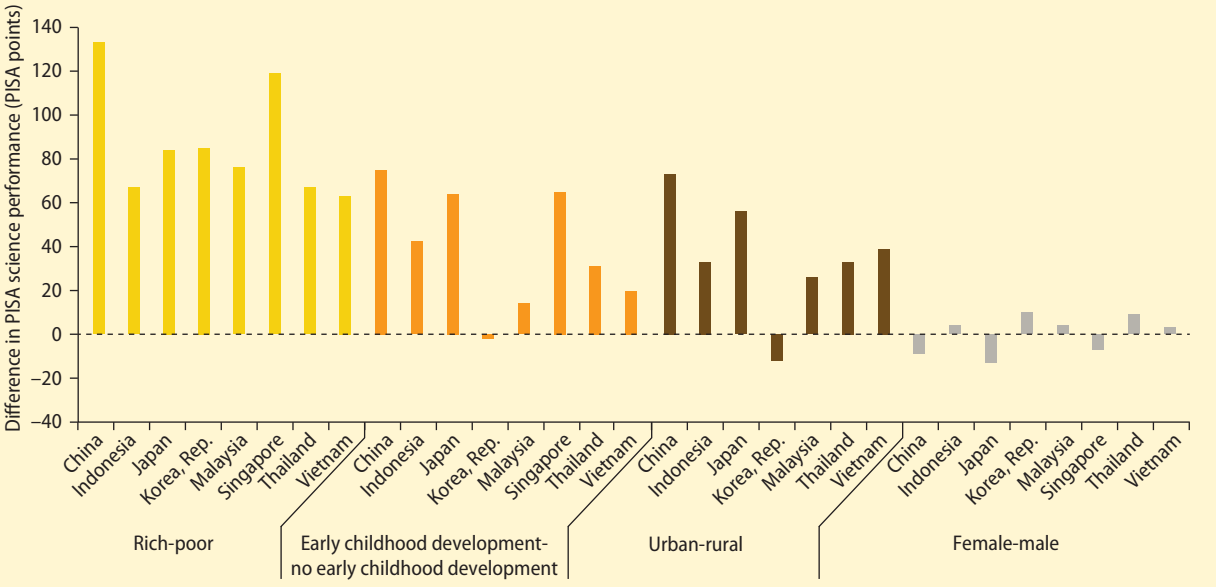
TABLE 2.9 Girls in East Asia generally outperform boys

	Score differences (boys-girls)		
Assessment and economy	**Mathematics**	**Science**	**Reading**
PISA 2015			
Japan	14*	–14*	–13*
Korea, Rep.	–7	10	–41*
B-S-J-G (China)	6	–9*	–16*
Hong Kong SAR, China	2	1	–28*
Indonesia	–3	4	–23*
Macao SAR, China	–8*	8*	–32*
Singapore	0	–6*	–20*
Taiwan, China	6	–4	–25*
Thailand	–3	9*	–31*
Vietnam	–3	3	–25*
Malaysia[a]	–7*	4	–31*
OECD average	**8***	**–4***	**–27***
TIMSS 2003, 2007			
2003			
Philippines grade 8	13*	7	n.a.
International average grade 8	**1**	**–6***	**n.a.**
2007			
Mongolia[b] grade 8	–9	1	n.a.
International average grade 8	5	6	n.a.
Mongolia[b] grade 4	1	5	n.a.
International average grade 4	**0**	**3***	**n.a.**

Sources: PISA 2015 (OECD 2016); TIMSS 2003, 2007.
Note: For PISA 2015, on average, across countries, the difference between adjacent grades is about 40 score points. OECD average for reading excludes Austria. Score differences for reading are not given for TIMSS because it assesses math and science only. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study; n.a. = not applicable.
a. Coverage in Malaysia is too small to ensure comparability.
b. Mongolia did not provide the necessary documentation for sampling, data collection, and scoring. Its achievement data are not reported in the main tables.
* Statistically significant (see annex A3 of OECD 2016).

The equity of performance in East Asia and Pacific is not as clear when one looks at gaps in learning outcomes along other dimensions (figure 2.12). But one thing is evident: gender gaps are far smaller than other gaps in countries that participate in PISA. Box 2.3 looks at educational attainment gaps among ethnic minorities. Box 2.4 looks at disability and inclusion in Vietnam's education system.

FIGURE 2.12 **On the 2015 PISA science assessment, gender gaps are smaller than other kinds of gaps**



Source: PISA 2015 (OECD 2016).
Note: PISA = Programme for International Student Assessment.

BOX 2.3 Educational attainment gaps between majority and minority ethnic groups in China, the Lao People's Democratic Republic, and Vietnam

Large gaps in educational attainment show up early between majority and minority ethnic groups in the Lao People's Democratic Republic and Vietnam. In Vietnam, men who are not from the Hoa and Kinh ethnic groups are most likely to have completed only primary school, whereas Hoa and Kinh men are most likely to have completed lower-secondary school. Ethnic minority women are most likely to have received no schooling at all, whereas Hoa and Kinh women are most likely to have completed primary school.

Gaps in educational attainment among minority groups in Vietnam have persisted over time. Data from 2006 show that age-grade distortion is more severe among ethnic minority students than among ethnic majority students. In first grade, 4.5 percent of ethnic minority students are more than one year behind their age-appropriate achievement level. By third grade, 36.3 percent of minority students but just 15.3 percent among ethnic majority students are a year behind. In the same year (2006), 8 percent of the ethnic minority population had completed upper-secondary, and less than 1 percent had completed tertiary. These numbers are around 50 and 20 percent, respectively, of the completion rates for people of ethnic majority groups in Vietnam.

In Lao PDR, Lao-Tai (ethnic majority) male students living in rural areas are four times more likely to have attended school than their male non-Lao-Tai counterparts. Lao-Tai women are six times more likely to have attended schools than non-Lao-Tai women.

Educational attainment gaps between ethnic groups exist in China, but they have narrowed. Between 1990 and 2005, the gap in enrollment rates in basic education between the most and the least enrolled ethnic group decreased from 18 to 9 percentage points. Over the same period, the minority groups among whom college attainment

box continues next page

BOX 2.3 Educational attainment gaps between majority and minority ethnic groups in China, the Lao People's Democratic Republic, and Vietnam *(continued)*

rates grew most were the Miao, Uyghur, and Zhuang. Disparities in tertiary enrollment remain, but they are declining.

Across the region, ethnic minority women have lower average levels of educational attainment than ethnic minority men. In 2005, in both urban and rural areas of China, ethnic minority women between the ages of 16 and 21 were only a third as likely to be enrolled in school and had nine years less education than ethnic minority men. In Lao PDR, Lao-Tai women have the same average educational attainment as Lao-Tai men in urban areas. In contrast, there is no sign of gender convergence among non-Lao-Tai women and men, in either rural or urban areas. Among all ethnolinguistic groups, non-Lao-Tai women in rural areas have the fewest years of schooling on average, lagging urban Lao-Tai men by 6.6 years in 2003.

Source: Hall and Patrinos 2012.

BOX 2.4 Disability and inclusion in Vietnam's education system

In Vietnam, roughly 15,500 children under the age of six are deaf or have a hearing impairment. The Vietnam Intergenerational Deaf Education Outreach (IDEO) project seeks to build a system of support for these children. The project is funded by the Japan Social Development Fund, administered by the World Bank, and implemented by the World Concern Development Organization.

IDEO adopted an innovative model of family support teams, including a deaf mentor, a sign language interpreter, and a hearing teacher, to teach sign language to deaf children and their families in their own homes. In five years, the project provided home-based sign language lessons for 255 deaf children under six in Hanoi, Thai Nguyen, Quang Binh, and Ho Chi Minh City. It also trained more than 50 deaf adults to become mentors to deaf children and helped to train about 200 hearing teachers in the use of sign language. More than 50 hearing people were trained as communication facilitators or sign language interpreters. In addition, almost 50 deaf children in first grade received sign language–based education by both deaf and hearing teachers in the 2015/16 school year through a pilot scheme.

The project also launched an interactive website (http://ideo.org.vn) to provide online sign language learning videos, sign language vocabulary, games, and other materials on deaf education for deaf children and their families, educators, and the public. A series of short sign language videos is expected to be broadcast on the national education channel to reach a wider audience.

Initial project evaluations show that using sign language has helped to improve deaf children's language, cognitive development, and communication ability.

Educational systems in the region's low- and middle-income countries serve learners from the bottom 40 percent

The socioeconomic gradient for learning outcomes is a fundamental characteristic of measured learning outcomes in all countries—and a serious threat to equity and opportunity later in life. Enriched home environments, social capital, and higher levels of parental education are thought to be the main factors that contribute to better learning among students from wealthier families.

National education systems seek to ensure that all students get a chance to make the most of their potential. Evidence from PISA shows how high- and middle-income

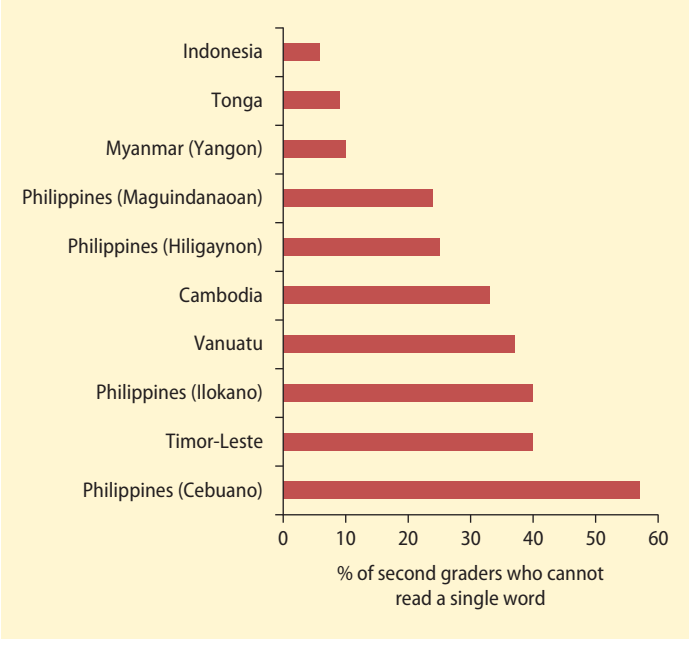
economies in the region succeed in doing so, often much more so than their OECD peers (figure 2.11). Students from China and Vietnam in the second income quintile (21st–40th percentiles of family income) have scores in math, reading, and science that are as high as or higher than OECD students' average scores in these subjects regardless of income levels.

Subscores belie the myth of rote learning

East Asia and Pacific economies have heard concerns about the overreliance on rote learning in their classrooms, along with concerns about the purported lack of deep understanding of what is learned. The empirical evidence indicates that students are indeed learning. PISA subscores in math measure the ability to recognize and set up problems, perform mathematical operations, and interpret the meaning and significance of results. In 2012, Vietnam's subscores for performing operations were slightly higher than those for structuring problems and interpreting results. But all three subscores were above the OECD average, pointing to Vietnamese students' superior abilities on all aspects of mathematical processes and undercutting the idea that rote memorization accounts for their high scores.

Further evidence that sound fundamentals—rather than rote learning or test-taking skills—are being developed comes from Vietnam. Data from the Young Lives initiative, which closely follows cohorts from birth through secondary school, show Vietnamese students pulling away from their peers in low-income countries in math by third grade. When tested at ages 10 and 12, average Vietnamese students perform better than all but the top students in Ethiopia, India, and Peru (Young Lives 2013).

FIGURE 2.13 In several economies in East Asia and Pacific, more than a third of second graders cannot read a single word



Source: Graham and Kelly 2017.
Note: All data are from nationally or regionally representative samples completed in the second half of the school year with the exception of the Philippines. The Philippines conducted its only nationally representative Early Grade Reading Assessment (EGRA) in 2013 for third and first graders only, in both English and Filipino. The results were similar to those in Indonesia: the rates of zero-word readers for third graders were low—at only 1 percent for both languages—and reading comprehension was at 73 percent for Filipino. On the other hand, English reading comprehension was only 32 percent. The 2014 EGRA study targeted regions and schools that taught in mother-tongue languages. Zero-word scores are based on the oral reading fluency subcomponent for all countries except Cambodia and Timor-Leste, for which the score is based on the familiar word reading subcomponent. In the Philippines, tests were conducted in the indicated mother tongues. Scores for Timor-Leste are for combined tests of Portuguese and Tetum. Scores for Vanuatu are for tests in English. Data are from the following years: Cambodia 2012, Indonesia 2014, Myanmar 2015, the Philippines 2014, Timor-Leste 2009, Tonga 2009, and Vanuatu 2010.

Measured performance levels begin to emerge early in basic education

Whether students learn a little or a lot in school begins to be apparent in primary school, if not earlier. Countries whose systems have sound fundamentals see results in measures of early grade reading and math—and systems on the path to failure often see poor results early. High prevalence of "zero scores" (students unable to read a single word) in Indonesia and the Philippines are a harbinger of the five to six years of difference in years of learning between these countries and Vietnam that are brought to light when 15-year-olds are tested on PISA (figure 2.13).

Continuous improvement of performance has accompanied progressive universalism

A recurring theme among high-performing economies is constant improvement—a trend evident in test scores on internationally comparable standardized tests. Altinok, Diebolt, and Demeulemeester (2014) calculate long-term trends in schooling quality for 24 mostly high-income economies for which sufficient data were available. The top three annual average growth rates of achievement belong to East Asian economies: Singapore (0.98 percent), Korea (0.90 percent), and Hong Kong SAR, China (0.55 percent). These rates were all three to six times the average rate of improvement of 0.165 percent. Japan improved at about that average rate. Thailand regressed by 0.26 percent.

The region's education systems share some common features

National education systems in the region are diverse in size, organization, governance, levels of autonomy, and funding systems. Some school districts in China have more students than the national systems of the smaller Pacific Island countries. Countries such as Indonesia and Vietnam rely on contract teachers; in Japan and Korea, virtually all teachers are career civil servants.

Still, some shared features give education in East Asia and Pacific its regional flavor. Centralized decision making and control of basic education is common. Most students in the region attend public primary and secondary schools. Many countries have a national curriculum and allow only authorized textbooks to be used in public schools. Through a variety of means, governments often play a strong role in setting national standards for teacher quality and educational practice. Absenteeism of teachers from classrooms is comparatively rare in most countries. Basic educational infrastructure, including reasonably well-functioning administrative and financial systems, is in place in most countries. Few teachers belong to unions. Teaching is generally a respected profession, although teachers are not universally well paid. Families throughout the region are known to value education highly and to place high expectations on their children to do well in school. Tutoring, extra classes, and long hours of homework and self-study are common.

An emerging literature on the roots of high performance highlights elements that promote learning

For more than a decade, the education policy community has emphasized the need to focus policies on learning rather than merely schooling. Partially as a result, a body of literature is emerging that seeks to establish the determinants of learning outcomes and the effectiveness of interventions aiming to raise learning. Several meta-analyses of interventions have been conducted (Evans and Popova 2015; McEwan 2015), along with controlled micro-level analyses. Evans and Popova (2015, 12) find that, across reviews, "the intervention category which most commonly produces the largest improvements in student learning is pedagogical interventions that match teaching to students' learning." Whether called "adaptive instruction," "structured pedagogy," or something else, they involve providing resources for teachers and strategies that they use to interact with students.

The findings of Evans and Popova (2015) are consistent with the highest-quality micro-level studies of determinants of learning. Dobbie and Fryer (2011) followed charter students in New York City for three years. They found that the ability of schools to produce consistently high learning outcomes among randomly assigned students had nothing to do with traditional resource-based input measures—class size, per pupil expenditure, teacher certification, and teacher credentials. Instead, five factors—all pertaining to classroom practices—explained half of the variation in learning outcomes: high expectations

of students, increased time on task, high-dosage tutoring, data-informed instruction, and frequent feedback to teachers.

Conclusions

East Asia and Pacific has enjoyed tremendous, albeit still uneven, success in raising education quality. Since 1950, as the total population of the region doubled, average per person levels of school attainment rose by a factor of five. This massive increase in educational attainment did not lower quality. Economies with some of the highest gains in attainment also have the highest measured increases in achievement.

Across income levels, many students in the region are at or above OECD average levels of performance on PISA and TIMSS, and many of its economies—both middle- and high-income—are among the world's top performers. Perhaps most important, in most economies in the region that participate in these tests, learning outcomes are more equitable than the average for the OECD, with millions of students from the bottom 40 percent of the income distribution scoring as well as average students in the OECD. East Asia and Pacific's successes provide clear proof of concept that education systems in low- and middle-income countries can promote high learning outcomes among all students.

At the same time, a large share of students in the region are in school but not learning nearly enough. Roughly 60 percent of students in East Asia and Pacific are in school systems that are struggling to escape from the global learning crisis (or have no data on which to determine their status). For a variety of reasons, these systems have been unable to impart basic proficiency. Some are in low-income, largely rural, economies at the beginning of their structural transformation. Others—representing the majority of systems in crisis—are in large, middle-income countries. New ideas and new approaches are needed to bring learning up to the level of their high-performing regional peers.

The rest of this report shows that the roots of high performance in East Asia and Pacific economies are grounded in policies and practices that systematically increase learning outcomes for students.

Notes

1. In East Asia and Pacific, only Brunei Darussalam; Macao SAR, China; Myanmar; and the Philippines have such laws (UNESCO 2015).
2. Student population numbers represent primary and secondary school enrollment. Population numbers are from World Development Indicators for 2016 (World Bank, various years); enrollment numbers are from World Bank EdStats (World Bank, various years). All figures are for 2016, except the figures for Lao PDR, Malaysia, Myanmar, Thailand, Vanuatu, and Vietnam, which are for 2015. Data are also from Singapore Department of Statistics (2015); Taiwan Ministry of Education (2016); and UIS (various years). Figures include economies participating in at least one round of the following assessments: PISA, 2000–15; TIMSS, 1995–2015; the Progress in International Reading Literacy Study (PIRLS), 2001–11; the Early Grade Reading Assessment (EGRA), 2009–14; the Early Grade Mathematics Assessment (EGMA), 2009–14; Literacy Boost, 2009–12; the Programme d'Analyse des Systèmes Éducatifs de la CONFEMEN (PASEC), 2011; and the Southeast Asia Primary Learning Metrics (SEA-PLM), 2015.
3. The OECD uses arithmetic average to calculate the average OECD score.
4. At level 2, "Some tasks require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognizing the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require readers to make a comparison or several connections between the text and

outside knowledge, by drawing on personal experience and attitudes" (OECD 2016).

5. Level 3 is below basic proficiency in PILNA. Level 3 is described as the ability to "Locate the main events in a variety of texts. Identify common language conventions in the use of text connectives and synonyms. Spell diagraphs; identify and correct errors in some frequently used one syllable words" (PILNA 2016).
6. At level 6, students can conceptualize, generalize, and use information based on their investigations and can adapt their knowledge to relatively nonstandard contexts. Students at this level have a mastery of symbolic and formal mathematical operations and relationships and can use this understanding to develop new approaches and strategies in unfamiliar situations. Students at this level can reflect on their actions and precisely communicate their actions and reflections regarding their findings, interpretations, arguments, and adaptations to original situations. At level 5, students can develop and work with models for complex situations, identifying constraints and specifying assumptions. Students at this level can work strategically using broad and well-developed reasoning skills and are beginning to reflect on their work, formulating and communicating their interpretations and reasoning.

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SPOTLIGHT 1

Education in the Pacific Island Countries: Achievements and Challenges

The Pacific Island countries are a heterogeneous group of countries with wide differences in their geography, institutional structures, historical development, economic drivers, and many other aspects. They can be divided into three subgroups: Melanesia, Micronesia, and Polynesia. Melanesia includes Fiji, Papua New Guinea, the Solomon Islands, and Vanuatu. Micronesia includes Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, and Palau. Polynesia includes Samoa, Tonga, and Tuvalu.

This subregion—sometimes referred to as Oceania—covers an area larger than that of the Russian Federation. Its most populous country is Papua New Guinea, with about 8.22 million people. The least populous countries are Nauru and Tuvalu, with 10,000 and 11,000 people, respectively.

Some countries, like Samoa, are not very dispersed. In contrast, Kiribati is spread over an area the size of India (despite having a land mass of just 811 square kilometers, about the size of New York City).

The subregion is also home to hundreds of languages, dialects, and sociocultural groups, making it one of the most diverse regions in the world. Geographic barriers to access—between islands or over difficult terrain not adequately serviced by roads—pose additional challenges, which highlight the need to make efficient and effective use of resources.

Role of the church

The church plays an important and at times central role in the provision of education services in most Pacific Island countries. It is officially recognized as a critical nonstate actor. Education was introduced in Tonga in 1826 by the Free Wesleyan Church; primary education has been compulsory there since 1876.

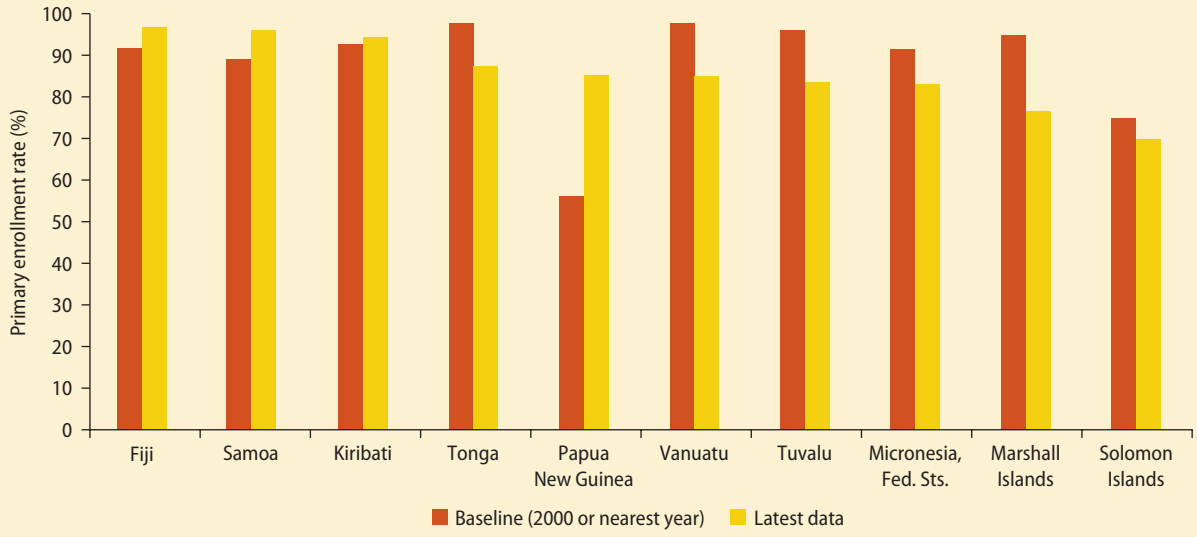
Attainment

The Pacific Island countries have a mixed record of attainment in education. Between 2005 and 2015, primary and secondary enrollments increased substantially. Fiji, Kiribati, Samoa, Tonga, and Vanuatu have sustained net primary enrollment rates well above 90 percent since the 1990s. Indeed, the Pacific Island countries outperform many other countries at similar income levels in getting children into school (figure S1.1).

Some Pacific Island countries are even succeeding in the more difficult task of keeping children in school throughout primary school (figure S1.2). Enrollment of girls is low in

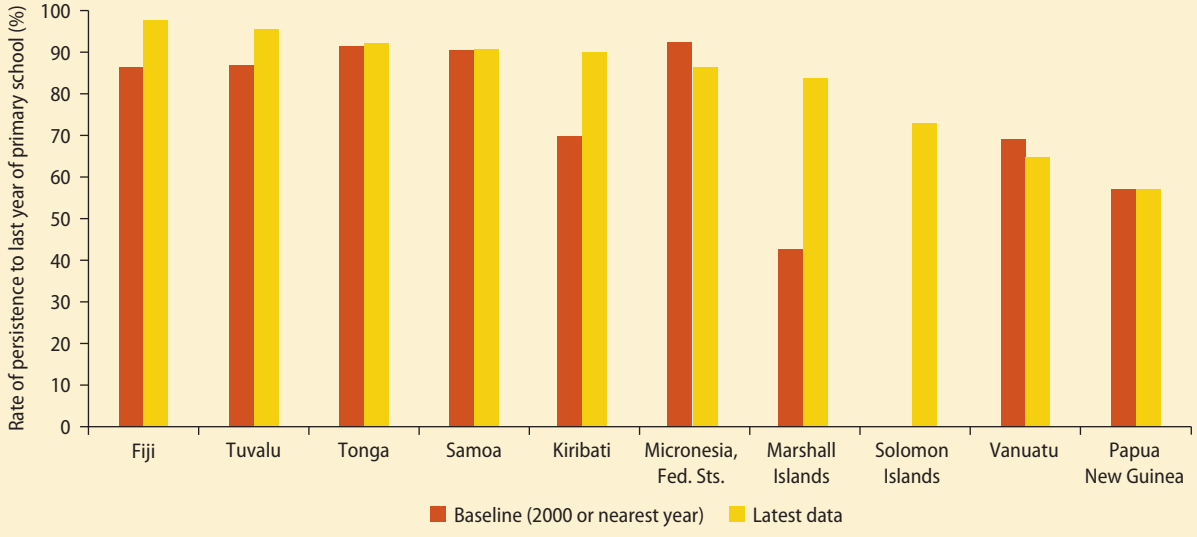
SPOTLIGHT 1

FIGURE S1.1 Primary enrollment rates vary in Pacific Island countries



Sources: World Bank EdStats (World Bank, various years); Pacific Islands Forum Secretariat 2015.

FIGURE S1.2 Some Pacific Island countries are succeeding in keeping children in school throughout primary school



Sources: World Bank EdStats (World Bank, various years); Pacific Islands Forum Secretariat 2015.
Note: No data on baseline for the Solomon Islands.

some countries, but in many Pacific Island countries their enrollment, participation, attendance, and achievement in school are higher than those of boys.

Achievement

Time spent in school does not necessarily translate into learning outcomes, however. Policy makers in Pacific Island countries are concerned about poor learning outcomes from basic education. They have identified improvements in literacy and numeracy as an important shared goal. They view access to good-quality education not only as an inherent right but also as a means of preparing young Pacific Islanders for the future. In 2006, the heads of states agreed that it was essential to have all children in school and learning. They recognized that, to improve learning outcomes, they needed to have tools in place to measure and benchmark performance accurately.

Fifteen countries worked together to develop Pacific-wide benchmark standards for literacy and numeracy at grades 2, 4, 6, and 8. These benchmarks were developed from curriculum skill components and learning outcomes considered to be common across the national curricula of the 15 member states.

The results of the most recent Pacific Islands Literacy and Numeracy Assessment (PILNA) illustrate that the focus on learning has started to make a difference, particularly in numeracy. The key findings from the 2015 PILNA regional report include the following:

- Literacy improved between 2012 and 2015 (PILNA 2016). Students seemed to improve during the transition from year 4 to year 6 (equivalent to grade 3 and grade 5). However, in stark contrast to numeracy scores, only 46 percent of students were at or above expected proficiency levels in both year 4 and year 6. The proportion of students in the three lowest proficiency levels for year 4 was lower in the 2015 assessment (38 percent) than in the 2012 assessment (43 percent), and the proportion of students in the two lowest proficiency levels for year 6 fell from 12 to 16 percent. At the highest proficiency levels, however, there was a slight decline, from 9 to 7 percent for year 4 and from 20 to 13 percent for year 6.
- Girls demonstrated higher levels of literacy than boys. In 2015 the mean scores were 462 for girls and 444 for boys in year 4 and 487 for girls and 469 for boys in year 6. The trend holds for all three strands of literacy (reading, language features, and writing). The share of students in the top three proficiency levels was also higher among girls than boys (21 vs. 13 percent in year 4 and 33 vs. 23 percent in year 6). The proportion of girls in the bottom three proficiency levels was lower among girls than boys (32 vs. 43 percent for year 4 and 17 vs. 27 percent for year 6).
- In literacy, students in nongovernment schools outperformed students in government schools in both year levels in 2015. Students in nongovernment schools had higher mean scores than students in government schools in both year 4 (459 vs. 453) and year 6 (488 vs. 476).
- Numeracy improved as children progressed from year 4 to year 6. The proportions of students at or above the expected proficiency levels for year 4 and year 6 were 86 and 67 percent, respectively. The share of year 4 students in the three highest proficiency levels rose from 24 percent in 2012 to 34 percent in 2015.
- Girls demonstrated higher levels of performance in numeracy than boys across the region in 2015. In year 4, 37 percent of girls achieved the three highest proficiency levels compared with 32 percent of the boys, and 12 percent of girls were in the bottom three proficiency levels compared with 16 percent of boys. In year 6, 52 percent of girls and 47 percent of boys achieved the top three proficiency levels, and 7 percent of girls and 10 percent of boys scored in the lowest three proficiency levels.
- The performance in numeracy in government and nongovernment schools varied

between year levels in 2015. For year 4, students from nongovernment schools had a higher mean score (512) than students from government schools (504). This result was evident in all three strands of numeracy (numbers, operations, and measurement and data). For year 6, the result was reversed, with the mean scores of students from government and nongovernment schools at 524 and 520, respectively. This result was evident in all three strands of numeracy.

Results from Early Grade Reading Assessments

In addition to testing with PILNA, countries in the region have been undertaking Early Grade Reading Assessments (EGRAs), with support of the World Bank. The results from EGRAs conducted between 2009 and 2013 are provided in table S1.1.

Pacific Island countries struggle to get students to the next stage of basic reading skills. After three years of instruction, only a fraction of students can read a simple short story and understand most or all of it. Although part of the problem is that students are learning to read in an unfamiliar language, EGRA results suggest that the low proportion of students meeting the literacy expectations as measured by PILNA is strongly related to very weak foundational reading skills in the early years of primary education.

The challenge of education systems in the Pacific Islands is the quality of instruction and efficiency in the use of instructional time. Teachers and schools struggle to help students to become readers even after three years of instruction (not counting time spent in preschools). Substantial improvements in the quality of instruction in the early years are needed so that all students are able to read and write well no later than grade 3. Box S1.1 groups countries by their level of performance.

TABLE S1.1 Early reading assessments in Pacific Island countries

Country or province	Language of test in grade 3	% of students who, after 3 years of schooling, cannot read a single:			% of students who, after 3 years of schooling, are considered readers[a]
		Letter	Familiar word	Word from the first sentence in a short story	
Vanuatu					
Francophone	French	12	5	7	24
Anglophone	English	8	13	10	24
Tonga	Tongan	0	1	3	30
Tuvalu	Tuvaluan	8	18	14	21
Kiribati	Kiribati	2	4	3	27
Samoa	Samoan	2	20	20	19
Solomon Islands	English	1	18	22	33
Papua New Guinea					
Madang[b]	English	2	6	6	22
East New Britain[c]	English	1	3	12	39
Western Highlands[d]	English	0	8	11	6
National Capital District[e]	English	2	2	16	11

Sources: World Bank 2010, 2011a, 2011b, 2011c, 2012a, 2012b, 2013.
a. Average comprehension at or above 80 percent.
b. Average comprehension at 47 percent.
c. Average comprehension at 55 percent.
d. Average comprehension at 46 percent.
e. Average comprehension at 76 percent.

BOX S1.1 Grouping Pacific Island countries by level of performance

Pacific Island countries can be classified into three performance groups:

- High performers in access, high performers in primary school completion, and modest performers in lower-secondary school completion: Fiji, Kiribati, Palau, and Samoa
- Modest performers in access, modest performers in primary school completion, and very modest performers in lower-secondary school completion: the Marshall Islands, the Federated States of Micronesia, Nauru, Tonga, and Tuvalu
- Modest performers in access, low performers in primary school completion, and poor performers in lower-secondary school completion: Papua New Guinea, Solomon Islands, and Vanuatu.

Public expenditure on education

Spending on education in many Pacific Island countries is high, with education consistently receiving the largest share of government budgets from year to year. In percentage terms, Pacific governments have made sizable allocations to human development budgets. Pacific Island countries spend nearly twice as much per capita on education and health as other low-income small island states spend. Their per capita expenditures on primary education are an order of magnitude greater as those of many low-income African countries.

But funding for health and education is dependent on bilateral aid, which has declined significantly in recent years or has skewed away from areas of education where returns are likely to be greatest. More than half of the education assistance from Australia's Department of Foreign Affairs and Trade goes to scholarships, for example.

The quality of spending and service delivery is a key factor in poor education outcomes. Service delivery is hampered by the fragmentation of financing and administration, inefficient financing flows, and weaknesses in how education services are managed at the subnational level.

Salary spending comprises more than 75 percent of education budgets in many Pacific Island countries. And although tuition-free education policies have been largely successful in expanding access to education, they come at the expense of good-quality inputs, such as teacher training, curriculum development, and classroom materials.

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Institutional Alignment for Policy Implementation

3

The experience of high-performing education systems in East Asia underscores the critical role played by institutional alignment and sound administrative systems at a variety of levels in implementing policies and reforms that ultimately raise learning outcomes in schools. Institutional alignment is a critical component of ensuring that policies across key domains are aligned and then implemented, adjusted, evaluated, and revised to foster continuous improvement. Top Performing Systems fostered alignment by setting targets and demanding results, advocating for education in national spending, and providing the impetus for alignment across sectors. Systemic reform was made possible by investing in improving the capacity of the education system itself.

From the very basics of ensuring safe, adequate physical space to the intricacies of decentralizing curricula with a framework for learning, institutional alignment can be a key determinant of the extent to which the ideas that underpin policies are translated into reality for teachers and students in classrooms. Education requires getting millions of details right in hundreds of thousands of schools. Students who lack desks or textbooks, or teachers whose training is unrelated to the demands of delivering the curriculum, cannot be expected to engage in meaningful classroom interactions that produce learning.

Institutional alignment is critical to ensure that students learn

Education systems require effective institutional alignment at a variety of levels and among myriad actors (World Bank 2018). Capacity levels matter for national, provincial, and municipal governments; national ministries of education and subnational education authorities; and district- and school-level bodies. The strength of institutions can strongly affect the quality of interactions between education officials and providers, on the one hand, and stakeholders from civil society, especially parents and employers, on the other.

These interactions take place within contexts shaped by political influences and political culture. Politics can drive misalignments when the vested interests of different stakeholders collide. Misalignment can occur along every step of the policy process, from defining goals to designing and implementing policies to evaluating their effectiveness. Together and separately, misalignment threatens to undermine the efforts of education systems to produce learning.[1]

The experiences of Top Performing Systems shed some light on the influences that spurred their institutional alignment early on and helped them to achieve strong attainment and achievement results. Top Performing Systems in East Asia and Pacific began to lay the foundation for their current school systems in the 1960s, when resources were scarce and institutional capacity was severely limited. Subsequent efforts to upgrade quality and expand access through the 1990s reflected a consistent government response to fundamental changes in industrial structure, the global economy, and parental expectations. Progress was made possible by a series of deliberate policy choices that fostered alignment (Wong 2017). These policies included setting targets and demanding results, advocating for education in national spending, and providing the impetus for cross-sectoral alignment.

Setting targets and demanding results

Top Performing Systems used available resources to achieve realistic targets. Universal basic education was often a first target. Achieving it was no small feat given widespread illiteracy. In 1950, nearly 40 percent of the population of Hong Kong SAR, China had no formal schooling. The figure was 61 percent in Singapore; 46 percent in Taiwan, China; and 28 percent in the Republic of Korea. Under colonial rule, education was mainly for elites. Only in Japan, which began its education modernization in the late 19th century, did more than 95 percent of the population go to school in 1950.

By the 1960s, with universal basic education achieved, national leaders recognized that higher productivity and skills were needed to raise wages and sustain economic competitiveness. Consequently, access to secondary education began to expand in the 1970s. Singapore built many new public high schools. Other economies allowed private institutions to help to meet demand. Significant upgrades to curricula and teacher quality began to prepare students for the higher skills demanded by employers as industrial development shifted to higher value-added work, including shipbuilding and jobs related to petrochemicals and consumer electronics.

Advocating for education in national spending

Top Performing Systems in East Asia and Pacific advocated for education in national spending. By ensuring that education was considered a critical input for economic development, policy makers made public spending on education a national investment in economic growth.

Allocations for education among East Asia's Top Performing Systems were historically among the top categories in their national budgets. In Japan, 14.5 percent of all public spending in 1955 went toward education and stayed at that level for much of the next 30 years. In Korea, education received 14.3 percent of the budget in 1963; the figure grew to 16.1 percent in 1984 and 20.4 percent in 2000. In Singapore, on average, 23.3 percent of the national budget went to education between 1959 and 1967. It stayed at roughly this level in subsequent decades.

Providing the impetus for cross-sectoral alignment

National leaders in Top Performing Systems saw that the full potential of education—or any other sectoral policy—could be undercut if allowed to function within silos. They therefore persistently and proactively underscored the need to put knowledge and skills to work to power economic growth. They put education on a par with physical infrastructure, the legal system, and banking and financial institutions, which are perceived as essential to attracting investors and support industry.

National leaders pushed for cross-sectoral policy alignment by bringing into government people who shared their vision of human capital–driven economic growth. They used the authority and power of their offices to build support and processes for cross-sectoral policy alignment. Education and the quality of the workforce have been constant themes

in National Day speeches of the prime minister of Singapore since the first celebration in 1966. In Korea, numerous presidential commissions on education have advised presidents and their cabinets on major education and industry policy reforms. In Vietnam and Shanghai, China, leadership has been visible and proactive in promoting alignment between education and other sectors. Their emphasis on human capital–driven growth provides a unifying theme and impetus for policy alignment across education, industry, labor, and other relevant departments.

Systemic reform of education for improved learning

Far too often, policies and investments in education are not well aligned with national economic development needs, as noted in the *World Development Report 2018* (World Bank 2018). This lack of alignment has the potential to undermine system reform of education for improved learning. Overall government capacity may affect actions that affect student learning, but capacity in education systems is likely to have a greater impact.

The literature on promoting systemic change in education systems highlights inherent obstacles and difficulties. Four obstacles are ubiquitous:

- Political pressure for immediate or short-term results
- Lack of implementation continuity or abrupt changes of direction
- Overemphasis on accountability of teachers and use of punitive measures to force desired behavioral change
- Inability or unwillingness to diagnose performance accurately and clearly (Harris 2011).

No country is immune to political pressure for fast results, but several high performers in East Asia and Pacific inclined toward incrementalism and continuity in reforms, through the use of specific, reasonable, and periodically revised targets.

Another important strand of the literature emphasizes actions and orientations that promote success. Near unanimity exists about the need to change or improve organizational cultures along with or as a means of improving organizational capacity. Elmore (2004, 11) finds that "prevailing cultures of administration and teaching in schools … do not change by mandate: they change by the specific displacement of existing norms, processes, and structures by others … modelling the new values and behaviors [to] the existing ones."

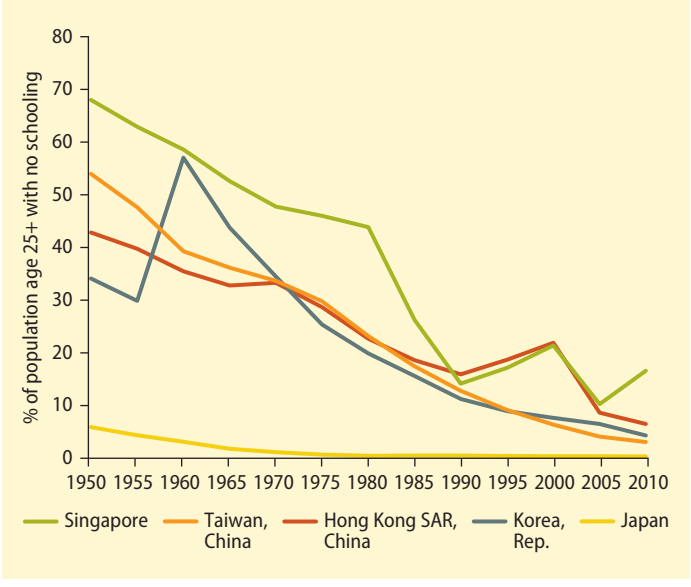
Other analysts find that successful reform of education systems relies on centering reforms on clear targets and results, ensuring that the goals are related directly to improving teachers' professional practices in order to improve student learning, and focusing on a reasonable number of achievable goals (Fulan 2009; Levin and Marcus 2010).

Both Top Performing and Above-Average Performing Systems have had policy experiences that are broadly consistent with the assessment of the best approaches to systemic reform. Explicit goals were set, and policies were largely sequenced, with emphasis first placed on getting all children into school through the lower-secondary level and ensuring the basic adequacy of infrastructure. Curricula were initially more centrally controlled; autonomy was ceded gradually and selectively, often only after benchmarks were achieved.

Top Performing Systems began addressing educational challenges amid capacity and resource scarcity during post–World War II reconstruction in conditions similar to the ones many low-income countries faced or face decades later. In 1950, the share of the population with no schooling was 34 percent in Korea; 43 percent in Hong Kong SAR, China; 54 percent in Taiwan, China; and 68 percent in Singapore (figure 3.1). Expansion of schooling began from low levels, with the emphasis on quantity, not quality. Hong Kong SAR, China; Korea; and Singapore relied heavily on exams and testing to allocate access to education (Wong 2017).

Despite scarce resources, enormous effort was made to bring schools to every community and ensure ease of attendance. In Hong Kong SAR, China and in Singapore,

FIGURE 3.1 In economies with Top Performing Systems, the share of the population with no schooling plummeted between 1950 and 2010



Sources: Barro and Lee 2013.

for example, new schools were built in newly constructed public housing estates so that children could safely walk to school. This focus on achieving basic universal primary enrollment explains why the state allowed private providers of secondary education to emerge and even dominate the system (see spotlight 2).

By and large, only after 2000 did these Top Performing Systems adopt policies that emphasized academic and behavioral skills beyond the basics, such as the ability to solve problems, innovate in complex systems, and collaborate in diverse environments. Progress toward these goals has been possible because of strong, localized institutional capacity to ensure that critical elements are aligned in their common aim of crowding in learning.

Starting in the 1980s and 1990s, respectively, China and Vietnam pursued policies that sought to imitate the success of Japan, Korea, and Singapore. In Vietnam, initial efforts focused on ensuring that appropriate physical infrastructure and teaching capacity—the basic conditions for learning—were in place in all schools, through implementation of the Fundamental School Quality Audit program.

Aligning political support for investment in education with jobs and social mobility

High performers in East Asia and Pacific had great success in building industries that created employment at scale to accelerate the structural transformation of their economies. They were also widely recognized for having few social safety nets. The ability to secure employment in the modern industrial sector served as both a ladder for social mobility and a cushion against the lack of government-provided social safety nets. Policies offered a vision in which parents saw their children securing jobs after completing increasing amounts of school. Initial successes in employment of graduates in these newly created industries reinforced both the demand for schooling and the value that parents placed on their children's achievement.

A recurrent theme in Top Performing and Above-Average Performing Systems has been the tension between government and civil society to ensure access to education as a means to more secure and better income and the calls from civil society for greater access to initially restricted opportunities for improved job opportunities, which depended on education. This dynamic helped to propel exam-based allocation of opportunity to a distorted state in several East Asia and Pacific economies. Although many years of reforms have broadened opportunities at the very top of the educational ladder, tension between widespread access to basic education and restricted access to higher levels of education remains part of the political economy of education reform in the region.

The call for greater opportunity at the top came only after success at basic levels was firmly in place. Ensuring success was a function of simplifying, focusing, and sequencing reforms so that literacy and numeracy skills for all were secured before new challenges

were attempted. Institutional capacity was built in the drive for these goals, rather than as a precursor to them.

Sound administrative systems start by ensuring that basic conditions for learning are in place

A robust body of literature supports the importance of basic physical inputs on student achievement in school. Glewwe and others (2011) summarize the results of more than 40 high-quality research studies that examine the relationship between school inputs and educational outcomes in low- and middle-income countries. Their review finds strong evidence that the availability of basic inputs such as desks, tables, and chairs helps to raise student achievement. They find that all research estimates show a positive relationship, with almost half of them statistically significant. Other statistically positive inputs were blackboards, libraries, and school infrastructure (such as walls, ceilings, and roofs).

Vietnam's experience with developing Fundamental School Quality Level (FSQL) standards illustrates how a centralized administrative system can be used to ensure that schools have the basic inputs needed for learning. The FSQL began as an effort to collect data on classroom infrastructure and sanitation, furniture, textbooks, learning materials, teacher training, and community engagement (box 3.1). Over time, it was used to create an input index, which is used not only to monitor progress but also to assess whether inputs lead to learning.

The first step in developing FSQL standards involved the launch, in 2004, of an annual school census that became known as the District FSQL Audit. The 10-page data instrument was distributed to all primary school campuses nationwide. It enabled the collection of detailed information from each campus and provided for both project-specific and national monitoring of FSQL status. The audit produced a detailed national database of information on some 40,000 primary schools. Compiled and released within six months, the audit was conducted annually between 2004 and 2010 and cost roughly US$4–US$5 per school campus per year. Consistent use for decision making allowed the instrument to be refined and correlated with learning outcomes. The data in figure 3.2 underscore the importance of ensuring not only that basic inputs are available, but also that they are the right inputs and that they lead to increased learning.

An assessment system is effective only if it is updated regularly. In recent years, the use of the FSQL has stagnated; the list of basic inputs is in need of updating. If Vietnam's strong performance on the Programme for International Student Assessment (PISA) in recent years is any indication of the usefulness of having a system such as the FSQL, continuing to use the FSQL to set the basic conditions for learning is likely to be fruitful.

Administrative systems in Shanghai also seek to go beyond ensuring that inputs have reached schools, to measuring their use. The provincial government has established a mechanism for monitoring resource distribution in schools, tracking how funds are spent, and linking inputs to use in classrooms. Municipal and district offices carry out annual external audits to verify the fiduciary aspects of spending as well as the use of resources by schools during the year (Liang, Kidwai, and Zhang 2016).

The Philippines is making similar efforts, although these efforts do not yet seem to have catalyzed learning gains. Like Shanghai and Vietnam, the Philippines has a centralized system for monitoring and managing resources. The Department of Education identifies school infrastructure needs annually using the Basic Education Information System. It uses the data to develop a list of school-level projects to be carried out using the year's infrastructure budget appropriations. The Department of Education also compiles a priority list of schools, identifying first schools with high student-classroom ratios and a lack of water and sanitation facilities. In the second step, through site visits, the department verifies the condition of facilities and the feasibility of the work needed and formally

BOX 3.1 The original elements of Vietnam's Fundamental School Quality Level standards, as designed in 2001

Physical infrastructure

- Schools and campuses have solid classroom construction (walls, floors, and roofs), and adequate natural lighting.
- Schools and campuses have one blackboard per classroom, sufficient tables and benches for students, one teacher desk-chair per classroom, and sufficient durable and transportable storage boxes or lockers for instructional materials.

Teaching staff

- Teachers are minimally qualified.
- Teachers receive annual professional training on relevant classroom management and pedagogical topics (such as crafting teaching aids, multigrade teaching, remediation support, Vietnamese language instruction, and inclusive education).

School organization and management

- Schools ensure that each satellite campus offers the same quality of instruction, services, and resources as the main school site.
- Schools and campuses offer grades based on a full 175-week curriculum.
- Head teachers are trained to manage and support satellite campuses.

Education socialization

- Schools and campuses have parent committees.
- Parent committees at all schools and satellite campuses are trained in school and student support strategies.

Educational activities and quality

- One set of teaching aids or instructional materials per grade is available to each school and satellite campuses.
- One set of teacher supplies (ruler, scissors, chalk, paper, pen) is available to each teacher in all schools and satellite campuses.
- One full set of textbooks, a teaching manual, and other guides as required per grade taught is available to each teacher.
- One set of supplementary reading materials appropriate to all grades taught is available to each school and satellite campuses.
- All students have math and Vietnamese textbooks.
- All students are equipped with a sufficient (minimum) number of notebooks and pencils.
- All teachers in ethnic minority areas are trained in teaching Vietnamese to children whose native language is not Vietnamese.
- Special Vietnamese language materials are available in all schools and campuses with ethnic minority populations.

Expected outcomes

- All school-age children are enrolled in school.
- Ninety-six percent of 14-year-olds complete primary education.
- Gender equity is achieved in primary school enrollment.

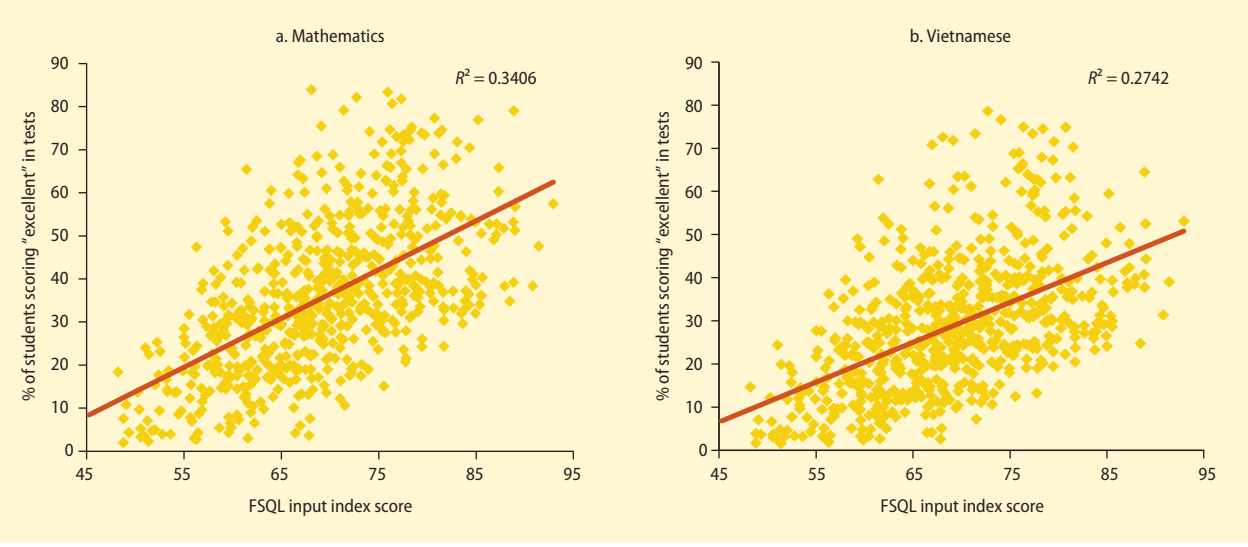
Source: Attfield and Vu 2012.

prepares a list of potential projects aligned with the budget available.

The Philippines Public Education Expenditure Tracking and Quantitative Service Delivery Study (PETS-QSDS) was commissioned after information from the Basic Education Information System revealed the need for investment in school facilities and infrastructure (one in seven elementary and high school classrooms was characterized as unfit for teaching and learning). The study, designed by the World Bank in consultation with the Philippines Department of Education, aimed to track, manage, and evaluate the presence, use, and efficacy of resources in the education sector. It has tracked more than 80 percent of the national government education budget.

The initial picture revealed by PETS-QSDS was discouraging. Widespread deficiencies

FIGURE 3.2 **Basic inputs can help to enhance learning outcomes: an example from Vietnam**



Source: Attfield and Vu 2012.
Note: FSQL = Fundamental School Quality Level. FSQL standards were launched in Vietnam in an effort to collect data on classroom infrastructure and sanitation, furniture, textbooks, learning materials, teacher training, and community engagement.

were found in the nearly 7,000 classes and classrooms that were observed. They included unclean classrooms, with poor ventilation; inadequate sound insulation; lack of electricity; and inadequate seating (Al-Samarrai 2016). The data were used for school renovation and infrastructure budget appropriations.

The Philippines also has a decentralized, community-based system to track resource inputs in schools. Check My School is a participatory monitoring initiative that mobilizes community volunteers to track the provision of resources in public schools (Shkabatur 2012). Volunteers (usually parents with children in the public school system) visit public schools, verifying the data collected and released by the Department of Education by reviewing the existence and quality of school resource inputs and infrastructure such as toilets, textbooks, and classrooms and sending pictures and text messages documenting what they see. The aim of Check My School is to have systems-level impact on accountability and transparency. Its effectiveness is limited, however, because few schools know about it, and even fewer engage in active reporting through the system.

Providing clear guidance to teachers through national curricula and textbooks

Curricula

Initially, all of the systems in the region that are now Top Performing Systems had a single national curriculum. Opting for a unified, compulsory national curriculum served multiple purposes.

First, when qualified teachers were in short supply, it was safer to rely on centralized experts to develop curricula (Chung and Ngan 2002; Goh and Gopinathan 2008; Lee 2006; Sweeting 1990).

Second, a prescribed curriculum promoted a relatively uniform education experience for students regardless of their school, location, and socioeconomic background (Ashton and others 2002; Chou and Ho 2007; Kim 2002; Lai 2009; Lee 2006).

Third, using the same mandatory curriculum throughout the system was seen as

giving every student the same fair chance to do well on the government exams for selection to higher levels of education. Some observers have credited this last concern to a belief in meritocracy; the focus on hard work (that is, effort or hard work versus innate intelligence or natural talent) is strongly held across these societies (Chou and Ho 2007; Goh and Gopinathan 2008; OECD 2010; Tu 2007).

Fourth, and perhaps most important, a single prescribed curriculum provided guidance for curricular development for teacher education and training. Curricula were focused and set clear and unambiguous learning goals. Teachers were expected to possess the same basic knowledge and skills to deliver the prescribed curriculum, in government or private schools and regardless of location (Chung and Ngan 2002; Fujita 2007; Goh and Gopinathan 2008). In Japan, having a single prescribed curriculum fit especially well into its practice of regularly rotating teachers among schools across the country to "level up" the performance of teachers, principals, and students (Fujita 2007; OECD 2010).

For similar reasons, having a single set of approved or government-issued textbooks was also the norm in these systems. It had a similar positive effect on teacher education and training. Teacher education and training programs are expected to adhere to the prescribed curriculum or to follow alternative guidance from the central government. This decision is partially related to the need to prepare students for standardized exams that these governments use to select students for secondary and postsecondary school placements, therefore requiring teachers to devote much attention to content in the national curriculum and its revisions.

Review and revision of the curriculum occur under central government oversight, driven by the push for constant improvement and excellence. International trends and models of success are closely studied. Education experts from universities are brought into special commissions, and input from teachers and principals is solicited. In Japan, curriculum updates occur every 10 years. In Singapore, the process is continual. In Korea, major revisions typically follow high-level government reviews of national human resources policy and economic development strategy needs; and minor amendments are continual (Chang Chien, Lin, and Chen 2013; Lai 2009; OECD 2010; Seth 2002).

Having unified curricula was seen as part of the goal of simplifying the educational endeavor while capacity was scarce by focusing on a smaller set of goals.

Strong central leadership and a unified system are not without critics, some of whom decry a one-size-fits-all approach to problems and needs. Top-down mandates are not always sensitive to local conditions and preferences and may not allow bottom-up innovation. Pent-up frustration can undercut morale among people working in the system, and public grievances can undermine trust in it.

Textbooks

Just as governments exercised firm control of the curriculum and set qualification standards for teachers, many mandated a single set of textbooks. Singapore follows this practice to this day. Advocates of a single set of textbooks see Singapore's approach as beneficial to faithful implementation of the single prescribed curriculum across the system. They assert that this approach better fulfills the promise of equity and quality in education when teacher competency is low and capacity to train them is limited.

As teacher capacity grows and systems respond to new demands on student performance (such as the need for creativity and problem-solving skills), many systems now allow teachers and schools to choose from several government-approved textbooks produced by private publishers and encourage them to develop their own syllabi to promote student learning. In Hong Kong SAR, China, textbook development, production, and dissemination have always been left to the private sector, although private publishers are careful to reference the government-mandated curriculum.

Sequenced reforms allowed more complex and ambitious learning goals to be achieved

After universal basic education was achieved, the emphasis of policy reform shifted to diversifying goals as a means of improving quality in schools, classrooms, and facilities (although schools remain fairly basic by Western standards, and class sizes remain large, at 30-plus students) (Wong 2017). Sports, music, and the arts—previously deemed largely nonessential—found space in curricula and schools. Educational goals moved beyond acquiring foundational skills to seek to impart the full range of skills needed for the knowledge economy.

The school experience should fundamentally prepare children for the challenges they will face as adults in the world of work. The more straightforward and basic learning goals that might allow a person to transition from farm to factory would likely not be sufficient to allow her children to move from working on an assembly line to working for Facebook. Mastery of factual knowledge and declarative content needs to be increasingly coupled with mastery of noncognitive skills and abilities such as creativity, the ability to communicate, resilience, and grit. Top Performing Systems moved to ensure that these 21st century skills are taught in school. They did so largely after securing the basics—and often only in response to strong demand from civil society.

In Taiwan, China, the policy of a single national curriculum ended when massive demonstrations by middle-class families in 1994 called for fundamental reforms. Parents were concerned about the harmful effects of school stress and the ability of the education system to prepare their children for work in the 21st century. A "national educational framework" setting out national goals and priorities in education replaced the national curriculum. Schools can develop their own student-centered curriculum based on this framework, and teachers are encouraged to develop innovative pedagogical techniques to connect better with students and conditions in local communities. New exam-free pathways to secondary school were adopted in 2014, and more assistance was given to disadvantaged students and students from low-income households (Chen and Fan 2014; Clark 2010; National Center on Education and the Economy, n.d.).

In Japan, reforms introduced in the new Fundamental Education Law in 2006 (the first revision in 60 years) devolved some functions to lower levels of government and allowed schools to exercise greater discretion over their budgets and personnel (OECD 2010). A school self-evaluation scheme that began in 2002 allows schools to set their own goals and criteria for evaluation within a framework defined by the central government. Goals can include academic objectives (such as adding learning activities outside the curriculum with input and support from parents, local community, and businesses) as well as nonacademic goals (such as reducing incidents of bullying and absenteeism—two serious problems in Japan).

In Korea, decentralization and deregulation of the education system began in the mid-1990s. The pace picked up when the Asian financial crisis of 1997–98 forced the central government to downsize. More decision-making authority was devolved to provincial, municipal, and local education offices. Central authorities still exercise enormous influence because they provide the bulk of education spending (75–80 percent) (Ferreras, Kessel, and Kim 2015; Kim 2007). The insistence on national standards may be easing, but the demand for performance remains.

Korea continues to revise its vision of what its school system should aim to produce. King and Rogers (2014) document how skills valued by the modern innovation economy, such as creativity and emotional intelligence, pose next-generation challenges for education policy makers in Korea. The foundational elements of success are still an important part of the equation—but they are no longer sufficient for producing students with the cutting-edge skills and abilities needed to compete in the 21st century.

High-performing economies continue to evolve their institutions and seek new ways

FIGURE 3.3 Timeline of selected educational developments in East Asia and Pacific

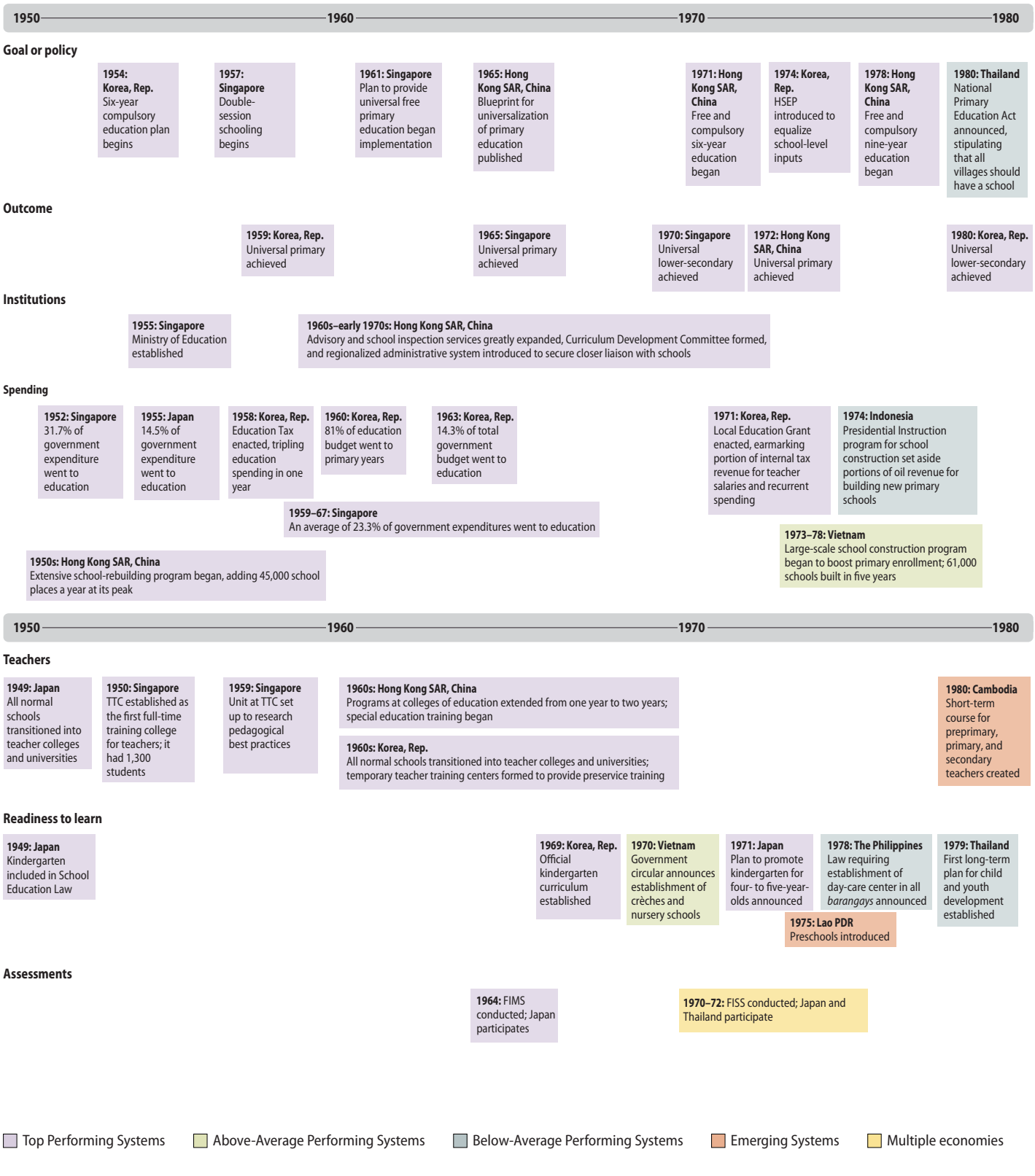
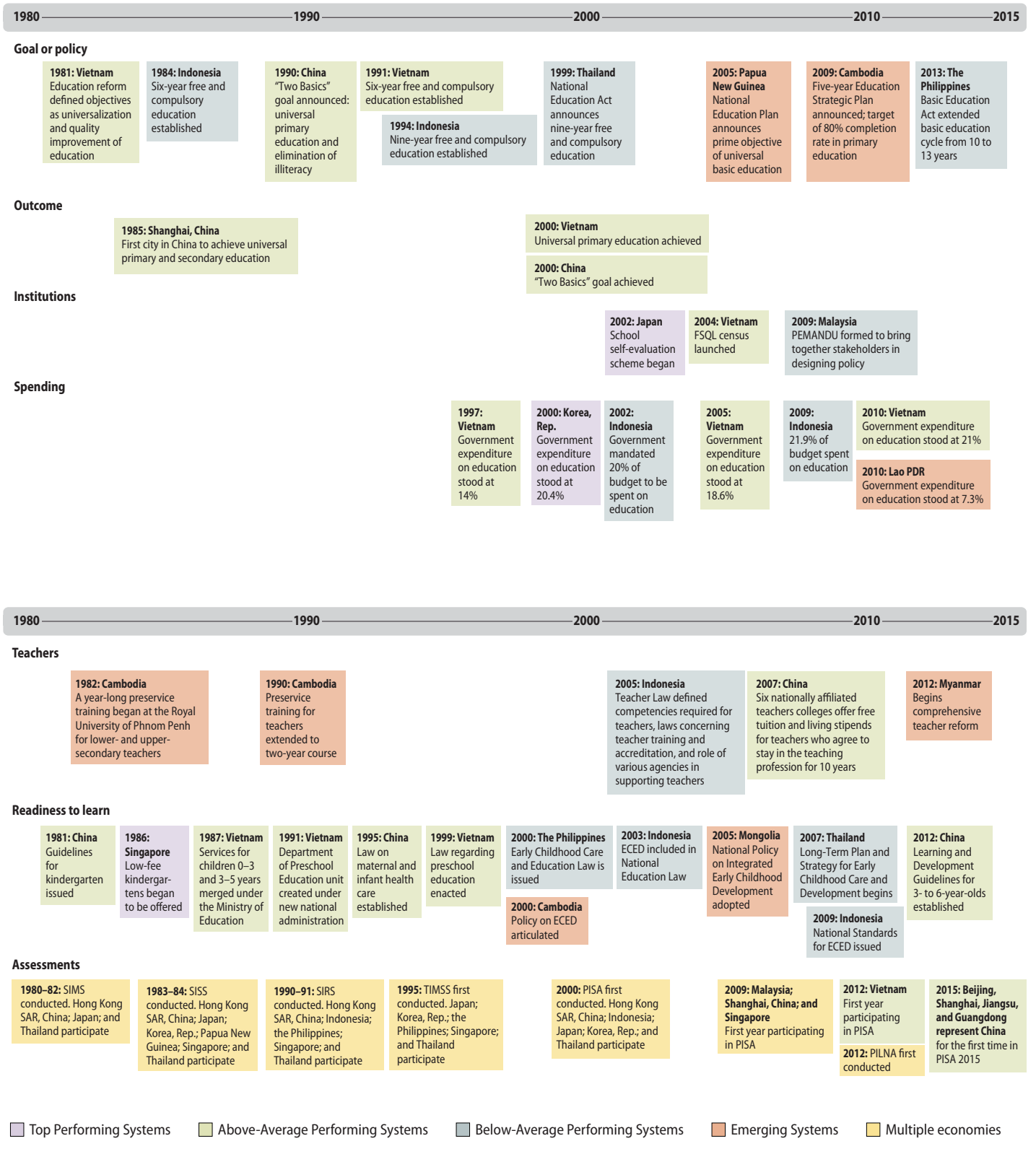


figure continues next page

FIGURE 3.3 Timeline of selected educational developments in East Asia and Pacific *(continued)*



Sources: Chang and others 2014; EDB 1981; Goh and Gopinathan 2008; Hanushek and Woessmann 2015; Kim 2000; Tandon and Fukao 2015; UNESCO 2015; Wong 2017.
Note: ECED = early childhood education and development; FIMS = First International Mathematics Study; FISS = First International Science Study; FSQL = Fundamental School Quality Level; HSEP = High School Equalization Policy; PEMANDU = Performance Management and Delivery Unit; PILNA = Pacific Islands Literacy and Numeracy Assessment; PISA = Programme for International Student Assessment; SIMS = Second International Mathematics Study; SIRS = Second International Reading Study; SISS = Second International Science Study; TIMSS = Trends in International Mathematics and Science Study; TTC = Teachers Training College.

to promote alignment between what is taught and the skills required in a changing economy. In Singapore, for example, in 2016, government ministers convened the Committee on the Future Economy of Singapore, to develop a report to outline Singapore's economic strategies for the next decade (Committee on the Future Economy, n.d.). Co-chaired by the minister of education, the minister of communications and information education, and chief executive officers and managing directors of the country's largest private enterprises, the Subcommittee on Future Jobs and Skills focused on how to ensure that the skills of the workforce are updated in accordance with future jobs and technologies. Education systems that promote creativity, love of learning, the ability to work in teams, and communication skills are fundamental to this vision, as are resilience and the ability to guide one's own learning through an increasing array of digital information sources.

Institutional alignment and sequenced reforms helped high-performing economies to reach critical milestones in expanding access and improving quality

Figure 3.3 displays a timeline of selected educational developments across the region. Although each economy's actions were determined principally by domestic concerns, reforms consistently sought a focused and sequenced set of goals. Universal basic education and improved attainment were pursued first by the Top Performing Systems and then by others. Concern for having all students acquire foundational skills in literacy and numeracy followed. Part of the initial focus

BOX 3.2 Elements of policies and practices that promote learning

The success of some education systems in East Asia and Pacific shows that students learn most when efforts focus on five policy domains and align 15 elements. These *domains* and elements are as follows:

Align institutions to ensure basic conditions for learning:

- Ensure that the basic conditions for learning are in place in all schools.

Concentrate effective, equity-minded public spending on basic education:

- Spend effectively.
- Concentrate public spending on basic education.
- Channel resources to schools and districts that are falling behind.

Select and support teachers throughout their careers to allow them to focus on the classroom:

- Raise the selectiveness of who becomes a teacher.
- Support new teachers by observing classroom practices and providing feedback.
- Make teachers' jobs easier by providing clear learning goals and uncluttered texts.
- Keep experienced teachers in the classroom and leading as peers and researchers.
- Center teacher training on classroom practice and the ability to teach the curriculum.

Ensure that children are ready to learn in school:

- Focus on physical and cognitive development from birth.
- Assess and improve the quality of early childhood education and development services.
- Coordinate across actors to deliver needed services.

Assess students to diagnose issues and inform instruction:

- Benchmark learning through participation in international large-scale assessments.
- Diagnose cohort progress at every educational sublevel.
- Inform instruction with data from formative classroom assessment.

was an ambitious agenda for school construction and capacity building to ensure that the basics were in place.

Korea and Singapore established goals for compulsory education in the 1950s and 1960s, respectively. In both cases, they took no more than five years to achieve universal primary enrollment. For Korea, evidence of the progressive universalism approach is apparent in the sequential expansion of first primary and then junior-secondary education. China and Vietnam launched similar goals almost a decade apart, meeting them in 2000.

Public spending on basic education testified to the importance that these economies placed on maintaining a degree of quality control over education performance, as did the use of unified national curricula and textbooks.

Success in reaching initial goals created tensions and led to demands for more educational opportunity, higher quality, more diversified educational experience, and more complex goals. Japan embraced support for readiness to learn very early, but most other economies began this expansion of service delivery only in the late 1980s or later. Assessment remained principally a device for allocating scarce opportunities for advanced education. Although exams still serve this function, assessment policies now inform instruction in basic education.

Subsequent chapters examine the details of policies and practices with regard to public spending, teachers, readiness to learn, and assessment (box 3.2) and provide information related to the milestones included in figure 3.3.

Note

1. See, for instance, the examples highlighted in chapter 10 of the *World Development Report 2018* (World Bank 2018).

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SPOTLIGHT 2

What Lessons Can Be Drawn from Top Performing Systems' Experience with Technical and Vocational Education and Training?

Technical and vocational education and training (TVET) played an important role in creating human capital for economic development in Japan, the Republic of Korea, and Singapore. TVET programs were an important component of education systems in all three countries from the 1950s through the 1990s (and they remain important in Singapore). The ministry of education, in coordination with the ministry of labor or industry, oversaw these programs.

TVET produced workers for low-tech, labor-intensive manufacturing industries that launched high-speed economic growth in the 1950s and 1960s. TVET subsequently produced workers for heavy industries, such as shipping, steelmaking, and petrochemicals, which took off in the 1960s and 1970s, and workers for technology-based manufacturing, such as electronics and integrated circuit chips, in the 1970s and 1980s.

TVET was central to national education policy and national economic development strategy

The economies of North America and Western Europe boomed after World War II. Leaders in Japan, Korea, and Singapore saw in their success a golden opportunity to put their populations to work and lift them and the national economy out of poverty. They needed low-skill labor that could work in labor-intensive light manufacturing industries, such as textiles, clothing, light electronics, toys, and kitchenware, producing exports for these markets.

They concentrated their limited resources and capacity on universal basic education. Large portions of state education funds went to building schools, quickly adding teachers to classrooms, and developing national curricula and textbooks. These governments saw TVET programs, rather than academic secondary education, as the quickest way to produce low-skill workers for the factories, construction sites, and shipyards that were hungry for labor.

Demand for workers stayed high for more than two decades of rapid growth. Average unemployment was less than 2 percent in Japan in the 1960s and 1970s. In Korea, it was under 3 percent in the 1960s–80s. In Singapore, it was 3.6 percent in 1978, after a decade of sustained high growth. These low numbers are all the more remarkable given the countries' high fertility and rapid population growth during these decades (see Benson and Zhu 2012; Husna 2018; Singapore Ministry of Trade and Industry 2011).

In the 1950s through the 1970s, Singapore tracked at least one-fifth of all students into TVET programs after primary school, and more enrolled in TVET programs when they failed to pass rigorous exams to advance from middle to high school (Center on International Education Benchmarking, n.d.; Goh and Gopinathan 2008). Education was a state monopoly; parents and students had no choice but to pursue the path chosen for them.

In Korea, rapid economic development took off under President Park Chung-Hee in the 1960s. His vision was to transform Korea into an industrial power. To achieve this, he looked to the German education model of the 19th century for guidance. Basic education was made compulsory for all to build basic literacy and numeracy. As much as 80 percent of all funds for school construction went to primary schools through the 1960s. Most primary school graduates enrolled in TVET programs at the middle and high school levels, as only top-performing students could pass highly competitive national exams and gain entry to the next level of academic education (Kim 2001).

The view that TVET programs rather than academic education would produce the workers Korea needed to power economic growth was articulated in the government's five-year economic development plans. The first plan, launched in 1962, envisaged that 70 percent of secondary school students would be enrolled in TVET programs.

As incomes and aspirations in Korea rose in the 1970s, more parents rejected TVET and demanded greater access to academic secondary education. They saw an academic education as promising better jobs, higher wages, and higher social status for their children. The state acknowledged this parental preference but refused to abandon its preference for combining primary schooling with secondary-level TVET programs. As late as 1979, more than half of all public funds for school construction went to the primary level (Kim 2001). The government responded to parental demand for academic secondary education by allowing more private secondary schools to open. The state refused to invest more in secondary academic education. As a result, nearly all children in Korea enrolled in public primary schools, and about half of all secondary students attended private institutions (Kim 2001; Sorensen 1994).

Government preference for a combination of primary academic education and TVET programs at the secondary level persisted through the 1990s (Center on International Education Benchmarking, n.d.; Chou and Ho 2007; Education Commission of Hong Kong 1984; Murata and Stern 1993; Seth 2002; Sorensen 1994; Sweeting 2004). In 1991, government policies still tried to push half of all secondary school students into TVET programs. These programs ended only in 1998, when industry shifted from using low-skill labor to adopting labor-saving technologies to stay competitive and when growth in insurance, banking, finance, and education required workers with higher academic education (Kim 2001).

In Japan, use of TVET programs to produce workers for modern industry dates back to the end of the 19th century. The founding fathers of modern Japan thought the German model was best suited for a latecomer to industrial development. In postwar Japan, TVET programs were revived to produce skilled workers. In the 1950s and 1960s, about 40 percent of all senior high school students were enrolled in vocational high schools (Abumiya 2012; Center on International Education Benchmarking, n.d.; OECD 2010).

These students were not tracked at an early age, as in Singapore, or denied the option of any academic education, as in Korea. As a highly egalitarian society, Japan viewed tracking as taboo. Parents and educators broadly reject exams as a way to measure student performance in the kindergarten through twelfth-grade system. "Exam hell" was (and is) only for students seeking to obtain a post-secondary education at universities and colleges (Fujita 2007).

Japan rapidly rebuilt its education system on the foundation of knowledge and experience accumulated in the prewar years. Its economy took off earlier and was more

advanced than those of Korea and Singapore. The government was therefore able to provide greater access to academic education at the middle and junior high school levels.

Enrollment in TVET programs was at the senior high school level. It was elective, and private institutions operated many of these programs. Students could gain specialized education in many subjects, including agriculture, plumbing, electrical, accounting, mechanics, food processing, and woodworking. Graduates were regarded as higher-skill workers and could easily secure well-paid jobs with good benefits.

TVET 2.0

As incomes rose and new job opportunities opened up, families broadly rejected TVET programs, viewing them as inferior in income potential and social status. Families now invest enormous resources to get their children the best academic education they can. In Korea, more than 70 percent of high school graduates go on to university—the highest rate among Organisation for Economic Co-operation and Development (OECD) countries. However, a university degree does not guarantee employment. One out of three unemployed people in Korea is a university graduate (*Korea Times* 2016). Technology is central to virtually all industries. Employers in Japan, Korea, and Singapore are desperately seeking workers with appropriate technical knowledge and skills. Box S2.1 describes one way in which China is addressing this need.

In Singapore, the government knows that it has to produce more highly skilled blue-collar workers if it is to continue to ascend the value chain in production activities and make the island state a regional innovation hub for high-tech manufacturing firms. For Japan,

BOX S2.1 World Bank engagement in TVET in China: the Liaoning Urban Construction School's eco-laboratory

The World Bank has a long history of investing in China's technical and vocational education and training (TVET), dating back to the first World Bank project there, the 1981 China Higher Education Project, which supported tertiary TVET programs at project universities. Early World Bank TVET projects in China were designed mostly at the national level. Since 2006, demand for TVET directly from provinces has increased. By focusing on competency-based curricula and pedagogy reform as well as on implementation, all projects have strived to position TVET in China as a demand-driven, equitable system within a lifelong learning framework.

One of these provincial-level projects addressed eco-architecture, a booming field in China. The Liaoning Urban Construction School (LUCS) used funding to construct an "eco-laboratory" building to enhance its architectural education program. This nationally recognized, award-winning green building expanded the training space on LUCS's campus. The construction process, which lasted about two years, provided an exemplary case study of school-industry collaboration.

The 5,100 square meter eco-lab is a high-tech educational space equipped with state-of-the-art architectural features, such as solar lighting and heating, ground-source heat pumps, energy-saving technologies, and water recycling. Its construction contributed significantly to LUCS's learning activities. The building became an integral part of the school's architectural education activities, with a large variety of exhibitions and lab sessions for students to observe and gain hands-on experience. To foster LUCS's connection with industry, a committee on eco-architecture, including academic experts and leading technical practitioners from industry, was put in place. The committee has incorporated several additions to LUCS's architecture curriculum, including information management technology, architectural industrialization, use of green building materials, energy-efficient building structures, and construction techniques. The eco-lab provides digitalized equipment to enhance students' learning experience, helping them to visualize and practice these concepts.

highly skilled workers are critical to increase productivity in an aging society. The prospect of a shrinking population and workforce is forcing companies to adopt more labor-saving technologies, but they still require workers to oversee and maintain them.

Upgrading TVET programs at the secondary and postsecondary levels is only part of what needs to be done. The bigger challenge is changing negative perceptions of TVET.

In Singapore, since the early 1990s, publicity campaigns have shown that TVET and technical jobs are not second-best options in a technology-driven world, and enormous state investment has gone into upgrading TVET programs at all levels. Today, nearly two-thirds of all postsecondary enrollments are in TVET programs with state-of-the-art facilities and equipment and top-quality instructors with industry experience.

Although TVET has less of an image problem in Japan, the government wants to encourage more young people, including women, to use postsecondary TVET programs to prepare for entry into the workforce. Raising female labor force participation would help to ease Japan's severe labor shortage. High-quality TVET classes have been introduced in many academic junior high schools to expose students to different industries and career options. In 2016 the government also approved the establishment of four-year technical universities. Programs at these institutions are expected to help students to build problem-solving skills relevant to industry needs.

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Spending Public Resources on Education Effectively

4

Top Performing and Above-Average Performing Systems in East Asia and Pacific have spent their public resources on education effectively by adopting three principles:

- Prioritize public spending on basic education
- Manage essential inputs efficiently
- Enhance the equitable distribution of resources.

These principles reinforce the concept of "progressive universalism" advocated by the International Commission on Financing Global Education Opportunity (2016), known popularly as the Education Commission. Progressive universalism means that "when balancing spending across different levels of education and population groups, decision makers should prioritize the poor and early years where social returns are highest, and minimize household spending on basic education by the poor" (International Commission on Financing Global Education Opportunity 2016, 20). This chapter distills lessons from East Asia and Pacific's high-performing systems that other countries—in the region and beyond—can adopt to spend public resources for education effectively. It does not describe how much to spend but rather how to spend.

Trends in public spending on education

Wealthier countries do not necessarily spend more on education

There is no overall correlation between a country's gross domestic product (GDP) and government spending on education as a percentage of GDP. Top Performing Systems are not among the highest spenders (table 4.1 and box 4.1); there are high and low spenders within each group. Among Above-Average Performing Systems, Vietnam has been a consistently high spender, whereas China only recently increased spending. Among Below-Average Performing Systems, spending in Malaysia and Thailand fluctuated over the years. In Indonesia, spending increased slowly but steadily, from 1.0 percent in 1995 to 3.3 percent in 2014. Spending by the Philippines remains low. Among Emerging Systems, spending is still relatively low, but Cambodia, the Lao People's Democratic Republic, and Myanmar (box 4.2) increased spending considerably in recent years. In contrast, spending declined in Mongolia and Timor-Leste. This lack of correlation is not unique to East Asia and Pacific; it can be observed worldwide.

TABLE 4.1 Government spending on education as a share of GDP varies widely, even among economies with similar levels of performance

	Government spending on education as % of GDP				GDP per capita (US$)
Country	2000	2005	2010	Latest[a]	2015
Top Performing Systems					
Japan	3.6	3.5	3.8	3.8	34,524
Korea, Rep.	4.3	3.9	4.9	4.6	27,222
Singapore	3.6	2.9	3.1	3.0	52,889
Above-Average Performing Systems					
China	—	2.8	3.6	3.9	8,069
Vietnam	—	—	6.3	6.3	3,968
Below-Average Performing Systems					
Indonesia	—	2.9	2.8	3.3	3,346
Malaysia	6.0	—	5.0	6.1	9,768
Philippines	3.3	2.4	2.2	2.6	2,904
Thailand	5.3	3.9	3.5	4.1	5,815
Emerging Systems					
Cambodia	1.7	—	1.9	2.7	1,159
Lao PDR	1.5	2.4	2.8	4.2	1,818
Mongolia	5.6	—	4.6	4.6	3,968
Myanmar	<1.0	—	0.7	2.0	1,161
Papua New Guinea	—	—	—	4.8	2,268[b]
Timor-Leste	—	—	10.5	7.7	1,217

Sources: Cambodia Ministry of Economy and Finance 2017 (for 2010) and World Bank 2017a (for latest) for Cambodia; National Bureau of Statistics of China 2016 for China; World Development Indicators (last data, updated April 2017) for GDP per capita (World Bank, various years); Indonesia Ministry of Finance for Indonesia (unpublished data; latest only); OECD 2003, 2013, and 2016a for the Republic of Korea; Government of the Republic of the Union of Myanmar 2014 and UNESCO 2016 for Myanmar; World Bank 2014b for Papua New Guinea; World Bank 2016 for the Philippines; Singapore Ministry of Education (http://data.gov.sg/) for Singapore; World Bank EdStats (World Bank, various years) for others.
Note: — = not available; GDP = gross domestic product.
a. Latest between 2011 and 2014, except 2016 for Indonesia and 2015 for Cambodia, China, Myanmar, the Philippines, and Singapore.
b. GDP per capita for 2014.

BOX 4.1 Government spending on education as a share of GDP is a better indicator of education spending than is spending as a share of total government spending

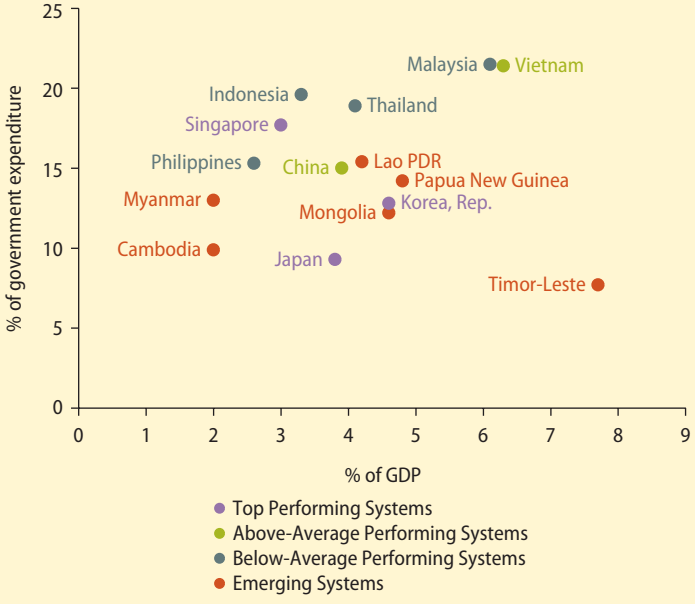
The two most frequently used indicators for education spending—government spending on education as a percentage of GDP and as a percentage of total government spending—illustrate different pictures. Spending as a share of GDP illustrates the magnitude of education spending; spending as a share of total government spending illustrates how each country places education among competing demands, given budget availability and demographic conditions.

The two indicators are only loosely correlated (figure B4.1.1). For instance, Timor-Leste spends a very small portion of its government budget on education, but its spending still represents a very large share of GDP. Indonesia spends almost 20 percent of its government budget on education, but the figure represents only 3.3 percent of GDP.

box continues next page

BOX 4.1 Government spending on education as a share of GDP is a better indicator of education spending than is spending as a share of total government spending *(continued)*

FIGURE B4.1.1 Spending on education as a share of government expenditure is largely uncorrelated with spending as a share of GDP



Sources: World Bank 2017a for Cambodia; National Bureau of Statistics of China 2016 for China; Indonesia Ministry of Finance for Indonesia; OECD 2016a for the Republic of Korea; Government of the Republic of the Union of Myanmar 2014 and UNESCO 2016 for Myanmar; World Bank 2014b for Papua New Guinea; World Bank 2016 for the Philippines; Singapore Ministry of Education (http://data.gov.sg/) for Singapore; World Bank EdStats (World Bank, various years) for others.
Note: Figures are latest between 2011 and 2014, except 2016 for Indonesia and 2015 for Cambodia, China, Myanmar, the Philippines, and Singapore.

BOX 4.2 Myanmar is gradually increasing public spending on education

For many decades, Myanmar allocated a much smaller share of GDP to education than did most other countries. In 1973/74, government expenditure on education was estimated to be about 3.3 percent of GDP. The share subsequently fell steadily, reaching just 0.7 percent of GDP by 2011/12. Households financed about 70 percent of total education spending that same year.

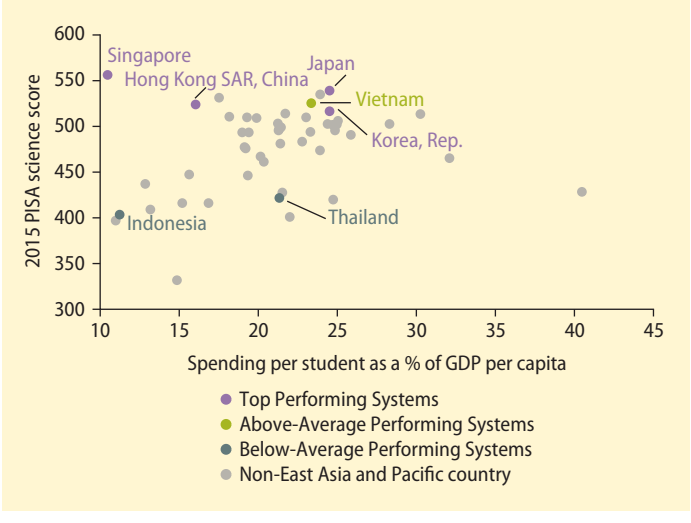
Decades of inadequate spending have affected the quality of education. In 2012/13, Parliament approved a substantial increase in the education budget, as tax revenues began to rise. Estimated actual spending on education increased to 2.1 percent of GDP, or about 14 percent of overall government spending in 2013/14, although it dropped to 2.0 and 13.0 percent, respectively, in 2015.

Sources: UNESCO 2016; World Bank 2015a.

More spending does not promise higher performance

Most participants in the Programme for International Student Assessment (PISA) spend 18–25 percent of GDP per capita per student per year (figure 4.1). Among high performers, Japan, the Republic of Korea, and Vietnam spend about 24 percent of GDP per capita on each student, but the highest performer, Singapore, spends only 11 percent. Several countries that spend 20–25 percent of GDP per capita per student—and even some that spend more than 30 percent of GDP per capita—performed as poorly as those spending less than 15 percent. Thailand, for example, with an average PISA score of 409, spends 21 percent of GDP per capita per student, and Indonesia, with a score only slightly lower (397), spends only 11 percent. High per student spending relative to the country's income level is thus no guarantee of high performance.

FIGURE 4.1 Per student spending as a share of GDP per capita does not correlate with 2015 PISA science scores



Sources: Data from World Bank EdStats (World Bank, various years) and PISA 2015 (OECD 2016d).
Note: GDP = gross domestic product; PISA = Programme for International Student Assessment.

Prioritizing public spending on basic education

Top Performing and Above-Average Performing Systems sequenced subsectoral allocations

Countries that aim to build strong human capital for economic growth should prioritize public spending on basic education to deliver good-quality and universally available education at that level before devoting more spending to higher levels of education (Jimenez, Nguyen, and Patrinos 2012). East Asia and Pacific's Top Performing and Above-Average Performing Systems followed this principle, shifting their focus from basic to tertiary education over time. During their early period of economic growth, they invested in primary education to establish basic literacy and numeracy for the largest number possible and to build strong foundations before moving gradually to higher levels of education. Then, as their economies grew and demand for highly skilled workers rose, these systems devoted an increasing share of education expenditure to higher levels of education. Their central control over the education budget enabled them to sustain the investment.

In Korea, the government more than tripled the education budget, from 4.2 percent of government spending in 1954 to 14.9 percent in 1959. To achieve free compulsory primary education, it allocated 69–80 percent of the education budget to primary education between 1948 and 1959. Much of this money was spent to build schools in order to reduce double-shifting. The allocation to primary education peaked at 81 percent in 1960 and leveled off at 54 percent by 1979 (Kim 2002).

In Singapore, education expenditure expanded dramatically in the 1950s, from 1–8 percent of total government expenditure in the prewar period to 13.2 percent in 1952 and 24.9 percent in 1958 (Blackburn 2017). It peaked at 31.7 percent in 1964 and 28.8 percent in 1965. In 1965, the government allocated 59 percent of the education budget to primary education.

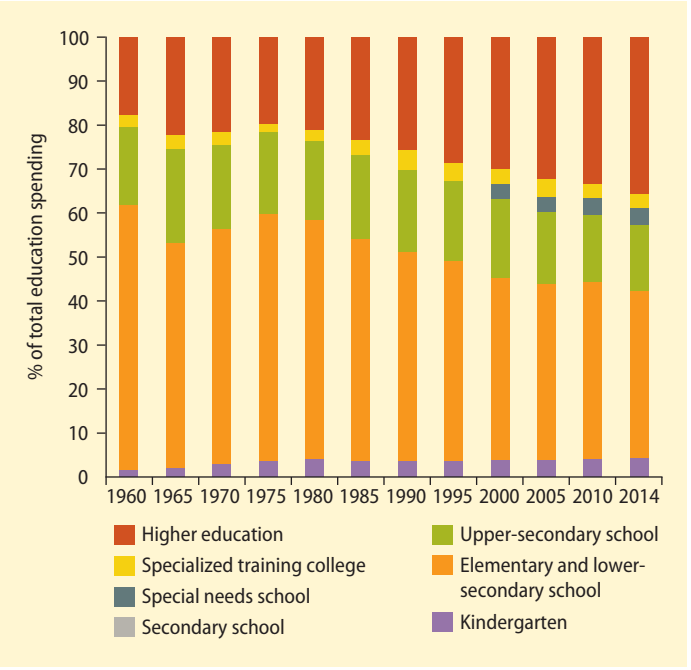
In Japan, the education system that constituted the foundation of postwar education reforms underwent rapid quantitative expansion beginning in the 1950s (IFIC and JICA 2004). A large share of the education budget in the early postwar period was spent on extending compulsory education from six (elementary school) to nine years (elementary and lower-secondary school) (figure 4.2). Increases in enrollment in vocational high school followed. The stock of mid-level human capital capable of using borrowed technology efficiently was further augmented during the period of rapid economic growth by allocating a large share of the education budget to secondary schools, at the expense of tertiary education (Godo and Hayami 2009).

Above-Average Performing Systems are still focusing on basic education. Vietnam continues to prioritize public investment in primary and secondary education. China also prioritizes investment in pretertiary education, particularly primary, vocational, and preschool education (OECD 2016b).

Top Performing Systems continue prioritizing investment in basic education

Although increasing spending on higher levels of education, Top Performing Systems continued raising per student spending on primary and secondary education. In Singapore, for example, between 1986 and 2015, per student spending grew by 122 percent in real terms at the primary level and by 113 percent at the secondary level.[1] In Japan and Korea, per student spending on primary and secondary levels grew steadily in real terms between 2000 and 2013 (figure 4.3). A notable difference between Singapore and the other two countries is that per student spending for tertiary education in the other two was always lower than spending for the other levels, except for a recent increase in Japan, primarily because tertiary education is financed largely by private spending in Japan and Korea.

FIGURE 4.2 Japan prioritized basic education in its earlier years of economic growth, 1960–2014

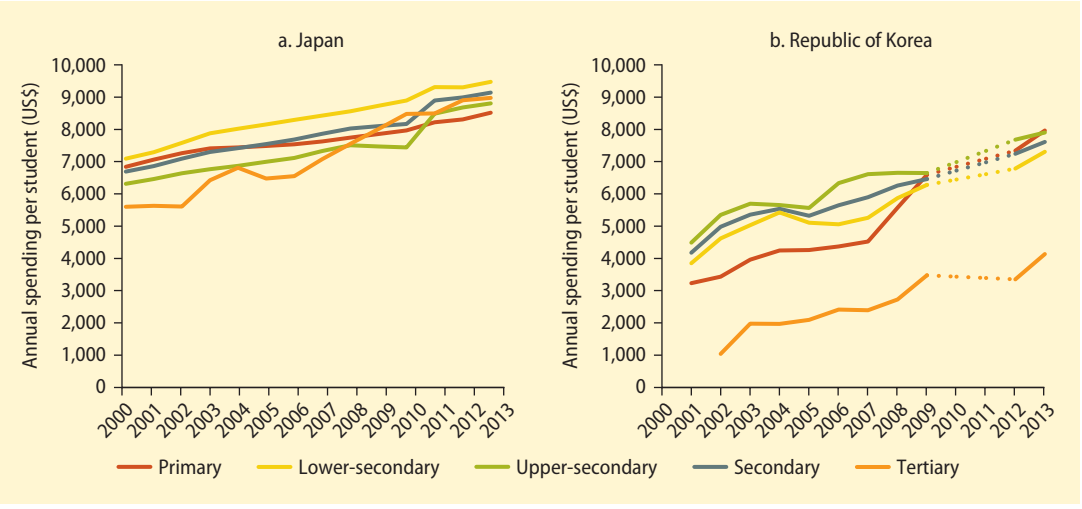


Source: Japanese Ministry of Education, Culture, Sports, Science, and Technology (http://www.mext.go.jp/b_menu/toukei/002/002b/1383990.htm).
Note: Historical data for the breakdown by elementary and lower-secondary levels are not available. Secondary schools consist of lower- and upper-secondary levels, which are not common in Japan.

Relative to poor countries in East Asia and Pacific, wealthier countries tend to spend a larger share of GDP per primary and secondary education student and a smaller share per tertiary education student. Patterns of public spending vary widely (figure 4.4).

Both worldwide and in East Asia and Pacific, per student public spending at the primary level and countries' wealth are correlated. This correlation is less clear at the secondary level worldwide, although it is still evident in East Asia and Pacific. At the tertiary level, there is a negative correlation in the rest of the world, a slightly negative correlation in East Asia and Pacific, and a positive correlation in the Organisation for Economic Co-operation and Development (OECD). These findings reflect the fact that governments in East Asia and Pacific play an important role at the primary and secondary levels

FIGURE 4.3 Annual per student spending in Japan and the Republic of Korea rose at all levels of education between 2000 and 2013



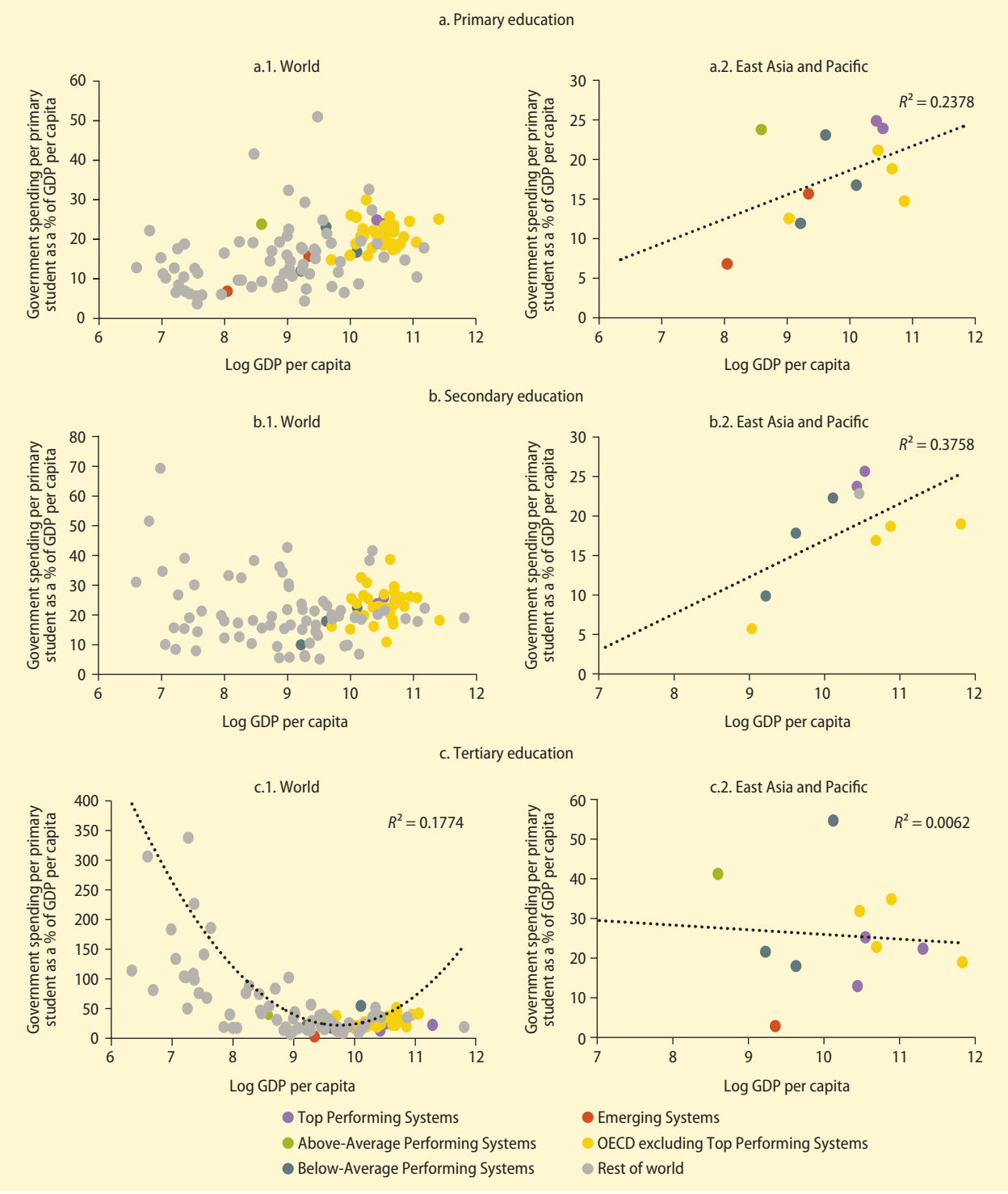
Source: World Bank EdStats (World Bank, various years).
Note: Values are in 2013 purchasing power parity prices. Dotted lines in panel b indicate missing data.

and spend more per student as their economies grow. In East Asia and Pacific's low-income countries, the unit cost for tertiary education is about the same as or slightly higher than that for lower levels of education; it is not higher than in many poorer countries outside the region.

Even in Japan and Korea, where private spending on education is substantial, primary and lower-secondary education (and upper-secondary education to a lesser extent) are mostly publicly funded. The proportion of private spending on educational institutions within the formal education system is large in Japan and Korea relative to the OECD average. In 2013, of spending on educational institutions, only 72 percent in Japan and 64 percent in Korea was publicly financed, compared with an average of 84 percent in the OECD (table 4.2). However, the large share of private spending in these two countries is driven primarily by spending on tertiary education and, to a lesser degree, on upper-secondary education; primary and lower-secondary education are financed predominantly by public resources. In Singapore, private spending on formal education was never more than 1 percent of total spending on education (Wong 2017). These statistics illustrate that Top Performing Systems in East Asia and Pacific prioritize public funding for basic education.

Returns to different levels of education may help to explain why countries shift their subsectoral focus yet continue investing in basic education as their economies grow. Figure 4.5 presents the returns to education in low- and middle-income countries by country income group and level of schooling (Psacharopoulos, Montenegro, and Patrinos 2017). It shows that returns are higher in lower-income countries in general, where the quantity of schooling is scarcer. Private returns to all levels of education are higher than social returns in these countries, but the difference is much larger at the tertiary level. Given the high social returns at the primary level, it would make sense for low- and

FIGURE 4.4 Government spending on education as a share of GDP per capita varies widely



Source: Data from World Bank EdStats (World Bank, various years).
Note: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development.

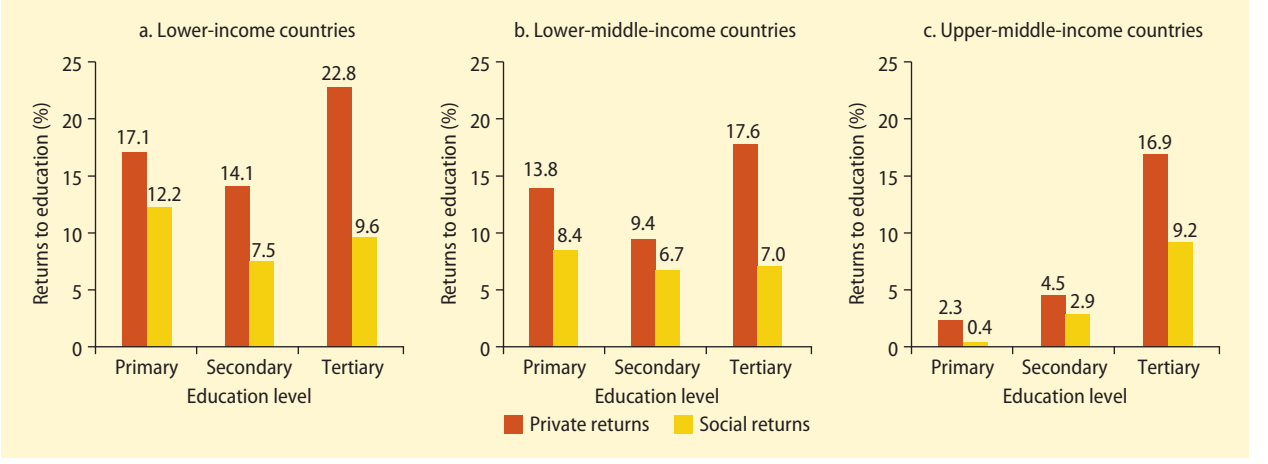
TABLE 4.2 Share of public expenditure on educational institutions in Japan, the Republic of Korea, and the OECD, by level of education, 2013

Percent

Country or country group	Primary	Lower-secondary	Upper-secondary	Tertiary	All
Japan	99	94	82	35	72
Korea, Rep.	91	93	71	32	64
OECD average	**93**	**93**	**87**	**70**	**84**

Source: OECD 2016a, table B3.1a.
Note: OECD = Organisation for Economic Co-operation and Development.

FIGURE 4.5 Returns to education differ by level of schooling and country income group



Source: Psacharopoulos, Montenegro, and Patrinos 2017.

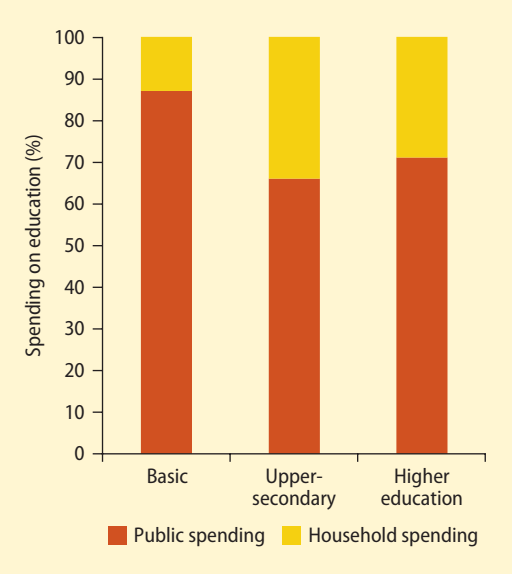
lower-middle-income countries to prioritize investment at that level.

The low returns to primary and secondary education in upper-middle-income countries stem from the fact that primary and, to a lesser degree, secondary education have already reached most of the population. Governments need to continue investing to enhance the quality of primary and secondary education and to strengthen the human capital foundation to meet rapidly changing labor market demand.

Below-Average Performing and Emerging Systems have not prioritized primary education

Unlike Top Performing and Above-Average Performing Systems, Below-Average Performing and Emerging Systems have not sequenced the focus of their spending from primary to tertiary, and they have not sufficiently prioritized investment in lower levels of education. Indonesia, Malaysia, and Thailand have increased per student spending for primary and secondary education in recent years. This spending is now higher than spending on tertiary education in Thailand, but it is still much lower in Indonesia and Malaysia. In Malaysia, per student spending on tertiary education (in purchasing power parity dollars) is even much higher than in Japan and Korea. In Indonesia, public spending on public tertiary institutions (US$5,794 in 2013 prices) is more than four times greater than spending on public primary institutions (US$1,319) (OECD 2016a, table B3.3).

FIGURE 4.6 Indonesia spends more public funds on higher education than on upper-secondary education



Source: Adapted from World Bank 2013b.

Public spending represents only two-thirds of total spending on noncompulsory upper-secondary education, less than spending on higher education (figure 4.6).

In the Philippines, total government spending on education and government spending on basic education fell in real terms at the start of the 2000s. The government began increasing spending on basic education in 2005, but as a share of GDP, spending on basic education reached the rates of the early 2000s only recently, and it is still much lower than in comparator countries, such as Malaysia, Thailand, and Vietnam (World Bank 2016).

Among Emerging Systems, in 2013/14, Lao PDR allocated only 64 percent of education spending to pretertiary education (3 percent to preprimary, 32 percent to primary, and 30 percent to secondary, including technical and vocational education and training). Tertiary and other education received 36 percent of the budget (World Bank EdStats; World Bank, various years).

Since the late 2000s, Papua New Guinea has prioritized universal access to basic education, rapidly increasing education spending to achieve it. The abolition of school tuition fees for basic education in 2012 led to a dramatic increase in enrollment. As a result, per student spending has decreased in recent years (World Bank 2014b).

High-performing systems manage teachers and school infrastructure efficiently

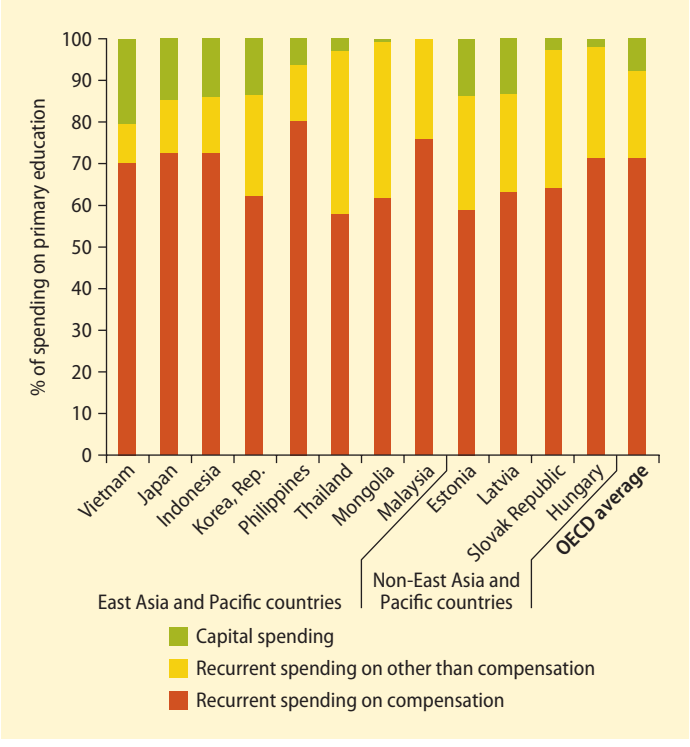
More spending does not necessarily result in better outcomes. Efficient management of essential inputs is key. This section discusses how high-performing systems finance teachers and school infrastructure.

Teachers

East Asia and Pacific's Top Performing and Above-Average Performing Systems tend to spend less on recurrent spending than other countries, leaving room for capital spending. Japan and Korea allocate the smallest shares to recurrent spending among OECD countries: 85–87 percent for primary compared with the OECD average of 92 percent (figure 4.7). The patterns are similar for secondary and tertiary education: 85–89 percent for secondary and 84–86 percent for tertiary in Japan and Korea compared with the OECD average of 93 and 89 percent, respectively.[2]

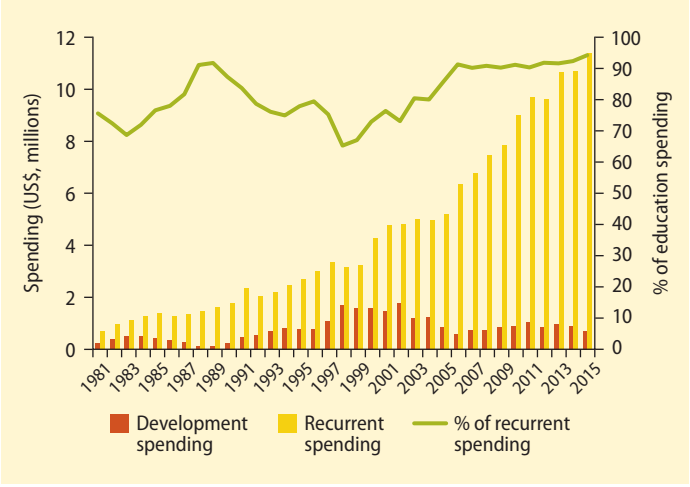
The proportions of recurrent and capital expenditures vary over time, depending on investment needs. In Singapore, for instance, development spending peaked in the late 1990s to early 2000s. It represented more than 25 percent of total education spending over five years during the period; in 2015 the figure was less than 10 percent (figure 4.8). The composition of spending in Indonesia and Japan was similar. Vietnam allocated only

FIGURE 4.7 The composition of spending on primary education varies widely across countries



Sources: OECD 2016a for Estonia, Hungary, Indonesia, Japan, the Republic of Korea, Latvia, and the Slovak Republic; World Bank EdStats for other countries (World Bank, various years).
Note: Data are for 2009 for the Philippines, 2012 for Indonesia, 2013 for OECD countries, and 2012–14 for Malaysia, Mongolia, Thailand, and Vietnam. OECD = Organisation for Economic Co-operation and Development.

FIGURE 4.8 In Singapore, the proportion of recurrent and development education spending fluctuated over time, 1981–2015



Source: Singapore Ministry of Education 2017.

80 percent to recurrent spending. By contrast, Malaysia, Mongolia, the Philippines, and Thailand spent more on recurrent expenditure than the OECD average.

East Asia and Pacific's Top Performing and Above-Average Performing Systems offer sufficiently attractive starting salaries and benefits, as well as progressive salary schemes and other incentives, to attract and retain qualified teachers.

The Ministry of Education in Singapore regularly adjusts salaries for new teachers so that teaching remains as attractive to new graduates as other occupations. Although teacher salaries do not increase as much as salaries in the private sector, the government offers retention bonuses and nonfinancial incentives, such as career opportunities within education. High-performing teachers can earn significant performance bonuses under the comprehensive performance appraisal system (OECD 2011).

New teachers in OECD countries earn an average of 77 percent of GDP per capita. In Japan and Korea, new teachers earn 76 and 92 percent of GDP per capita, respectively. They can expect salary increases to reach 133 and 159 percent of GDP per capita, respectively, after 15 years (figure 4.9). These increases are much higher than the OECD average, where teacher salaries are 4–13 percent lower than those of workers with similar qualifications (OECD 2016c). The high reward for experience is a likely reason for the extremely low average annual teacher attrition rates in the East Asia and Pacific's Top Performing Systems—less than 3 percent compared with 6 percent in most Western European countries and 8 percent in the United States (Wong 2017).

In China, teachers receive average salaries for civil servants. Civil service jobs are stable and provide good benefits, which makes teaching popular, especially in big cities (OECD 2016b). In Shanghai, teacher salaries are based partly on performance evaluations (Liang, Kidwai, and Zhang 2016).

In Vietnam, where teachers are promoted to a higher salary category every three years and receive a "working-year allowance"

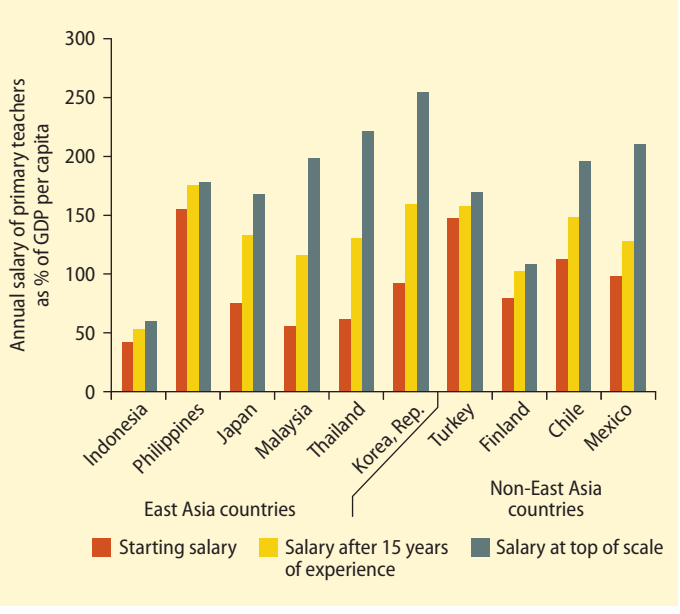
every year, teachers at the top of the scale with more than 30 years of experience can earn 2.77 times as much as beginning teachers (World Bank 2017b).[3]

Although teaching is a relatively well-paid profession in Malaysia and Thailand, the school system is unable to attract enough qualified teachers. In Malaysia, the salary increment for teachers increases substantially with seniority (UNESCO 2015a). But the very low starting salaries relative to GDP per capita fail to attract qualified teachers in the first place (figure 4.9). In 2010, 93 percent of applicants to the bachelor's in education program did not meet academic requirements. Among candidates offered a place, 70 percent did not meet academic requirements (World Bank 2013a). Thailand also faces chronic teacher shortages. Starting salaries for teachers there are very low relative to GDP per capita (OECD and UNESCO 2016). In Cambodia, teaching is not a particularly attractive profession for top graduates, primarily because of low salaries. Almost all teacher trainees enrolled in teacher training centers are bottom-half performers on the grade 12 exam (World Bank 2014a).

Analysis of PISA results suggests that the only type of resource that is correlated with student performance is teacher salaries relative to national income. There is a statistically significant positive relationship between teacher salaries relative to GDP per capita and PISA 2012 math scores in economies with GDP per capita of more than US$20,000 (figure 4.10). All of East Asia and Pacific's high performers are above the trend line, but teachers in Japan; Shanghai, China; and Singapore are not particularly highly paid, unlike teachers in Korea and Hong Kong SAR, China.

There is no statistically significant relationship between teacher salaries and test scores among economies with GDP per capita of less than US$20,000. In Malaysia, where teachers earn more than twice GDP per capita on average, student performance was worse than in Thailand, where teachers earn only 25 percent more than GDP per capita. Vietnam has been a much better performer on PISA than Thailand, even though teachers

FIGURE 4.9 Salaries of primary school teachers in East Asia rise markedly with seniority

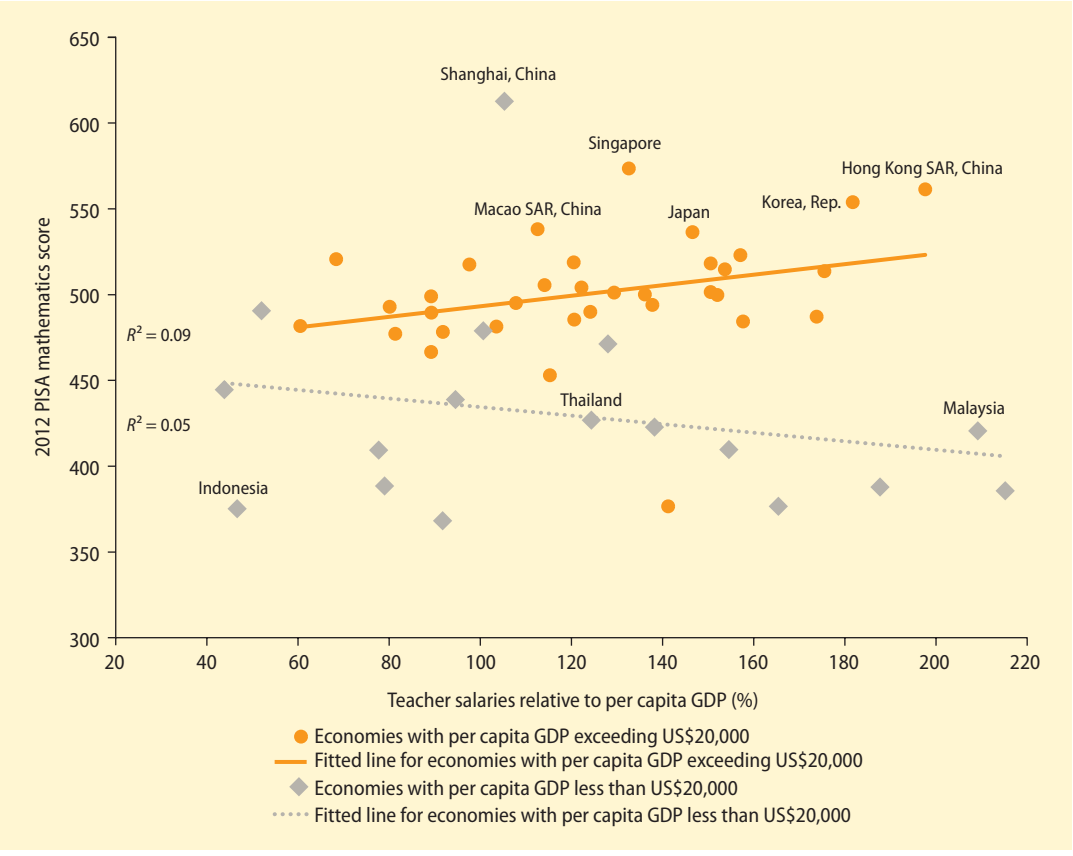


Source: UNESCO 2012.
Note: Salaries reflect official pay scales in 2010. They refer to the average scheduled gross annual salary for a full-time teacher with the minimum training necessary to be fully qualified at the beginning of his or her teaching career. GDP = gross domestic product.

in Thailand are much better paid than teachers in Vietnam (in 2011, teachers earned 144 percent of comparable professions in Thailand and only 88 percent in Vietnam). To meet the constitutional mandate to allocate 20 percent of the government budget to education (introduced in 2002), Indonesia increased teacher salaries considerably over the past decade—without observable improvements in learning outcomes (World Bank 2013b).

Student-teacher ratios declined over the past two decades in most of the region, at both the primary and secondary levels (figure 4.11). The decline reflects both the fact that governments did not reduce the size of their teaching workforces in the face of falling numbers of school-age children and the fact that some governments hired more teachers to respond to increasing enrollments or to reduce student-teacher ratios. Changes in the school-age population (5- to 19-year-olds) since 2000 and projected changes over the next two decades vary considerably across the region. They suggest that changes

FIGURE 4.10 Higher teacher salaries relative to GDP per capita are correlated with student performance on the 2012 PISA among wealthier economies but not among less wealthy ones

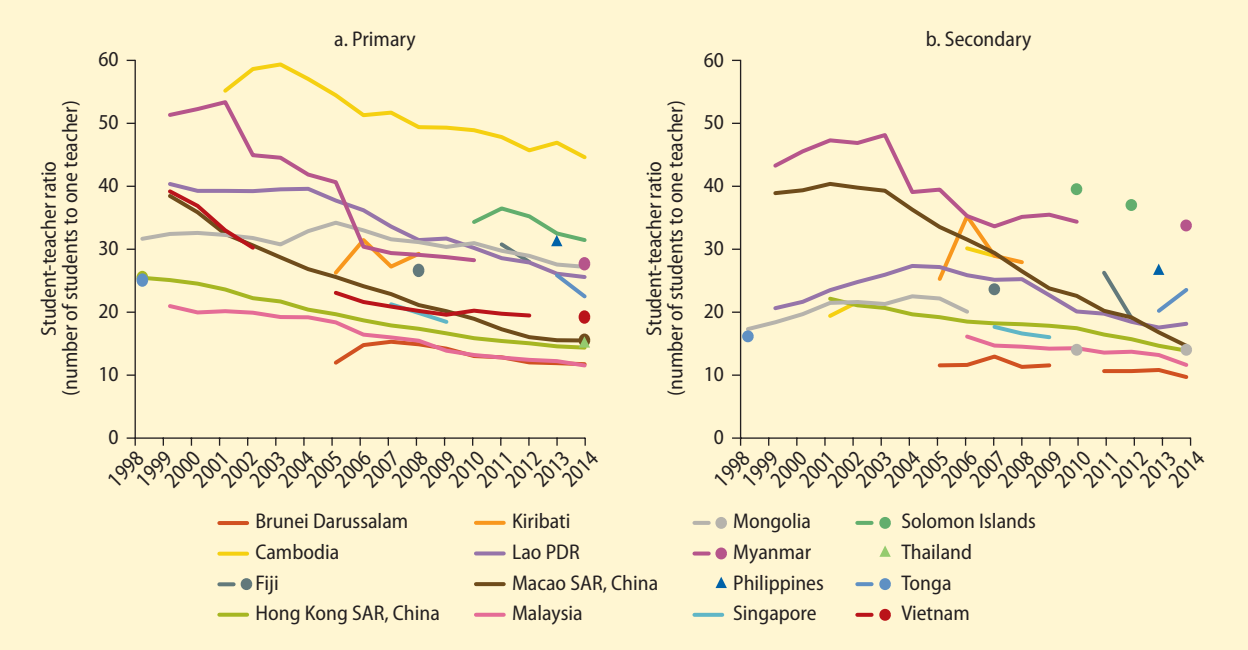


Source: Adapted from OECD 2014.
Note: The solid line shows a significant relationship ($p < 0.10$). The dotted line shows a nonsignificant relationship ($p > 0.10$). Teacher salaries are the weighted average of upper- and lower-secondary school teacher salaries. The average is computed by weighting salaries based on the enrollments of 15-year-old students (for economies with valid information for both upper- and lower-secondary education). GDP = gross domestic product; PISA = Programme for International Student Assessment.

in the size of the school-age population were a driving factor for the rapidly declining student-teacher ratios in about half the region. Compared with 2000, there were fewer people age 19 and younger in 2015 in about half the economies in the region; compared with 2015, it is projected that there will be fewer 5- to 19-year-olds in 2035 in more than half of them (figure 4.12). Depending on the size of the school-age population, governments need to adjust the size of the teaching workforce efficiently.

Very high student-teacher ratios are likely to result in poor student performance, but low ratios do not guarantee high performance. Evidence from recent impact evaluations in low- and middle-income countries shows that reducing class sizes in primary schools improves learning (MacEwan 2015). However, large class sizes in themselves may not be detrimental to learning, as long as student-teacher ratios are not very high, as observed in East Asia and Pacific economies. Class sizes in PISA-participating East Asia and Pacific economies are larger than in most other PISA-participating economies, but student-teacher ratios are not, meaning that more teachers are present in classrooms

FIGURE 4.11 **In most of the region, student-teacher ratios declined at the primary and secondary levels between 1998 and 2014**



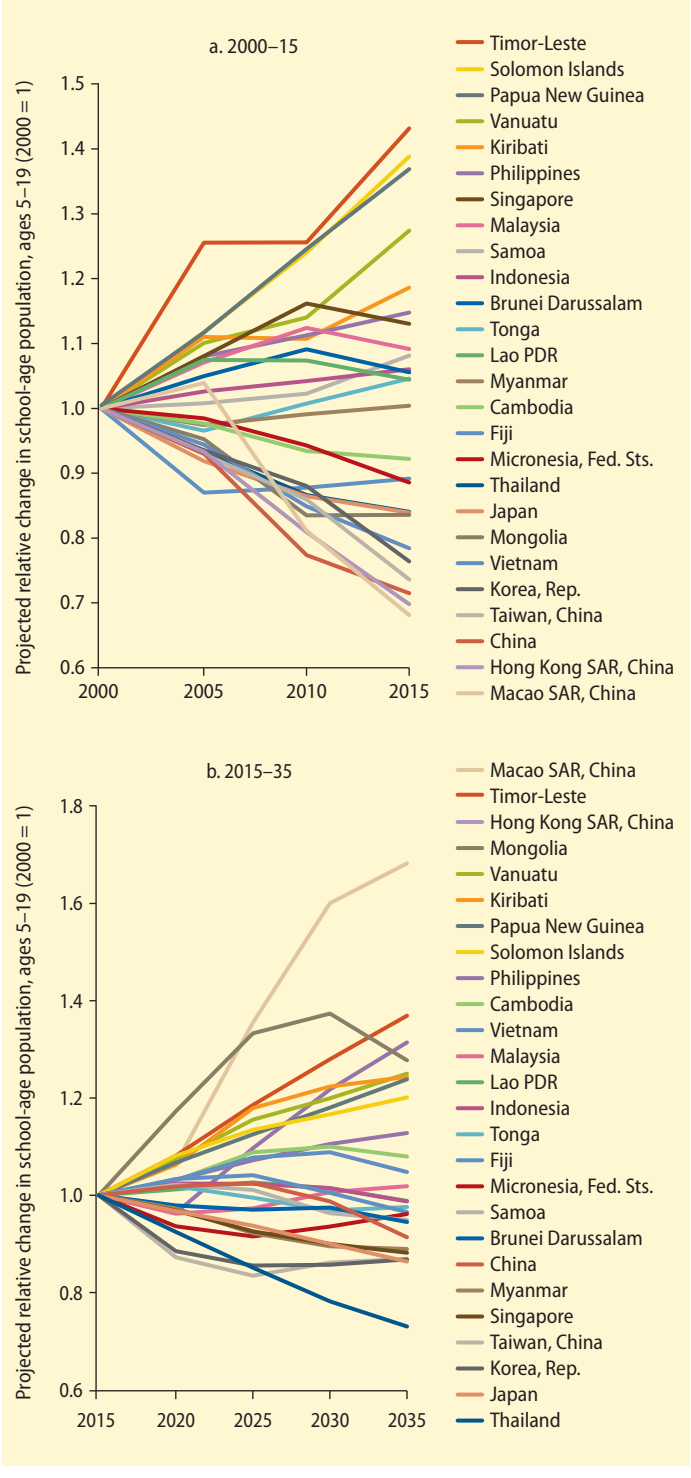
Source: World Bank EdStats (World Bank, various years).

in East Asia and Pacific. Except for Thailand, these ratios are about average or below average (figure 4.13). Student-teacher ratios are more closely correlated with learning outcomes than are class sizes. Except for the Netherlands, no country with a student-teacher ratio higher than 17 performed above average in math, although a ratio lower than 17 did not guarantee good performance either (based on an analysis of PISA 2015 data).

Very low student-teacher ratios have not improved student performance in Indonesia and Malaysia. In Indonesia since the early 2000s, the number of teachers for primary and secondary education grew faster than the number of students. As a result, the student-teacher ratio continued to decline in primary and senior-secondary schools. By 2010, the student-teacher ratio was 20 for primary and 12 for secondary schools. In Malaysia, the student-teacher ratio declined from 17.2 in 2004 to 11.5 in 2013 at the primary level and from 16.3 to 13.0 at the secondary level. The numbers in 2013 were significantly lower than the OECD average of 16.1 in 2011 at the primary level and 13.5 at the secondary level (World Bank 2013a).

These lower student-teacher ratios did not improve learning outcomes. In Indonesia, there is no correlation between the student-teacher ratio and learning for math or Bahasa Indonesia for schools with student-teacher ratios below 32 and only a slight correlation for schools with ratios above 32 (World Bank 2015b). In Malaysia, Trends in International Mathematics and Science Study (TIMSS) scores continued to decline between 1999 and 2011 for eighth-grade math, and they fell between 2003 and 2011 for eighth-grade science. PISA scores improved for all three subjects between 2012 and 2015, but Malaysia still lags countries at a similar level of economic development and the regional and OECD average by 1.5–2.2 years.

FIGURE 4.12 In about half the economies in the region, the school-age population has decreased since 2000 and is projected to decrease over the next two decades



Source: UN 2017.
Note: The figures for 2000–15 are estimates. The figures for 2015–35 are projections.

School infrastructure

Evidence from around the world shows that improving school infrastructure leads to better learning outcomes.[4] Reviewing 39 studies published between 1990 and 2012 (of which only 19 are of high quality), Cuesta, Glewwe, and Krause (2016) assess the extent to which school infrastructure affects educational outcomes and enrollment.[5] They find that school libraries and the creation of new schools lead to improved learning and enrollment. Toilets improve student learning, and laboratories and drinking water facilities increase enrollment. Having roofs, walls, and floors in good condition improves student learning. No other classroom-level variables have clear effects.

Woolner and others (2007, 60) review school environments in the United Kingdom. They find that "beyond the necessity of meeting basic standards, there is not enough evidence to give clear guidance to policy makers on how to set priorities for funding or to evaluate the relative value for money to different design initiatives."

Classrooms can become more effective if they are designed well. It is not necessary to invest massive resources (box 4.3).

East Asia and Pacific's Top Performing Systems generally provide school facilities efficiently by keeping them simple but functional. Japanese schools are built to ministry designs. They are functional but very plain, without many of the special features of schools in other high-income countries. There is no cafeteria, and students take their meals from a central kitchen to their classrooms. Students are also responsible for cleaning their classrooms. These practices keep spending on school construction and maintenance low. The savings can be spent on teachers and instruction that matter more for student learning (OECD 2011).

In Korea and in Taiwan, China, school buildings are also basic and built to accommodate large classes (Wong 2017). In Singapore, schools built in the 1970s typically had simple designs and standard features (Heng 2011); today the government invests heavily to improve schools' information and

FIGURE 4.13 Class sizes are larger in East Asia and Pacific than in most PISA-participating economies, but the student-teacher ratios are not higher

Source: PISA 2015 (OECD 2016d).
Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); OECD = Organisation for Economic Co-operation and Development; PISA = Programme for International Student Assessment.

BOX 4.3 Inexpensive, small changes in classrooms can make big differences in student performance

A study in the United Kingdom assessed three types of physical characteristics of classrooms: naturalness, individualization, and stimulation. Its results present clear evidence that well-designed and decorated primary schools boost children's academic performance in reading, writing, and math. Differences in the physical characteristics of classrooms explain 16 percent of the variation in learning progress over a year.

The design of individual classrooms is much more important than whole-school factors such as size, navigation routes, specialist facilities, and play facilities. The same school often includes a mix of more and less effective classrooms.

Teachers can readily improve many design elements. Small changes that cost little or nothing—such as changing the layout of the classroom, the displays, and the color of the walls—can make a real difference. To stimulate learning, the classroom should be neither chaotic nor boring but somewhere in between.

Source: Barrette and others 2015.

communication technology infrastructure for the future (Govtech Singapore 2017).

Lack of basic school facilities remains a challenge in the region, except among Top Performing Systems. Reasons for poor school conditions may include insufficient public spending on school infrastructure, limited access to water and electricity in rural areas, and difficult and costly construction conditions. Many schools in Indonesia

(World Bank 2009) and the Philippines (World Bank 2016) are overcrowded and do not meet basic standards for sanitation facilities, desks, and chairs. In Lao PDR, almost half of schools have leaky roofs. Only slightly more than half of schools have a water supply, only 20 percent have electricity, and fewer than half have toilets. Only 40 percent have telephone service (mostly provided through the principal's cell phone), and fewer than 3 percent have access to computers (Santibañez 2014). The inequality of resource allocation is much worse than in OECD countries. In Papua New Guinea, the rapid increase in capital spending on schools in recent years has resulted in a dramatic expansion of access to basic education, but it has not led to learning improvement (World Bank 2014b).

When access is still an issue, heavy investment in school facilities can improve educational attainment, performance, and wages. In 1973, the Indonesian government launched an unprecedented school construction program to boost primary enrollment, building more than 61,000 primary schools between 1973 and 1978. Duflo (2001) analyzes the impact of the program on educational attainment and wages. She finds that each new school built led to increases of 0.12–0.19 year of education, 1.5–2.7 percent of earnings, and 6.8–10.6 percent in economic returns to education. A study of Indonesia finds that the availability of at least one functioning toilet led to better student performance among girls (but not boys) (Suryadarma and others 2006).

Enhancing the equitable distribution of resources

Public resources should be distributed equitably, not only because equity has an intrinsic value but also because it helps countries to improve student performance. In Top Performing and Above-Average Performing Systems such as Korea, Singapore, and Vietnam, learning outcomes are consistently more equitable than in most other economies (figure 4.14). This section explores policies that Top Performing and Above-Average Performing Systems have adopted to promote the equitable distribution of resources to minimize gaps in learning outcomes.

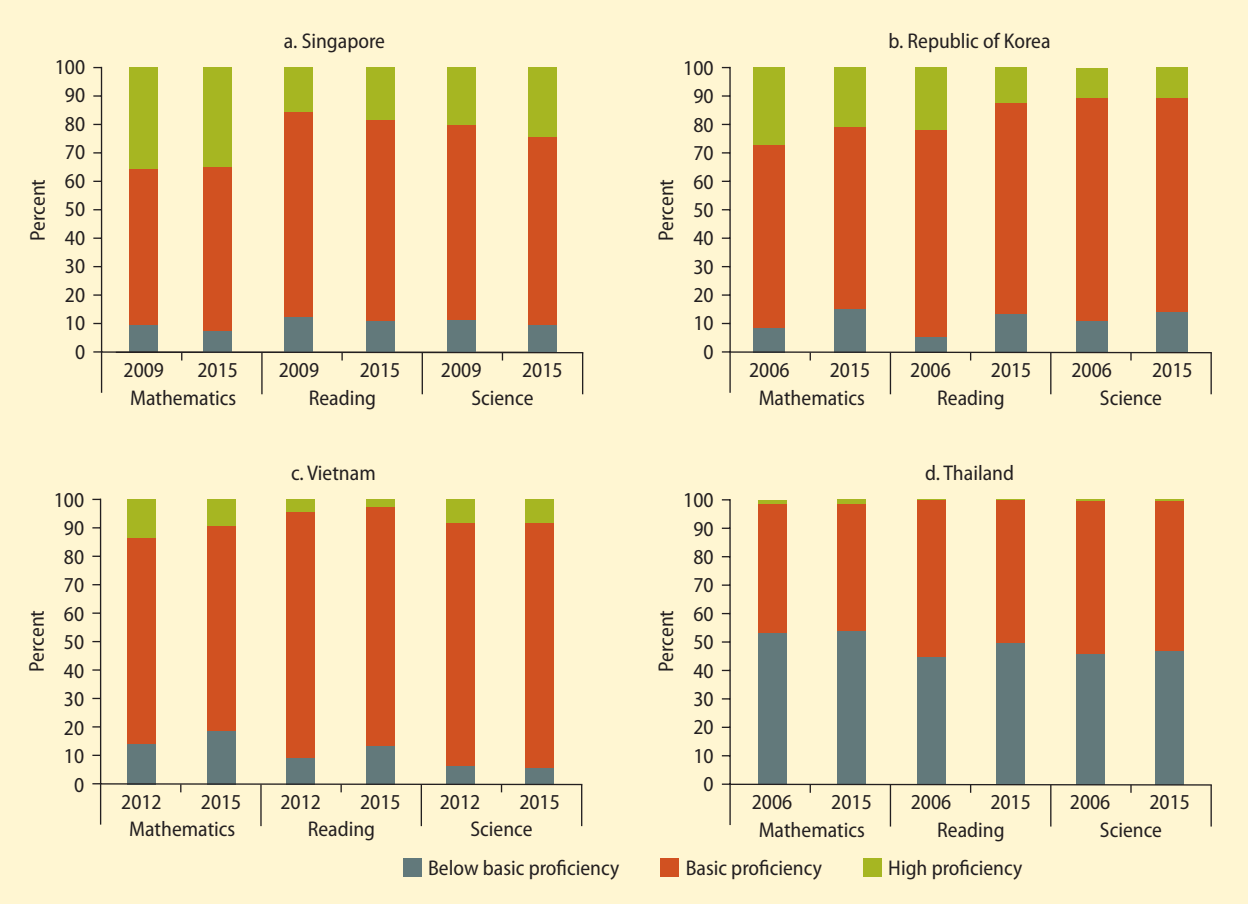
The role of the central government in ensuring equity

In East Asia and Pacific's Top Performing Systems, the central government plays a key role in equalizing education funding. In Japan, the government subsidizes prefectures (equivalent to states or provinces) in order to equalize public resources. For nine-year compulsory education, prefectures fund two-thirds of the cost of teacher salaries, and the central government subsidizes the rest. Disadvantaged schools have the same share of qualified teachers as advantaged schools and more teachers per student. At the upper-secondary level, students from low-income families are exempt from tuition fees for public schools, receive financial support to pay tuition fees for private schools, and gain scholarships to cover financial obligations other than tuition, such as school trips and textbooks (OECD 2015). In Singapore, the government provides merit-based scholarships and other financial assistance for all students as well as tuition subsidies for students from low- and middle-income families to attend independent schools (National Center on Education and the Economy, n.d.).

Vietnam allocates more per capita to geographically disadvantaged provinces and districts and pays teachers serving in disadvantaged areas higher salaries than teachers in cities, through various types of allowances.[6] In China, reducing inequalities in education is a government priority. The government has gradually integrated the compulsory education funding guarantee mechanism in rural areas. By 2010, 97 percent of the total educational investment in rural compulsory education came from the government budget (OECD 2016b).

Governments in Below-Average Performing and Emerging Systems could improve

FIGURE 4.14 Learning outcomes in the region's Top Performing and Above-Average Performing Systems are consistently more equitable than in other economies



Sources: PISA 2006, 2009, 2012, and 2015 (OECD 2006, 2009, 2014, and 2016d).
Note: Singapore started participating in the Programme for International Student Assessment (PISA) only in 2009; Vietnam began in 2012.

their funding measures to support disadvantaged areas and students, with a goal of equalizing learning outcomes. In Malaysia, the government has taken various steps to address inequities in the system, creating special programs for the indigenous population, offering support programs for poor students, upgrading and expanding educational facilities, and deploying more qualified teachers to rural areas. Performance gaps on national exams are evident across and within states, however (UNESCO 2015a). The Indonesian central government provides scholarships for the poor; it does not have central programs to equalize the distribution of teachers across the country (World Bank 2013b). In Thailand, the government allocates higher per student subsidies for small village schools, but their small size makes it difficult for these schools to provide a high-quality education (World Bank 2015c). In the Philippines, the national government does not allocate the education budget equitably across regions and provinces. Local government patterns of spending reinforce these differences, leading to wide differences in levels of per student spending and the quality of learning environment (World Bank 2016). In Myanmar, the government

provides a hardship allowance to incentivize teachers to work in remote areas (World Bank 2015a). But remote schools face challenges in retaining specialized teachers (Muta 2015). In 2012, Papua New Guinea abolished school fees in basic education and introduced subsidized fees for postbasic education in order to increase access. This policy increased enrollment in basic education, particularly for girls, reducing gender disparities (Papua New Guinea Department of Education 2016). The tuition-free policy does not take into account different needs across the country, however (UNESCO 2015b).

Increasing the role of private spending in increasing access

The government is the dominant financier of basic education, but many East Asia and Pacific economies promote private funding to increase access to secondary education and, to a lesser extent, primary education (see spotlight 3). For instance, the Chinese government promotes privately run schools by requiring the government at all levels to establish and improve the government subsidy system and to specify projects, targets, standards, and purposes of the subsidies (National People's Congress 2012). The share of Chinese elementary students enrolled in private schools rose from 2.9 percent in 2004 to 6.7 percent in 2015 (Simon 2015). Private enrollment at the secondary level increased to 10.1 percent by 2015.

Korea uses a lottery to assign students randomly to academic (not vocational) high schools. It applies the equalization policy not only to public schools but also to private schools, which account for about half of all high schools in the country (Park 2013).

In the Philippines, the government introduced the Educational Service Contracting (ESC) scheme in the 1980s, under which the government provides subsidies to private high schools (grades 7–10) to enroll primary education completers, in order to ease congestion in public high schools. The subsidies do not necessarily cover the full cost of education; ESC-awarded schools may charge top-up fees to students, raising equity concerns. To increase access to senior high school education (grades 11–12), the government also introduced a voucher program that provides qualified junior high school completers with government vouchers to enroll in private senior high schools.[7] The voucher amount reflects the cost of public provision, so that whether a student enrolls in a public or a private senior high school, the cost to the government is the same (Department of Education of the Philippines 2016).

In Indonesia, private schooling continues to account for about 40 percent of secondary school enrollments. Although government-dependent private schools are underfunded, with a high proportion of uncertified, underpaid teachers, demand remains high because of their focus on religious training and education and their ability to increase educational access for low-income families (Stern and Smith 2015).

Governments of East Asia and Pacific's Top Performing Systems have also mobilized private spending to increase the overall preschool enrollment and to narrow the gaps between the poor and the rich. As discussed in chapter 6, the economic value of early childhood development programs is often highest for the most disadvantaged children. Investment in their early years therefore improves both equity and efficiency (Heckman and Masterov 2007). However, across the world, except in South Asia, children from the richest households are at least twice as likely—and in some regions three times as likely—as children from the poorest households to be enrolled in preprimary school (Neuman and Devercelli 2013).

Most economies in East Asia and Pacific allocate a small proportion of GDP to preprimary education. On average, OECD economies spent 0.61 percent of GDP on preprimary education in 2013. Japan spent 0.24 percent and Korea spent 0.39 percent. In East Asia and Pacific, only Mongolia and Vietnam spent more than the OECD average (table 4.3).

When only government spending is considered, this figure came down to 0.10 percent for Japan and 0.18 percent for Korea compared with the OECD average of 0.54 percent. In these two countries, more than half of spending on preprimary education comes from private sources. Despite the low level of public spending and high level of private spending, preprimary education enrollments for Japan and Korea are among the highest in the OECD, at nearly 100 percent (OECD 2016a).[8] In contrast, enrollment rates vary widely between the poor and rich in Below-Average Performing Systems and Emerging Systems, where private funding for preschool education is limited. In Indonesia, for instance, the enrollment rate for four- to six-year-olds was 51 percent among the poorest quintile and 71 percent among the richest quintile in 2016. In the Philippines, increased government spending on school infrastructure and key inputs raised the kindergarten enrollment rate among the poorest 20 percent the most—from 33 percent in 2008 to 63 percent by 2013 (World Bank 2016).

TABLE 4.3 Most East Asian countries spend only a small share of GDP on preprimary education

Country	Total spending as % of GDP	Government spending as % of GDP
Philippines	—	0.04
Indonesia	0.06	0.06
Malaysia	—	0.08
Japan	0.24	0.10
Korea, Rep.	0.39	0.18
Thailand	—	0.22
OECD average	**0.61**	**0.54**
Vietnam	—	0.62
Mongolia	—	1.09

Sources: OECD 2016a for total spending; World Bank EdStats (World Bank, various years) for government spending.
Note: Figures are for 2011–14, except for the Philippines (2009).
GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development. — = not available.

Pros and cons of private tutoring

Spending on private tutoring in primary and secondary education has been growing rapidly across the world (box 4.4). This increase is a concern because the proportion of students who use private tutors is higher among wealthier students than among

BOX 4.4 Spending on private tutoring is on the rise

Spending on private tutoring is considerable and increasing in East Asia and Pacific. More than half of the 15-year-olds in East Asia and Pacific and the Middle East and North Africa who participated in the 2012 PISA took at least one hour a week of private tutoring (table B4.4.1). These shares are more than twice the share in the European Union. In some countries, spending by households on private tutoring now rivals public sector education expenditures.

Japan has been a pioneer in private tutoring. In 2010, families spent US$12 billion (0.2 percent of GDP) on private tutoring. In the Republic of Korea, families spent US$20 billion or about 1.5 percent

TABLE B4.4.1 Use of private tutoring is high across the world

Region	% of 15-year-olds taking private tutoring
Middle East and North Africa	58.3
East Asia and Pacific	54.5
Europe and Central Asia	43.5
Latin America and the Caribbean	41.9
European Union	24.1
Others	23.2

Source: Data from PISA 2012 (OECD 2012b).

box continues next page

BOX 4.4 Spending on private tutoring is on the rise *(continued)*

TABLE B4.4.2 Effect of one additional hour of private tutoring on PISA math scores in select economies in East Asia and Pacific

Economy	Effect
Indonesia	0.042
	(1.118)
Japan	0.425
	(1.296)
China	0.675
	(0.986)
Korea, Rep.	2.064***
	(0.631)
Macao SAR, China	2.236**
	(0.978)
Thailand	3.487***
	(0.621)
Singapore	3.644**
	(1.612)
Taiwan, China	3.841***
	(1.268)
Vietnam	3.921***
	(0.477)
Hong Kong SAR, China	3.954***
	(1.511)
Malaysia	7.319***
	(0.989)

Source: Data from PISA 2012 (OECD 2012b).
Note: The following control variables are included in the regressions. *Student characteristics*: age; gender (1 = male); grade; and index of economic, social, and cultural status. *School resources*: school average of the index of economic, social, and cultural status; regime school (proportion of funds from public sources); rural school (1 = rural); proportion of certified teachers; teaching practices (teacher-directed instruction); disciplinary climate in the classroom; student-teacher ratio; school autonomy in curriculum; and school autonomy in resource allocation. *Student motivations:* index of sense of belonging at school, students who strongly agree that trying hard at school will help them to get into a good college (1 = strongly agree), and students who strongly agree that trying hard at school will help them to get a good job (1 = strongly agree). *Parental engagement:* parental pressure at school for achievement. Standard errors are in parentheses.
***$p < 0.01$, **$p < 0.05$.

of GDP on private tutoring in 2012; these expenses account for 12 percent of household spending. Some 80 percent of elementary, 69 percent of middle school, and 50 percent of high school students used private tutors in 2014.

Even in Singapore, where the state generously funds education, parents spent 1.2 percent of GDP on education services in 2013, one-third of which was spent on private tuition and other educational courses. The proportion of household spending on preprimary and general education relative to public spending is very high in Vietnam as well.

The impact of private tutoring on academic achievement is mixed. Outcomes depend on the grade level; the type and duration of provision and delivery modes; specific national and local circumstances; definitions of achievement; and probably most important, the motivation, attitudes, and learning styles of learners as well as the motivation, attitudes, and teaching styles of tutors.

An additional tutoring hour at a commercial company is significantly correlated with higher PISA scores in 8 of the 11 economies analyzed (Hong Kong SAR, China; Korea; Macao SAR, China; Malaysia; Singapore; Taiwan, China; Thailand; and Vietnam) (table B4.4.2). The results are less evident for tutoring with a personal tutor. In contrast, there is no significant impact of an additional hour studying at a commercial company or with a private tutor in most Western European countries (one exception is Spain) or the United States. These outcomes may suggest that in East Asia and Pacific economies, private tutoring is increasing because it is effective and because students and parents tend to value extracurricular classes more than school education.

Source: Bray and Lykins 2012.

poorer students (figure 4.15). In Vietnam, for instance, over 60 percent of children from poorer households use private tutors, compared to close to 90 percent of children from better-off households.

Tutoring is also a concern because it may be an outcome of badly functioning school systems and poor teacher governance. In Cambodia, teacher salaries are low and often paid late, pushing teachers to provide private tutoring for additional income.

Prohibiting private tutoring is likely to be ineffective; Cambodia, Korea, Myanmar, and other countries tried and failed to do so (Bray and Lykins 2012). Private tutoring is likely to continue to expand in

many countries. Therefore, governments should focus on regulating it better and ensuring that it does not displace classroom teaching (UNESCO 2014).

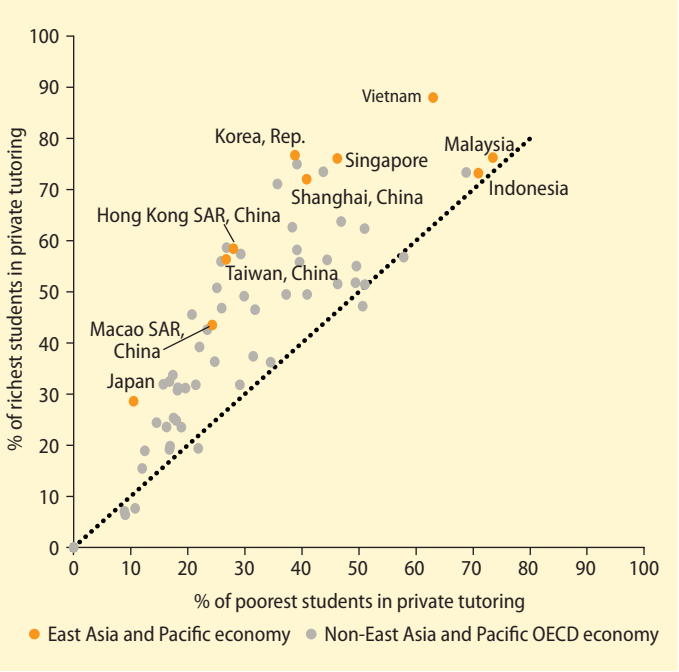
Private tutoring tends to have a greater impact on the academic performance of poor students than on the performance of rich students. The difference is statistically significant only in China and Singapore for personal tutors and in China, Singapore, and Taiwan, China for commercial companies, however (analysis based on data from OECD 2013).

As an alternative to private tutoring, governments of East Asia and Pacific's Top Performing Systems provide funding to schools and parents to support extracurricular activities to mitigate widening gaps in student performance. In Singapore, the Edusave Scheme provides Ministry of Education–funded schools (government and government-aided schools and government-funded independent and special education schools) with resources for school enrichment activities to support students' holistic development and encourage students to excel in both academic and nonacademic areas. The government also provides financial assistance to needy students in government and government-aided schools and institutes of higher learning so that all Singaporeans, regardless of their income level, can benefit from the best opportunities in education. It also provides a subsidy for school fees to students from lower- and middle-income families in independent schools.[9]

In Korea, where 77 percent of students in primary and secondary schools have private tutors, the government provides additional public resources to schools to offer extra instruction after school and financial support to poor parents to make private tutors more affordable (OECD 2012a).

In Japan, the central and local governments provide subsidies to students with financial needs, students with disabilities, and students living in remote areas. It also provides teachers with ample time for work other than teaching. Teachers use nonteaching time on activities that support weaker students and help to build social capital. Japan can afford these activities because it keeps overall education spending relatively low by maintaining comparatively large class sizes (OECD 2012c). The effectiveness of these practices is consistent with the finding that "high-dosage tutoring" is one of the key factors contributing to high academic performance among charter schools in New York (Fryer and Dobbie 2013).

FIGURE 4.15 In almost all economies, wealthier students are more likely than poorer students to use private tutors



Source: PISA 2012 (OECD 2012b).
Note: OECD = Organisation for Economic Co-operation and Development.

Conclusions and recommendations

East Asia and Pacific's Top Performing and Above-Average Performing Systems adopted three principles for effective education spending:

- Prioritize public spending on basic education
- Manage essential inputs efficiently
- Enhance the equitable distribution of resources.

Policy makers in other economies in the region and beyond may wish to consider adopting these principles to improve the effectiveness with which they spend public resources (table 4.4).

Principle 1: Prioritize public spending on basic education

Top Performing and Above-Average Performing Systems in East Asia and Pacific sequenced investments from basic to tertiary education. During their early economic growth period, they prioritized government investment in lower levels of education to build a strong human capital foundation. Even after they began increasing investment in tertiary education, they continued increasing per student spending at the lower levels of education to enhance its quality. Even in Japan and Korea, where private spending on education is substantial, primary and lower-secondary (and to a lesser extent upper-secondary) education is mainly publicly funded.

Below-Average Performing Systems and Emerging Systems have not sequenced the focus of their spending from primary to tertiary education, and they have not prioritized investment in lower levels of education. Countries such as Indonesia, Lao PDR, Malaysia, and the Philippines could consider reallocating public resources to lower levels of education; per student spending on tertiary education in these countries seems too high relative to spending on lower levels of education. Other Emerging Systems have focused on investing in basic education. They should continue doing so to establish strong basic education systems.

Principle 2: Manage essential inputs efficiently

Top Performing and Above-Average Performing Systems in East Asia and Pacific manage two essential inputs efficiently: teachers and school infrastructure. They offer competitive salaries and benefits to attract and retain qualified teachers, but higher salaries and more teachers do not lead to higher student performance in many East Asia and Pacific countries. They keep schools simple but functional. In countries where access to primary and secondary education is still an issue, large-scale investment in school facilities has resulted in improving educational attainment and student performance.

Policy makers in Below-Average Performing Systems and Emerging Systems should review their teacher compensation and career development policies holistically to attract and retain qualified teachers. They should also prioritize simple but functional school buildings and basic school facilities to meet increasing demand for access. Such capital investment will have to be accompanied by other reforms, including training and balanced deployment of teachers, timely provision of textbooks, and curriculum development.

Principle 3: Enhance the equitable distribution of resources

Top Performing and Above-Average Performing Systems not only perform well, but they also achieve consistently more equitable learning outcomes than most other systems. The central government plays a key role in equalizing education funding across the country. At the same time, although the government is still the dominant financier for basic education, many countries, including China, Indonesia, Korea, and the Philippines, have promoted private funding to increase access and narrow gaps between the poor and rich. Ever-increasing private tutoring is a concern for widening inequity in student performance, but it can support disadvantaged students. As an alternative to private tutoring, governments of Top Performing Systems in East Asia and Pacific provide funding to schools and parents to support extracurricular activities and to mitigate widening gaps in student performance.

Where equity in access to good-quality education is an issue, governments should consider not only increasing scholarships for disadvantaged students and schools but also mobilizing the private sector by

TABLE 4.4 Steps toward achieving more effective spending of public resources on education

	Action			
Policy	**Emerging Systems**	**Below-Average Performing Systems**	**Above-Average Performing Systems**	**Top Performing Systems**
Public spending	Prioritize public spending on basic education and ensure high completion of primary and lower-secondary school. Increase starting teacher salaries to attract qualified teachers. Build simple but functional school facilities to increase access to basic education. Provide funding to support disadvantaged students in accessing basic education.	Continue investing in basic education to ensure high completion while expanding access to upper-secondary school and above. Strengthen teacher compensation policies to encourage good performance and retain qualified teachers. Build simple but functional school facilities to ensure access to basic education and increase access to preprimary and upper-secondary education. Help disadvantaged students to access basic education; consider mobilizing the private sector to increase access to preprimary and upper-secondary education.	Continue investing in basic and upper-secondary education while diversifying funding for vocational, technical, and tertiary education. Strengthen teacher career development policies and nonfinancial benefits for teachers to continue improving their quality. Provide remedial measures such as extracurricular activities to enhance learning of disadvantaged students.	

creating a conducive environment for private investment.

This chapter explores the effectiveness of education financing among East Asia and Pacific's high-performing systems and identifies the principles for effective spending commonly observed in those countries. Analysis in other countries requires better student assessment data.

Notes

1. Calculations are based on data from the Singapore government (https://data.gov.sg/).
2. The shares ranged from 85 percent (Japan) to 98 percent (Hungary) in primary education; from 86 percent (Estonia) to 98 percent (Austria, Belgium, Hungary, Italy, and the United Kingdom) in secondary education; and from 74 percent (Luxembourg) to 97 percent (Argentina, Denmark, Finland, and Sweden) in tertiary education.
3. The data are not shown in figure 4.9 because the source and definition for Vietnam are different.
4. School infrastructure includes classroom-level infrastructure and other classroom characteristics (natural light, temperature, acoustics) as well as school-level infrastructure, which includes school utilities (availability of electricity, potable water, and the condition of the building) and other features of the school (library, computer lab, science labs).
5. This study is an update of Glewwe and others (2011).
6. World Bank (2017b) discusses some caveats in implementation of the formula. Chingos and Blagg (2017) describe implementation challenges of formula funding in the United States, where many states that have progressive funding formulas on paper do not achieve equity in practice, partly because it is difficult to segregate and target students by income.

7. Department of Education of the Philippines (2017a, 2017b). The Senior High School Voucher Program subsidizes senior high school students enrolled in non–Department of Education senior high schools, including private high schools, private colleges and universities, local universities and colleges, state universities and colleges, and technical and vocational institutions.
8. See chapter 6 for a more detailed discussion of how Japan, Korea, and Singapore mobilized the private sector for preprimary education.
9. For the Edusave Scheme, see https://www.moe.gov.sg/education/edusave; for the Financial Assistance Scheme, see https://www.moe.gov.sg/education/financial-assistance.

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SPOTLIGHT 3

How Have Governments Used Public-Private Partnerships to Improve Education Outcomes?

Economies in the East Asia and Pacific region have embraced public-private partnerships in education and used them to varying degrees (box S3.1). Private provision has increased in recent years in many countries in the region, especially in preprimary education, where 54 percent of preprimary students were enrolled in private institutions in 2014 (World Bank, various years). Although the public sector remains the principal provider of primary and secondary education in most of the region, the number of primary and secondary students enrolled in private institutions is growing (table S3.1). This spotlight provides examples of how economies—especially those in East Asia and Pacific—have used public-private partnerships to improve their education systems.

Does private enrollment increase access?

The role of private enrollment in increasing access differs at different levels of education. East Asia and Pacific's high-performing systems except Vietnam rely heavily on the private sector to enroll preprimary education and keep enrollment rates high (figure S3.1). Gross preprimary enrollment rates are relatively high in Malaysia and Vietnam, despite only modest private enrollment (lower-right quadrant). In contrast, preprimary enrollment rates remain low in many Below-Average Performing Systems (upper- and lower-left quadrants). In Indonesia, for instance, almost all preprimary students are enrolled in private schools, and the gross enrollment rate is below 60 percent. In Cambodia, the Lao People's Democratic Republic, and Timor-Leste, both private enrollment and total enrollment are low. These data suggest that the private sector helps to increase preprimary enrollments, but that it alone cannot guarantee access for all, particularly in lower-income countries. The Korean case illustrates the importance of public investment at least at an initial stage. The rapid growth of public kindergartens in 1982 contributed to the rapid growth of enrollment in the 1980s (figure S3.2) (Kim and Na 2003).

Figure S3.3 presents the relationship between the size of private enrollment and gross enrollment rate at the primary, lower-secondary, and upper-secondary levels.

BOX S3.1 What are public-private partnerships in education?

The concept of a public-private partnership recognizes the existence of options for providing education services other than public finance and public delivery. Governments may guide and finance the private sector to deliver education services through different types of contracts and with different objectives. Public-private partnerships in education have four main objectives: increasing enrollment (access), improving education outcomes, reducing inequality, and reducing costs.

The provision of education services can range from the construction, management, or maintenance of infrastructure (often referred to as a private finance initiative) to the provision of education services and operations. Contracts for education-related services can cover a range of services and inputs, including the private management of public schools; subsidies and vouchers; private finance initiatives for school construction and maintenance; and professional services such as teacher training, curriculum design, and textbook provision (table SB3.1.1). Each type of contract has different expected effects on the four objectives. For instance, vouchers and subsidies are expected to have strong effects on increasing enrollment, whereas private finance initiatives are expected to reduce costs.

The World Bank's Systems Approach for Better Education Results-Engaging the Private Sector (SABER-EPS) aims to help countries to engage the private sector more effectively in promoting equitable learning for all. SABER-EPS assesses how well a country's policies are oriented toward ensuring that the services of nonstate providers promote learning for all with regard to four policy goals: encouraging innovation by providers; holding schools accountable; empowering all parents, students, and communities; and promoting diversity of supply (see World Bank 2014 for details).

Source: Patrinos, Barrera-Osorio, and Guáqueta 2009.

TABLE SB3.1.1 Public-private partnerships in education

What governments contract for	What governments buy
Management, professional, support services (input)	• School management (financial and human resources management) • Support services (meals and transportation) • Professional services (teacher training, curriculum design, textbook delivery, quality assurance, and supplemental services)
Operational services (process)	• Education of students, financial and human resources management, professional services, and building maintenance
Education services (outputs)	• Student places in private schools
Facility availability (inputs)	• Infrastructure and building maintenance
Facility availability and education services (both inputs and outputs)	• Infrastructure combined with services (operational or educational outputs)

Source: Patrinos, Barrera-Osorio, and Guáqueta 2009.

TABLE S3.1 The share of private enrollment has changed over the last two decades, 1990–2014
Percent

	Preprimary			Primary			Secondary	
Economy	1990	2000	2014	1990	2000	2014	2000	2014
Myanmar	—	—	82.1	—	—	0.2	—	1.3
Vietnam	—	51.1	11.8	—	0.3	0.6	—	—
Japan	77.4	65.3	72.7	0.7	0.9	1.2	18.4	19.7
Korea, Rep.	64.6	—	80.5	1.4	1.5	1.6	39.6	31.0
Finland	—	9.8	8.5	0.9	1.1	1.7	7.8	14.2
Cambodia	—	22.5	13.4	—	1.6	2.6	0.5	—
Lao PDR	—	16.6	21.1	—	2.0	4.5	0.9	3.0

table continues next page

TABLE S3.1 The share of private enrollment has changed over the last two decades, 1990–2014 *(continued)*
Percent

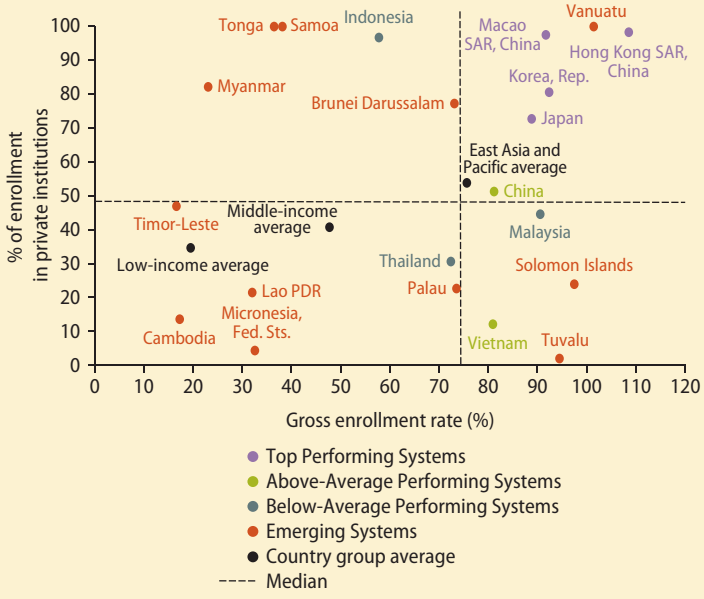
	Preprimary			Primary			Secondary	
Economy	**1990**	**2000**	**2014**	**1990**	**2000**	**2014**	**2000**	**2014**
Poland	0.0	3.9	19.8	—	—	4.5	—	11.2
Mongolia	—	3.7	7.1	—	0.9	5.7	0.3	—
Philippines	53.0	48.5	—	6.6	7.2	8.3	—	19.4
East Asia and Pacific average	**17.2**	**30.4**	**53.7**	**3.6**	**4.4**	**8.7**	**—**	**17.1**
Upper-middle-income average	**8.0**	**17.0**	**36.6**	**3.1**	**4.5**	**9.2**	**8.5**	**10.8**
OECD average	**31.7**	**31.9**	**36.8**	**8.8**	**9.5**	**10.0**	**14.5**	**17.5**
Timor-Leste	—	—	46.8	—	—	12.9	—	23.3
Low-income average	**31.5**	**38.1**	**34.5**	**13.3**	**14.0**	**13.9**	**19.7**	**18.7**
Malaysia	59.9	48.1	44.5	0.3	—	13.9	5.8	13.4
United Kingdom	6.0	6.0	45.2	4.8	4.7	14.0	26.0	69.5
Denmark	9.0	—	17.4	9.7	10.8	15.3	11.5	13.3
Indonesia	99.6	99.2	96.8	17.5	15.7	18.4	—	43.4
Colombia	—	40.8	28.0	15.2	18.7	18.7	30.1	20.3
Middle-income average	**18.2**	**25.8**	**40.6**	**8.3**	**9.6**	**18.7**	**20.1**	**27.2**
Hong Kong SAR, China	100.0	—	99.0	9.6	—	18.9	—	18.0
Thailand	23.7	—	30.4	9.5	13.1	20.0	—	11.0
Brunei Darussalam	—	61.5	77.2	—	35.1	39.2	10.7	16.8
Chile	47.7	—	67.2	—	—	61.5	—	61.0
Macao SAR, China	—	91.7	97.5	—	94.2	97.7	93.4	95.7

Source: World Bank EdStats (World Bank, various years).
Note: Countries are ordered according to the percentage of primary school enrollment in private schools in 2014. Data for 2014 include latest data since 2011.
— = not available; OECD = Organisation for Economic Co-operation and Development.

It suggests that the role of private provision in increasing access is not important at the primary level but is important at the upper-secondary level and, to a less extent, the lower-secondary level.

In Thailand, the National Education Act obligated the state to provide general subsidies for basic 12-year education, whether it is provided by the state or by private institutions (Australian Education International 2013). Private schools providing basic education can qualify for state-subsidized loans to build new school buildings or renovate old ones. The government also has a revolving fund for private schools, which offers loans at 4 percent interest with a repayment period of 10–15 years to schools that can provide collateral (Patrinos, Barrera-Osorio, and Guáqueta 2009). Private education has played an important role in delivering basic as well as other levels of education. It also has contributed to reducing public spending on education (Pinyakong, Virasilp, and Somboon 2007).

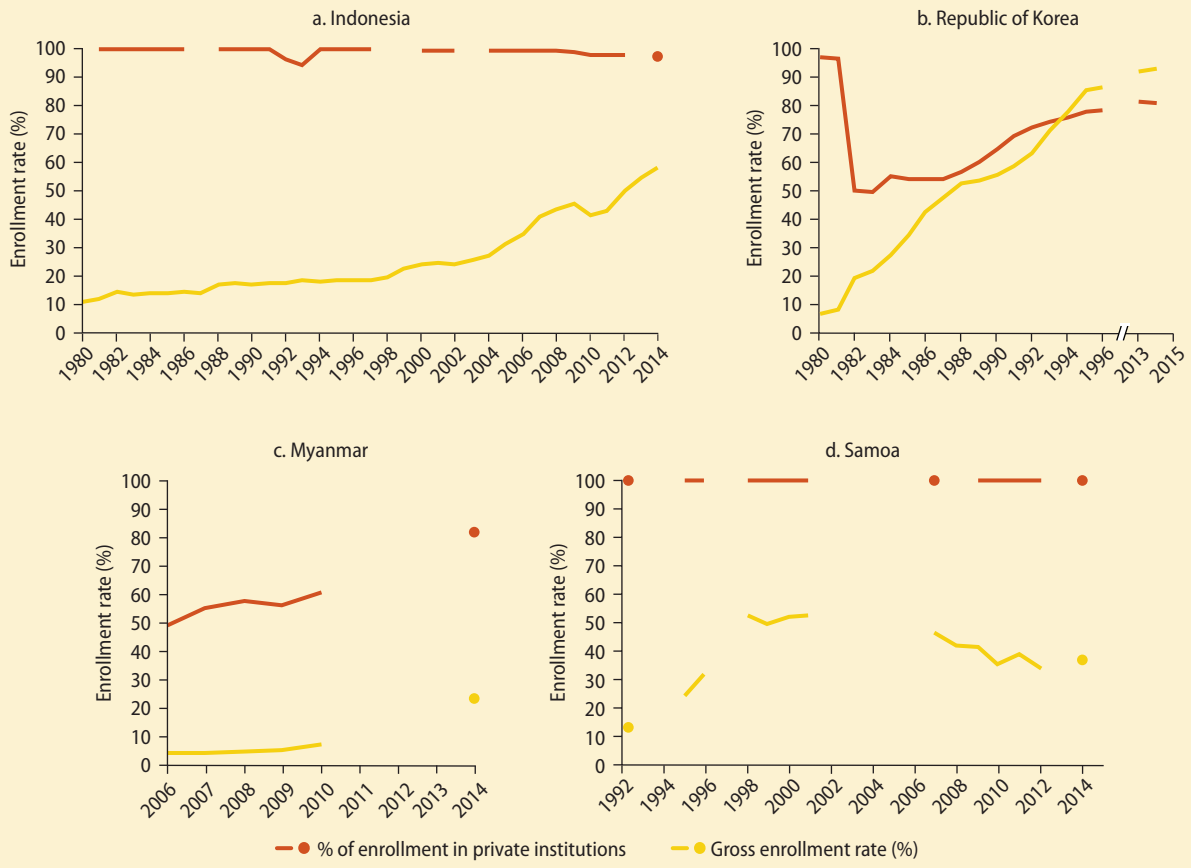
FIGURE S3.1 There is little correlation in East Asia and Pacific between the share of private enrollment and the gross enrollment rate for preprimary education



Source: World Bank EdStats (World Bank, various years).
Note: Gross enrollment rate can exceed 100 percent due to over- and underage students.

SPOTLIGHT 3

FIGURE S3.2 The private sector helped to increase preprimary enrollments, but it alone cannot guarantee access, particularly in lower-income countries



Source: World Bank EdStats (World Bank, various years).

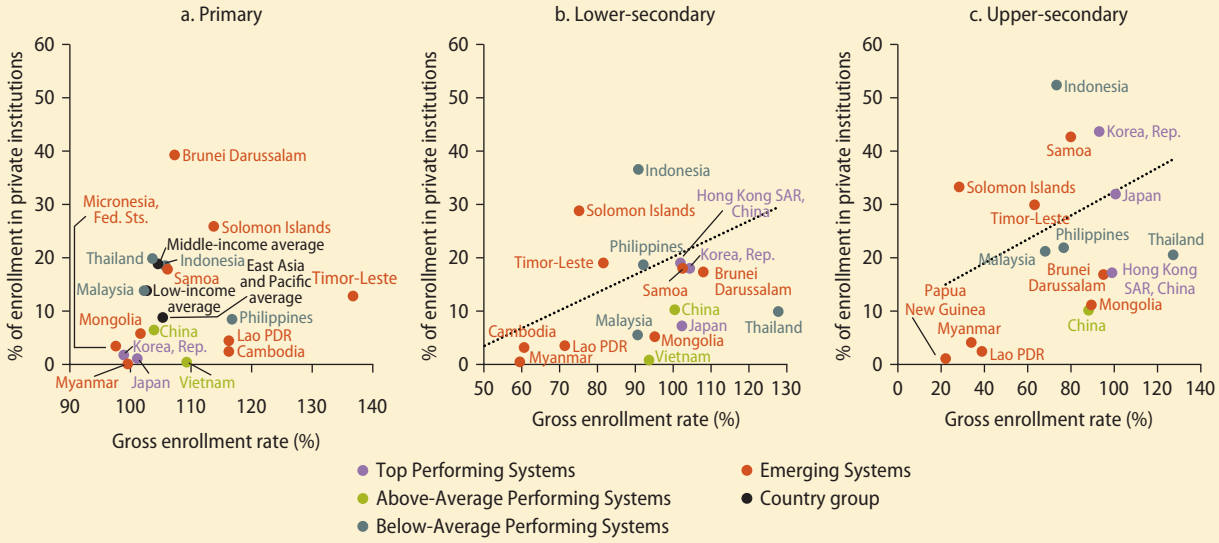
Does private provision of education improve learning outcomes?

The evidence is mixed on the effect of private provision of education on learning outcomes in East Asia and Pacific. These results contrast with the positive correlation observed across the world (Patrinos, Barrera-Osorio, and Guáqueta 2009).

A study of Indonesia finds that graduates of public schools score higher on the national exit exam than graduates of private schools, controlling for a wide variety of student characteristics and family background (Hendajany 2016). An Organisation for Economic Co-operation and Development (OECD) study finds that private school students in Indonesia significantly underperformed public school students on the Programme for International Student Assessment (PISA) 2000, although the difference was negligible after controlling for student and school characteristics (OECD 2005).[1]

Mixed outcomes are observed in the Republic of Korea. One study finds that students in private foreign language high schools outperformed students in general private and public high schools on the College Scholastic Aptitude Test of Korean, English, and mathematics (Kim 2012). After controlling for prior achievement, the achievement gap decreased significantly in English and Korean scores, although it held up in math scores.

FIGURE S3.3 Private enrollment is not correlated with access at the primary level, but it is correlated at the upper-secondary and, to a less extent, lower-secondary levels



Source: World Bank EdStats (World Bank, various years).
Note: For most countries, data are for 2014 or the closest year. Private provision in Macao SAR, China, is almost 100 percent. It is omitted from the graph because including it would have made it difficult to display the other data. Gross enrollment rate can exceed 100 percent due to over- and underage students.

Private high school students scored higher than public high school students in Korean even after controlling for student-school backgrounds and prior achievement; their scores were not higher in English or math.

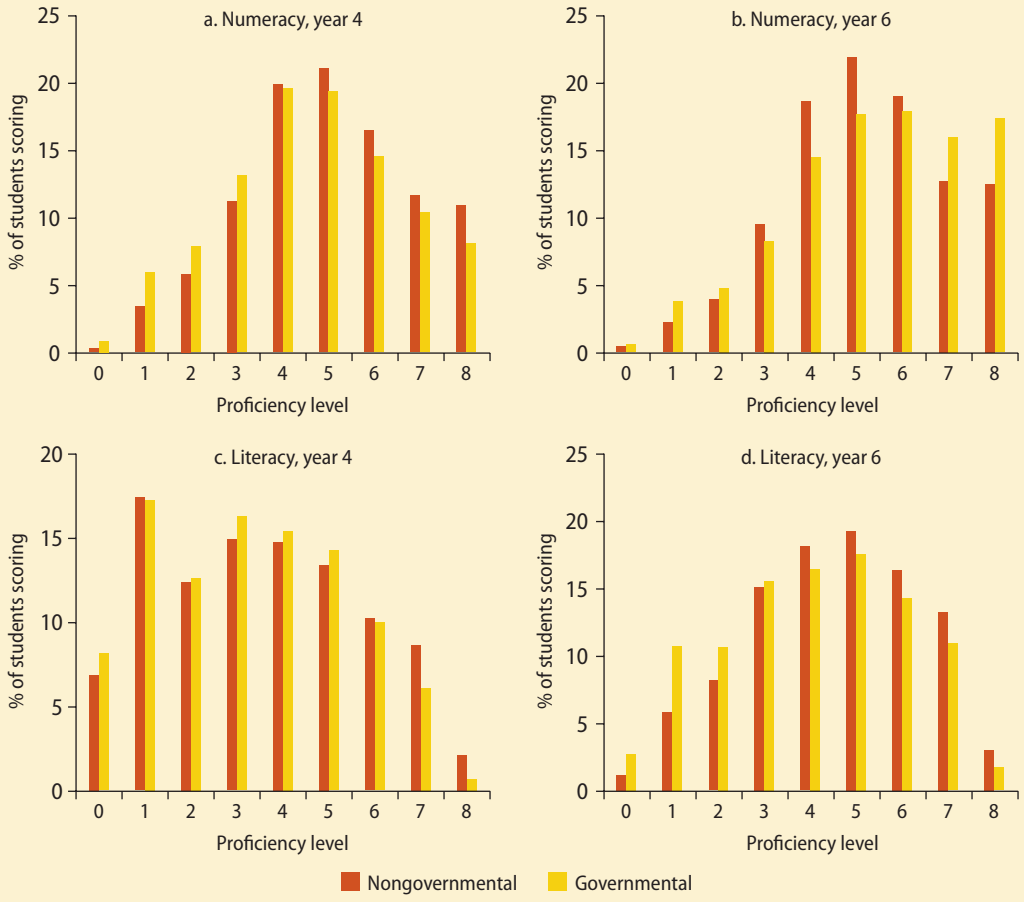
For lower grades, the results of the 2015 Pacific Islands Literacy and Numeracy Assessment (PILNA)—which measures literacy and numeracy skills of students who have completed four and six years of formal primary education in 13 countries in the Pacific—present mixed results as well (figure S3.4). In the year 4 numeracy assessment, students in nongovernment schools performed better than students in government schools (fewer low scores and more high scores), but this difference was reversed in the top two highest proficiency levels in year 6. On both the year 4 and year 6 literacy assessment, students in nongovernment schools had slightly higher mean performance in literacy than students in government schools across all proficiency levels.

Do public-private partnerships in education reduce inequity?

Public funding for privately managed schools may have helped to reduce inequity in East Asia and Pacific's Top Performing Systems. Korea has used private schools to address between-school differences in overall levels of student ability and the quality of high school education by randomly assigning students to general high schools, including both public and private schools. Private schools are not allowed to charge tuition fees; the government subsidizes 95 percent of their costs. Analysis of the effect of random assignments on academic achievement shows that, in areas where students were randomly assigned, school effects explain only 0.5 percent of the observed variation in academic achievement. By contrast, in areas where students were not randomly assigned, school effects account for more than 30 percent of the variation in test scores (Bastos, Cristia, and Kim 2016).

SPOTLIGHT 3

FIGURE S3.4 Regional assessments in the Pacific show an unclear impact of the school authority (governmental, nongovernmental) on students' numeracy and literacy proficiency



Source: Adapted from EQAP 2015.

Analysis of PISA scores also suggests that countries with higher levels of public funding for privately managed schools tend to have less socioeconomic stratification.[2] Japan and Korea are among the countries with low stratification.

The Philippines uses targeted vouchers to help to increase access for disadvantaged students. It has one of the largest public-private partnership programs in education in the world. More than 567,500 students—almost 9 percent of the country's 6.5 million high school students—received vouchers in 2009 (Jimenez and others 2011). The program—the Education Service Contracting Program—aims to increase access to good-quality basic education at the secondary level by extending financial assistance from the public budget that allows "poor but deserving" elementary school graduates to attend private high schools that have contracts with the government (Jimenez and others 2011). The program has faced many shortcomings in relation to equity, as grantees have tended to come from relatively well-off households, because poorer households are unable to pay

even the difference between the subsidy and the fees that schools charge. The contract does not specify performance criteria for participating private schools, such as targeting students most in need or requiring minimum student achievement to ensure the continuation of their public funding (Aslam, Rawal, and Saeed 2017; Jimenez and others 2011).

What can governments do to promote public-private partnerships that lead to positive outcomes?

Evidence on the impact of public-private partnerships is still limited in East Asia and Pacific, but country experiences yield some lessons:

- Private provision and financing of education can help to increase access where public resources are limited. In particular, in Below-Average Performing Systems and Emerging Systems, where access to preprimary education is very limited, promoting public-private partnerships, with or without public subsidies, is likely to increase enrollment at that level. Private provision and financing are likely to help to increase enrollment in upper-secondary education.
- Impacts on learning outcomes in private schools are mixed. Incentives for improved learning outcomes, government monitoring of outcomes, and both financial and technical support for private schools are essential to produce positive outcomes.
- For vouchers and subsidies to help to reduce inequity, targeting mechanisms need to be well designed. Poorly targeted subsidies may actually widen inequity.

Notes

1. Private schools include independent and government-dependent private schools. The OECD defines independent private schools as schools that receive at least half of their funds from private sources; government-dependent private schools receive half or more of their core funding from government agencies.
2. OECD (2012) defines stratification as the difference in socioeconomic background between students in privately and publicly managed schools, as measured by the PISA index of economic, social, and cultural status. Japan and Korea were among the countries with low stratification, with privately managed schools receiving 38–50 percent of their budgets from public resources.

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Developing Skilled Teachers and Supporting Effective Teaching

5

Teachers are a core element of East Asia and Pacific's Top Performing Systems. These systems have established competent, qualified, and motivated teaching forces that promote sustained learning. Elsewhere in the region, teacher reform has produced only mixed results. Lessons can be learned from both types of experiences.

In East Asia and Pacific's Top Performing Systems, policies focus on the principle that good teachers are made, not born. Policy makers consider effective teaching a process that requires extensive training and practice, a mentality of continual learning, and a tactic of constant refinement to hone the craft of teaching. These systems tend to be thoughtfully designed and continually enhanced through an evolutionary process that develops and supports teachers throughout the teaching life cycle and provides them with the tools and environment to be effective.

Teachers in Top Performing Systems benefit from coherent systems of recruitment, development, and support that make their jobs easier and promote effective teaching. These systems begin by attracting top candidates into teaching, filtering for quality, and providing an excellent induction into the profession. They have a history of preservice institutions with initial quality control, clear goals, and reform in incremental steps. They also provide comprehensive support that increases equity, enables teachers to develop professionally, provides the space and resources they need to do so, and motivates them to be effective.

Beyond direct support, the systems provide strong auxiliary elements aligned in ways that make the teacher's job easier. These elements include clear learning objectives and standards; well-aligned curricula that tend to focus on a few topics; textbooks that are uncluttered and focused on learning goals; more time for teachers to prepare lessons and engage in professional development activities; and efficient assessment systems.

A foundational aspect of the approach to professional development is the mentality of constant improvement, exemplified by an emphasis on in-service training. In many Western systems, teacher development often stagnates after a burst of improvement in the initial years. In East Asia and Pacific's Top Performing Systems, the mind-set is one of continuous improvement.

Japan's "lesson study" is the epitome of this approach, which has proliferated in many East Asian systems. Lesson study brings together teachers of different levels of skills

and experience to discuss techniques and formulate sample teaching plans. The Top Performing and Above-Average Performing Systems also foster extensive collaboration, with networks and learning communities of teachers. Policies encourage collaboration, providing space for teachers to work together and to support one another.

Another feature of high-performing systems is that teaching is viewed as an "open-door" profession. Hong Kong SAR, China; Japan; the Republic of Korea; Shanghai, China; and Singapore have a culture and accompanying policies that encourage observation and critiquing of classroom practices (see, for example, Choy 1996; Doig and Groves 2011; *Economist* 2016; Liang, Kidwai, and Zhang 2016).

The practices and aspects of high-performing classrooms offer important lessons regarding teaching effectiveness. Good teachers take a focused learning outcome–oriented approach, through a combination of meticulous preparation and purposeful execution. Before even entering the classroom, good teachers have clear, concise learning goals and sequential steps that are heavily focused on ensuring that students understand by elaborating and directing them to underlying principles, which develops habits of mind. Lessons are constantly refined and improved. They are executed using practices that stimulate learning (Echazarra and others 2016) and ensure that lower-performing students do not fall behind (Tucker 2016).

Many of the low-performing East Asia and Pacific education systems, including Cambodia, Indonesia, Myanmar, and the Philippines, have tackled teacher reform with varying degrees of success. Comprehensive reform requires a sober assessment of capacity and constraints, areas of high impact and with "leapfrog" potential, and the steps to be performed.

Coherent systems of teacher recruitment, development, and support

When policies are developed without a blueprint or overall vision, they tend to be misaligned (box 5.1) or even contradictory. Policies may be a reaction to pressures and demands from stakeholders, including teachers themselves, or budget constraints may allow for only pieces of a blueprint to be implemented. These issues may stem from constant changes in governments and education ministry officials, which do not allow an overall vision to be concretized and to prosper. Such disjointed policy development can create friction, inefficiencies, and frustration.

High-performing East Asian systems have generally developed coherent teacher policies, driven by clear goals and vision from an early stage. Although they have by no means

BOX 5.1 Policy misalignment hurt Indonesia's education system and teachers

Indonesia's rollout—and eventual rollback—of the 2013 curriculum presents a cautionary tale of misalignment. With pressure to implement the new curriculum before a change of government, the government announced and developed the new curriculum hurriedly, without consulting with key stakeholders. Rapidly developed and printed textbooks were misaligned with the curriculum content and of low quality. In addition, they were not available for many schools and teachers at the time of the rollout. Training was also a major issue. The new curriculum required a very different role for teachers and the approach to teaching as well as content. But only one or two weeks of training were given, and the curriculum was rolled out in a cascaded manner that did not reach many teachers.

The combination of misalignment of curriculum and textbooks, missing textbooks and materials, and inadequate training created confusion and frustration among teachers. In 2015, the curriculum was rolled back.

been free of challenges, most have seen fewer radical shifts or short-term thinking than low-performing systems did.

In the 1970s, Singapore's educational outcomes lagged the rest of the world's. Transformation was achieved through systemic change at the national level that encompassed curriculum development, national textbooks, and preservice and in-service teacher education. Hong Kong SAR, China provides a strong example of supporting teachers with integrated curriculum development. In Korea and Shanghai, China educational change and improvement were planned and directed at the national level. All schools use government-approved curriculum and materials, entry qualifications to become a teacher are consistent, and there is much less diversity of types of schools than in many other systems (Boylan 2016).

A coherent system is important at all stages of the teacher career cycle (table 5.1). The central importance of teachers to the education enterprise was recognized from the start in Hong Kong SAR, China; Japan; Korea; Singapore; and Taiwan, China. Their experiences suggest that teacher qualifications, teacher quality, and the goal of education for the state and parents can have an enormous influence on teacher effectiveness.

East Asia's Top Performing Systems have policies that make teaching attractive and allow for selectivity of teachers

Attracting top candidates into the teaching profession depends on a complex combination of cultural and policy factors. Cultural aspects such as the value a society places on education and the level of esteem in which teachers are held play a critical role. But there are also important policy factors, including financial incentives, that signal that teachers are supported and taken care of.

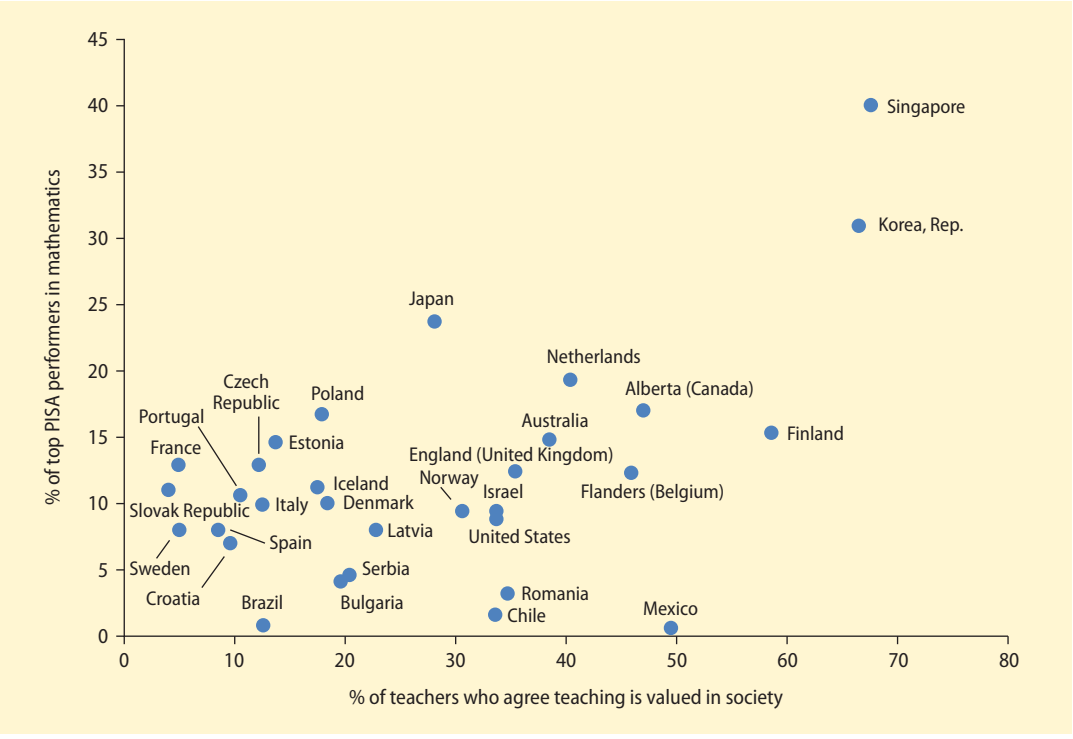
Top Performing Systems in East Asia and Pacific stand out for how much they value teachers. They hire good teachers, pay them well, and continually invest in their professional development. Curriculum and textbooks provide clear guidelines, but teachers are also given considerable autonomy to apply their knowledge and skills in classrooms and are encouraged to experiment and innovate.

Results from the Organisation for Economic Cooperation and Development (OECD) Teaching and Learning International Survey (TALIS) indicate that there is a positive correlation between the value society places on teachers and student learning outcomes as measured by the Programme for

TABLE 5.1 A coherent system covers all aspects of the teacher career cycle

Goal	Instrument
Attraction and selectivity	• Good pay • Effective filtering • Mechanisms to increase the attractiveness of teaching as a profession
Good preservice	• Government control and quality assurance • Filtering at various stages
Smooth induction	• Open-door culture • Mentoring and extensive support • Time and space for learning
Continuous improvement	• Teacher support networks • Teamwork and collaboration • Lesson study • Culture of continuous improvement
Career development	• Progression and promotion policy • Career ladders with multiple pathways in teaching
Making teaching easier	• System coherence • Aligned, streamlined curriculum and textbooks • Adequate nonclass time

FIGURE 5.1 A positive correlation exists between the value that society places on teachers, and student learning outcomes as measured by PISA



Source: PISA 2015 (OECD 2016a).
Note: PISA = Programme for International Student Assessment.

International Student Assessment (PISA). Korea and Singapore are among the highest performers on PISA. In these countries, 67 and 68 percent, respectively, of teachers agree that teaching is valued in society (figure 5.1). With the exception of Finland, all other countries are below 50 percent; the average is only 28 percent. Although there are challenges in disentangling causation—higher performance on tests could lead to a higher value of teachers—there is likely a virtuous cycle.

Today's high-performing East Asia and Pacific systems tended to attract the best teachers from the beginning. Even in the early years, when the pool of potential recruits was small and demand was great, only students who took top scores on national university entrance exams were selected for admission to teacher education and training programs in Hong Kong SAR, China; Japan; Korea; and Singapore (Tan and Wong 2007). All graduates meeting the minimum qualification requirements were hired. In-service training or exemptions to these qualification requirements were used liberally to remedy weaknesses and meet urgent needs.

In Japan, only 14 percent of applicants to education programs are accepted, and only about 30–40 percent of graduates are hired annually (National Center on Education and the Economy, n.d.). In Singapore, the government recruits the top one-third of university graduates and top graduates of polytechnic schools to become teachers (Tan and Wong 2007). In Korea, teacher education program entrants are among the top 10 percent of high school graduates, and only 1 in 20 passes the arduous exams for employment to become a teacher (Ferreras, Kessel, and Kim 2015). In Taiwan, China, education programs are highly competitive. Typically, only the top third of applicants ranked by their academic

performance in high school and university entrance exams are selected (Chou and Wang 2012). Teaching is a well-regarded profession in Shanghai with established entry requirements; the central government provides incentives to increase the pool of teaching candidates and encourage teacher retention; and teacher pay is appealing, varying by performance and years of service.

Pay is an important element of attracting good candidates. In Japan, salaries for new teachers compete well against professions like engineering and the civil service. Singapore has gone the furthest to make teaching a financially attractive option. The starting salary of teachers is equal to or higher than that for engineers and lawyers in the civil sector. Indonesia doubled teacher salaries through its 2005 teacher reform. The resulting inflow of candidates into the system was huge, with a fourfold increase in enrollment into teacher education programs as well as an increase in the average national exam scores of entrants, indicating higher-quality candidates (Chang and others 2013).

Low pay and delayed or irregular payments are problems in some systems. In the Philippines, for example, monthly pay for a secondary teacher is less than US$400, compared with a minimum wage of US$570 for domestic work in nearby Hong Kong SAR, China (plus room and board) (Ager 2014; Ubalde 2007). In the Lao People's Democratic Republic, preliminary results of a World Bank survey on service delivery in the school system indicate that 53 percent of teachers surveyed reported delays in receiving their salary at least once a year (Demas, Khan, and Arcia, forthcoming).

East Asia's Top Performing Systems generally filter so that good teacher candidates enter the system

Filtering is important in ensuring teacher candidate quality. Filtering points vary across the region, but all systems have mechanisms to ensure that qualified, prepared, and motivated teachers enter the system (table 5.2). Singapore uses intensive selection at entry into teacher education colleges, recruiting its teachers from the top third of high school graduates. The filtering is front-loaded; nearly

TABLE 5.2 Different systems use different methods of selecting and filtering teachers

Economy	Entry to teacher education program	Evaluation of practical experience	Exit from teacher education program	Certification	Hiring	Evaluation of induction period	Evaluation of professional development	Evaluation of probation period (for tenure)
East Asia and Pacific								
Hong Kong SAR, China	⊙	⊙	○	○	○	○	⊙	●
Japan	●	●	○	○	⊙	⊙	●	●
Korea, Rep.	●	⊙	●	○	●	○	●	○
Singapore	●	⊙	●	○	⊙	⊙	○	○
Non-East Asia and Pacific								
Australia	⊙	⊙	●	⊙	○	○	○	⊙
Netherlands	●	●	⊙	○	○	○	○	⊙
United Kingdom	○	●	○	●	○	○	○	⊙
United States[a]	⊙	○	⊙	●	○	○	○	○

Source: Wang and others 2003.
Note: ● = high stakes; ⊙ = medium stakes; ○ = low or no stakes. Stakes are based on author-defined rubrics and are indicative of whether there is a high, medium, or low level of filtering and quality control measures for the given category.
a. Teacher education and certification are the responsibility of individual states; practices differ among them.

all candidates who enter the preservice system receive a position on graduation, making it extremely efficient. In contrast, Japan filters at multiple points. It filters at entry, with only 14 percent acceptance of applicants into schools of education, as well as at hiring, with only 30–40 percent finding work in public schools, and through a rigorous induction program, followed in later stages by an evaluation of professional development and evaluation of a probation period for tenure. In Japan, 98 percent of classes at the secondary level are taught by teachers who hold a certificate in the field or subject they teach, and a majority of teachers remain in the profession until retirement.

East Asia's Top Performing Systems raised their standards as their economies developed

From the start, Hong Kong SAR, China; Japan; Korea; Singapore; and Taiwan, China recognized the central importance of teachers to the education enterprise. Given the enormous gap between demand and capacity, a practical response was the only option. The initial focus in all five systems was on expanding the number of teachers. Individuals meeting minimum qualifications, such as graduates of regular and teacher high schools, were hired. Minimum qualifications were deemed sufficient when the state priority was basic literacy and numeracy at the primary level. Simply having enough teachers to staff classrooms was a measure of success for the education system.[1] In-service training was a pragmatic solution to meet the urgent need for teachers. In Singapore, for example, teachers in training were recruited from teacher training colleges. Teachers who taught in morning sessions studied in the afternoon and vice versa. Through massive recruitment and training, the number of teachers in Singapore nearly doubled in a decade, from 10,590 in 1959 to 19,216 in 1968 (Goh and Gopinathan 2008).

Qualification requirements were gradually raised as capacity in the system grew, parents demanded higher levels of schooling and better-quality education for their children, and the state targeted higher value-added jobs and industries. Over time, new teachers were required to complete preservice professional training at teacher high schools, then two-year teacher colleges, then four-year colleges. In all these systems, an undergraduate degree in education or other fields plus a one- to two-year professional teaching program are now the minimum education requirement for teachers. Japan was the first to make this shift, in the 1950s. Other economies followed, in the 1980s and 1990s. Teachers already in the system were also required or incentivized to undertake continuing professional education and training for higher pay and promotion (Lai 2009; Sweeting 2004).

The state as a major employer of teachers has helped to raise teacher qualifications. State-mandated education and other qualification requirements can be uniformly applied. Nongovernment schools are either mandated to use the same teacher education and qualification requirements or incentivized to adopt them via public subsidies that raise teacher salaries to the levels in government schools.

East Asia's Top Performing Systems ensure good preservice teacher training, often through direct provision

Although approaches and experiences of systems at the different performance levels (Top, Above-Average, Below-Average, and Emerging) differ, a few features stand out. First, state control of teacher training, qualifications, and hiring is generally more far-reaching at the primary level than at the secondary level. This dominance aligns with state goals to establish basic literacy and numeracy and to promote common core social values or political ideology.

Second, the state is frequently the sole provider of primary education. Virtually all children attend government primary schools in these systems. Having unitary forms of government, the central authority can impose standards via mandates or tie requirements to the allocation of education funds to lower levels of government.

Third, the state accepted expansion of universal access to academic secondary education only in the later years of high growth, by which point industry was adopting more technology to offset rising labor costs and move up the value chain in production. More parents saw academic secondary and postsecondary education as critical to the economic future of their children. Besides expanding access at public and private secondary schools, the state raised teacher qualifications by upgrading teacher education to four-year undergraduate programs, relinquishing its monopoly on teacher education to expand the production pipeline, and providing state subsidies for teacher salaries at private secondary schools that meet the higher teacher qualification standards mandated by the state. By raising teacher qualifications across the entire secondary school system, the state hoped to minimize gaps in quality between public and private secondary schools.

Two points are key features of these systems' experience. The first is the quality of teacher education and training programs. The integrity of the teacher training institutions is also important. A corrupt system may sell diplomas or push students through just to show high completion rates. The second is the cognitive ability of teachers. Continual upgrades in the curriculum mean that teachers must possess knowledge and skills essential to deliver it and meet other goals of the state and parents in education. Consequently, attracting top-performing students into the teaching profession and keeping them became core to improving education systems.

In the postwar reconstruction period, these five systems had at most a handful of teacher training institutions, and most were teacher training high schools and two-year colleges (also known as "normal" schools and colleges). Gradually over the next two decades, two-year teacher training colleges were elevated to become full undergraduate institutions under government control, and in-service training and continuing education and training all became more rigorous. State-mandated and standardized curriculum for primary and secondary education became an important guide to developing content for teacher education and training programs (Chou and Wang 2012; Fujita 2007; Kim 2000; Kim 2007; Lai 2009; Tan and Wong 2007). The five systems also conducted benchmarking against the best systems in the world and integrated the latest concepts and techniques in education with their teacher education and training programs (Beauchamp and Vardaman 2015; OECD 2010).

Supporting induction into an "open-door" profession

Support of new teachers is a prominent and well-supported component of many successful systems. Japan and Singapore, in particular, use induction as an integral part of the process. Japan, for example, sets itself apart through active mentoring and a collaborative approach to the continual upgrading and "leveling up" of teaching skills (OECD 2010). All new teachers must complete six weeks of practical training under senior teachers at the school to which they are assigned. Mentoring can come in many forms, from pairing new hires with senior teachers to sending skilled teachers with proven success in the classroom to assist teachers in struggling schools. On leveling up, teachers and administrators are transferred to other schools within the same school district and beyond about once every six or seven years; these moves rotate teachers between urban and rural areas and between big and small cities (OECD 2010). With informal "lesson studies" that are used in all Japanese schools, teacher quality is lifted across the entire system.

In Korea, teachers from high-performing schools and education experts from universities are sent to low-performing schools to identify problems, develop solutions, and build capacity.

Teachers need to be observed and critiqued

Teaching is a "closed-door" profession in most Western systems. In the OECD, 40 percent of teachers have never taught alongside another

BOX 5.2 Models of teachers observing teachers

Observation can yield its greatest benefits when used to share instructional techniques and ideologies. This form of practice has a long tradition in many East Asian systems, as exemplified by three practices:

- *Lesson study.* Designed by Japanese educators, this approach has teachers collaboratively develop a lesson, observe it being taught to students, and discuss and refine it.
- *Peer coaching.* Educators work together to discuss and share teaching practices, observe one another's classrooms, and provide mutual support.
- *Cognitive coaching.* Teachers are taught specific skills that involve asking questions so that the teacher observed is given the opportunity to process learning associated with teaching the lesson.

Source: Education World, n.d.

teacher, been observed, or given feedback. Teaching is still a closed-door profession, and teaching unions have made it hard for observers to take notes in classes (*Economist* 2016).

In contrast, in many East Asian countries, the classroom is seen as a public space, and lesson observation and peer support are ingrained characteristics (box 5.2). Japan's induction period involves lesson demonstrations conducted in front of panels for evaluation and feedback. Many Shanghai schools have separate lesson observation rooms, where lessons can be videotaped and demonstrations conducted with an audience.

Effective professional development leads to effective teaching

One of the three "promising principles" identified in the *World Development Report 2018* to make teaching more effective is the delivery of professional development: "For effective teacher training, design it to be individually targeted and repeated, with follow-up coaching—often around a specific pedagogical technique" (World Bank 2018, 22). This practice lies in stark contrast to much teacher professional development in a range of countries.

Experience from high-income countries shows that practicality, specificity, and continuity are key to effective teacher professional development (Popova, Evans, and Arancibia 2016). Practicality means that teachers are trained with concrete methods as opposed to theoretical constructs and that training is classroom based (Walter and Briggs 2012). Specificity means that teachers are taught teaching pedagogy that is specific to a subject area. Continuity means that teachers receive significant, continual support, not one-off workshops (Darling-Hammond and others 2009; Yoon and others 2007).

Teacher improvement must be a continuous process that does not end at preservice or induction. Preservice preparation sets the foundation of a teacher's knowledge and skill set. Induction in the initial years is critical in getting the teacher comfortable and effective in the classroom. But the next 30 years or more of a teacher's career must also be used to build skills and continually improve. The in-service portion typically makes up more than 80 percent of the teaching cycle.

There is evidence that teachers often stall in their skills development after an initial jump early in their careers. A differentiating factor in high-performing systems is that learning and improvement continue throughout the teaching cycle.

Traditional approaches of bringing teachers to a training center for one-off training tend not to have longer-term effects on changing practices in the classroom. Professional development is often poorly aligned to what Darling-Hammond and others (2017) identify as the seven characteristics of effective professional development, which (a) is content focused; (b) incorporates active learning using adult learning theory; (c) supports

collaboration, typically in job-embedded contexts; (d) uses models and modeling of effective practice; (e) provides coaching and expert support; (f) offers opportunities for feedback and reflection; and (g) is of sustained duration.

Professional development programs in East Asia and Pacific's Top Performing Systems tend to embody these characteristics. They emphasize content, collaboration, modeling, coaching, and expert support with opportunities for feedback and reflection. The rest of this section explores how these systems implement these efforts.

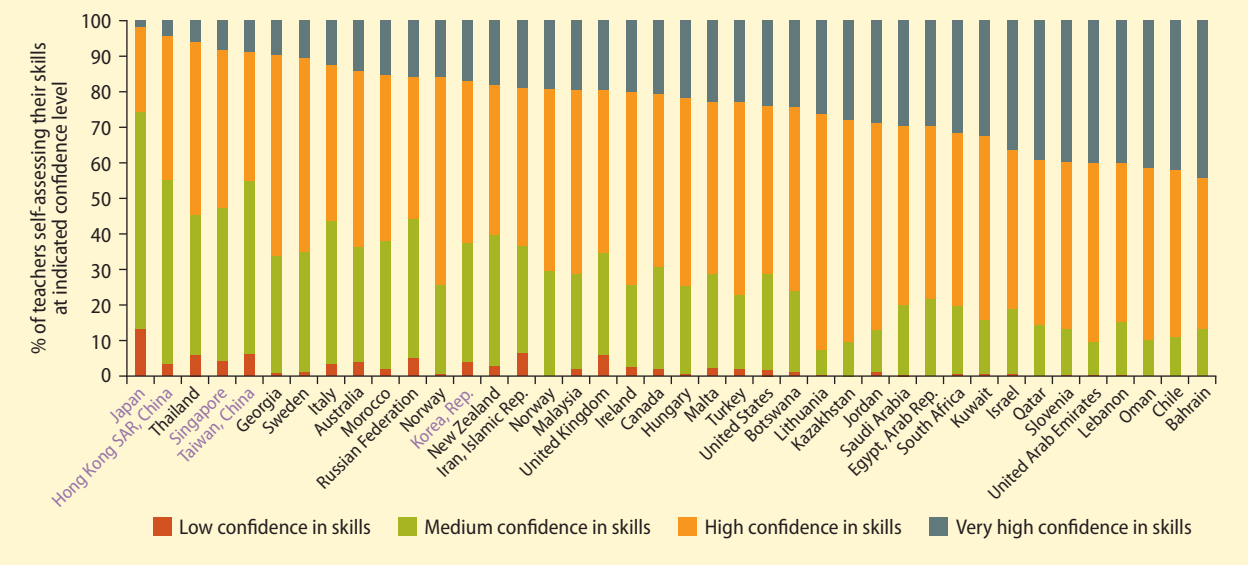
A mentality of constant improvement is the foundation for professional development

In most education systems, after the burst of improvement at the start of their careers, teachers rarely get much better. This stagnation often reflects the fact that teachers do not think they need to improve. Three out of five low-performing teachers in the United States think they are doing a great job; 9 out of 10 teachers in the OECD say they are well prepared (*Economist* 2016).

In contrast, in many East Asian countries, teachers think that they need to improve constantly. In the 2015 Trends in International Mathematics and Science Study (TIMSS) survey, teachers were asked to characterize their confidence in developing students' higher-order thinking skills. Many of the Top Performing Systems tended to have the lowest proportion of teachers saying they had high or very high confidence. This result partly reflects a cultural tradition of modesty, but it also likely indicates a belief that there is room for improvement (figure 5.2).

In Shanghai, teachers participate in teaching-research groups at the school, district, provincial or municipal, and national levels. At the municipal level, Shanghai's Municipal Education Commission Teaching-Research Office, founded in 1949, is the key agency for conducting teaching-related research. At the school level, teaching-research groups are professional development networks consisting of same-subject teachers. In larger schools, the groups are often further

FIGURE 5.2 Teacher modesty in self-assessment of skills may facilitate or complement continuous professional development



Source: TIMSS 2015.
Note: Economies labeled with purple type are East Asia and Pacific Top Performing Systems.

divided by grade. Each group has a leader responsible for organizing activities and introducing novice teachers to the learning community. The groups normally meet for two to three hours a week. Activities include the following:

- *Professional development.* Teachers share resources, set clear goals for student learning, engage in conversations about instruction and subject knowledge, and ask questions and seek answers from colleagues or external advisers.
- *Coaching and guidance.* Senior teachers provide guidance and coaching to junior teachers in a wide range of activities, including exam design and teaching experience discussions.
- *New teacher induction.* New teachers participate in group activities, receive guidance from experienced teachers, and gain expertise on a wide range of teaching topics. The leader of the group often coaches new teachers. Mentoring includes lesson observations and critiques.
- *Research.* Teachers conduct research on subject areas and pedagogical practices to improve their instructional ability. Schools provide teachers with various research approaches. Among the schools surveyed, 84 percent have an overarching topic for all teachers to research, 81 percent encourage teachers to conduct individual-topic research, and 88 percent provide research topic options for teachers on various subjects.
- *Performance evaluations.* Teachers often evaluate one another during group activities. The group leader provides feedback in annual teacher performance evaluations (Liang, Kidwai, and Zhang 2016).

The groups' collaborative nature helps the entire teaching community to grow. Such groups create a constructive work environment and allow teachers to forge close bonds. The groups' tiered network at the school, district, and municipal levels allows for quick and far-reaching dissemination of curricula, best practices, and other ideas on teaching and learning. Of the 154 schools surveyed, 44 percent host groups once a week and 53 percent host them every two weeks.

Collaborative environment with feedback

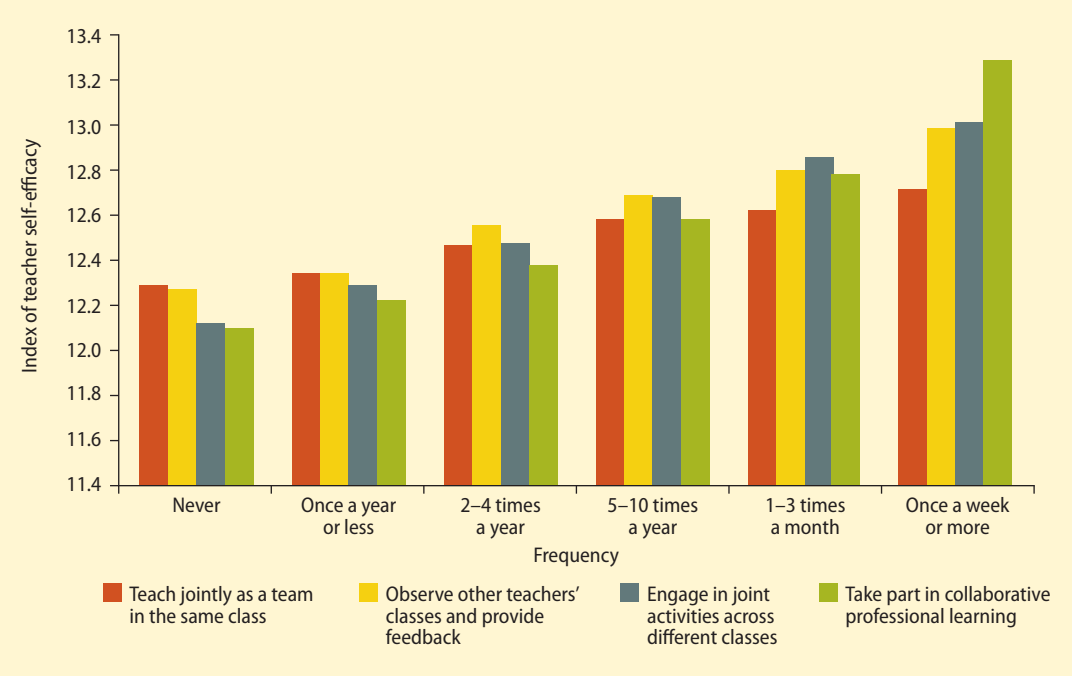
Collaboration and teamwork are explicit features of many successful East Asian systems. In Shanghai, for example, teachers are not promoted unless they can prove they are collaborative. Mentors are not promoted unless they can show that their student teachers improve. Teachers are given ample time for these collaborative activities. They teach only 10–12 hours a week—less than half the U.S. average of 27 hours (Liang, Kidwai, and Zhang 2016).

The 2013 TALIS developed a peer network index that measures opportunities for the information exchange and support needed to maintain high standards of teaching. The index includes participation in induction and mentoring programs, participation in teacher networks, and the receipt of feedback from direct observations. Of 37 education systems in the study, the three top-scoring systems were Malaysia, Shanghai, and Singapore, with Korea coming in 6 and Japan in the middle at 19. The fact that four of the top six systems are from East Asia indicates the high importance the region places on collaboration among teachers.

Teachers who meet more frequently for professional collaboration tend to have higher levels of self-efficacy (belief in their own abilities). Most of the best teachers have a strong sense of self-efficacy (Künsting, Neuber, and Lipowsky 2016). High levels of self-efficacy are also found among teachers who engage in joint activities—observing other teachers' classes, providing feedback, and teaching jointly in the same class. Although even meeting just once a year in professional collaboration activities can improve self-efficacy (figure 5.3), there is a clear and steady trend of increasing self-efficacy with incremental increases in frequency.

Teacher collaboration is common in nearly all East Asian systems. Indonesia has a strong system of teacher working groups. Networks

FIGURE 5.3 Teachers who meet more frequently for professional collaboration tend to have higher levels of self-efficacy (belief in their own abilities)



Source: OECD 2014, using an index to measure self-efficacy.

of general teachers at the primary level and subject teachers at the secondary level are complemented by working groups of principals and supervisors to provide teacher support from different levels. In Myanmar, full-time mentors provide pedagogical guidance and demonstrations. In Vietnam, teacher clusters play a prominent role in supporting professional development for early childhood teachers and in introducing new teaching techniques, such as Vietnam Escuela Nueva and its student-centered 21st century skills approach. In Thailand, a peer review method monitors the practice of math teachers.

Career progression and promotion that attracts, supports, and motivates

Career opportunities are important to attract talented individuals into teaching and provide incentives for them to stay. In addition to vertical promotions into leadership positions, case study research on high-performing systems shows that most systems offer teachers the possibility of horizontal promotions to positions that allow them to grow professionally as teachers but remain closely connected to instruction, instead of moving "up" to managerial positions (Darling-Hammond 2010; OECD 2012b). In many countries, the way to get ahead in a school is to move into management. U.S. school districts, for example, "pay people in inverse proportion to the value they add" (*Economist* 2016). District superintendents make more money than teachers, although they generally have less impact on students' lives.

Singapore has a separate career track for teachers, so that the best teachers do not leave the classroom. In Shanghai, teachers can apply for academic or administrative positions to assume more responsibilities. Unlike many other systems, in which one is either a teacher or not, teachers have opportunities to advance professionally throughout their teaching career through a five-level

ranking system. Shanghai regularly evaluates teachers for promotion (Liang, Kidwai, and Zhang 2016).

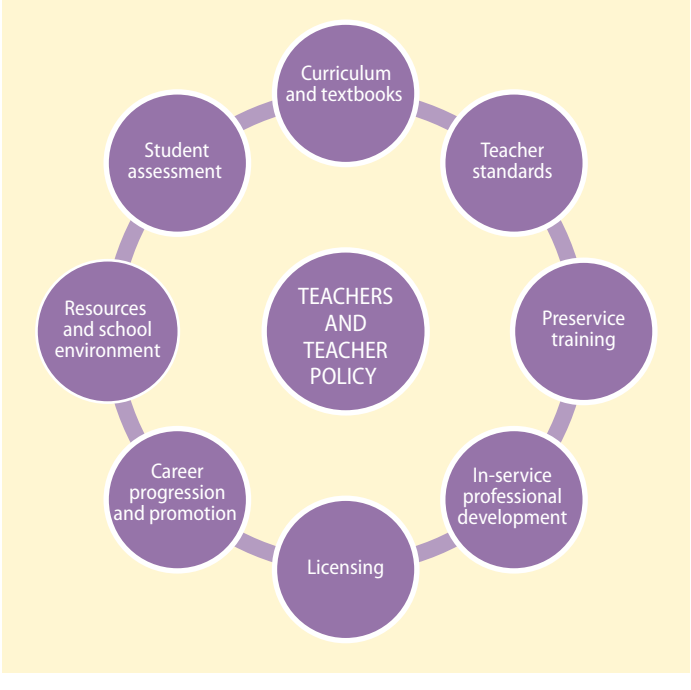
Strong supporting elements are aligned in ways that make the teacher's job easier

The top systems provide strong auxiliary elements that are aligned in ways that make the teacher's job easier, including clear learning objectives and standards; well-aligned curricula, usually focusing on relatively few topics; textbooks that are uncluttered, focused, and effective for learning goals; more time for teachers to prepare lessons; professional development activities; and assessment systems.

Alignment of system elements

Because teachers are intimately linked to most aspects of the education system, policies affect them as well as their ability to get students to learn. A major change in the curriculum that is not accompanied by actions to ensure alignment with all teacher-related aspects such as teacher standards, the accompanying textbook modification, and teacher training will weaken teachers' ability to carry out their tasks and possibly reduce their motivation. An approach to policy that considers the impact on teachers and the direct or indirect role that teachers play in policy implementation can make policies more effective (figure 5.4).

FIGURE 5.4 Considering the direct or indirect role played by teachers in implementation can make policies more effective



Curriculum alignment

A well-aligned curriculum with a small number of topics focuses learning and allows deeper study of the topics covered. Schmidt and others (2001) analyze textbooks and standards in 34 countries. They find that the highest-performing countries tend to have fewer content standards and topics in their textbooks than other countries. The United States covers all 79 of the TIMSS science topics in its content standards. In contrast, Korea covers only 8, Japan covers 19, and Hong Kong SAR, China covers 22. Textbooks in the United States cover 78, whereas Korea covers 38 and Japan only covers 17. The narrower focus and deeper study allow teachers to develop better lessons rather than rushing through topics (table 5.3).

Focused, streamlined textbooks

A streamlined curriculum allows for uncluttered, focused textbooks. Textbooks in the United Kingdom and the United States tend to be extremely thick and full of content, much of which is not covered. In contrast, Chinese textbooks tend to be thin and narrowly focused on specific topics, allowing them to go into greater depth on those topics (textbooks in Japan, Korea, and Vietnam also tend to be narrowly focused). Chinese textbooks are also significantly more demanding than textbooks in the United Kingdom (Qin 2017). All students cover all of the content in the textbooks, making the study more focused and allowing students to master topics.

The mastery approach is believed to have been important in propelling

TABLE 5.3 Top Performing East Asia and Pacific systems tend to focus learning on fewer content standards and topics in textbooks compared with other countries

Economy	Content standards	Textbook topics coverage	Topics tested in content standards	Topics tested in textbook
Korea, Rep.	8	38	6	29
Japan	19	17	18	15
Hong Kong SAR, China	22	37	17	26
Greece	25	49	22	37
Romania	29	53	19	33
Czech Republic	33	49	22	30
Germany	35	32	21	22
Israel	37	32	25	21
Singapore	38	27	27	20
South Africa	39	49	26	35
Cyprus	41	53	31	39
Bulgaria	43	57	28	37
Sweden	47	49	34	32
Netherlands	48	67	32	43
Slovak Republic	48	49	29	30
Denmark	50	9	29	8
France	50	37	30	25
Hungary	53	62	36	43
Iceland	56	46	42	30
Scotland	57	44	42	36
Austria	58	60	36	39
Canada	58	74	38	46
Colombia	58	65	43	46
Ireland	61	58	42	40
Russian Federation	62	42	37	28
Australia	66	65	43	44
Portugal	66	64	40	39
Spain	66	67	43	41
Norway	69	61	41	40
Slovenia	69	62	44	41
Switzerland	69	78	44	48
Latvia	70	35	44	24
New Zealand	79	52	48	37
United States	79	78	48	48

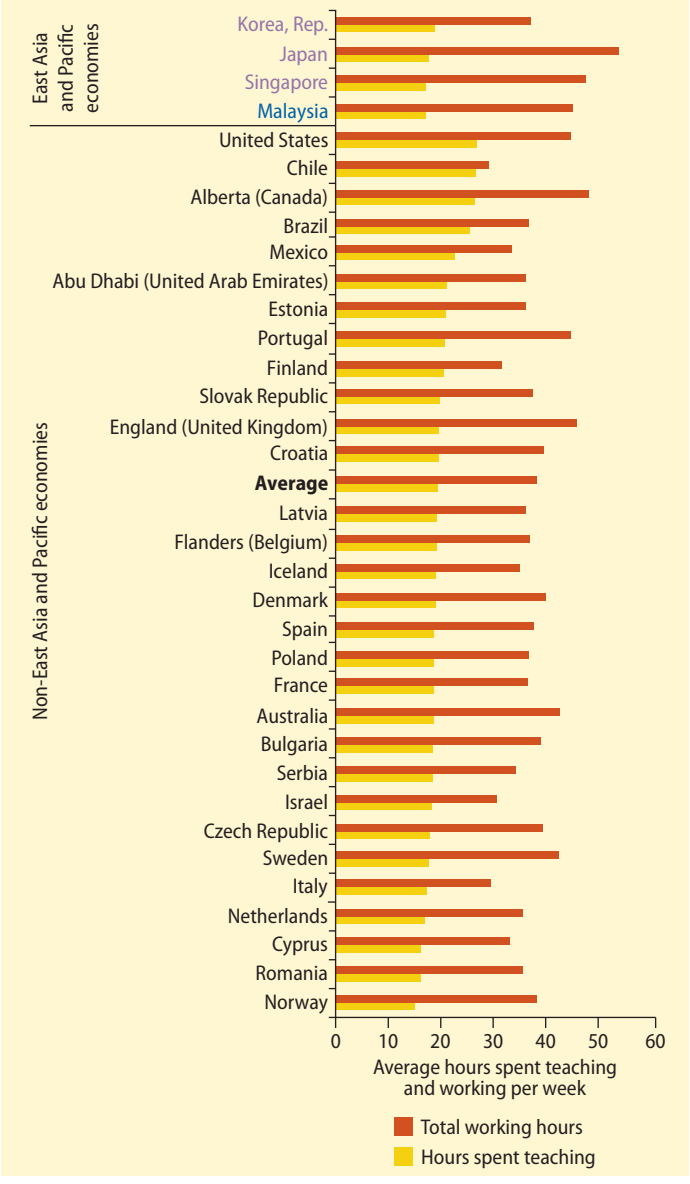
Source: Schmidt and others 2001.
Note: Economies labeled with purple type are East Asia and Pacific Top Performing Systems. Green shading is used to indicate systems that cover 30 or fewer topics, yellow indicates systems that cover 31 to 60 topics, and red indicates systems that cover 61 or more topics. Topics are within science curricula.

students in Hong Kong SAR, China; Shanghai, China; and Singapore to the top of the PISA rankings (Qin 2017). It also allows teachers to focus and have a clearer sequence of content.

Time and space for lesson preparation and professional development

Spending time in class is only one part of a teacher's job. Teachers also prepare lessons,

FIGURE 5.5 Teachers in Top Performing East Asia and Pacific systems tend to spend a smaller proportion of total working hours teaching and more time preparing lessons compared with teachers in other countries



Source: TIMSS 2015.
Note: Economies labeled with purple type are East Asia and Pacific Top Performing Systems. The economy labeled with blue type is an East Asia and Pacific Below-Average Performing System.

check homework, develop tests, and provide after-hours support to students. If a large proportion of time is spent in class, less time is available for other activities.

In the high-performing Asian countries, a small proportion of total working hours is spent in class. Japan's teachers spend only 18 hours teaching on average, even though they have the most total working hours (54) (figure 5.5). With nearly two-thirds of their working time spent outside of class, they spend much more time on lesson preparation and other quality-enhancing activities that make in-class time much more effective.

What happens in the classroom? Insights into effective teaching

PISA top performers focus their time and effort not on the school system but rather on what goes on in the classroom. PISA results reveal what does not work. Spending more money, for example, is associated with higher scores only in poorer countries. Among systems that already spend more than US$50,000 per pupil throughout their time in school, money alone brings no improvement.

But PISA also teaches what does work. Its most important insight is that what matters most is what happens in the classroom. Successful children are exposed to good teaching more often (OECD 2016a).

Case study research on successful education systems in Finland; Japan; Korea; Ontario, Canada; and Singapore suggests that high-performing education systems devote considerable time to activities related to instructional improvement, such as collaboration among teachers on the analysis of instructional practice (Darling-Hammond 2010; Darling-Hammond and Rothman 2011; Levin 2008). These systems also devote a smaller share of teachers' time to contact with students and a larger share to teacher collaboration, on-site professional development, and research on the effectiveness of teaching strategies. Japan, for example, devotes about 40 percent of teachers' working time to these types of activities; Ontario devotes 30 percent (Darling-Hammond and Rothman 2011).

According to an extensive meta-analysis, the 20 most powerful ways to improve learning are related to teaching. Many factors shape

a child's success, but in schools nothing matters as much as the quality of teaching. In a meta-study updated in 2015, John Hattie examines the results of more than 65,000 research papers on the effects of hundreds of interventions and their effects on student learning (Hattie 2003, 2015). He finds that aspects of schools that parents care about a lot—such as class size, uniforms, and streaming by ability—make little or no difference to whether children learn. What matters is "teacher expertise." All 20 of the most powerful ways to improve school-time learning identified by the study depend on what a teacher did in the classroom.

Many "good practices" have turned out to be ineffective. Coe and others (2014) note that many common classroom techniques do not work. Unearned praise, grouping by ability, and accepting or encouraging children's different "learning styles" are widely espoused but bad ideas. So, too, is the notion that students can discover complex ideas all by themselves. Teachers must impart knowledge and critical thinking.

Research offers clear pointers to the most likely effective approaches. The two factors with the strongest evidence in improving student outcomes are content knowledge and the quality of pedagogical practices (box 5.3). Teachers with strong knowledge and understanding of their subject have greater impact on student learning. Teachers also need to understand how students think about content and be able to identify common misconceptions. Pedagogical practices include effective questioning and the use of assessment by teachers. Practices such as reviewing previous learning, providing model responses for students, giving adequate time for practice to embed skills securely, and progressively introducing new learning ("scaffolding") improve attainment.

In many high-performing East Asian systems, teachers have very good mastery of content. In a comparison of third-grade math teachers in China and the United States, researchers find that U.S. teachers were more knowledgeable about general educational theories and classroom skills, whereas Chinese teachers had stronger knowledge of the subject matter they were teaching as well as a better understanding of the overall elementary curriculum that their students

BOX 5.3 Subject and pedagogical knowledge are critical for effective teaching

A video study conducted in Indonesia that measured subject and pedagogical knowledge of math teachers finds that 57 percent of teachers scored below 50 percent (Ragatz and others 2014). Higher-knowledge teachers tended to use a greater range of practices, such as investigation, open-ended questioning, the use of mathematical language and symbols, and the use of nonroutine problems and applications. They also used these practices more effectively. These teachers also

- Make fewer mathematical errors
- Use more accurate language and are more concise in their explanations
- Come up with new problems that were not originally in the lesson plan
- Make greater attempts to probe student thinking
- Are more able to spot and correct student misconceptions
- Involve a wider range of students, including students who might not provide correct answers
- Demonstrate more confidence and command in the classroom
- Stimulate more teacher-student interaction, with interaction involving more higher-order thinking
- Use questioning more and encourage students to think and share ideas rather than just follow instructions
- Make connections between procedures and concepts.

When teachers do not reach a minimal level of mastery of the subject, they are unable to convey concepts and procedures effectively, even if they use good pedagogical practices. Many low- and middle-income countries in the region, including Cambodia and the Lao People's Democratic Republic, have teachers with low subject knowledge, which limits their effectiveness.

Sources: Benveniste, Marshall, and Santibañez 2007; Ragatz and others 2014; Tandon and Fukao 2015.

had covered and would cover in later years. Chinese teachers spoke in great detail about the content they present to students and demonstrated a deep understanding of the subject matter as well as knowledge of the entire elementary math curriculum. When asked about their teaching methods, few U.S. teachers mentioned content (Zheng, Peverly, and Xin 2006).

What do effective teachers do?

"I don't teach physics," says Charles Chew, a teacher in Singapore, "I teach my pupils how to learn physics" (*Economist* 2016). This statement encompasses a critical learning outcome approach to teaching often found in high-performing East Asian systems that combines high-quality instruction with pedagogical content knowledge—a blend of subject knowledge and pedagogy for effective teaching. Teachers teach students how to learn by directing them to underlying principles, developing habits of mind.

Effective teaching is a combination of preparation (well-planned lessons with a clear goal of learning outcomes) and execution (practices that stimulate thinking and learning) (table 5.4).

Meticulous preparation—before even entering the classroom—with clear, concise goals and sequence

In East Asia and Pacific's Top Performing Systems, lessons are refined through a *kaizen* (change for better) approach, with a focus on detail, quality, and learning. *Kaizen* encompasses a Japanese business philosophy of continuous improvement of working practices, personal efficiency, and productivity. Lessons are approached through investigation and research into the teaching-learning process, with constant refinements for improvement. Lessons are planned with a clear sense of the goal and how to reach it.

Japan's lesson study breaks a lesson down in detail and indicates how to teach it effectively. In lesson study, the principal typically organizes and oversees activities. A teacher in the group tries out the sample teaching plans in the classroom while other teachers (and frequently university researchers) observe. The group then reviews, critiques, and adjusts the sample teaching plans before adopting revised versions for use. This collaborative approach strengthens work culture and gives teachers considerable autonomy to determine how best to implement the curriculum simultaneously to achieve education policy objectives and meet local needs and conditions (OECD 2010).

Schools in Korea have been using the lesson study approach for more than a decade. In addition, the central government provides grants of US$5,000–US$10,000 to support research by small groups of teachers to develop new instructional techniques and materials (Ferreras, Kessel, and Kim 2015).

Singapore is also working to adopt lesson study (Lu and Yee 2011–12). Besides peer collaboration within schools, the government gives teachers time and funding to undertake "attachment" (internship or observation) in local and overseas schools as well as in business and community organizations. The goal is to expand teachers' perspectives and bring

TABLE 5.4 Content and pedagogy needed for lesson preparation and execution

Item	Content	Pedagogy
Preparation	• Clear goal of learning outcome • Deep thought on how students will learn the content • Identification of potential misconceptions • Assessment for learning plan	• Pedagogical approach that will most effectively convey the content • Identification of alternative pathways for students to learn content • Effective ways to address potential misconceptions
Execution	• Concise, accurate explanations of content • Dynamic approach to content based on circumstances	• Teacher-centered but interactive pedagogy • Practices that stimulate thinking and learning • Elaboration and use of cognitive activation strategies

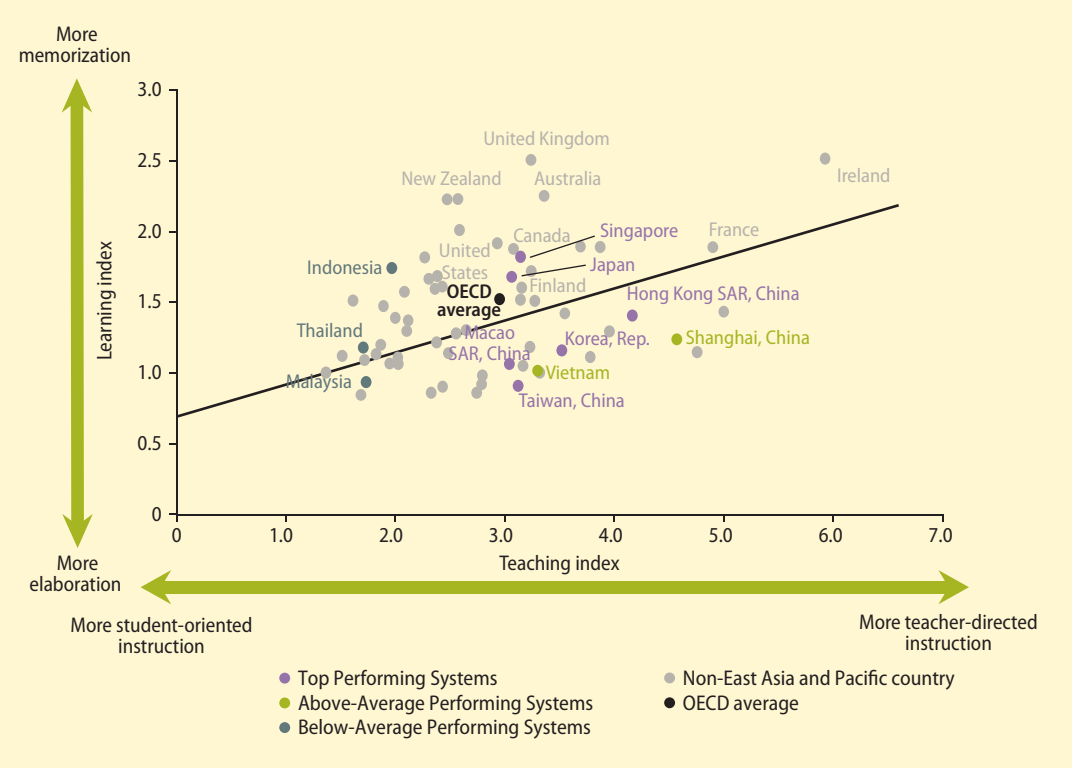
new experiences and insights back to their classrooms so that they can better prepare students for life and work.[2]

Practices that stimulate thinking and learning

Classes in East Asia tend to be planned, teacher-led but interactive, with a clear sense of the goal and how to reach it. Effective teachers ask probing questions of all students and assign short writing tasks that get children thinking and allow them to check student progress. Teachers anticipate errors, such as the tendency in math to mix up remainders and decimals. They space out and vary ways in which children practice, based on the results of cognitive science that doing so aids long-term retention. These techniques work. A 2016 OECD report finds a link between the use of cognitive activation strategies and high test scores among mostly high-income countries. Cognitive workouts such as "turn and talk" (when a teacher asks students to turn around and talk to a surrounding peer about a topic) and cold calling are common in Shanghai and Singapore (OECD 2016b).

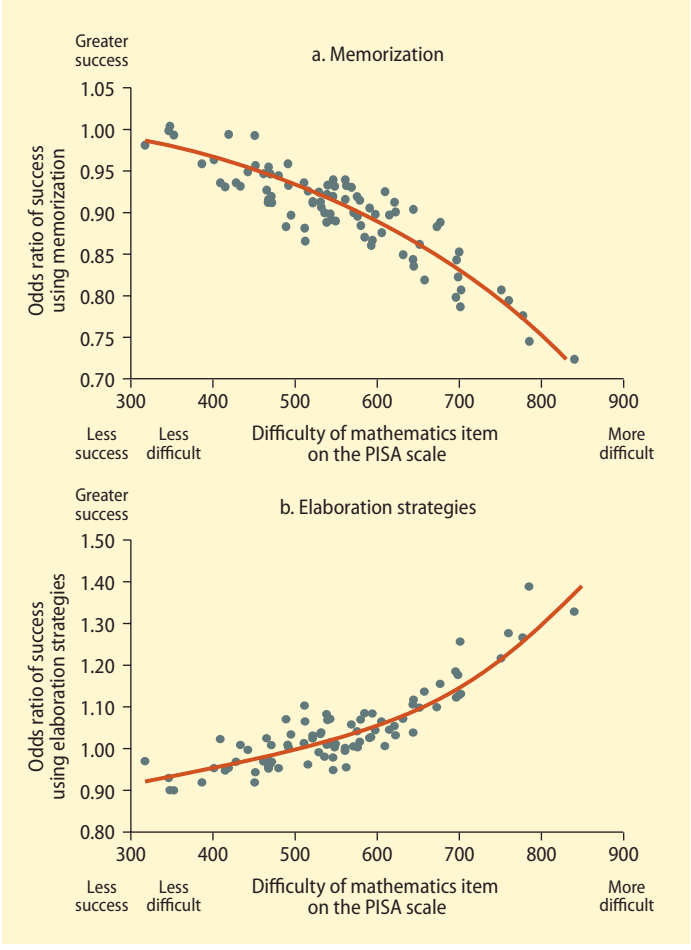
The PISA index of teacher-directed instruction provides insights on (and breaks some stereotypes about) East Asian education systems. The OECD used the PISA survey results to create indexes that measure the extent to which instruction is teacher directed or student oriented, as well as the extent to which learning is memorization versus elaboration. The Top Performing Systems in East Asia and Pacific tend to use more elaboration and less memorization (figure 5.6). This finding does not fit the stereotype that the region tends to use memorization and rote learning.

FIGURE 5.6 The Top Performing Systems in East Asia and Pacific tend to use more elaboration and less memorization in teaching math



Source: PISA 2012 (OECD 2012a).
Note: OECD = Organisation for Economic Co-operation and Development.

FIGURE 5.7 Memorization is less useful, and elaboration strategies are more useful, as math problems become more difficult



Source: PISA 2015 (OECD 2016a).

Students in classrooms in which elaboration strategies are more prevalent tend to perform better, particularly on more difficult problems. Memorization can be effective for easy problems (figure 5.7, panel a). But as difficulty increases and critical thinking is required, elaboration strategies become much more important (figure 5.7, panel b). The high-performing Asian countries include some memorization, but they focus on elaboration.

Directed learning versus student-driven learning

A study by Miao and Reynolds compares math teaching in Nanjing, China and Southampton, England. It finds that "whole-class interactive teaching" (when a teacher interacts with pupils in the whole class through two-way communication, typically in the form of questioning-answering or discussion) was used 72 percent of the time in Nanjing and just 24 percent of the time in Southampton (Miao and Reynolds 2018). Stigler and Hiebert (2009) find that U.S. classrooms tend to ask "what" questions. In Japan, teachers asked more "why" and "how" questions that checked whether students understood what they were learning. Box 5.4 describes how the Classroom Assessment Scoring System (CLASS) was used in China to observe teaching practices.

BOX 5.4 Teaching practices in Guangdong, China

The Classroom Assessment Scoring System (CLASS) is a classroom observation instrument that has been applied extensively in many international contexts to measure teaching practices. Coflan and others (2018) use it to compare practices in 16 poor locales.

Teachers in Guangdong, China, scored particularly high on the domain of classroom organization (figure B5.4.1). Scores on student engagement were also very high, and scores on emotional and other support were similar to averages in other countries. Student engagement also appears to be linked to cognitive activation techniques, where understanding of content and quality of feedback were relatively high dimensions of instruction.

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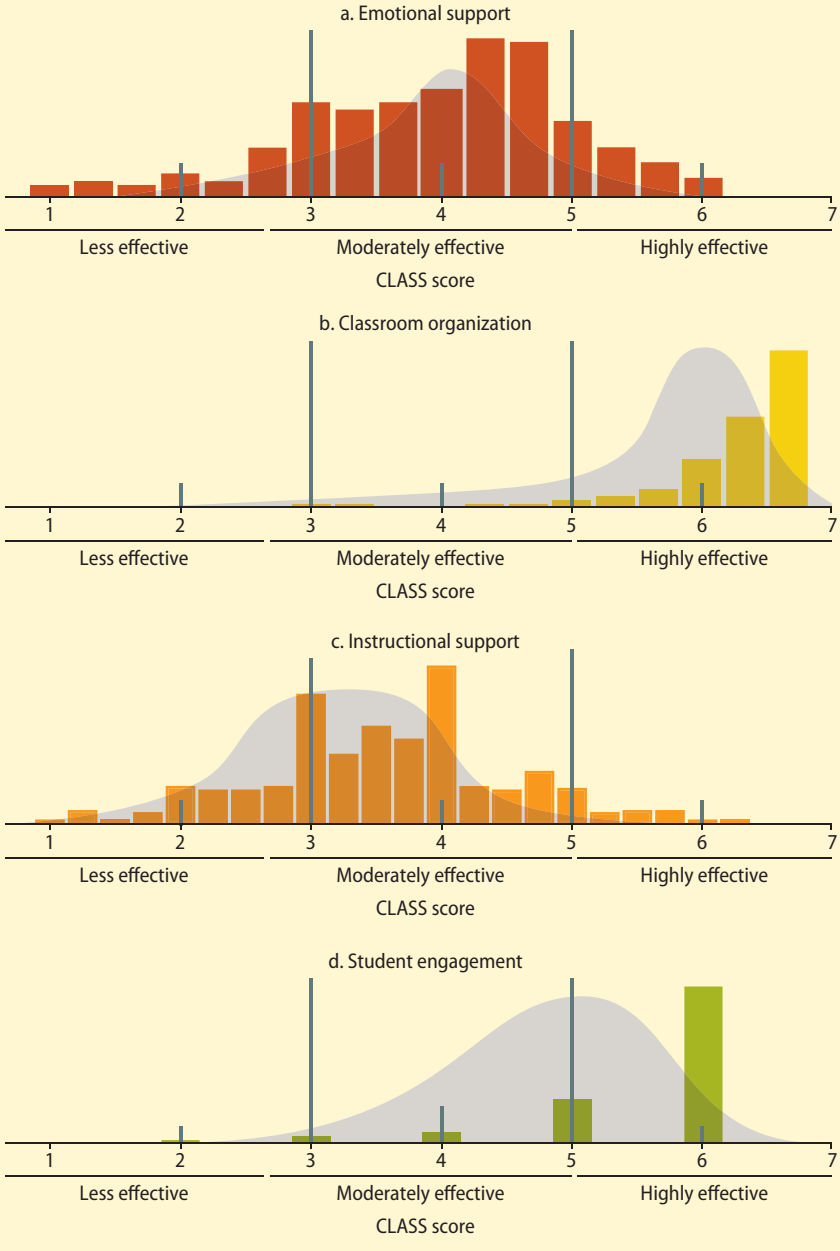
BOX 5.4 Teaching practices in Guangdong, China *(continued)*

FIGURE B5.4.1 Teachers in Guangdong, China, perform on average at higher levels on CLASS studies than do teachers in other countries



Source: Coflan and others 2018.
Note: The bars are Guandong's pilot values; the grey, smoothed overlays are the averages from other upper-elementary studies collected by Teachstone, the company responsible for the management and certification of CLASS. CLASS = Classroom Assessment Scoring System.

Reducing the proportion of low-performing students

Thanks to an approach of equity and learning for all, East Asia and Pacific systems have the lowest percentage of low-performing students on international assessments. Hong Kong SAR, China; Korea; Shanghai, China; and Singapore all rank in the global top 10 for achievement as measured by PISA, and in each of them, less than 10 percent of students score at the lowest levels (Tucker 2016). Improving the performance of the low performers does not require an education system to sacrifice the performance of the average or top performers.

In the United States and many other systems, as students start to fall behind, they find it harder and harder to comprehend what is going on in class and fall even further behind. Sometimes, as their morale sinks and embarrassment rises, they stop coming to school and then drop out. East Asia and Pacific systems deal with this downward spiral by stopping it before it gains momentum. They start from a commitment to the idea that all students can and will meet high standards as they progress through the years. Although it requires extra commitment, this approach helps teachers to be more effective in the long run (Tucker 2016).

Challenges in teacher reform

Although no two paths are alike, some fundamental similarities of teacher reform exist among East Asia's high performers. In the early stages, teacher qualifications were not necessarily high, but a strong emphasis was placed on attracting high-quality candidates, and preservice training provided a strong base. Advances in teacher policy tended to be made in tandem with other system components to ensure a coherent and aligned system. Although reform efforts and accomplishments of the high performers were rapid, they still spanned decades (see the timelines in figure 3.3 in chapter 3).

Lower-performing East Asia and Pacific countries have adopted many teacher reforms, with varying ambitions and varying degrees of success. Cambodia has made impressive progress since the 1980s in educating teachers and rebuilding its system, starting with teachers at very low education levels. Myanmar is embarking on many important teacher reforms that began mainly in 2012, in an effort to expand its young teacher workforce and rebuild its system after years of military rule. The Philippines introduced a New Teacher Education Curriculum in 2004 and has experimented with many teacher initiatives. It is attempting to support teachers through major changes to the kindergarten through twelfth-grade curriculum, but it has struggled to develop a competent teaching force (Tucker 2016).

Starting in 2005, Indonesia undertook one of the most comprehensive regional teacher reforms. It has accomplished a great deal—establishing teacher rights, developing an array of teacher policies, creating teacher standards, establishing new systems, and making the profession more attractive through both higher salaries and a degree of professionalization of teaching. But the reform has gone in fits and starts, with many struggles along the way, and has often fallen short of what was envisioned. Although the accomplishments should be recognized, Indonesia also highlights the challenges of teacher reform.

Teacher quality was a key focus of Indonesia's reform, a cornerstone of which was teacher certification. Certification was intended to ensure that teachers met a minimum threshold of quality, but it was politicized and became a watered-down and toothless process in which nearly all teachers received certification and little was done to establish clear standards and thresholds of quality. The plan to establish an integrated Teacher Professional Management System brought a strong vision for evaluating teachers through observation and assessment, which would then link to targeted professional development. It ran into implementation realities, however, such as difficulty conducting objective assessments or making sufficient professional development opportunities available. Financial, technical, and political realities forced an ad hoc implementation, with some aspects implemented in a hasty and ineffective manner.

Indonesia's experience offers the following lessons:

- The political economy of reforms, including the political will of the implementers as well as the recipients, needs to be considered.
- Ambitious reform has to take into account the realities of financial and technical constraints and be coherent.
- A degree of ad hoc implementation is unavoidable, but a coherent vision should underpin activities and their sequence, and certain activities should be implemented in sync to ensure coherence.
- Establishment of teacher quality standards requires the political will to enforce them; standards need to reflect realistic thresholds that teachers can meet or work to achieve.

Indonesia's reform is just over a decade in the making, and many important elements are now in place, albeit imperfectly. The teaching profession has become an attractive prospect, with large numbers of applicants to preservice programs. Whether a sufficient foundation for the future has been established will depend on the political will to refine the elements, fill missing gaps, and push for system coherence.

Conclusions and recommendations

Educational systems perform best when they have teachers who are respected, prepared, selected on merit, and supported in their work (World Bank 2018). East Asia and Pacific systems provide many lessons for developing such high-performing systems. A foundational aspect is attracting high-quality candidates into the profession by offering not only competitive compensation but also an appealing professional environment founded on respect and support. By attracting good candidates, education systems can also be selective. Combined with a process of support and effective development throughout a teacher's career, such selectivity leads to more effective teachers and greater respect for the profession. With this foundation, a virtuous circle can be created.

The system of support is critical. It begins with induction into an "open-door" profession, created by policies that assume that new teachers need help and that it is the role of all actors in the education community to provide it. In an open-door profession, peers, school leaders, and others provide support, and teachers habituate themselves to being observed and critiqued. This kind of culture is marked by collaboration with feedback. A mentality of constant improvement on the part of teachers provides a foundation for continuous professional development activities, which are closely linked to career progression and promotion.

Strong supporting elements within the system include an aligned and focused curriculum, streamlined textbooks, time and space for lesson preparation and professional development, and a focus on learning (with minimized administrative activities).

Systems that focus on classroom and teacher-related policies and devote considerable time at the school level to activities related to instructional improvement are the most effective.

High-performing systems often adopt a critical learning outcome approach—teaching students to learn rather than just teaching students to know. It combines high-quality instruction with pedagogical content knowledge—a blend of subject knowledge and pedagogy for effective teaching. Teachers teach students how to learn by elaborating and directing them to underlying principles, combining meticulous preparation and solid execution.

Many systems in East Asia and Pacific now use the lesson study approach, which originated in Japan. Effective classroom practices tend to be teacher-led but interactive, involve elaboration strategies, and aim to stimulate thinking and learning. They also seek to ensure that lower-performing students are given extra support and do not fall behind.

As the *World Development Report 2018* notes, in the short run, systems can improve the quality of professional development by shifting resources to the kinds of professional

TABLE 5.5 Steps toward attracting and developing skilled teachers and supporting effective teaching

Policy	Action: Emerging Systems	Below-Average Performing Systems	Above-Average Performing Systems	Top Performing Systems
Teachers	Start the positive foundational cycle of attracting and ensuring reasonable-quality teachers, while being realistic about the system's capacity to implement quality assurance measures balanced with supply of candidates. Establish teacher networks (with a focus on supporting new, weaker teachers with mentoring and other support), lesson study, and an "open-door" culture as key elements of professional development. Establish a basic framework of professional development and how teachers can reasonably be reached. Establish a mentality of teaching to learn with clear learning goals with curriculum and textbooks. Begin creating a cohesive, aligned system that supports teachers and promotes focused, streamlined learning.	Take incremental steps to increase qualifications and quality, establishing greater quality assurance and filtering measures. Deepen teacher networks in which more-advanced teachers provide greater support through mentoring and coaching. Provide more advanced professional development that develops deeper critical thinking techniques. Create tracks of progression and promotion for expert teachers that allow them to remain in the classroom. Evolve system- and teacher-related policies in ways that reform and move all elements forward with alignment. Decrease classroom hours and increase supplementary activities.	Establish rigorous criteria and multiple filtering mechanisms, while ensuring that teaching is attractive in terms of salary, professionalism, and prestige. Leverage high-performing teachers for professional development and support. Provide more autonomy for high-performing teachers. Create a highly developed professional development framework with tailored, individualized approaches. Deepen critical thinking, elaboration, and cognitive activation techniques.	

development that will change teacher performance in the classroom. They can support teachers in teaching to the level of the child. They can provide a professional structure so that teachers feel motivated to apply what they know.

Comprehensive reform requires assessment of capacity and constraints, identification of areas that are high impact and areas that provide leapfrog potential, and guidance on the steps that must be taken. Challenges to success include ad hoc policies that are not part of a comprehensive plan, lack of critical elements necessary for successful implementation, rushed implementation without a long-term vision, unrealistic goals, the setting of education policies in other areas without proper consideration of their impact on teachers, and policy misalignment.

Lessons from the region's successful systems suggest a way forward (table 5.5). They suggest a step-by-step approach that includes ambitious but realistic goals based on the capacity of the system and teachers within the system; alignment with key elements; and thoughtful implementation that ensures that key supporting elements are in place.

On specific policy areas, it is critical to establish a virtuous circle of attracting good candidates through adequate pay, creating an attractive professional environment, and establishing a culture of respect for teachers. Quality control in preservice and filtering mechanisms are also important.

Professional development in high-performing systems includes collaborative teacher networks and a culture of teamwork, knowledge sharing, peer observation, feedback, and support.

A complementary area is career progression and promotion linked to professional development, such as tracks that keep the best teachers in teaching by recognizing and rewarding high performers. A key takeaway in classroom practices is the importance of meticulous preparation and refinement of lessons with a deep focus on student learning, followed by lesson execution with practices that teach students how to learn by directing them to underlying principles, developing habits of mind.

Notes

1. In Hong Kong SAR, China, for example, teachers received training at night and taught during the day (Chung and Ngan 2002; Sweeting 2004).
2. See "Enabling Teachers," Ministry of Education Singapore (https://www.moe.gov.sg/education/education-system/enabling-teachers).

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a. Titles of publications that include "Hong Kong," "Korea," and "Taiwan" refer to Hong Kong SAR, China; the Republic of Korea; and Taiwan, China, respectively.

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Getting Children Ready to Learn

6

Data from international student assessments suggest that early efforts by Top Performing Systems in East Asia to universalize preschool progressively have contributed to their success. A review of the region's post–World War II history suggests that these systems focused on children's physical and cognitive development, assessed and improved the quality of the services they offered, and coordinated across actors to deliver needed services.

As other countries in the region seek to emulate this success, their strategies will need to focus on physical and cognitive well-being and emphasize quality as central elements of improving children's readiness to learn (boxes 6.1 and 6.2). Country strategies also need to make allowances for their own current state of preparedness to learn from others. For instance, efforts at improving readiness to learn are beset by large-scale nutritional challenges in several East Asia and Pacific economies. Policies have to be grounded in the fact that gaps in children's readiness to learn manifest themselves early and, if unaddressed, can affect children's cognitive and noncognitive skills in the long term.

Despite growing evidence of the efficacy of early childhood education and development services, some education systems continue to lag in ensuring delivery of key packages of services. Ensuring quality is a continual challenge, especially when seeking to coordinate across actors such as private sector providers, parents, and families. The costs of inaction are high, but acting to close the access gap is affordable. Solutions have been tested and proven in the region, and in some systems they are being attempted at scale.

Merely increasing the supply of services for children's physical and cognitive development will not improve school readiness—countries need to improve the quality of these services. In most cases, close coordination across actors will be required to ensure that these services are catering to the full range of physical, cognitive, and socioemotional needs of young children.

Top Performing Systems invested in readiness to learn for lasting returns

Data from the Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA) reveal that, among 15-year-olds in school, children who attended preschool scored a full year ahead of their peers who did not, after controlling for socioeconomic differences (OECD 2013, 2016c).

BOX 6.1 What is readiness to learn?

Readiness to learn is a multifaceted construct. It is as much about children's readiness for school as it is about schools' readiness for children. Readiness to learn describes children's intellectual and socioemotional development as they prepare to enter primary school. Successful transition to school depends on children's ability to keep up with the academic content as well as to integrate into the social environment, including through relationships with peers and teachers. In some settings, children who are socioemotionally vulnerable lag behind children who are not vulnerable by about 9–12 months of learning in primary school.

Readiness to learn also encompasses a family's readiness to support their child's education. Parents are a child's first teachers and supporters. From birth to about three years old, they need to provide proper nutrition, health care, and a supportive, nurturing environment. From about age four to entrance into primary school, they can support readiness by putting their children into preschool and providing emotional support and a stimulating learning environment at home.

Academically, children need foundational numeracy and literacy skills; schools have to be ready to help children to build on these foundations. If children enter primary school without the requisite language skills, such as recognizing sounds and letters, they will quickly fall behind, leading to life-long gaps in achievement. Unfamiliarity with numbers can cause primary school students to fall behind in their first year of primary school, with a magnifying effect as they progress through grades.

Children should be able to regulate their emotions, follow instructions, interact with peers, and pay attention. Educators note the importance of the socioemotional side of readiness to learn. Familiarity with letters and numbers is not sufficient if the child lacks the ability to sit still and engage in the lesson. A child's success in primary school relies on many social skills, such as cooperation with peers, teamwork, emotional regulation—all skills that are also essential for success in a career and everyday life as an adult.

These skills begin at home and are strengthened through preprimary programs. Readiness to learn is a holistic concept, essential to success not just in primary school but throughout life. Strong support for families' efforts to assist in their child's academic and socioemotional development pay high dividends at low cost.

Sources: Blair 2002; Bowman, Donovan, and Burns 2001; Bradley and Corwyn 2005; Brazelton and Greenspan 2000; Britto, Fuligni, and Brooks-Gunn 2003; Dockett and Perry 2007; Ginsburg, Lee, and Boyd 2008; Minujin, Delamonica, and Komarecki 2006; Perez and Gauvain 2009; Raver 2004.

BOX 6.2 The early years are the cornerstone of readiness to learn

The early years are the foundation for a child's readiness to learn. There is no other time during which the brain develops so rapidly or is as sensitive to learning. It is during this time that the child begins developing the framework for later cognitive and noncognitive skills. The skills developed in the early years influence learning and development not just through primary school but also late into life. A focus on the early years includes both at-home and preprimary education interventions and support.

Development starts in the womb. The brain develops rapidly throughout gestation. Poor maternal nutrition and ill health can hinder child development. However, improved nutrition alone is not sufficient to make sure children are able to reach their full potential. To support the developing brain, countries need to bring to bear both health and education policy tools in support of expectant mothers, their families, and their children.

The early years are the most rapid period of neuron growth for the brain. Essential to this

box continues next page

BOX 6.2 The early years are the cornerstone of readiness to learn *(continued)*

growth is interaction with the child. Lack of interaction or a stressful environment can inhibit or reverse growth.

Early development has many facets, including cognitive and noncognitive domains. Cognitive domains include thinking and reasoning, while noncognitive domains encompass socioemotional and other related skills. Families and communities need to support development of these domains long before children enter compulsory education.

There is strong evidence that these facets are linked to readiness to learn. Far from being abstract concepts with little relation to education, development of cognitive and noncognitive domains in the early years relates directly to readiness to learn starting in primary education.

Investments yield benefits across a range of outcomes, in the short term and the long term. A focus on the early years pays dividends over the life span, from primary school through adulthood. In fact, early inputs have a multiplier effect, as skills beget skills. Support for development in the early years leads to more than just increased educational outcomes. It also improves employment outcomes and health.

Sources: Conti, Heckman, and Urzua 2010; Cunha and Heckman 2007; Gunnar and Fernald 2009; Heckman and Kautz 2012; Heckman, Pinto, and Savelyev 2013; Schweinhart 2005; Young and Mustard 2007.

Abundant evidence suggests a link between access to preschool services and long-term benefits. Among Top Performing Systems, research from Japan (Nitta and Nagano 1975), the Republic of Korea (Rhee and Lee 1990), and Singapore (Sim and Kam 1992) suggests that participating in preschool prepared children for elementary school and supported the development of traits such as sharing and cooperating. The evidence on the relationship between access to preschool and long-run improvements in learning is mixed, but the number of rigorous studies showing a correlation is growing (see, for instance, Berlinski, Galiani, and Gertler 2009; Brinkman and others 2017a).

Long-term improvements in test scores are also suggestive of the benefits of school readiness (Altinok, Angrist, and Patrinos 2018). Hong Kong SAR, China; Korea; Macao SAR, China; and Taiwan, China experienced strong improvements in the learning outcomes of their secondary schools (table 6.1). Since 2015 (the end year of the data reported in table 6.1), various policies have sought to increase access to and improve the quality of preschool services.

TABLE 6.1 Long-term gains in test scores underscore the importance of investments in readiness to learn

Economy	Compound annual growth rate in test scores (%)	Period
Macao SAR, China	0.63	2005–15
Hong Kong SAR, China	0.57	1980–2015
Korea, Rep.	0.32	1995–2015
Japan	0.18	1965–2015
Taiwan, China	0.15	2000–15
Thailand	−0.21	1980–2015

Source: Calculations based on Altinok, Angrist, and Patrinos 2018.

Top Performing Systems strived progressively to universalize early childhood education

Economies can be differentiated by the degree of continuity of their early childhood education policies, whether services were targeted or universal, and whether multiple sectors were involved.[1] Top Performing Systems such as Japan and Korea had policies and curricula in place well before the turn of the 21st century, but they continue to refine both curricula and standards for services. Singapore has been

offering low-fee kindergarten since the mid-1980s. In all three countries, different ministries have been involved in the provision of child care and kindergarten services. In each country, policies have ebbed and flowed with demographic and socioeconomic trends. As more women entered the labor force, there was an increase in child care services. The timing varied across Top Performing Systems. In Japan, the increase took place in the aftermath of World War II; in Singapore it took place during the 1970s.

Top Performing Systems assessed and improved the quality of preschools

Top Performing Systems such as Hong Kong SAR, China and Korea are especially comprehensive in ensuring quality through school self-assessment and monitoring by the Department of Education. In Korea, the Nuri Curriculum was introduced in 2012 to integrate curriculum standards for nursery centers and kindergartens for an emphasis on holistic child development. It lays out comprehensive lesson content and learning objectives. Korea assesses service and staff quality, providing funding and training to monitor results (OECD 2016a).

In Hong Kong SAR, China, the government has put in place performance indicators to measure the quality of early childhood education.[2] It has also issued a guide to the preprimary curriculum, which stipulates areas and objectives of early childhood learning. Its quality assurance framework comprises annual school self-evaluations and external quality reviews. Self-evaluations collect data on the qualifications of teachers and ask teachers to reflect on administrative structure, parent involvement, and goal-setting for the next year. External quality reviews compare results from classroom observations with performance indicators.

In Japan, curricula and standards for early childhood education have been refined since the turn of the 21st century, with parallel frameworks for child care (from birth to three) and early education (age three to the beginning of compulsory schooling). The National Guidelines for Care and Education at Day Nursery were first devised in 1965. They were revised in 1990, 1999, and 2008, based on social transformation and current best practices. Major changes in the most recent guidelines increase support for parents of preschool-age children and enhance the requirements and objectives of nurseries and child care centers (Shishido 2008).

In Singapore, three waves of reforms—in 2000, 2008, and 2012—sought to improve the quality of teachers, centers, and programs and improve accessibility and affordability. By 2009, 97 percent of children were reported to be in preschool.

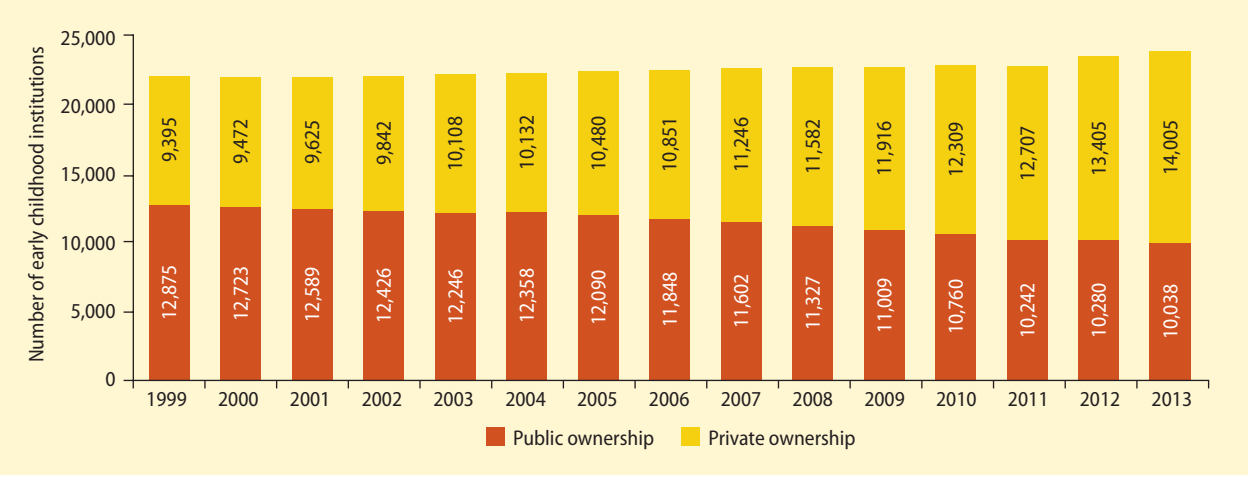
Top Performing Systems leveraged the private sector but insisted on quality and affordability

The private sector provides a substantial share of preschool enrollment in East Asia and Pacific. Governments differ in the degree to which they monitor the quality of preschools and incentivize the provision of services to all children.

In Japan, 55 percent of total expenditure on early childhood institutions comes from private sources, largely households (the OECD average is 19 percent). Less than 30 percent of children enrolled in preschool are in public institutions (the OECD average is 68 percent); 71 percent of children in preschool attend independent private institutions (the OECD average is 11 percent) (OECD 2014). In 2013, Japan had 24,043 kindergartens, of which more than 58 percent were privately owned (figure 6.1).

In Korea, the government has encouraged an independent private market. As a result, more than 91 percent of children between the ages of three and five had access to kindergartens and child care centers in 2013 (KICCE 2013). Historically, parents were expected to fund the full cost of provision (OECD 2004), some of which was borne by their employers. Where available, government funding from the Ministry of Education was targeted

FIGURE 6.1 **There is a trend of increasing private ownership among early childhood institutions in Japan, 1999–2013**



Source: UNESCO 2016.

at providing kindergartens in rural areas (Kamerman 2006). Financial support was available to children whose households were below the 70th percentile of the income distribution. As of 2012, all households regardless of income can be subsidized.

In Singapore, the government relies on the private sector to deliver services but maintains a strong role in defining and assessing the quality and affordability of services. Private sector provision was seen as advantageous because it allowed a spectrum of institutions to meet the diverse needs of parents.

After three decades of nondirect government involvement, in 2012 Singapore announced that it would open 15 government kindergartens, a decision driven by the desire to maintain affordability in the sector (Choo 2010). Early childhood care in Singapore falls under the auspices of two ministries, which functioned independently until recently. They have now merged on policies and requirements regarding accreditation, teacher qualification, and teacher training and collaborate in developing the Kindergarten Curriculum Framework of the Ministry of Education (Tan 2017).

As low-income countries in the region strive to emulate the success of Top Performing Systems, they need to consider the status quo

Outside the Top Performing Systems, countries are at various stages of drafting and refining national strategies

Above-Average Performing Systems began offering early childhood education and development services in the 1970s and 1980s but continued to refine service offerings and curricula well into the 1980s and 1990s. In China, a policy and legal framework is in place to support early childhood development in all relevant sectors. The Law on Maternal and Infant Health Care and the Outline for Chinese Children Development (2011–20) are the two core policy frameworks. Some services for maternal and infant health care and early childhood education services are neither free nor mandatory.

In the 2000s, Below-Average Performing Systems often issued laws detailing their policies and goals. Thailand established its first long-term plans for early childhood education

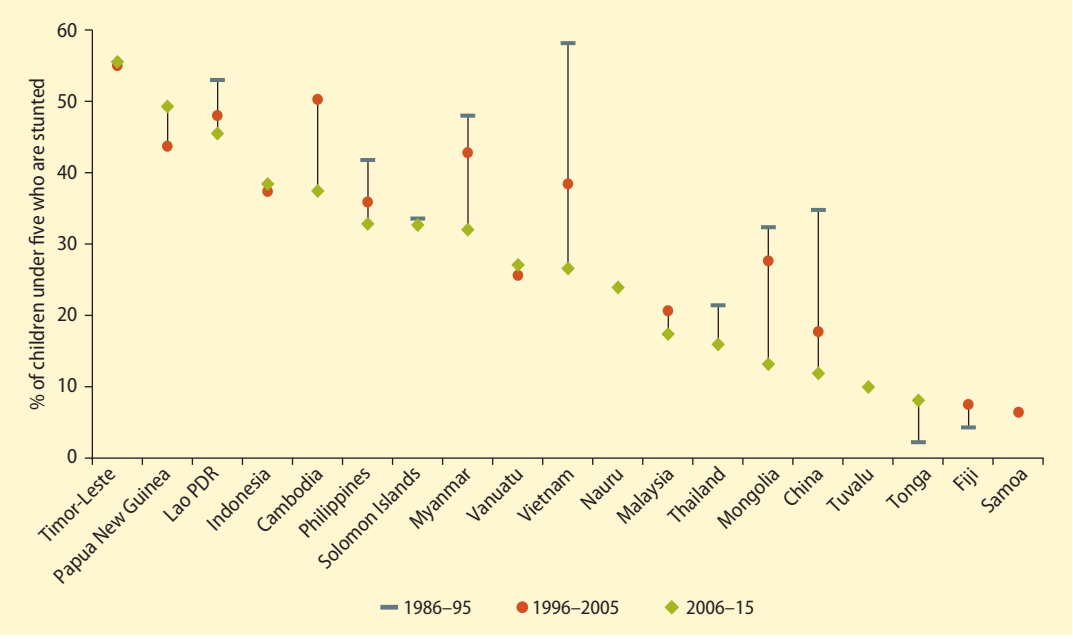
and development in 1979. It developed more detailed policies in 2002 and in the context of the 2007–16 Long-Term Plan and Strategy for Early Childhood Care and Development (children from birth through age five) (Shaeffer 2015). Indonesia passed National Education System Law No. 20 in 2003, and the Ministry of Education and Culture developed the *Rencana Strategis* (Village Development Strategic Plan) in 2004. In 2008, the government issued an ambitious policy strategy and accompanying guidelines. In 2009, it developed national standards for early childhood education and development, which established the first level of the country's education system.

In Emerging Systems, such as Mongolia, early attempts to create a favorable environment for preschool education (as early as the mid-1990s) faced fiscal difficulties. In 2005, the National Policy of Integrated Early Childhood Development was endorsed by a joint order of the Ministry of Health, Education, Labor, and Social Welfare to promote policy coordination among stakeholders. The major breakthrough was adoption of the Law on Preschool Education in 2008. It stipulates that the provision of food, books, manuals, and toys for children attending state-owned kindergartens, as well as the norm-based variable costs, should be financed from the state budget. Before the law's implementation, parents were obligated to pay half of the food costs and other expenses. In addition, the government decided to provide its own financial and technical support for nonformal programs for young children, programs that had earlier been supported by external stakeholders only (UNICEF 2013).

Nutritional challenges impede some countries' efforts to improve readiness to learn

The youngest children in East Asia and Pacific still face high rates of moderate to severe stunting. In a third of the region's countries, stunting remains highly prevalent, despite decades of improvement (figure 6.2). Stunting challenges

FIGURE 6.2 Stunting remains prevalent in many countries in East Asia and Pacific, despite decades of improvement, 1986–2015



Sources: Estimates by the World Health Organization, United Nations Children's Fund, and the World Bank.
Note: Some data are unavailable for each of the three time frames.

national efforts to improve readiness to learn. Evidence from many countries shows that inadequate nutrition undermines brain stimulation that is critical to early development. It also suggests that policies and programs to improve readiness to learn may be particularly beneficial for poor and marginalized groups, especially in poorer countries (Gertler and others 2014; Grantham-McGregor and others 2014, cited in UNESCO 2015).

Gaps in readiness to learn manifest themselves early

Across the region, gaps in readiness to learn open up early. If unaddressed, they can linger.

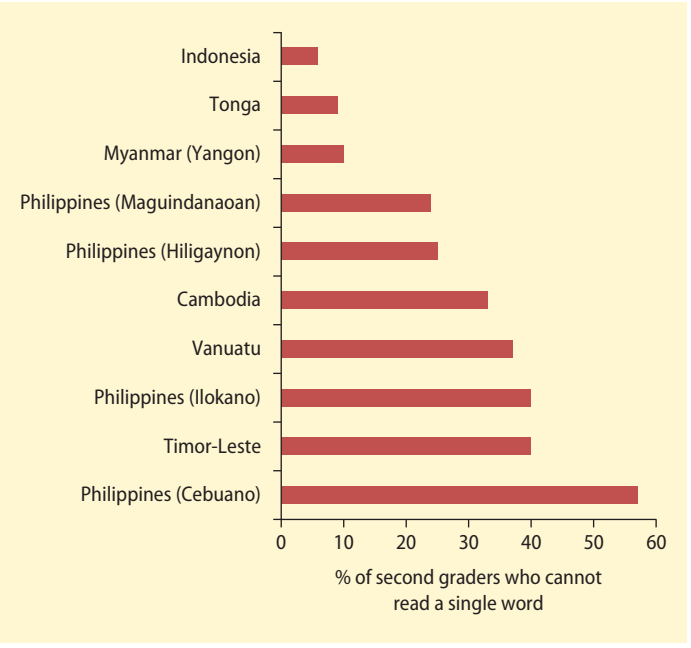
Ability—or inability—to read

Large differences in early development outcomes are evident across and within countries (figure 6.3). The worst-performing countries generally have Emerging Systems. For every country in this group, too few students are meeting national standards and an unacceptable number of students cannot read any words at all. Even in countries where zero-word rates are relatively low, results from Early Grade Reading Assessment (EGRA) data suggest that fluency is not very high. A large portion of students are still struggling with basic subtasks.

Top Performing and Above-Average Performing Systems tend to perform better than Emerging Systems, with a higher proportion of students meeting curricular standards, smaller shares of students failing on basic subtasks, and higher levels of reading comprehension. However, reports from Indonesia, the Philippines, and Vietnam suggest that too few students are able to read for comprehension even by the end of second and third grades. National averages mask regional inequalities, especially in Indonesia and the Philippines. In all reports in which disaggregated data are available, inequality in achievement by gender and socioeconomic background is evident (Graham and Kelly 2017).

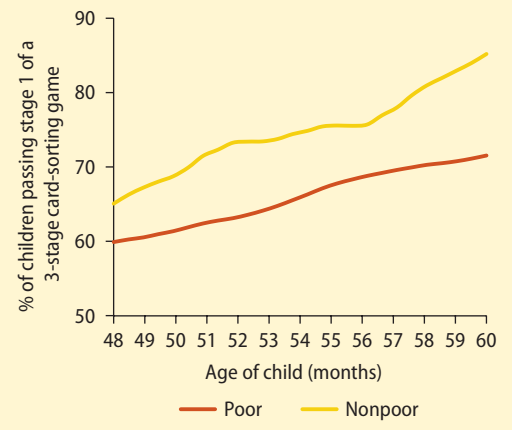
In all the countries and provinces for which EGRA data are available, the majority of students are not reading with a high level of comprehension by the end of second or third grade. They are not ready to "read to learn." Data from the nationally representative Dynamic Indicators of Basic Early Literacy Skills test in the United States reveal that, by the end of the school year, the median first grader can read with 95 percent comprehension. Even a student in the 15th percentile can read with 75 percent comprehension, and a student in the 1st percentile can read with 15 percent comprehension (Dewey, Kaminski, and Good 2014). In the EGRA-tested East Asia and Pacific economies, students in the 1st percentile are usually reading zero words—far from comprehending any written text at all.

FIGURE 6.3 Large shares of second-grade students in East Asia and Pacific cannot read a single word



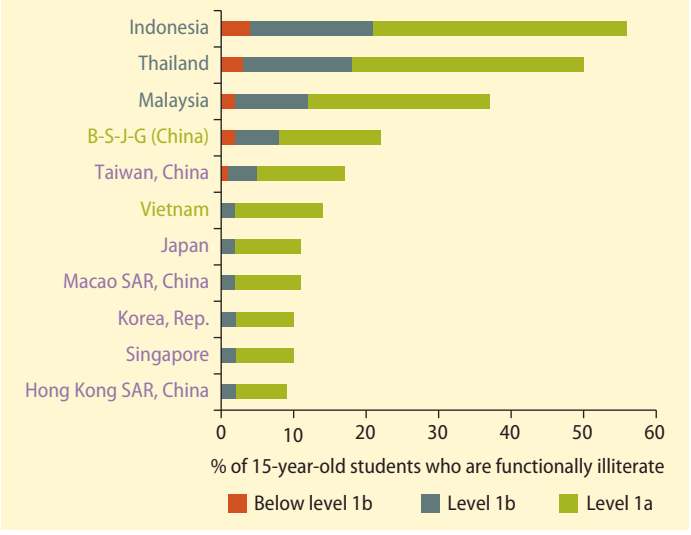
Source: Graham and Kelly 2017.
Note: All data are from nationally or regionally representative samples completed in the second half of the school year with the exception of the Philippines. The Philippines conducted its only nationally representative Early Grade Reading Assessment (EGRA) in 2013 for third and first graders only, in both English and Filipino. The results were similar to those in Indonesia: the rates of zero-word readers for third graders were low—at only 1 percent for both languages—and reading comprehension was at 73 percent for Filipino. On the other hand, English reading comprehension was only 32 percent. The 2014 EGRA study targeted regions and schools that taught in mother-tongue languages. Zero-word scores are based on the oral reading fluency subcomponent for all countries except Cambodia and Timor-Leste, for which the score is based on the familiar word reading subcomponent. In the Philippines, tests were conducted in the indicated mother tongues. Scores for Timor-Leste are for combined tests of Portuguese and Tetum. Scores for Vanuatu are for tests in English. Data are from the following years: Cambodia 2012, Indonesia 2014, Myanmar 2015, the Philippines 2014, Timor-Leste 2009, Tonga 2009, and Vanuatu 2010.

FIGURE 6.4 **Poor children score lower than nonpoor children on tests of executive function, and, in the absence of any services, the difference can grow over time**



Source: Jung and Hasan 2016.
Note: Data are from a study conducted in rural Indonesia.

FIGURE 6.5 **Rates of functional illiteracy among 15-year-old students vary widely in East Asia**



Source: PISA 2015 (OECD 2016b).
Note: At level 1a, tasks require the reader to locate one or more independent pieces of explicitly stated information; recognize the main theme or author's purpose in a text about a familiar topic; or make a simple connection between information in the text and common, everyday knowledge. The required information in the text is prominent and there is little, if any, competing information. The reader is explicitly directed to consider relevant factors in the task and in the text. At level 1b, tasks require the reader to locate a single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, such as a narrative or a simple list. The text provides support to the reader, such as repetition of information, pictures, or familiar symbols. There is minimal competing information. In tasks requiring interpretation, the reader may need to make simple connections between adjacent pieces of information. Below level 1b, the reader is unable to locate a single piece of explicitly stated information in a short and syntactically simple text. Economies labeled with purple type are East Asia and Pacific Top Performing Systems. Those labeled with green type are East Asia and Pacific Above-Average Performing Systems, and those labeled with blue type are East Asia and Pacific Below-Average Performing Systems. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China).

Ability—or inability—to manage time and pay attention

An assessment in rural Indonesia shows that gaps in young children's executive function are apparent at as early as age four (figure 6.4). Executive function is a set of skills that allows one to manage time and pay attention. These gaps do not close over time (Jung and Hasan 2016), especially in the absence of interventions.

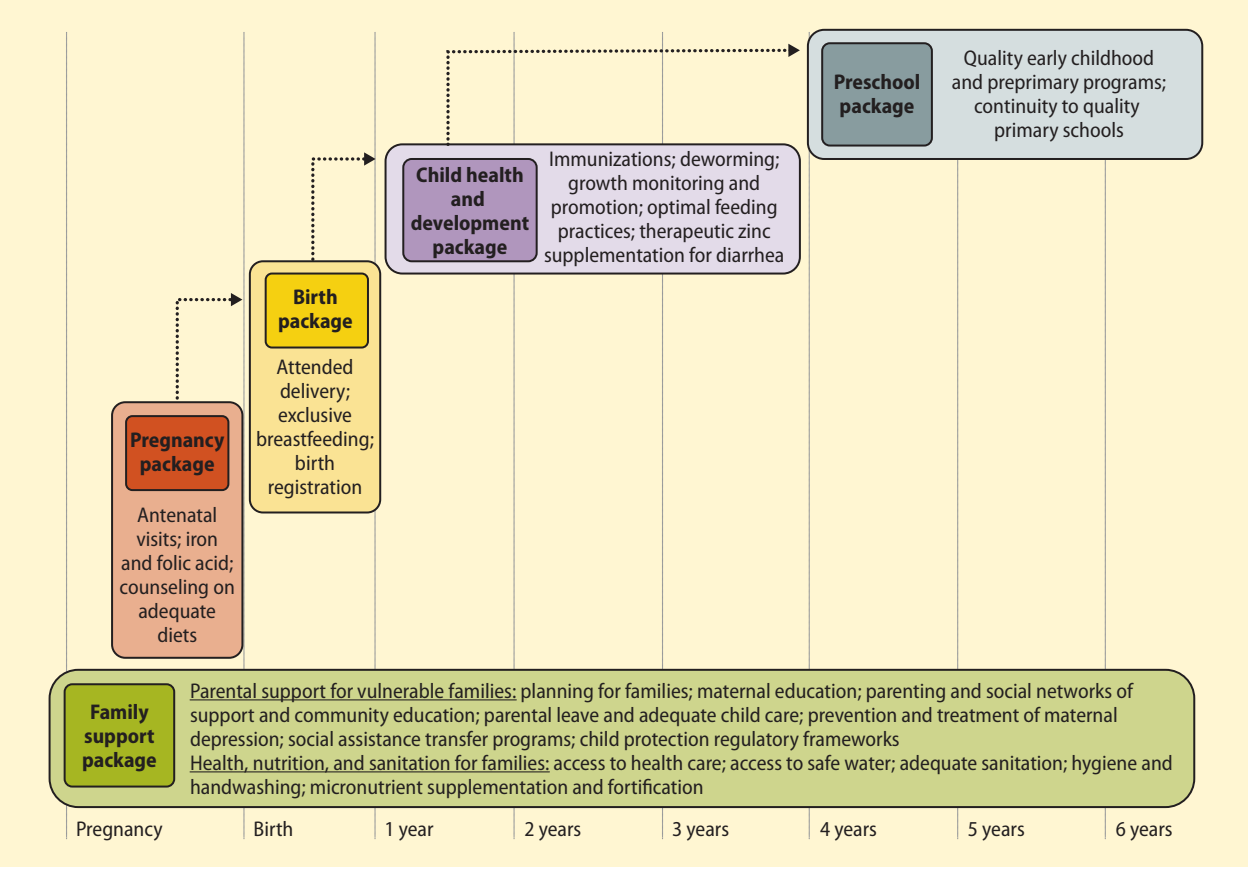
If unaddressed, gaps in readiness to learn linger

If students are not ready to "read to learn" going into grades 3 or 4, there is only a weak chance that they will attain a high level of functional literacy by the time they complete primary school. Figure 6.5 shows that functional illiteracy (defined as the inability to comprehend the main message in grade-appropriate texts) is much more prevalent among 15-year-olds in Below-Average Performing Systems than it is among Top Performing Systems. If students do not learn to read fluently in the early grades, there is little hope that they will develop the skills to succeed on tests like PISA or in the workplace.

Low-income countries in the region lack certain key packages of services

Denboba and others (2014) identify five packages of services that are key for ensuring that all young children reach their full potential (figure 6.6). The stimulation young children receive at home is often a foundation for the formal stimulation they receive in preschool. Consequently, some of these packages focus on families. Investments in these interventions lay the foundation for building human capital (physical health, cognitive development, and socioemotional maturity) and preparing children to learn. Countries are often able to support families and parents through pregnancy and birth, but many struggle to provide support for families or for child health and development. As a result, many new parents

FIGURE 6.6 **Five packages of services for children under six improve readiness to learn**



Source: Denboba and others 2014.

lack the information and tools needed to enrich their child's learning.

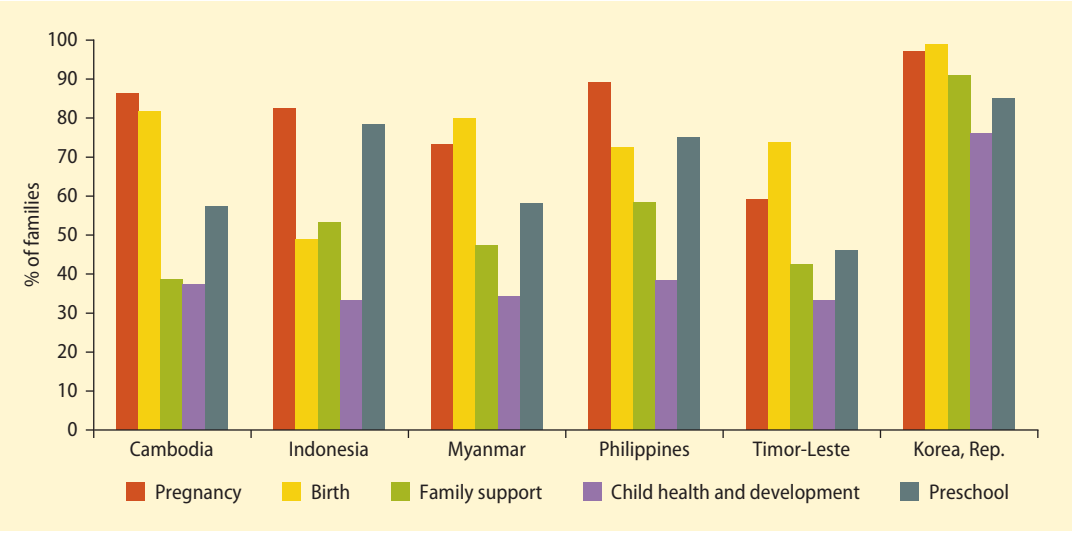
Below-Average Performing and Emerging Systems appear to be supporting readiness to learn in a variety of ways, but there are large disparities in access and take-up across the five key packages (figure 6.7). Take-up rates for services during pregnancy and birth are high in most of these countries; availability and take-up is lower for services aimed at families and children before their children reach preschool age. In particular, availability and take-up of family support services and services for child health and development tend to be low even in countries where preschool coverage rates are high. In contrast, in a country such as Korea, availability and take-up of all five packages are higher and more uniform.

How important are interventions aimed at parents? Research from across the globe, including from East Asia and Pacific, suggests that both parenting practices and children's participation in preschool services have the potential to increase young children's exposure to developmental essentials—opportunities for stimulating play, rich language experiences, practice in developing executive function skills, and more.

Home environments matter for school readiness

The stimulation young children receive at home is often a foundation for the formal stimulation they receive in preschools.

FIGURE 6.7 Families do not have consistent service coverage between pregnancy and preschool



Sources: Data from Demographic and Health Surveys. Preschool attendance data were supplemented by the World Bank EdStats database (World Bank, various years).
Note: As described in Denboba and others (2014), *pregnancy* includes at least four care visits, iron supplementation, and diet counseling during pregnancy. *Birth* includes having a doctor or nurse present at delivery and breastfeeding. *Family support* includes mother having completed at least primary education, last birth interval greater than two years and last pregnancy desired, at least three types of stimulating activities at home, health care facility not too far and visited within 12 months, vitamin A and iron supplementation in last six months, safe water source, and improved sanitation. *Child health and development* includes at least three types of food besides breast milk from six months on; zinc supplement in case of diarrhea; children with weight, height, and height-weight ratio less than 2 standard deviations below the mean; and access to deworming medicine. *Preschool* measures enrollment in preprimary education. No data were available on non-breast milk nutrition for the Philippines. Only Cambodia had information on the provision of diet counseling during pregnancy and availability of deworming medicine.

Yet many new parents lack the information and tools they need to enrich their children.

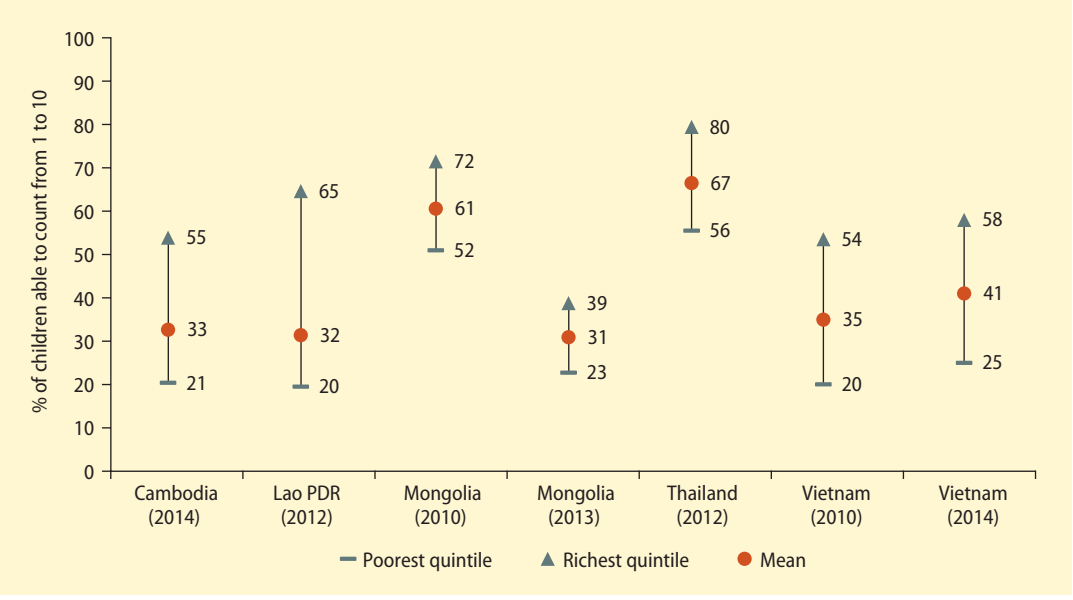
With the proper support, parents can help to improve their children's basic literacy. There are substantial wealth gaps in children's ability to perform basic functions such as counting from 1 to 10 (figure 6.8). These gaps are also apparent in preschool attendance and high-quality care at home (figure 6.9).[3] In Cambodia, the gap in access to preschools between the richest and poorest quintiles is 31 percentage points, and the gap in access to high-quality care at home is 24 percentage points.

Although both home and school factors help to explain differences in basic skills, home environments (interactions with the child, number of books at home, having at least two playthings at home, leaving the child unattended, and mother's years of schooling) account for most of the gap observed in Mongolia, Thailand, and Vietnam. In the Lao People's Democratic Republic, where the gap is extremely wide, preschool attendance accounts for most of the variance (figure 6.10).[4] These results are consistent with evidence from low-income settings showing that 10–20 percent of the gap in learning outcomes can be explained by differences in home stimulation, even after controlling for maternal education and endowments (Galasso, Weber, and Fernald 2017).

Parenting education programs can also support noncognitive skills

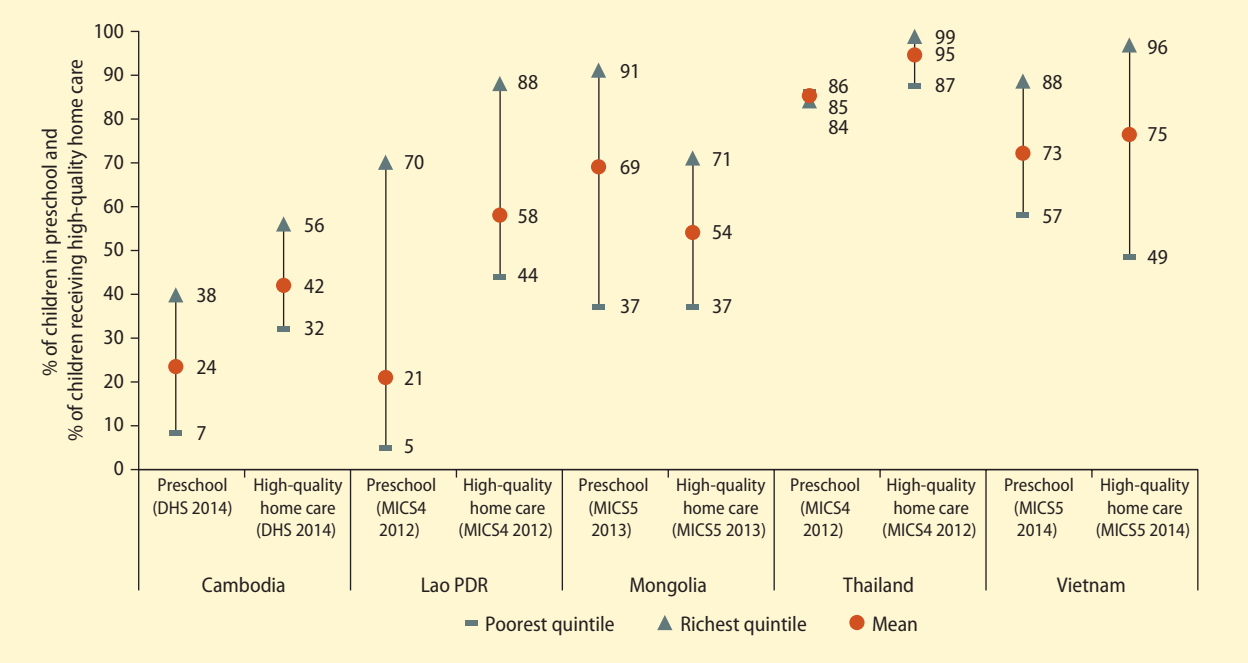
The importance of home and preschool environments is not limited to basic literacy and numeracy. Studies conducted in settings as diverse as Indonesia and Mongolia that collected detailed information on socioemotional development of children show that

FIGURE 6.8 Children from the poorest households are far less likely than children from the richest households to be able to count from 1 to 10



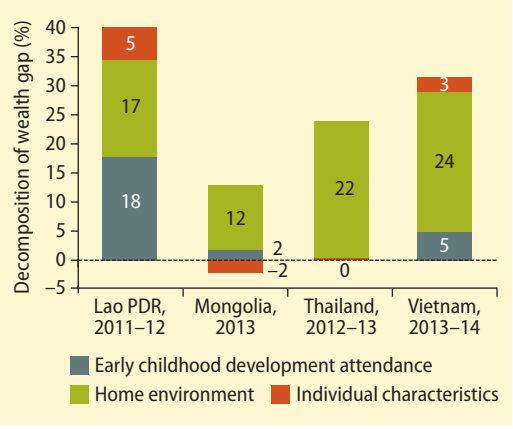
Source: Authors' calculations based on data from Multiple Indicator Cluster Surveys (MICSs).
Note: The richest and poorest quintiles refer to children who come from families with the top 20 percent and the bottom 20 percent of household income, respectively.

FIGURE 6.9 Access to both preschool and high-quality home care shows wide wealth gaps



Source: Authors' calculations based on data from Multiple Indicator Cluster Surveys (MICSs) and Demographic and Health Surveys (DHS).
Note: The richest and poorest quintiles refer to children who come from families with the top 20 percent and the bottom 20 percent of household income, respectively.

FIGURE 6.10 Home environments explain a substantial portion of the wealth gap in ability to count from 1 to 10



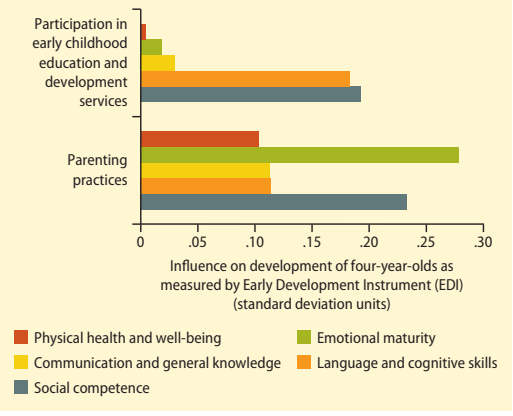
Source: Authors' calculations based on data from Multiple Indicator Cluster Surveys (MICSs).

both environments matter, with different degrees of importance depending on the domain of child development (figures 6.11 and 6.12).

Parent support services on topics relating to early childhood development vary widely in content and coverage. In Hong Kong SAR, China, the Education Bureau holds annual seminars for parents of children from birth to age six, inviting speakers such as professors, Education Bureau officers, and specialists in childhood development to present and create written material.[5] Parenting guides are available in five languages.[6] The number of parents and families that take advantage of such government resources is unclear.

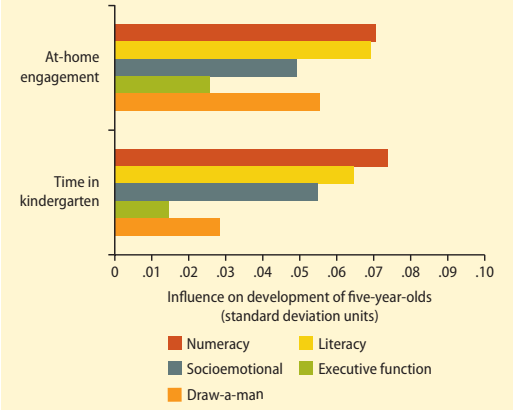
Indonesia's National Board on Family Planning (BKKBN) provides content on all domains of child development for children from birth to age six. Topics covered include discipline and behavior management, promotion of social skills, and parental attitudes and self-awareness. In 2012, there were 84,000 BKKBN programs across Indonesia, serving 3.7 million families. The rate of active participation (defined as having attended a BKKBN program in the past three months) was just 16 percent, however (Tomlinson and Andina 2015), and the quality of the material covered was less than satisfactory, according to an evaluation. The language used in the material was convoluted, and certain resources were confusing, resulting in the limited application of new knowledge at home by parents.

FIGURE 6.11 Both parenting practices and participation in early childhood education and development services affect the development of four-year-olds in Indonesia



Source: Hasan, Hyson, and Chang 2013.

FIGURE 6.12 Both home engagement and time in kindergarten affect the development of five-year-olds in Mongolia



Source: World Bank 2017b.

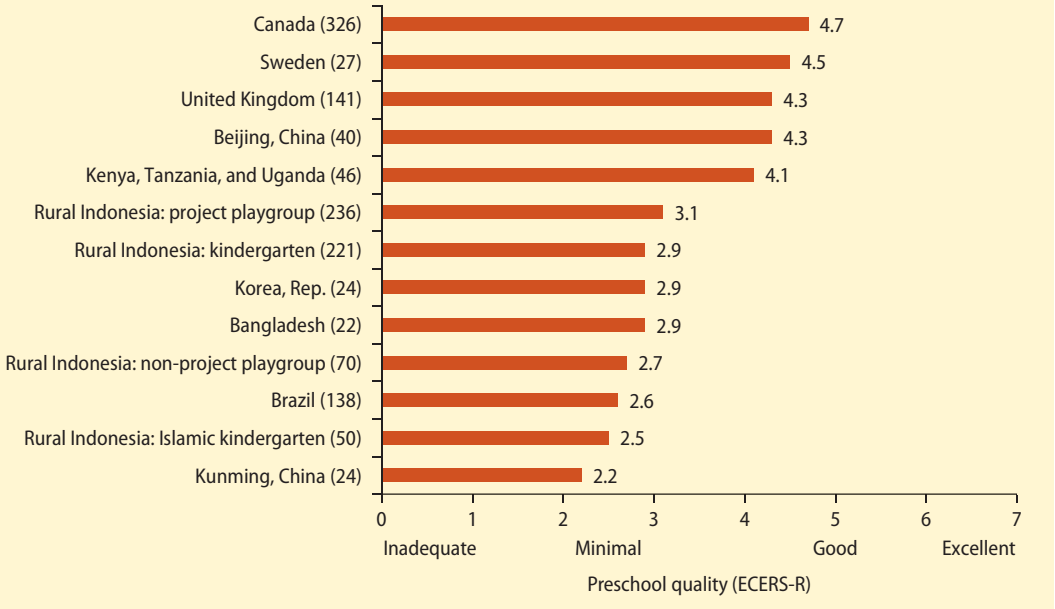
Across all settings—including high-income countries—the average preschool seldom achieves a rating of "good"

Three measures of preschool quality appear regularly in the literature: observed preschool quality, teacher characteristics, and structural characteristics. The Early Childhood Environment Rating Scale-Revised (ECERS-R) (Harms, Clifford, and Cryer 2005) collects information on each of them. ECERS-R scores incorporate observer assessments of space and furnishings, personal care and routine, language and reasoning, activities, interactions, program structure, and information on parents and staff. Figure 6.13 captures how varied the quality of preschool services can be. It also underscores the difficulty of providing high quality. Across all settings—including high-income countries—the average center is seldom rated "good," let alone "excellent," on this scale.

Evidence from across East Asia and Pacific suggests that the quality of services remains low even when countries have standards for service delivery. This is particularly true in countries striving to increase the supply of services while simultaneously upgrading quality. Evidence from Indonesia, for instance, suggests that only about 80 percent of services can meet local service standards (figure 6.14) and even less meet the minimum score for quality as outlined in the ECERS-R.

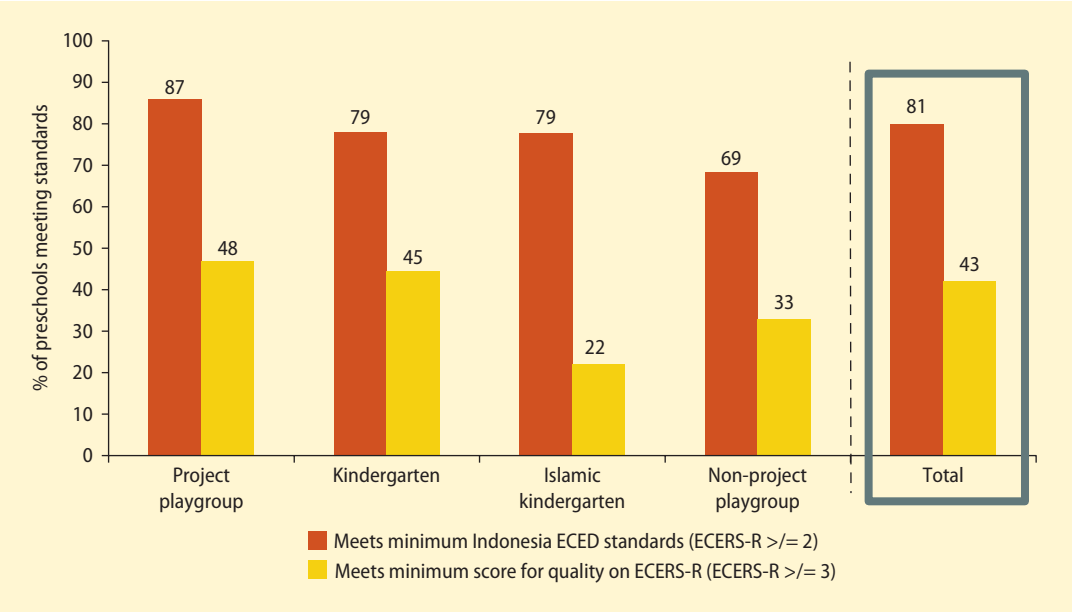
In Thailand, the trade-off between quality and supply is clear. Of more than 20,000 early childhood development centers in the country, 67 percent passed the quality assessment survey conducted in 2013.[7]

FIGURE 6.13 The quality of preschools varies widely across settings, and average quality is low



Sources: Aboud 2006 for Bangladesh; Campos and others 2010 for Brazil; Goelman and others 2006 for Canada; Liang, Zhang, and Fu 2013 for Beijing and Kunming; Malmberg, Mwaura, and Sylva 2011 for East Africa; calculations for Indonesia based on data collected in 2013 from World Bank Indonesia Early Childhood Education and Development Project; Sheridan and others 2009 for the Republic of Korea and Sweden; and Sylva and others 2006 for the United Kingdom.
Note: None of the samples is nationally or regionally representative. Numbers in parentheses are number of centers observed. ECERS-R = Early Childhood Environment Rating Scale-Revised. Rural Indonesia project playgroup refers to playgroups opened as part of the World Bank Indonesia Early Childhood Education and Development Project.

FIGURE 6.14 About 80 percent of preschools in rural Indonesia meet local standards, and fewer meet the minimum score for quality as outlined in ECERS-R



Source: Brinkman, Hasan, and others 2016.
Note: Evidence is based on a sample of preschool services in rural Indonesia. Data are not nationally representative. ECED = early childhood education and development; ECERS-R = Early Childhood Environment Rating Scale-Revised.

Access to early childhood education is linked to positive outcomes for both children and their mothers

Evidence from 7,520 children and their caregivers in northern Lao PDR shows that children who attended preschool outperformed children who did not across a range of developmental domains (figure 6.15).

Figure 6.16 documents the impacts of expanding access to preschool services on school readiness among a cohort of poor four-year-old children in rural Indonesia. It suggests that across several domains—including social competence, emotional maturity, and language and cognitive development—access to preschool is beneficial if the quality of services is high.

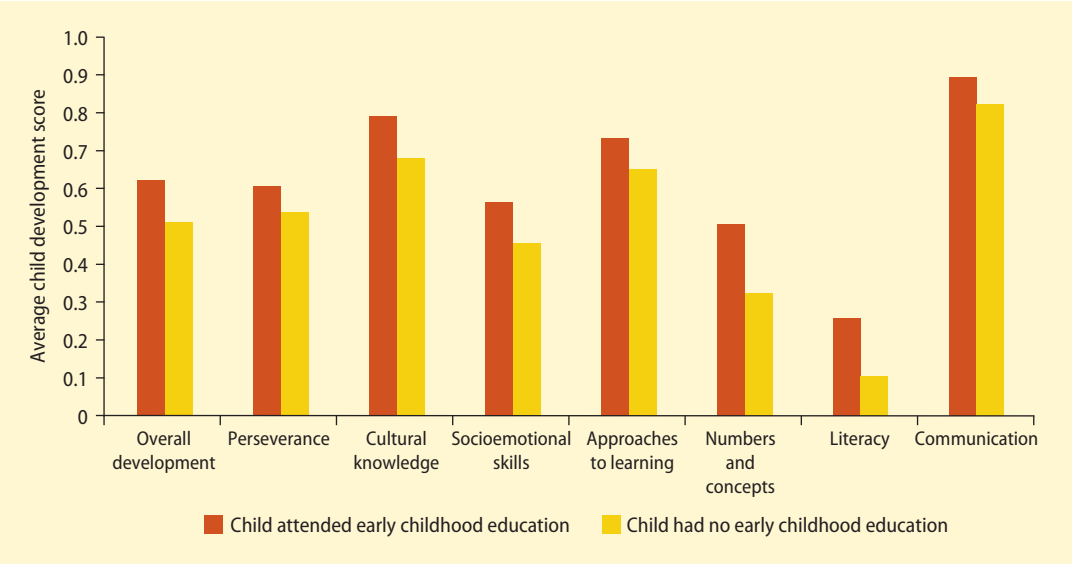
The costs of inaction are high, and countries can afford to act

Left unchecked, the wide socioeconomic gaps in early childhood interventions will have high costs for individuals and society. The costs of inaction are enormous. Without intervention, children who are at risk of poor development in low- and middle-income countries are expected to earn 26 percent less as adults than they would if they had reached their full developmental potential (Richter and others 2017). Globally, a 25 percent increase in preschool education is estimated to yield returns of US$10.6 billion (Lancet 2011).

Beyond earning potential, there are long-term economic and social benefits to acting. An abundance of research shows the correlation between effective early childhood intervention and an individual's quality of life, participation in crime, intelligence quotient, and mothers' labor outcomes (see box 6.3). Research suggests a 13 percent return on investment for comprehensive, high-quality education for children from birth to age five (Garcia and others 2016).

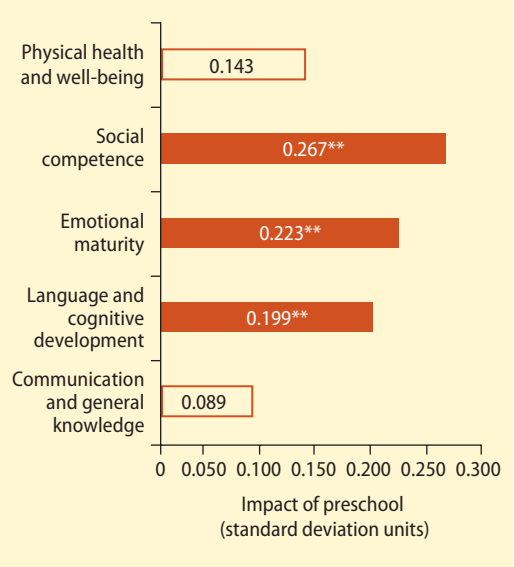
Lopez Boo, Behrman, and Vazquez (2016) estimate the costs of inaction for closing the socioeconomic gap in two early childhood

FIGURE 6.15 Access to preschool is associated with a range of child development outcomes in the Lao People's Democratic Republic



Source: Brinkman, Sincovich, and others 2016.

FIGURE 6.16 Access to preschool is associated with a range of child development outcomes in Indonesia, particularly for poor children



Source: Brinkman and others 2017a.
Note: Data are for 2013. Data in clear bars show no statistical significance.
**$p < .05$.

interventions: preschool and stimulation home visits in six countries in Latin America and the Caribbean. Applying their approach for the subset of East Asia and Pacific economies that took part in PISA 2015 suggests that closing the gaps in learning between children in the highest and lowest income quintiles would cost countries about 0.03–0.46 percent of gross domestic product (GDP) (figure 6.17). The cost of inaction is higher for countries with larger proportions of students performing below basic proficiency. Indonesia is an exception only because government expenditure for preprimary education is very low; if Indonesia had the same level of public expenditure per student as Thailand, the cost of inaction would be 0.35 percent of GDP.

Tested and proven solutions exist across the region

Community-managed play-based activities

In rural Indonesia, increasing the supply of low-cost, government-sponsored,

BOX 6.3 Child care services can improve women's labor force participation: evidence from Indonesia

Increasing female labor force participation is essential for economic growth and prosperity; economic empowerment of women is a prerequisite for sustainable development. Gender equality is a catalyst for change in multiple dimensions of development, including the health and educational attainment of future generations. In countries and regions with rapidly aging workforces, raising female labor force participation can help to offset the impact of the shrinking working-age population.

Access to child care is an important determinant of labor force participation for urban women. Elderly members within the household often act as informal child care providers, alleviating the need for women to stay home to take care of their children. Data from Indonesia show that, before motherhood, the presence of elderly family members at home has no effect on the likelihood of an urban woman working. But at age 26, when fertility begins to peak, the share of urban women who work is 10 percentage points higher among women with elderly family members at home. And by age 27, this margin grows to 19 percentage points.

Without access to child care, women tend not to return to the jobs they had before giving birth. In both urban and rural areas, the probability of working as an unpaid family worker during the year of giving birth is higher for women without elderly family members. Without access to elderly household members to provide informal child care, it takes an average of six years for women in rural areas to transition out of unpaid family work (eight years in urban areas). Women without support from elders are more likely to move out of manufacturing jobs and into less lucrative jobs than are women who have such support.

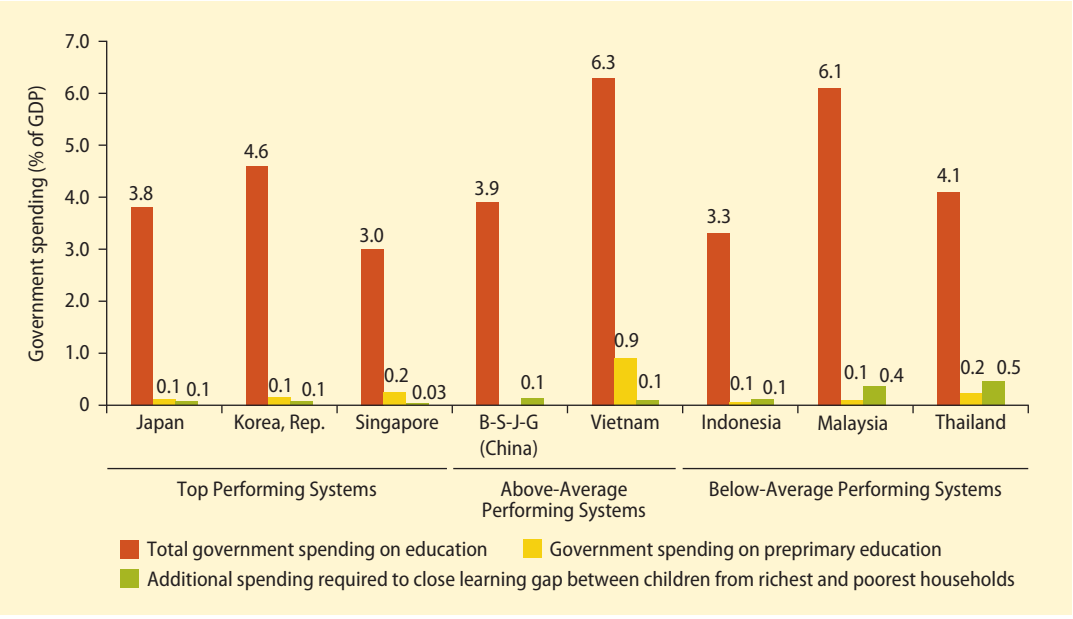
Unmet child care needs have an economic cost in terms of forgone earnings. In urban areas, Indonesian women with access to elderly family members return to work an average of two years after giving birth; women without access to such care return after four years. It is estimated that women who do not have elderly family members at home forgo US$1,300 in earnings in the two extra years it takes for them to return to regular work. The transition out of manufacturing occupations and into jobs like sales and agricultural work is associated with annual forgone earnings of US$319 and US$255, respectively. This sector switch is permanent; the likelihood of working in other sectors does not return to prepregnancy levels in either rural or urban areas.

Source: Halim, Johnson, and Perova 2017.

community-based playgroups helped to raise enrollment rates and the duration of enrollment. Greater exposure to the program led to modest and sustained impacts on child development, especially for children from more disadvantaged backgrounds (Brinkman and others 2017b). These improvements were large enough to close the achievement gap between richer and poorer children (Jung and Hasan 2016). At an annual cost of US$30 per child (in 2014 US$), conservative estimates suggest that this intervention had a benefit-cost ratio of 1.3–4.3 (Brinkman and others 2017a).

In Vietnam, the School Readiness Promotion Project was designed to support the expansion of full-day, full-year enrollment in preschools and the provision of lunch subsidies for poor and ethnic minority children to increase demand. The project also promoted quality through more and better teacher training, the development of a quality assurance system, and the establishment of an accreditation process. It supported policy measures to determine standards and authorize quality assurance systems that would guide investments in early childhood education and development and strengthen monitoring and reporting. The results-based project enabled the government to increase its financial commitment to early childhood efforts. After four years, the program achieved the following (World Bank 2017a):

FIGURE 6.17 Closing the achievement gap between socioeconomic groups is affordable



Sources: Authors' calculations based on data from PISA 2015 (OECD 2016b), UIS, and World Bank and Government of Vietnam 2017.
Note: Data on total government spending are the latest available between 2011 and 2014, except 2016 for Indonesia and 2015 for China and Singapore. Cost of inaction is for closing the socioeconomic gap in the percentage of students falling below basic proficiency in science. Data on percentage of government spending on preprimary are from UNESCO Institute for Statistics, Vietnam Ministry of Economy, and Vietnam Ministry of Finance for 2013, except 2012 for the Republic of Korea and Vietnam and 2014 for Japan. No data available for preprimary spending by B-S-J-G (China). B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment; UNESCO = United Nations Educational, Scientific, and Cultural Organization.

- The share of vulnerable five-year-olds declined from 24 percent in 2012 to 12 percent in 2016.
- The share of five-year-olds in full-day preschool rose from 74 percent in 2011 to 88 percent in 2017.
- The number of preschools accredited with quality level 1 or above reached 41 percent in 2017. No preschools were accredited in 2012.
- More than 90 percent of preschool teachers and managers completed compulsory professional development training programs.

In Tonga, researchers examined the impact on early grade reading outcomes of a low-cost community play-based activity. Using an instrumental variables approach, they demonstrated positive impacts of about 0.2 standard deviation in many, but not all, reading domains. The intervention improved test scores by 0.21–0.47 standard deviation (equivalent to 0.1–0.6 year of schooling) per US$100, depending on the reading test domain (Macdonald and others 2017).

Home-based programs

A home-based school preparation program in Mongolia helps five-year-olds living in the most remote rural areas to get ready for school. Children use a home-based school preparation learning program and selected educational toys and materials. Parents are the primary teachers, engaging with their children through reading, singing, and playing. Local teachers train them, using guide books prepared by the program (World Bank 2017b).

In Vanuatu, the Literacy Education Programme (2005–10) included a component on home literacy and parent education. The program, which focused on children in grades 3 and 4, showed positive impacts on student literacy of parents' attitudes toward educating their children and parent-teacher relationships (UNESCO, n.d.).

Reading interventions

In Tonga, researchers examined the impacts of a reading intervention on early grade reading outcomes. The average estimated impact was about 0.3 standard deviation, although in some reading domains impacts were 0.6–0.7 standard deviation (Macdonald and others 2017). The cost per child was US$183, and the estimated net present value of benefits was US$792, yielding a benefit-cost ratio of 4:1. Box 6.4 describes the impact of the Pacific Early Age Readiness and Learning (PEARL) program on improving literacy outcomes in the Pacific.

Cambodia assessed students on their reading of Khmer in 2006 and 2009. The poor results led to a change in reading method from whole-word recognition to a vowel and consonant combination approach. In 2010–12, Cambodia focused on reading skills in pilot schools. Thousands of students and their teachers received their own copies of Khmer language books—a unique intervention at a time when most children had to share books—and students were encouraged to read at home. More than 24,000 teachers were trained, and two Khmer-language textbooks were published. In 2010, the Cambodian Ministry of Education, Youth, and Sport announced that the teaching of reading would be a national priority. The government also established a dedicated National Assessment Office within a new Department of Education Quality Assurance. These investments in early literacy have reaped significant rewards. In 2014, an analysis of the Cambodian Grade 8 National Assessment showed that almost all students in that grade were capable of reading and comprehending text (World Bank 2016b).

Papua New Guinea's READ PNG program boosted literacy at low cost. It coupled innovative strategies for word recognition with teacher training and monitoring. Program results showed an average increase of 0.54 standard deviation across the different domains of literacy among third graders, as measured by the EGRA. The improvement was more than six times the difference in reading scores between third and fourth grades, underlining the efficacy of teacher training and support at the core of early literacy program efforts. Teachers had access

BOX 6.4 Improving literacy and readiness across the Pacific through the PEARL program

Early reading assessments in the Pacific reveal that a large proportion of children are not functionally literate and not ready to succeed in school. A 2009 assessment revealed that only 3 of 10 third graders in Tonga and 2 of 10 in Vanuatu were able to read and comprehend what they read. Poor reading and comprehension skills persist over time, as evidenced by the fact that more than half of fourth and sixth graders in the Pacific are not meeting regional benchmarks in literacy.

The Pacific Early Age Readiness and Learning (PEARL) program was designed to improve literacy and readiness to learn outcomes across the Pacific. It takes a holistic approach to developing foundations for literacy, while working with families and communities to build enabling environments for early childhood development. The program has provided classroom support and training for teachers in Tonga to incorporate new and more effective teaching methods that target reading and comprehension. It also supports the ministries of education of Papua New Guinea, Samoa, Tuvalu, and Vanuatu in producing roadmaps on how to support early literacy development in their respective countries. The program has advocated for increased parental and community involvement in helping children to prepare for school through play-based learning.

Results from pilot projects in Tonga indicate that the program has raised student learning outcomes. A randomized control trial showed significant reading gains, ranging from a half to a full school year's worth of advancement in one academic year. Community-based play groups have been operating in 49 communities, benefiting more than 2,000 children and their parents.

Source: Patrinos 2016.

to scripted instructional materials, structured lesson plans, feedback through consistent class observations, and remote support using mobile text messaging. A training model was developed to be responsive to teachers' needs. Key elements included relevant and participatory training, opportunities to practice new skills, and monitoring of teachers as they apply new pedagogy within the classroom (World Bank 2016a).

Programs that engage parents

In Mongolia, parents borrow learning materials from a mobile toy and book library established in 30 *soums* (county subdivisions) as part of an early childhood education program. The library includes at least 30 educational kits, with different sets of educational and storybooks, toys, digital tools, and listening resources. Parents and children use each kit for about two or three weeks before receiving another one. The cognitive and noncognitive skills of the children enrolled in the program were significantly higher than those of children in alternative programs, underlining the potential for a home-based model to improve school readiness among hard-to-reach populations (World Bank 2017b).

Programs that simultaneously engage parents and children

An initiative in the Philippines that included a wide range of health, nutrition, early education, and social services programs significantly improved the cognitive, social, motor, and language development of participants. By combining center-based services with a program of parent effectiveness services, the program increased the short-term nutritional status of children living in program areas, particularly for children under age four (Armecin and others 2005).

Some economies in the region are attempting to bring these solutions to scale

Hong Kong SAR, China provides comprehensive support for families with children attending preprimary institutions. The government has created and distributed materials and videos on topics such as choosing a good kindergarten, appreciating child growth and development, and understanding the kindergarten curriculum. It promotes parent education multisectorally through different departments and bureaus. The Education Bureau organizes seminars for parents every year, with the aim of helping them to understand age-appropriate expectations for cognitive and physical development. The Department of Health and the Department of Social Welfare also provide parent education. These initiatives focus on imparting knowledge and skills on child-rearing, family functioning, and health.[8]

In Indonesia, the government and nongovernmental organizations run parent education programs that cover many areas of the country. The Ministry of Health disseminates information on breastfeeding, immunization, health, and safety practices. District health offices offer classes taught by paraprofessional health workers and sometimes invite specialized professionals to speak to parent groups (Tomlinson and Andina 2015). The Ministry of Education and Culture provides grants for funding preschool programs that submit successful proposals to create parent education programs. Parenting programs receiving the government grant need to require that parents bring their child and interact with him or her during class.

Conclusions and recommendations

Top Performing Systems in East Asia and Pacific made substantial investments to support readiness to learn. These systems continue to do the following:

- Focus on children's physical and cognitive development from birth
- Assess and improve the quality of services
- Coordinate across actors to deliver needed services.

TABLE 6.2 Steps toward supporting children's readiness to learn

	Action			
Policy	Emerging Systems	Below-Average Performing Systems	Above-Average Performing Systems	Top Performing Systems
Readiness to learn	Develop policies and programs to ensure that both cognitive development and physical health are the focus of early childhood school readiness strategies.	Ensure that clear quality standards exist, are disseminated, and are addressed in an evaluative process.	Engage multiple actors in the development and delivery of integrated early childhood services.	

Investments in early childhood education have been linked to lower crime rates, higher economic output, and improved quality of life (Garcia and others 2016). The costs of inaction are thus high.

For others in the region, coverage and quality of early childhood education policies are mixed. Their governments need to recognize the developmental state of their countries' early childhood policies and craft plans grounded in realities.

Priorities need to be tailored to each economy's circumstances (table 6.2). For Emerging Systems, a primary challenge is to develop programs that emphasize cognitive and physical development at a sustained level from before birth to entry into compulsory education. Once these policies are in place, governments need to develop the tools and mechanisms to ensure that quality standards for readiness to learn services are addressed clearly and improved continuously. Above-Average Performing Systems need to engage across actors to deliver services in a manner that leverages multisectoral expertise.

Notes

1. Multisectoral coordination is especially critical, because programs with multiple components that target health, cognitive development, and emotional development tend to yield greater and longer-term results (Sánchez Puerta, Valerio, and Gutiérrez Bernal 2016).
2. These indicators cover teaching methods, classroom management, learning atmosphere, professional attitude, classroom environment and facilities, home-school relationships, and provision of support to children with family issues. For more information about how Hong Kong SAR, China measures quality in classrooms, see the Education Bureau (http://www.edb.gov.hk/en/edu-system/preprimary-kindergarten/quality-assurance-framework/index.html).
3. If an adult household member engages in four or more activities that promote learning and school readiness during the three days preceding the survey, the quality of home care is considered high; otherwise, it is considered low. Activities include reading books or looking at picture books; telling stories; singing songs; taking children outside the home; playing with children; and spending time with children in naming, counting, and drawing things.
4. The decompositions focus on the share of the gap that can be attributed to home environments and the share that can be attributed to preschool enrollment over and above the influence of parents' characteristics, such as education; child characteristics, such as age and gender; and household characteristics, such as household wealth. The results are qualitatively similar when an index of development is used as the dependent variable.
5. A sample of seminar and pamphlet topics since 2009 includes the following: "Strategies on Development of Young Children's Reading Habit," "To Nurture or to Pressure?" "Helping Your Preschooler Be Resilient," and "Cooperative Parenting with Grandparents."
6. For more information on parenting resources, see the Education Bureau (http://www.edb.gov.hk/en/student-parents/parents-related/parent-info/index.html).
7. For more statistics on early childhood education in Thailand, see https://www.unicef.org/thailand/education_14938.html.

8. See the Education Bureau website (http://www.edb.gov.hk/en/student-parents/parents-related/parent-info/index.html) for more information on parent education initiatives.

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Using Student Assessments to Improve Instruction and Learning

7

Because the quality, not just the quantity, of learning is crucial for growth and development, countries need to measure learning to ensure that the benefits of education reach all students. It is not enough that children are in the classroom—it is imperative that they learn.

The literature has established a strong association between economic growth and education quality (see, for example, Hanushek and Woessman 2007). Quality is increasingly becoming a global priority. The 2015 Incheon Declaration's call for high-quality inclusive education is a testament to the importance of learning outcomes; it also emphasizes the need for systems and practices for assessing quality (UNESCO 2015). Its framework emphasizes that improvements to quality and relevance of learning must accompany gains in access.[1] Many high-performing countries recognize this link and use student assessments as a central element in advancing their education systems.

Many countries systematically use assessments to develop their education systems (box 7.1). Many Top Performing Systems strategically used high-stakes exams early on to allocate spaces to higher levels of education. They have been flexible in using assessments in the classroom and national and international large-scale assessments to spur policy change. A focus on high-stakes exams is not the only viable path for other countries to follow; the principal lesson from the experience of the Top Performing Systems is that the right tool should be used for the right purpose and that the system should be flexible enough to adapt. Using assessments is not enough; systems need to have the right policies and frameworks to support a system of assessments. Many countries in the region have built systems that include an adequate enabling environment, mechanisms for quality control, and alignment of assessments with the rest of the education system.

Efforts to assess student learning have been closely integrated with ways of taking action in the education matrix—linking to policies and practices relating to teachers, students, and curricula. Although the mix of assessments may vary, high-performing systems have well-defined ways of feeding the information on student learning outcomes gained from such assessments back into the system to drive quality. Assessments can be used to feed information back into the system at the classroom level (training teachers to use such assessments and incorporating classroom assessment into curricula), at the school level (informing principals' decisions and

BOX 7.1 Multiple types of assessments can be used

Each type of assessment has a different purpose:

- *Classroom assessments* are used to provide results that teachers can use to adapt strategies and content to students' needs. Examples include teacher-designed tests, quizzes, oral questioning, and portfolios.
- *Exams* are generally high-stakes assessments used to determine students' schooling trajectory (often for transitioning between levels or accessing specific educational streams). Examples include school-leaving and matriculation exams.
- *Large-scale assessments* (international and national) are generally directed at evaluating system performance. Examples include international assessments such as the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS), regional assessments, and country-specific assessments, such as the National Assessment of Educational Achievement in the Republic of Korea.

Source: Clarke 2011.

educational strategies), and at the system level (using assessment data to enable systemwide accountability, create a broad commitment to quality, and spur policy decisions).

Assessments also have a potentially stronger link to the public in East Asia and Pacific: they can function as a lever for accountability to spur quality and equity. With all types of assessment, adequate communication and use of test results are important for improving education quality and equity. Learning assessment data provide transparency and allow parents to demand quality, make informed choices, and strengthen their role in governance. Within the region, policies and practices for disseminating assessment data could be developed further to strengthen the basis for such accountability. Analysis of practices in the region reveals that the poorest students are less likely to attend schools that publicly share achievement data.

Assessments are changing and must continue to do so to keep pace with education trends, which are looking ahead to the fourth industrial revolution. Many assessments measure content knowledge and cognitive skills. But education reforms in the region and beyond show that the scope of expected learning is expanding to meet changing economic realities. As curricula increasingly emphasize noncognitive skills—such as collaborative problem solving, well-being, and communication skills—measurements of learning need to keep pace. This shift presents a range of challenges for assessment. International exams such as the Programme for International Student Assessment (PISA) are already working to broaden the scope of skills assessed. Innovations in assessments in tandem with curricular reforms in the Republic of Korea, Singapore, and Vietnam offer insights into priorities for the future.

Multilevel measuring and monitoring of learning outcomes are critical

Regular information on student learning outcomes provides policy makers and educators with a critical tool for improving their education systems. Various types of assessments offer information on students' knowledge, skills, and attitudes. Such information can inform key decisions by teachers, including how to tailor instruction to learners' needs, provide real-time feedback to learners, determine placement and progression of students in the education system, and certify levels of education or skills achieved (Kellaghan 2004). For policy makers, information on learning outcomes serves as a window into

whether the education system is meeting the country's needs. This information provides critical input for policy reforms such as curricula and teacher training and for monitoring trends and implementation of reforms (Kellaghan 2004). For the public, assessment data can increase transparency about the quality of services and provide parents with information on their children's progress.

At each level of the system, data from learning assessments are central in informing efforts to improve the quality of the education and learning experience. At the country level, international and regional assessments offer countries the opportunity to gauge how their education systems are performing relative to others. Although the emphasis is often on the competitive nature of such assessments, the principal value of these assessments is the opportunity to benchmark. Both international and national assessments provide data that can be used to examine aspects of education systems as well as the factors related to learning, which can ultimately drive and inform policy responses and support system-level accountability. At the national level, data on student learning can serve as a gauge of how policies are working and how results vary across geographic areas and demographic groups. Early Grade Reading Assessments (EGRAs) and Early Grade Mathematics Assessments (EGMAs), for example, can provide detailed results on education system performance and directly inform teaching methodologies. Systemic assessments also inform central decisions regarding teacher and curricular policy (for example, identifying weak areas and resources needed). At the school level, data on student learning can help to distinguish high- and low-performing schools; identify areas that require intervention; and, if disseminated, serve as a powerful tool for accountability and parental choice by increasing the transparency of schools' results. At the individual level, feedback from assessments can directly inform students' learning plans and efforts.

Top Performing Systems regularly collect and use information on student learning outcomes at multiple levels. Their long history of exams in the civil service has translated into support for the principle of assessment in education and a strong culture for the use of exams (OECD 2012). Such exams complement classroom-based assessments, which offer teachers an opportunity to fine-tune instruction. International assessments offer opportunities to benchmark and drive quality.

Exams

High-stakes exams have dominated assessments in the region's Top Performing Systems. In Hong Kong SAR, China; Japan; Korea; Singapore; and Taiwan, China, these exams were an integral part of education strategies in the post–World War II period and served to allocate limited learning opportunities (Wong 2017). They also played a central role in the push for quality, by gauging teacher effectiveness and influencing how teachers were trained.

High-stakes exams helped to align education systems with economic development needs. As education resources were developing in the postwar period, the focus was on cognitive development in basic education and technical and vocational education and training (TVET). In Japan, for example, education policy was oriented to meet economic development needs. In the 1950s and 1960s, about 40 percent of senior high school students were in TVET. Exams for entry into high school and university were vital (Wong 2017).

Exams are important as education systems are developed, but countries need to be cognizant of risks, address them, and view exams within the full system of assessment. King and Rogers (2014) examine the changes needed in Korea to promote a creative and innovative economy. They affirm that rigorous exams supported the development of cognitive skills and may have provided incentives to develop some noncognitive aspects, such as grit. But they also highlight the heavy costs of the exam-driven system, including low levels of happiness, high stress, and private costs that burden families (box 7.2). They call for a balance to manage these trade-offs to promote creativity and innovation.

BOX 7.2 Balancing the advantages and disadvantages of high-stakes exams

Experience among East Asia and Pacific's high performers shows the value of meritocratic, standardized selection exams when coupled with good teachers, strategic vision, and labor markets that value productive workers. At the same time, exams have potential negative effects:

- *Student well-being.* Highly competitive environments driven by exams can lead to negative mental health outcomes. In the Republic of Korea and other countries in the region, the focus on exams has led to high stress (Wong 2017).
- *Crowding out.* High-stakes exams narrow the scope of education by incentivizing practices such as teaching to the test. High-stakes assessment can also limit innovation in education, as teachers are reluctant to try new methods (Looney 2009).
- *Impact on equity.* Some studies show that delayed tracking can improve academic outcomes (Jakubowski and others 2016) and that early tracking (via exams) may negatively affect outcomes for the poorest students, who may be disproportionately tracked into vocational streams. A focus on exams also leads to "shadow education" (private, supplementary learning offered outside of the mainstream education system), which many disadvantaged students cannot afford. Data from Korea show a 96 percent participation rate in shadow education at the elementary level in the highest income bracket and less than 49 percent in the lowest (Bray and Lykins 2012). In Thailand, the rise of shadow education has affected the meaningfulness of assessment results and adversely affected equity (OECD 2016a).

Countries are implementing reforms to manage these negative effects. Policy changes across countries indicate a trend toward reducing the unintended effects of a singular-focus exam. In response to concerns, in 2013, Korea introduced test-free semesters as a pilot program for the lower-secondary level. Since then, it has expanded the program across the system (OECD 2012). In 2014, Taiwan, China introduced exam-free pathways to secondary school (Wong 2017). Shanghai has sought to reduce the pressure of the *zhongkao* lower-secondary exam at the end of the ninth year. Strategies recommended to reduce the dominance of the test include testing more frequently, broadening the domains tested, and reducing the stress and fear of failure by having alternate routes to different levels and types of education (Liang, Kidwai, and Zhang 2016). Although these efforts are at early stages and their full impacts are not yet known, they indicate that policy makers need to consider balancing the weight of examinations in a country's assessment system.

Most East Asia and Pacific economies still use exams for entrance decisions at the secondary cycle, but many Top Performing Systems have removed or adapted high-stakes exams at lower levels of education. Korea removed middle school entrance exams in the 1960s and removed high school entrance exams as part of the High School Equalization Policy of the 1970s. Hong Kong SAR, China removed the public assessment after primary school in 2001. Singapore still maintains the primary school-leaving exam at the end of grade 6.

Shifts are also occurring in other countries. In 2013 in Malaysia, the National Education Blueprint replaced the high-stakes exam at the end of lower-secondary school with a mix of school-based exams and a centralized exam that includes more critical thinking skills. Efforts have aimed to reduce pressures and some of the negative effects of exams, but even exams at higher levels have been found to create pressures early on.

Classroom assessments

Classroom assessments offer teachers an opportunity to adjust and fine-tune instruction based on real-time data. Assessment procedures that are utilized by teachers in the learning process in order to modify teaching and learning activities are considered formative assessments. They are widely used in the region (box 7.3). Classroom assessments

BOX 7.3 What does the literature say about the use of formative assessments and student performance?

Black and Wiliam (1998) find that formative assessment is linked to learning gains. Wiliam and others (2004) note that students benefited from "authentic classroom tasks," outperforming students whose teachers did not use such tasks. Dobbie and Fryer (2011) use data from New York City charter schools to look at data-driven instruction, which includes how frequently assessments are conducted and how the data are used. They find that high-achieving schools make more use of assessment and data.

offer immediate feedback on student performance to guide teaching strategies and practices. They are particularly important given the emphasis on the execution of good teaching practices and "micro-teaching" (a teacher training technique involving the steps "plan, teach, observe, re-plan, re-teach, and re-observe") as a means of raising learning outcomes for all.

A regional study conducted by the World Bank in 2012 using a version of the benchmarking tool Systems Approach for Better Education Results (SABER) finds that, although almost all countries surveyed had a system-level framework for large-scale, system-level assessment and exam activities, only half had such a framework for classroom assessment activities.[2] "In almost all of the economies … surveyed, respondents reported that pre-service teacher training programs provide teachers with courses or workshops on classroom assessment techniques" (Patrinos 2012). Although SABER provides insight into policy in the region, data on implementation of classroom assessments are not as readily available.

Large-scale international assessments

Globally, the share of countries participating in PISA rose from one-fifth to one-third of countries between 2000 and 2015; in East Asia and Pacific, 20 percent of countries participated in PISA in 2000, and 35 percent participated in 2015 (Lockheed 2015).

The PISA assessment has increasingly been used to benchmark performance and inform policy. Policy makers view PISA performance as an indicator of a school system's effectiveness. Some of the impacts on policy and practice include actions related to establishing or improving national assessment systems, revising curriculum standards, promoting equity, setting strategies for improving student engagement, setting system targets and monitoring, and making changes to student tracking (Breakspear 2012).

PISA can spur improvements in teaching practices. Taiwan, China's Happy Reading program, launched in 2008, was a response to low performance on PISA 2006. Changes included increasing the time allocated for reading instruction, increasing resources, and making changes to teacher development (National Center on Education and the Economy 2014). In Vietnam, legal documentation on assessments was changed to drive innovation, spurred by participation in PISA, and education assessment became a key part of curriculum reform beginning in 2015. Barriers to impact include the low perceived quality of the assessment, lack of or poorly targeted dissemination, and lack of policy-relevant analysis (Tobin and others 2015).

Assessments other than PISA and Trends in International Mathematics and Science Study (TIMSS) include the Pacific Islands Literacy and Numeracy Assessment (PILNA) and the PISA for Development (to be launched in 2018). These assessments provide lower-income countries an opportunity to participate. PISA for Development increases the relevance of instruments for low-income countries by including

out-of-school children and helps to build the capacity of participating countries to conduct large-scale student assessments.

National assessments

The use of national assessments varies within the region (table 7.1). Top Performing Systems such as Japan and Korea reintroduced such assessments on a regular basis about a decade ago. China formally rolled out a national assessment for fourth- and eighth-grade students in 2015.

Assessments are used more sporadically in other type of systems. Vietnam intermittently has assessed fifth graders, Mongolia has conducted the National Assessment of Primary Education since 2004, and the Lao People's Democratic Republic uses the National Assessment of Learning Outcomes.

Early Grade Reading Assessments

EGRAs, which use oral assessment, have increasingly been used in low- and middle-income countries to gauge levels of learning in the system (see table 2.4 in chapter 2).[3] Although more intensive to implement than traditional large-scale assessments (EGRAs must be administered to individual children), these tools can be implemented at a smaller scale, which can potentially lower costs, allow for more flexibility, and take less time (Wagner 2011). Their use has sometimes spurred systemic changes in teaching methodologies and curricula (table 7.2). Analysis of EGRA results also allows evaluation of which interventions and teaching methods have a positive impact on literacy (Graham and Kelly 2017).

Tonga and Vanuatu illustrate how EGRAs can spur literacy interventions. EGRA analysis in 2009 revealed low levels of reading and comprehension (with only 3 in 10 children in Tonga and 2 in 10 in Vanuatu reading with comprehension). This evidence prompted policy makers to adopt the Pacific Early Age Readiness and Learning (PEARL) program, which was designed to address school readiness and early grade literacy through community-based groups, public awareness, teacher training, and an early-years roadmap.

More fundamentally, EGRAs have highlighted a literacy crisis in Below-Average Performing and Emerging Systems. Graham and Kelly (2017) recommend that these countries implement a periodic and nationally representative system for early grade literacy testing.

TABLE 7.1 The use of national assessments varies within the region

Country	Assessment	Year introduced	Target	Sample	Subject areas
China	China National Assessment	Piloted in 2008, formally rolled out in 2015; annual	Fourth- and eighth-grade students	Sample based	Chinese, math, science, physical education, art, moral education
Japan	National Assessment of Academic Ability	2007	Sixth-year primary and third-year middle school students	Alternates between census and sample	Japanese, math, science
Korea, Rep.	National Diagnostic Assessment of Basic Competency	2002	Year 3 students	Census	Reading, writing, math
	National Assessment of Educational Achievement	2000, extended to all students in 2008	Years 6, 9, and 11 (assessment in sixth grade abolished in 2013)	Census	Korean language arts, math, social studies, science, English

Sources: Liang, Kidwai, and Zhang 2016 for China; Kuramoto and Koizumi 2015 for Japan; OECD 2014 for the Republic of Korea.

TABLE 7.2 Select countries have changed policy based on data from EGRAs

Effect of EGRA data	Countries
Served as a wake-up call for education reform	Cambodia, Indonesia, Philippines, Timor-Leste, Tonga, and Vanuatu
Helped government to target regions for increased resources and assistance, including by type of instruction in some districts	Indonesia
Informed the development of new curricula and teacher training based on substantive feedback on specific issues faced by students such as phonetic awareness, decoding, knowledge of the alphabet	Timor-Leste and Vanuatu
Helped policy makers to develop clear and appropriate benchmarks for language, age, and region, enabling progress in tracking and accountability	Philippines

Source: Extracted from Graham and Kelly 2017.
Note: EGRA = Early Grade Reading Assessment.

Top Performing Systems in East Asia have linked assessments with teaching

Establishing the right policy environment

An assessment system encompasses the "group of policies, structures, practices, and tools for generating and using information on student learning and achievement" (Clarke 2011, 4). The 2012 SABER analysis finds that assessment systems in the region were fairly well established and that many economies had policies for classroom assessments, exams, and large-scale assessments; some also had strong enabling contexts with clear frameworks and dedicated budgets and assessments that were aligned with learning standards or the curriculum.[4] Gaps included monitoring and quality assurance of classroom assessment priorities, especially in lower-income countries such as Cambodia, Lao PDR, and the Philippines.

In all four performance systems, the dissemination and use of assessment results need to be boosted. Box 7.4 provides a deeper look at two systems, partly through the SABER lens.

Systematically linking assessments to instruction

Tests are frequently used to guide student learning (figure 7.1). Almost all PISA-participating East Asia and Pacific economies use teacher-developed tests; they use standardized tests less regularly.

Of the economies in the region participating in TIMSS 2015 (Hong Kong SAR, China; Indonesia; Japan; Korea; Malaysia; Singapore; Taiwan, China; and Thailand), nearly all use written classroom tests in math at least sometimes (no more than 4 percent of respondents in each country answered "never"). Some 45–70 percent use written tests in "some lessons," and 20–40 percent use them in "about half" of lessons. No more than 15 percent use tests in "every or almost every lesson," with the notable exception of Thailand, where 54 percent do so.

The use of assessments by school leadership is a key feature in four countries according to the 2013 Teaching and Learning International Survey (TALIS). The share of lower-secondary education principals who reported that they use student performance and student evaluation results (including national and international assessments) to develop the school's educational goals and programs was 99.5 percent in Malaysia, 99.3 percent in Singapore, 95.3 percent in Korea, and 93.0 percent in Japan; the survey average was 88.8 percent (OECD 2014).

Teacher development systems must support teachers in conducting assessments and using their data. One of the most crucial aspects of ensuring the systematic use of assessments is providing teachers with

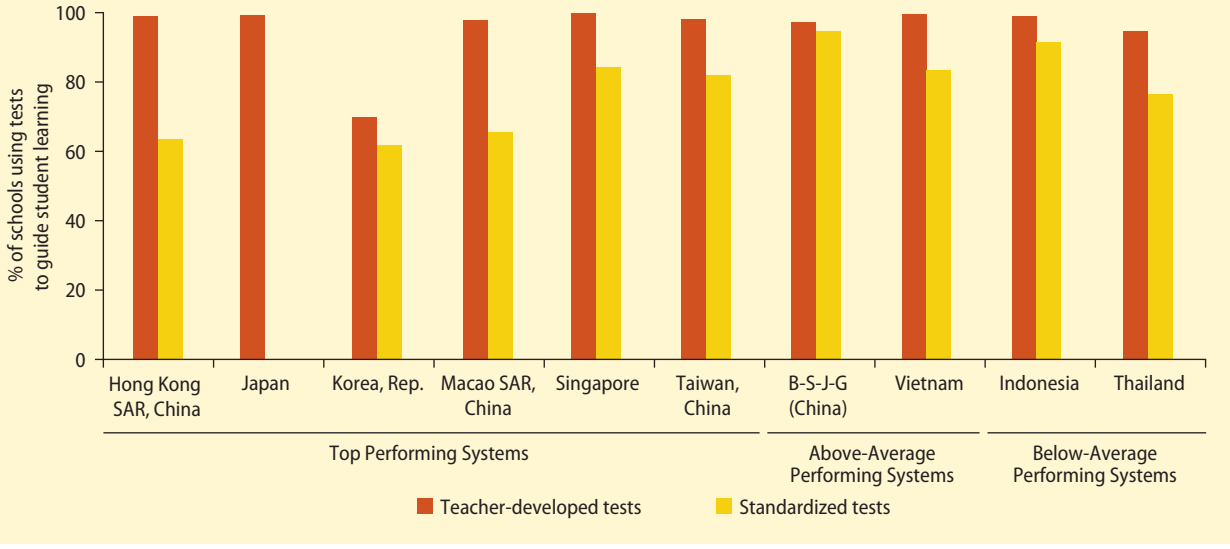
BOX 7.4 Using SABER to benchmark assessment systems in Vietnam and Shanghai, China

Shanghai's education system is well developed across types of assessments: It is rated "advanced or established" in all areas (Liang, Kidwai, and Zhang 2016) according to the Systems Approach for Better Education Results (SABER) system of ratings.[a] The Shanghai education system is particularly advanced in exams, which incorporate the *zhongkao* lower-secondary exam at the end of the ninth year (for entry to high school) and the *gaokao* senior-secondary exam at high school graduation. The system is rated as "established" in classroom assessment and national and international assessments. Contributory aspects include formal policy documentation, dedicated resources, alignment with curriculum standards, systematic support of teachers, and quality assurance for the assessment.

Vietnam demonstrates how countries can use a benchmarking approach such as SABER to spur policy changes. Vietnam moved from "emerging" to "established" in both classroom assessment and exams between 2009 and 2014. Efforts included training for stakeholders in assessment, widespread dialogue on related policy and reform efforts, new policies and guidelines, a new competency-based assessment framework, participation in Programme for International Student Assessment (PISA) 2012, leadership from the Ministry of Education and Training, and alignment with curricular reforms (Gardner and Clarke 2015). Vietnam also conducted Early Development Instrument surveys in 2012 and 2014 to assess the school readiness of preschool children (Gardner and Clarke 2015; Ruby and Kent 2015).

a. The SABER program collects comparable data on the policies and institutions of education systems around the world and benchmarks them against good practice. SABER rates policy areas on a four-point scale: from "latent" to "emerging" to "established" and to "advanced."

FIGURE 7.1 Almost all PISA-participating East Asia and Pacific economies use teacher-developed tests and use standardized tests less regularly



Source: PISA 2015 (OECD 2016b).
Note: No data available for use of standardized tests in Japan. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China); PISA = Programme for International Student Assessment.

adequate tools, guidance, knowledge, and skills to implement and use them. Top Performing Systems have succeeded in doing so by including assessment in teacher training programs and providing clear guidance and monitoring their use (box 7.5). In Singapore, educational reform included efforts to support assessment in the classroom, including study of teachers' practices and design of a two-year professional development program to support effective assessment (Sui-chu Ho 2012).

Innovative practices are emerging in Vietnam. Portfolio-based formative assessment was introduced under the Vietnam Escuela Nueva initiative and was institutionalized in 2014 for primary schools. The new guidance removed continuous testing and indicated that teachers should use observation and communicate with parents (World Bank 2016). Teachers were trained in these methods, which were built into training for school principals and education administrators at the district and provincial levels.

Failure to integrate assessments with teacher development can hinder their effectiveness. In Thailand, an obstacle to implementing assessment-related reforms is inadequate capacity of and support for teachers (OECD 2016a). Portfolio-based assessment was introduced in 2012, but implementation was slow, because of teachers' inadequate knowledge and skills in the new methodologies required.

Student assessments can also inform teacher training and development. Ontario's Teacher-Learning Critical Pathway uses student achievement data for each school to identify areas most in need of support. A "big idea" is identified, and faculty engage on the subject for six weeks; this process informs collective efforts by the faculty in teaching and classroom assessment. Assessment of students is ongoing throughout the period by teachers working together, which allows feedback and adjustments (and ultimately promotes teacher learning) (OECD 2012).

Fostering accountability through assessments

How to empower parents and other local stakeholders to improve a school's effectiveness has been studied extensively in the education and education economics literature (see, for example, Barrera-Osorio and others 2009). The main mechanisms are school-based management (in which parents are involved in school decision

BOX 7.5 Using formative assessments to inform teacher development and policy making in Shanghai, China

Schools in Shanghai, China, use quizzes, oral tests, presentations, and homework assignments for formative assessments, which are integrated into other areas, such as teacher development and policy making. Two factors enable the use of such assessments: (a) guidance and support for teachers and (b) monitoring of the assessments' quality, which is used to inform teaching practices and future assessments. Research projects by municipal and district-level teaching research offices are used to inform policy.

The system is well aligned. It includes guidelines for conducting formative assessments that focus on student growth rather than student comparison. Teachers are instructed not to use paper-based tests for the youngest students (first and second graders).

Formative assessments are also a focus of teacher development. The quality of teacher assessments is monitored and is a key area of focus during teacher observation and performance evaluation.

Source: Liang, Kidwai, and Zhang 2016.

making) and school choice (in which parents select a school for their children). Both pathways rely on the ability of parents to make informed choices.

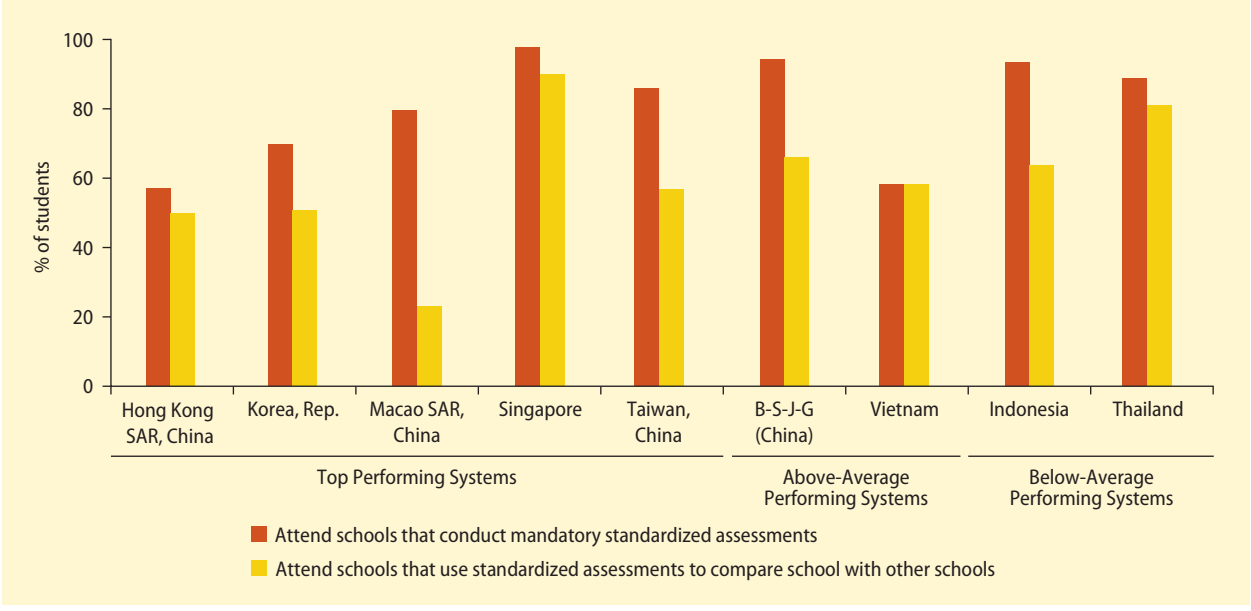
Disseminating student achievement results can have a strong impact on learning outcomes, but doing so does not always have the desired results, for several reasons. Parents involved in school management may require additional training to monitor school and teaching practices (Duflo, Dupas, and Kremer 2011), or they may lack influence even if they are ostensibly included in school management (Parker 2005). Learning outcome data may not be fully understood or socialized among parents, especially in disadvantaged contexts (Bruns, Filmer, and Patrinos 2011). In studies of large programs, research methods differ, and the causal impact of disseminating achievement results may be confounded with that of other reforms (Bradley and others 2000).

In all East Asia and Pacific economies that participated in PISA 2015, a majority of students attended schools with mandatory standardized assessments (the exception is Japan, where the question was not included on the PISA questionnaire and no data are given) (figure 7.2). Except in Macao SAR, China, at least half of schools use the assessments to compare their schools with others.

Few administrators share the achievement results with the public, particularly at schools attended by the poorest, suggesting inequity in transparency (figure 7.3).

Accountability to parents may be hindered in countries where schools do not publicize achievement data. The 2012 PISA study collected data on whether schools compete for other students (OECD 2013).[5] In most countries, the share of students attending schools that compete for students is high (figure 7.4), but many of these schools (especially in Japan and Shanghai, China) do not share achievement data publicly, leaving many parents disadvantaged when choosing schools, and weakening the role of school choice as an accountability mechanism.

FIGURE 7.2 The use of standardized assessments varies within East Asia and Pacific



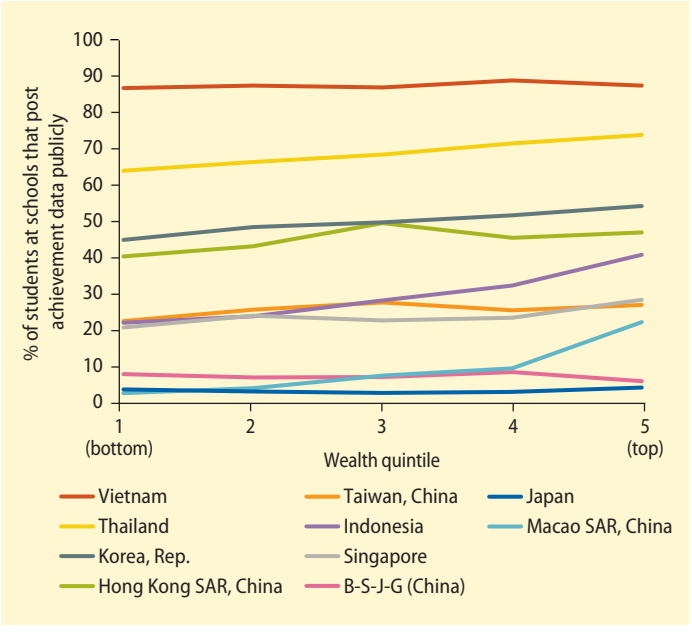
Source: PISA 2015 (OECD 2016b).
Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China).

Parents sit on the governing boards of many schools, according to PISA data. But because many schools do not share achievement data publicly, the lack of transparency hinders them from holding schools accountable.

The dissemination and use of assessment data are considered key drivers in improving quality in Chile (Ramírez 2012). Chile uses a national exam (the Sistema de Medición de la Calidad de la Educación) to target specific information to different audiences for each of the assessment's three purposes (accountability, pedagogical support, and informing policy), using school reports, national reports, newspaper supplements, parent reports, and online item banks. Many East Asia and Pacific economies need to strengthen accountability, in particular, by sharing learning outcome data. They could learn from Chile's example.

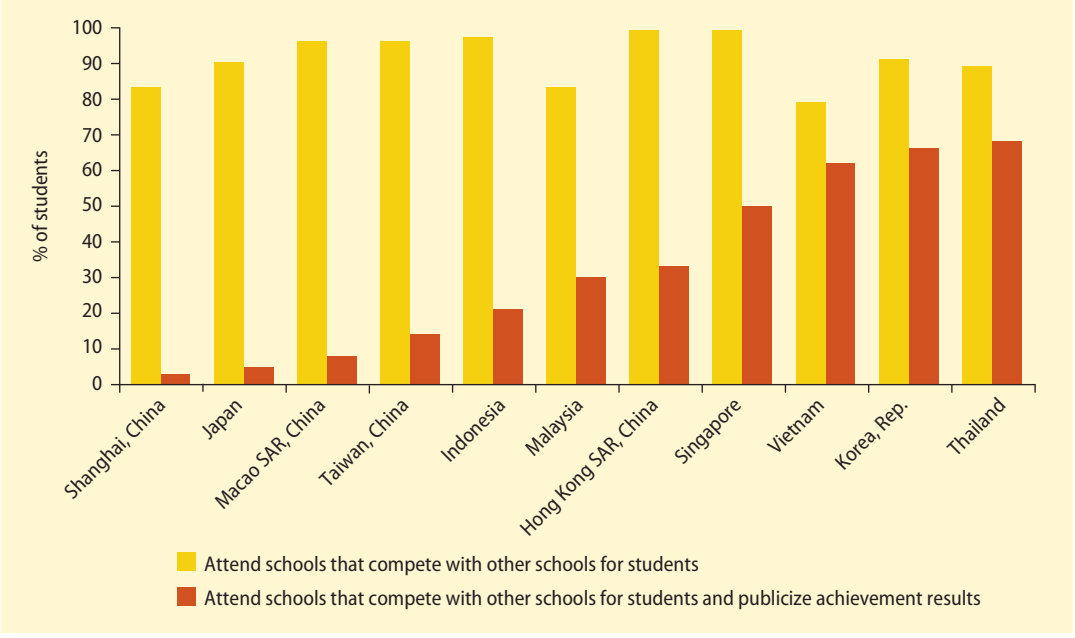
Accountability can be supported through a systemic approach that need not rely on test data. Japan—at the lower end of the spectrum in the use of standardized testing

FIGURE 7.3 Poorer children in East Asia and Pacific attend schools that are less likely to publicize achievement results



Source: PISA 2015 (OECD 2016b).
Note: The top and bottom quintiles refer to children who come from families with the top 20 percent and the bottom 20 percent of household income, respectively. B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China).

FIGURE 7.4 Even when competing for students, many schools do not publicize their achievement data



Source: PISA 2012 (OECD 2013).

and publication of data results—has a strong culture of accountability (OECD 2012). Its system works because teachers collaborate, teacher quality is known to peers, and all students have a homeroom teacher throughout their education, giving a link to parents and to students' lives outside of school (OECD 2012).

Keeping pace with shifting labor market priorities and evolving beyond cognitive skills

The new economy requires skills for the modern era. Education curricula are adapting to these new demands (see, for example, Kautz and others 2014; Valerio and others 2016). In East Asia and Pacific, this shift is seen in movements toward competence-based learning, student-centered learning, cross-curricular studies, and personalized learning (Looney 2009). Singapore's 1997 Thinking Schools, Learning Nation reform and Korea's 2015 curriculum reform responded to new labor market demands (Ministry of Education of Korea, n.d).

The definition and terminology of these skills is still evolving. Terms include noncognitive, behavioral, higher-order, and 21st century skills. Examples of these skills include creativity, collaborative problem solving, communication skills, flexibility and adaptability, digital literacy, and conflict resolution.

The United Nations Educational, Scientific, and Cultural Organization's framework for transversal skills (skills relevant to a broad range of subjects and disciplines) covers critical thinking, intrapersonal skills, interpersonal skills, global citizenship, media and information literacy, and other skills (UNESCO 2016). The World Bank Skills Towards Employability and Productivity (STEP) surveys highlight the importance of such skills in the labor market. A recent STEP study finds that employers in the Philippines, especially employers that are modern and innovative, value socioemotional skills, such as communication and commitment, and that these skills are associated with higher wages and employment probabilities (Acosta and others 2017).

Few assessment systems measure noncognitive skills

Noncognitive skills are difficult to measure through traditional assessments, which are designed predominantly to assess content knowledge or cognitive skills. Many areas, such as collaborative problem solving and creativity, encompass multiple interrelated components. Links between outcomes and schooling may reflect factors other than schooling (Ercikan and Oliveri 2016).

Most policy frameworks and guidelines in Hong Kong SAR, China; India; Korea; Malaysia; Mongolia; the Philippines; Thailand, and Vietnam include transversal skills to varying degrees (Care and Luo 2016). Few of these systems assess them, however. More clarity is needed in defining and assessing these skills.

Examples of systems to assess noncognitive skills

Some systems have begun adapting assessment frameworks to measure noncognitive skills. Singapore has shifted toward a "whole-student approach," which uses project work as one method of assessment. The assessment is interdisciplinary, collaborative, and group work–based; it includes written and oral components (Conley and Darling-Hammond 2013).

Shanghai's Green Indicator System, launched in 2011, covers "student academic achievement, student learning motivation, student academic workload, teacher-student relations, teachers' instructional styles, principals' curriculum leadership, the impact of students' socioeconomic background on their academic achievement, students' moral behavior, and annual progress on these indicators" (Liang, Kidwai, and Zhang 2016, 96). PISA has recently included questions on collaborative problem solving.

Conclusions and recommendations

Education systems are shifting focus, moving away from the narrow use of selection exams that test for content knowledge and cognitive skills toward an emphasis on formative assessments that measure noncognitive skills. The shift toward noncognitive outcomes does not preclude valid and regular measurement of basic cognitive outcomes, which is integral to measuring and driving quality improvement. Experience in the Top Performing Systems shows that it is important for countries to get these fundamentals right.

Priorities for the four groups of countries differ (table 7.3):

- For *Top Performing Systems*, a primary challenge will be to ensure alignment of assessments with changing curricula. These systems need to continue to develop and support means of measuring noncognitive skills beyond multiple-choice exams. They need to maintain a focus on equity and ensure that dissemination policies fully support accountability.
- *Above-Average Performing Systems* have similar priorities. They need to continue to use international assessments, ensure alignment of student assessments with reforms to teacher policies and curricula, and support the use of student assessments and their data in the classroom.
- *Below-Average Performing Systems* need to define, support, and monitor the use of assessments in the classroom; benchmark assessment systems; ensure quality control; and continue to use regular national and international assessments to drive national commitment to improved educational quality.
- *Emerging Systems* should continue to use tools such as EGRAs and EGMAs, as well as international and regional assessments, and ensure that assessments are integrated with teacher and curricular reforms.

TABLE 7.3 **Steps toward systematically strengthening assessments**

	Action			
Policy	**Emerging Systems**	**Below-Average Performing Systems**	**Above-Average Performing Systems**	**Top Performing Systems**
Assessments	Periodically use early foundational skills assessments to spur policy change and target reforms every five years. Integrate assessment policies into reforms of curricula and teacher development systems.	Implement national assessments for diagnostic purposes. Strengthen systems of assessment (enabling environment, quality control, alignment). Integrate the use of assessment data into teacher development, alongside adequate support and quality monitoring. Link assessment use to equity, examining current practices for tracking and accountability. Use internationally benchmarked assessments to check system performance.	Participate in regular international benchmarking (PISA, TIMSS). Engage in a national dialogue and secure commitment to quality. Disseminate assessment data to stakeholders for accountability. Reflect changing curricular priorities (such as noncognitive skills) in assessment design and methodology and provide support for change or research, guidance, training, quality, monitoring, and so forth.	

Note: PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

Notes

1. Paragraph 33 of the Incheon Declaration states, "Moreover, there is a need for shared understanding and viable strategies to measure learning in ways that ensure that all children and youth, regardless of their circumstances, receive a quality and relevant education, including in human rights, arts, and citizenship. Such understanding can best be cultivated through improved availability of systematic, reliable, and updated data and information obtained through formative and/or continuous (classroom-based) assessments and summative assessments at different levels. Finally, quality also requires systems for managing teachers, governance, accountability mechanisms, and strong public financial management."
2. SABER is a set of tools that enables countries to evaluate and benchmark education policies across a range of 13 topics, such as teachers, early childhood development, school autonomy and accountability, and student assessments. See http://saber.worldbank.org/.
3. EGMAs are also widely used.
4. The analysis evaluates the assessment systems in three domains (enabling context, system alignment with the rest of the education system, and quality of assessments) in Cambodia, China, Indonesia, Japan, Korea, Lao PDR, Malaysia, Mongolia, the Philippines, Singapore, Thailand, and Vietnam as well as in Hong Kong SAR, China and Shanghai, China.
5. PISA 2012 is used because PISA 2015 did not ask schools whether other schools in the area compete for students (OECD 2013, 2016b).

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a. Titles of publications that include "Korea" and "Taiwan" refer to the Republic of Korea and Taiwan, China, respectively.

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Charting the Course Ahead

8

The impressive record of success in education in some low- and middle-income countries in East Asia and Pacific is proof of concept that schooling in resource-constrained contexts can lead to learning for all. Other low- and middle-income countries—in East Asia and Pacific and elsewhere—can use the policies and practices that underlie this success to ensure that their students learn.

Education remains a long-term process of acquiring background knowledge, skills, habits, and behaviors. Current labor market conditions extend the amount and refocus the types of knowledge and skills needed, but they do not fundamentally alter them or the process for acquiring them. Reading ability is still the foundation for acquiring all other types of knowledge—the cognitive equivalent of the opposable thumb. The bar for quantitative skills continues to rise dramatically, but mastery of the fundamentals of math, logic, and data analysis is still critical. Communication skills rest on mastery of grammar and vocabulary—and years of practice in oral and written expression. Behavioral skills and the ability to work in teams improve through structured practice and feedback. Resilience and grit remain the glue that keeps other skills from falling to useless pieces.

The Top Performing Systems in East Asia and Pacific took a particular path toward establishing these fundamentals and achieving learning and growth. They offer lessons that can help policy makers elsewhere in the region to surmount the learning crisis affecting the millions of children who are out of school or in school but not learning.

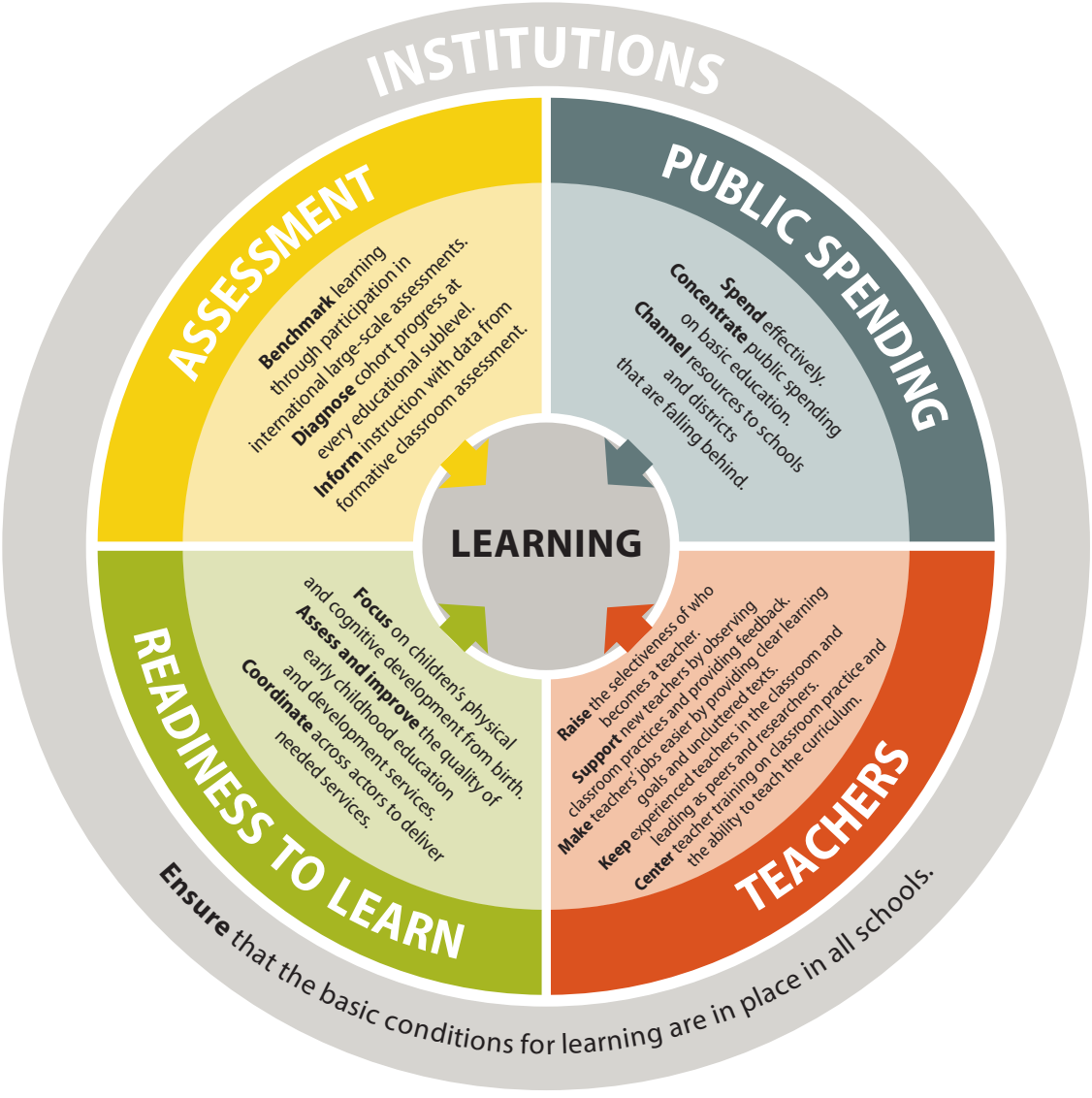
What has worked?

What policies and practices will promote learning in schools? What should a country do if it wants to achieve high and equitable learning outcomes? A focus on five key policy domains and core elements within them allowed the Top Performing Systems to promote learning. Coordinated efforts in these five areas (institutions, public spending, teachers, readiness to learn, and assessment) can improve the teaching and learning experience in the classroom (figure 8.1).

Aligning policies in five core areas is key to success

For countries with Emerging and Below-Average Performing Systems, the top priority is to focus on fundamentals. The Pacific

FIGURE 8.1 **Five policy domains promote learning**



Island countries and other Emerging Systems must continue to focus on early reading. Building basic cognitive skills for primary and secondary students in economies caught in the middle-income trap is paramount for moving on to imparting new skills.

School systems need to redouble their efforts in the following areas:

- Align institutions to ensure basic conditions for learning.
- Concentrate effective, equity-minded public spending on basic education.
- Select and support teachers throughout their careers to allow them to focus on the classroom.
- Ensure that children are ready to learn in school.
- Assess students to diagnose issues and inform instruction.

Top Performing Systems distinguish themselves by achieving alignment across elements

and sustaining it. Above-Average Performing Systems attempt alignment and succeed in some dimensions, but alignment is inconsistent in others. Below-Average Performing Systems strive to emulate the success of the rest of the region. They have devised plans for alignment of elements—at least on paper—but some plans are never implemented; in others, the plans themselves never materialize.

No single element will produce the kinds of success that Top Performing Systems have achieved. Progress occurs as the result of aligning all of these elements to promote learning (table 8.1).

TABLE 8.1 Policy actions in moving from Emerging Systems to Top Performing Systems

	Action			
Policy	**Emerging Systems**	**Below-Average Performing Systems**	**Above-Average Performing Systems**	**Top Performing Systems**
Public spending	Prioritize public spending on basic education and ensure high completion of primary and lower-secondary school. Increase starting teacher salaries to attract qualified teachers. Build simple but functional school facilities to increase access to basic education. Provide funding to support disadvantaged students in accessing basic education.	Continue investing in basic education to ensure high completion while expanding access to upper-secondary school and above. Strengthen teacher compensation policies to encourage good performance and retain qualified teachers. Build simple but functional school facilities to ensure access to basic education and increase access to preprimary and upper-secondary education. Help disadvantaged students to access basic education; consider mobilizing the private sector to increase access to preprimary and upper-secondary education.	Continue investing in basic and upper-secondary education while diversifying funding for vocational, technical, and tertiary education. Strengthen teacher career development policies and nonfinancial benefits for teachers to continue improving their quality. Provide remedial measures such as extracurricular activities to enhance learning of disadvantaged students.
Teachers	Start the positive foundational cycle of attracting and ensuring reasonable-quality teachers, while being realistic about the system's capacity to implement quality assurance measures balanced with supply of candidates. Establish teacher networks (with a focus on supporting new, weaker teachers with mentoring and other support), lesson study, and an "open-door" culture as key elements of professional development. Establish a basic framework of professional development and how teachers can reasonably be reached.	Take incremental steps to increase qualifications and quality, establishing greater quality assurance and filtering measures. Deepen teacher networks in which more-advanced teachers provide greater support through mentoring and coaching. Provide more advanced professional development that develops deeper critical thinking techniques. Create tracks of progression and promotion for expert teachers that allow them to remain in the classroom.	Establish rigorous criteria and multiple filtering mechanisms, while ensuring that teaching is attractive in terms of salary, professionalism, and prestige. Leverage high-performing teachers for professional development and support. Provide more autonomy for high-performing teachers. Create a highly developed professional development framework with tailored, individualized approaches. Deepen critical thinking, elaboration, and cognitive activation techniques.

table continues next page

TABLE 8.1 Policy actions in moving from Emerging Systems to Top Performing Systems *(continued)*

Policy	Action: Emerging Systems	Below-Average Performing Systems	Above-Average Performing Systems	Top Performing Systems
Teachers *(continued)*	Establish a mentality of teaching to learn with clear learning goals with curriculum and textbooks. Begin creating a cohesive, aligned system that supports teachers and promotes focused, streamlined learning.	Evolve system- and teacher-related policies in ways that reform and move all elements forward with alignment. Decrease classroom hours and increase supplementary activities.		
Readiness to learn	Develop policies and programs to ensure that both cognitive development and physical health are the focus of early childhood school readiness strategies.	Ensure that clear quality standards exist, are disseminated, and are addressed in an evaluative process.		Engage multiple actors in the development and delivery of integrated early childhood services.
Assessments	Periodically use early foundational skills assessments to spur policy change and target reforms every five years. Integrate assessment policies into reforms of curricula and teacher development systems.	Implement national assessments for diagnostic purposes. Strengthen systems of assessment (enabling environment, quality control, alignment). Integrate the use of assessment data into teacher development, alongside adequate support and quality monitoring. Link assessment use to equity, examining current practices for tracking and accountability. Use internationally benchmarked assessments to check system performance.		Participate in regular international benchmarking (PISA, TIMSS). Engage in a national dialogue and secure commitment to quality. Disseminate assessment data to stakeholders for accountability. Reflect changing curricular priorities (such as noncognitive skills) in assessment design and methodology and provide support for change or research, guidance, training, quality, monitoring, and so forth.

Note: PISA = Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study.

Increasing the role of the private sector

The private sector will continue to play a critical role in the transformation of education. A significant portion of preprimary education is available through private providers, and regional trends point to increasing enrollment in private institutions at the primary and secondary levels (see spotlight 3). Governments can capitalize on the potential impacts of public and private sector collaboration. In particular, private provision and financing can increase access where public resources are limited. Especially in Below-Average Performing Systems and Emerging Systems, where access to preprimary education is very limited, promoting public-private partnerships with or without public subsidies is likely to increase enrollment. Private provision and financing is also likely to increase enrollment in upper-secondary education.

Keeping up with rapid changes in technology and labor markets

Learning is critical to East Asia and Pacific's strategy for productivity-driven growth. Policy makers therefore have to keep their eyes focused on the next stage of education development. Even for high performers, a commitment to continuous improvement

BOX 8.1 The future requires both strong fundamentals and a wider view of skills

All of the Top Performing Systems in East Asia and Pacific invested heavily in human capital, technological capability, and knowledge institutions that drove growth. The virtuous circle through which governments promised better jobs to reward ever-higher levels of investment in human capital depended fundamentally on building successful national manufacturing industries.

Structural transformation continues today, but productivity has increased (across and within sectors) only where countries sustained transformative, high growth. Changing trends in technology and industry will continue to challenge education policy in the region in the coming years. Two changes in particular stand out: the nature of work and the skills that jobs require.

Artificial intelligence, machine learning, and robotics may change the nature of work. Frey and Osborne (2013) find that 47 percent of U.S. jobs are at high risk of being automated within one or two decades. Machine learning has the potential to extend the range of occupations and skill levels to relatively near-term computerization or automation. The risk of automation varies inversely with wages or salaries and average education in general, although very few tasks or employment categories are exempt from the threat of automation.

Widespread net job loss is unlikely—and technological change may create jobs—but one thing is certain: all jobs will change. A World Bank report (Hallward-Driemeier and Nayyar 2017) finds that the service content of manufacturing has grown and will continue to grow, eroding the distinction between manufacturing and service jobs. Furthermore, services are acquiring some of the pro-development characteristics that manufacturing is shedding. A main conclusion is that technological change fosters job creation as well as job displacement, so fears of net job loss in the economy may be ungrounded. Changes will bring a faster pace of change in manufacturing and services, increasing the skill requirements in all jobs.

A broader set of skills will be needed for the next stage of development. Cognitive, behavioral, and creative skills complement technology. The value of creativity and innovation rises as machines take over routine tasks. Education systems that promote creative thinking gain in value. Higher-level cognitive skills are less amenable to automation or computer replacement because of their nonroutine or nonalgorithmic nature, as seminal work by Autor, Levy, and Murnane (2003) shows. Subsequent work shows that idiosyncratic and unstructured problems—rather than "higher cognitive functions"—are most resistant to imitation by machines and therefore most resistant to substitution (Murnane and Levy 2013).

Drawing on a full set of cognitive and behavioral skills and being able to integrate background information in novel ways are the challenges that lie ahead for education systems. Building strong fundamentals of cognitive, literacy, and numeracy skills early on remains more critical than ever before.

will drive the vision of education systems. Policy makers should consider the impacts of rapid changes in technology and labor markets on education systems and skills development (box 8.1).

A way forward

Even as technology and economic landscapes shift, what made the high performers successful still matters for ensuring that education systems provide good-quality learning for all. If the technological revolution will disrupt high performers, it will be catastrophic in countries that still have not achieved fundamentals.

Below-Average Performing and Emerging Systems need to start now—by taking action to end or reduce functional illiteracy, focusing investment on engaging the private sector, recruiting and supporting better teachers, and maintaining a commitment to quality bolstered by adequate and appropriate assessment and data on learning outcomes. A critical priority for Below-Average Performing Systems and Emerging Systems is focusing on what made high-performing systems successful and moving quickly to implement some of these lessons.

No one size fits all reform agendas, but all systems share some priorities:

- *Emerging Systems* face the greatest challenges. Resources are scarcest, few measures of learning exist, and just getting all students in school has been difficult. Efforts are best concentrated on ensuring that basic conditions are in place for learning in all schools and reviewing spending to ensure that basic education is appropriately prioritized. Emerging Systems should also commit to diagnosing cohort progress, especially of early learners using early grade assessments, and to using test results to inform and improve basic reading and math instruction. They should continue to explore the use of regional and international assessments for benchmarking. Second-order challenges include channeling resources for equity and considering how to approach the range of teacher support policies that can improve capacities for the long term. As these policies are developed, Emerging Systems are well served to review the extent to which teacher training and professional development focus on improving the quality of instruction.
- *Below-Average Performing Systems* should review teacher development policies to ensure that training is prioritizing improved instructional quality while building the institutional capacity for deeper and more comprehensive reforms. Introducing selectivity, observation, collaboration, and feedback while creating incentives and career paths for teachers that reward teaching ability are likely to pay off substantially. Ensuring readiness to learn and broadening early childhood education and development services are also critical. Developing and implementing systemwide national assessments of cohort progress should complement programs for classroom assessment; assessment systems should also include the regular use of internationally comparable assessments for benchmarking and system accountability. Consideration should be given to making teachers' jobs easier, through curriculum and other reforms. Simultaneously raising the attractiveness of teaching as a profession and the accountability of teachers for good classroom performance is key.
- *Above-Average Performing Systems* should not rest on their accomplishments. Deepening the quality of the teaching force and continuing to monitor equity are in order. But these systems should also endeavor to tie learning to new and emerging needs, which includes introducing teaching and measurement of noncognitive and 21st century skills. Redoubling the commitment to internationally comparable assessment can keep public support for excellence in education high, along with public awareness of achievements. Deepening the availability of high-quality early childhood education and development programs, especially for families that cannot afford them, is another step. Also essential is to ensure that good options exist in the labor market for capitalizing on knowledge and skills acquired in basic and postbasic education. Amid all of these activities, further building institutional capacity cannot be neglected.
- *Top Performing Systems* provide compelling examples of how the work of producing high learning outcomes in schools is never completed. Looking at how these systems are evolving reveals that promoting creativity and new forms of assessment, ensuring that teachers remain motivated and grow in competency, and learning from other top performers worldwide are core tasks. Their continued efforts demonstrate that conserving and extending existing capacity and expertise is a precondition for staying on top.

A map of countries' current systems

The ability of East Asia and Pacific's Top Performing Systems to improve both schooling and learning provides valuable lessons for all countries struggling to address the learning crisis. Although these systems followed different paths to promote learning, all of them aligned and prioritized common elements across five policy domains.

Table 8.2 maps the current state of the region's economies for these domains and elements. It provides a starting point for countries to take stock of the current situation in each

TABLE 8.2 The status of policies and practices that promote learning varies within the region

Policy	Practice	Top Performing Systems: Hong Kong SAR, China	Japan	Korea, Rep.	Macao SAR, China	Singapore	Taiwan, China	Above-Average Performing Systems: B-S-J-G (China)	Vietnam	Below-Average Performing Systems: Indonesia	Malaysia	Philippines	Thailand	Emerging Systems: Cambodia	Lao PDR	Mongolia	Myanmar	Papua New Guinea	Timor-Leste	Pacific Island countries
Align institutions to ensure basic conditions for learning.	**Ensure** that the basic conditions for learning are in place in all schools.																			
Concentrate effective, equity-minded public spending on basic education.	**Spend** effectively.																			
	Concentrate public spending on basic education.																			
	Channel resources to schools and districts that are falling behind.																			
Select and support teachers throughout their careers to allow them to focus on the classroom.	**Raise** the selectiveness of who becomes a teacher.																			
	Support new teachers by observing classroom practices and providing feedback.																			
	Make teachers' jobs easier by providing clear learning goals and uncluttered texts.																			
	Keep experienced teachers in the classroom and leading as peers and researchers.																			
	Center teacher training on classroom practice and the ability to teach the curriculum.																			
Ensure that children are ready to learn in school.	**Focus** on children's physical and cognitive development from birth.																			
	Assess and improve the quality of early childhood education and development services.																			
	Coordinate across actors to deliver needed services.																			
Assess students to diagnose issues and inform instruction.	**Benchmark** learning through participation in international large-scale assessments.																			
	Diagnose cohort progress at every educational sublevel.																			
	Inform instruction with data from formative classroom assessment.																			

Alignment is successful and sustained.
Alignment is attempted, but success is inconsistent.
Alignment plans exist in writing, but there is little or no evidence of implementation, or no such plan exists.
No data.

Note: B-S-J-G (China) = Beijing, Shanghai, Jiangsu, and Guangdong (China).

domain and to envision a path forward. Top Performing Systems distinguish themselves not only by achieving alignment across elements but also by sustaining it. Above-Average Performing Systems attempt alignment, but it is not consistent in all domains. Below-Average Performing Systems strive to emulate the success of the rest of the region. They have devised plans for alignment, but implementation is lacking or plans have not yet materialized.

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Education Systems in East Asia and Pacific at a Glance

Appendix

This appendix provides summary information on 17 economies in East Asia and Pacific (refer to box A.1 for definitions of data included in the radar charts). Data are for most recent year available unless otherwise noted.

BOX A.1 Radar charts in this appendix

- Data in all radar charts refer to 2015, with a few exceptions. Primary school enrollment refers to 2014, except for Malaysia (2012), Papua New Guinea (2012), the Philippines (2013), and Vietnam (2013). Secondary school enrollment refers to 2014, except for Cambodia (2008), the Philippines (2013), and Thailand (2012). Top Performing Systems do not have radar charts as their coverage of indicators is close to universal.
- Enrollments are net enrollments, except in China, where they are gross enrollments.
- Improved sanitation facilities include flush/pour flush (to piped sewer system, septic tank, pit latrine), ventilated improved pit latrine, pit latrine with slab, and composting toilet.
- Improved water includes piped water on premises (piped household water connection located inside the user's dwelling, plot, or yard) and other improved sources of drinking water (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection).
- Access to Internet is defined as the share of people who used the Internet from any location and from any kind of device in the previous 12 months.

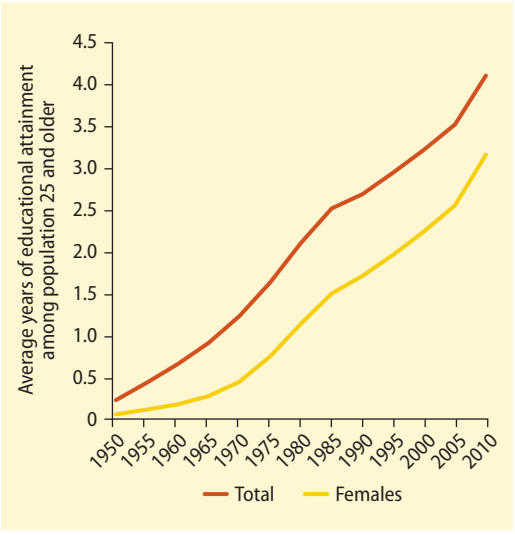
Cambodia

TABLE A.1 Selected indicators for Cambodia

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	15.6
GDP (US$, billions)	18
GDP per capita (US$)	1,159
Adult literacy rate (%)	73.9
Unemployment rate (%)	0.4
Student enrollment	
Preprimary	
Number enrolled	187,450
% female	48
Primary	
Number enrolled	2,178,916
% female	50
Secondary	
Number enrolled	930,200
% female	—
Tertiary	
Number enrolled	217,364
% female	—
Number of teachers	
Preprimary	6,084
Primary	47,866
Secondary	30,258
Tertiary	—
Education financing	
% of GDP	1.9
% of government spending	9.1

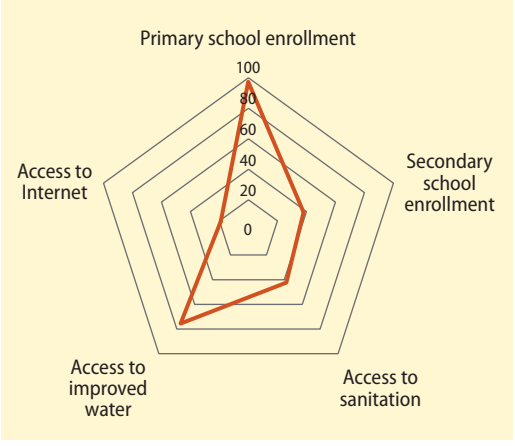
Source: EdStats data (World Bank, various years).
Note: GDP = gross domestic product; — = not available.

FIGURE A.1 Average years of educational attainment in Cambodia, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.2 Selected development indicators in Cambodia
Percent



Source: National statistical authorities and World Development Indicators data (World Bank, various years).

Overview

Cambodia's National Strategic Development Plan, Rectangular Strategy, and Education Strategic Plan have driven the expansion of access to education over the past 20 years. Net primary enrollment rates increased significantly, and girls now have equal access to educational opportunities. Cambodia educates about 3.5 million students from preprimary through tertiary education and employs about 85,000 teachers in preprimary through secondary schools.

Administration

The Ministry of Education, Youth, and Sport comprises a central headquarters, 24 provincial or municipal education offices, and 193 district education offices. Schools are grouped into local clusters to provide one another with technical and material assistance.

Compulsory education and testing

Cambodia has nine years of compulsory education. Examinations that certify completion and are necessary for progression are administered at the end of lower-secondary school (grade 9) and upper-secondary school (grade 12).

Curriculum and textbooks

The Curriculum Development Department sets learning standards, implements and monitors textbook policy, and develops technical and vocational education curriculum.

Teachers

Teacher education institutions comprise provincial and regional training centers for primary school teachers and postgraduate programs at the National Institute of Education for upper-secondary school teachers. In 2013 more than half of primary school teachers held an upper-secondary degree or higher, up from a quarter in 2007, and more than 80 percent of secondary teachers had completed at least grade 12 (Tandon and Fukao 2015).

China

TABLE A.2 Selected indicators for China

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	1,371.2
GDP (US$, trillions)	10.8
GDP per capita (US$)	7,924
Adult literacy rate (%)	95.1
Unemployment rate (%)	4.7
Student enrollment	
Preprimary	
Number enrolled	40,507,144
% female	46
Primary	
Number enrolled	95,958,040
% female	47

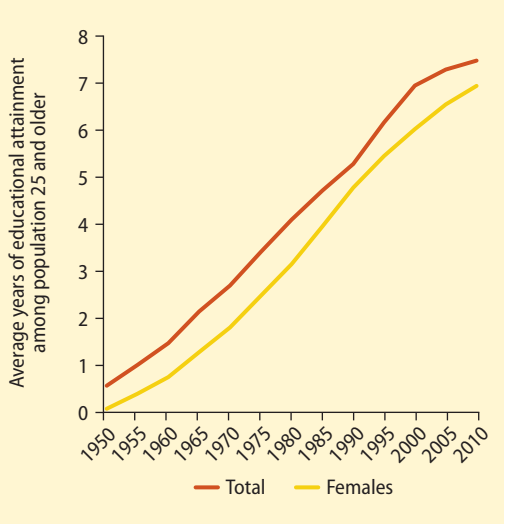
table continues

TABLE A.2 Selected indicators for China *(continued)*

Indicator	Statistic
Student enrollment (continued)	
Secondary	
Number enrolled	86,127,200
% female	46
Tertiary	
Number enrolled	43,367,392
% female	—
Number of teachers	
Preprimary	2,032,327
Primary	5,889,014
Secondary	6,234,124
Tertiary	—
Education financing	
% of GDP	3.9
% of government spending	15.0
Average 2015 PISA scores[a]	
Mathematics	531
Reading	494
Science	518

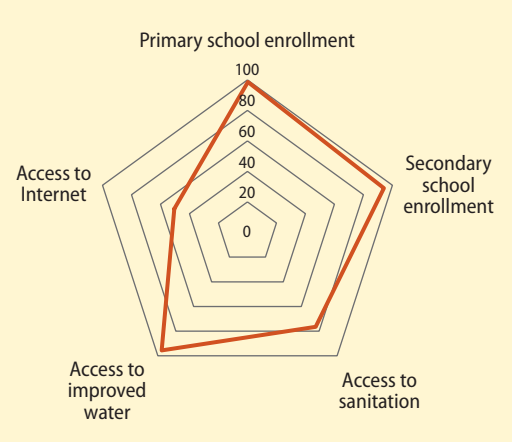
Sources: EdStats data (World Bank, various years); National Bureau of Statistics of China 2016; OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.
a. Data are for Beijing, Shanghai, Jiangsu, and Guangdong provinces, which are home to 16 percent of China's primary school students and 11 percent of its secondary school students.

FIGURE A.3 Average years of educational attainment in China, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.4 Selected development indicators in China
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Overview

China's education system, once highly centralized, is moving gradually toward a more decentralized model, in which local authorities assume greater responsibility for curriculum design, policy implementation, and funding. The change has been driven partly out of necessity and partly out of gains in capacity, as China seeks to educate nearly 266 million students from preprimary through tertiary and to ensure that its 15 million teachers in more than 500,000 schools maintain high standards necessary to prepare the country for future economic development.

Administration

The Ministry of Education, a governmental organ under the State Council, sets policy direction, allocates the budget, and drafts laws and regulations for the country's education system. County-level education offices retain responsibility for delivering education, including managing most of the financing, setting locale-specific policy based on ministry guidance, arranging standardized testing, and handling other administrative responsibilities.

Compulsory education and testing

China has nine years of compulsory education. Recent policies are aimed at universalizing preprimary education, which is currently available largely through private institutions. Upon finishing their ninth year of schooling, students sit for the *zhongkao,* which determines admission to upper-secondary school. Students who complete upper-secondary school are eligible to sit for the *gaokao,* which determines college admissions.

Curriculum and textbooks

Curriculum and textbook design are relatively decentralized, with the Ministry of Education setting standards for textbook development. Once a textbook has been written, it is reviewed by either the national or provincial Textbook Review Commission, an expert group separate from the textbook publisher. Curricular standards, including lesson hours and other guidelines, are set at the national level. Provincial authorities develop implementation plans based on national-level guidance; these plans are subject to review before they can be implemented.

Teachers

Teachers are required to be certified before applying for a teaching job. China is currently moving to a new system in which the qualification certificate is based on the results of a national exam. Teachers must receive 350 hours of training over a five-year period to retain their teaching qualifications.

Hong Kong SAR, China

TABLE A.3 Selected indicators for Hong Kong SAR, China

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	7.3
GDP (US$, billions)	309
GDP per capita (US$)	42,423
Adult literacy rate (%)	—

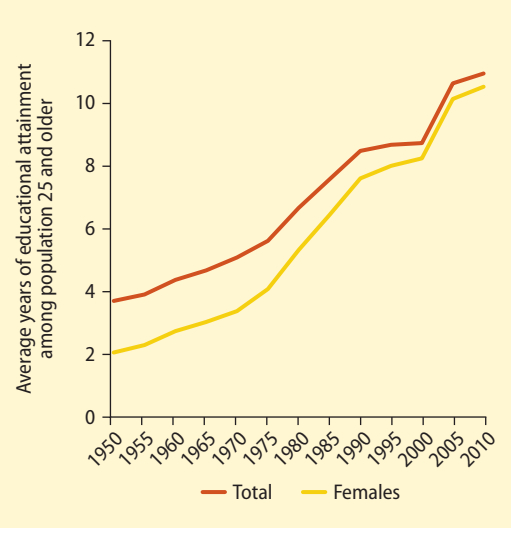
table continues next page

TABLE A.3 Selected indicators for Hong Kong SAR, China *(continued)*

Indicator	Statistic
Demographic and macroeconomic indicators (continued)	
Unemployment rate (%)	3.2
Student enrollment	
Preprimary	
Number enrolled	178,119
% female	48
Primary	
Number enrolled	332,531
% female	49
Secondary	
Number enrolled	393,952
% female	45
Tertiary	
Number enrolled	298,643
% female	—
Number of teachers	
Preprimary	—
Primary	24,339
Secondary	30,405
Tertiary	—
Education financing	
% of GDP	3.3
% of government spending	18.6
Average 2015 PISA scores	
Mathematics	548
Reading	527
Science	523

Sources: EdStats data (World Bank, various years); OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

FIGURE A.5 Average years of educational attainment in Hong Kong SAR, China, 1950–2010



Source: Barro and Lee 2013.

Overview

Education is based largely on the British system, imported under British rule. The system educates about 1.2 million students from preprimary through tertiary education and employs about 55,000 teachers in primary and secondary schools.

Administration

The Education Bureau manages education.

Compulsory education and testing

Compulsory education lasts from primary through secondary school. Primary school lasts six years. Upon completion of upper-secondary school, students take the Hong Kong Diploma of Secondary Education Examination. There are far fewer spots for tertiary education than there are qualified students. As a result, many students attend university abroad.

Curriculum and textbooks

The Curriculum Development Council, an independent advisory board of subject matter experts, develops curricula. The Curriculum Development Council comprises committees on each subject studied in schools, as well as specialty areas, such as a committee on early childhood education. The Education Bureau publishes guidelines for the publishing and review of textbooks.

Teachers

All teachers are required to hold a postsecondary degree. The Committee on Professional Development of Teachers and Principals (formerly the Advisory Committee on Teacher Education and Qualifications) advises the government on continuing teacher education, including the development of a Teacher Competencies Framework.

Indonesia

TABLE A.4 Selected indicators for Indonesia

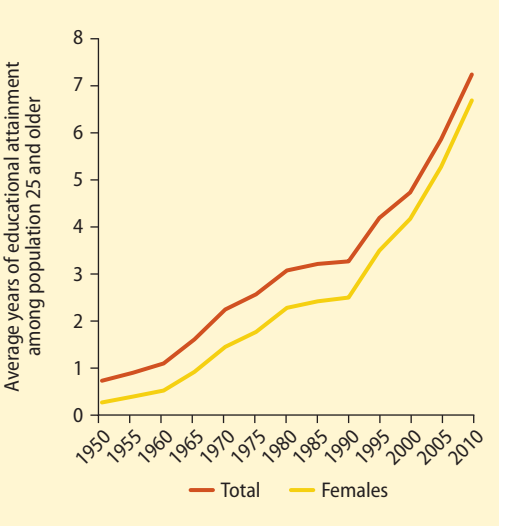
Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	254.5
GDP (US$, billions)	890
GDP per capita (US$)	3,499
Adult literacy rate (%)	95.1
Unemployment rate (%)	6.2
Student enrollment	
Preprimary	
Number enrolled	5,349,040
% female	49
Primary	
Number enrolled	29,838,440
% female	48
Secondary	
Number enrolled	22,586,956
% female	51
Tertiary	
Number enrolled	6,463,297
% female	—
Number of teachers	
Preprimary	427,585
Primary	1,801,909
Secondary	1,459,756
Tertiary	209,830
Education financing	
% of GDP	3.3
% of government spending	17.7
Average 2015 PISA scores	
Mathematics	386
Reading	397
Science	403

Sources: EdStats data (World Bank, various years); OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

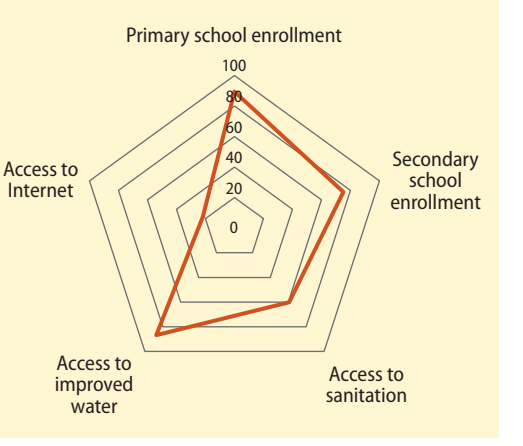
Indonesia, the second-largest country in East Asia and Pacific, has a largely decentralized education system. The nature of the system reflects the challenges inherent in trying to educate more than 64 million students across thousands of islands. The education system oversees more than 340,000 schools and institutions and employs about 3.9 million teachers in preprimary through tertiary institutions.

FIGURE A.6 Average years of educational attainment in Indonesia, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.7 Selected development indicators in Indonesia
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Administration

The Ministry of Education and Culture manages 84 percent of schools; the Ministry of Religious Affairs manages the other 16 percent (OECD 2016b). Provincial and District Offices of Education manage the

implementation of ministerial policy at their respective levels. Preprimary education is organized largely through civil society organizations, with some oversight by local government education offices. Districts are responsible for most spending on basic education (OECD 2016b). The National Education Standards Board prepares standards for schools, assessment, teachers, student competency, and curriculum throughout the country.

Compulsory education and testing

Indonesia has nine years of compulsory education. Students sit for tests at the end of primary and secondary school. The results of these tests determine eligibility for subsequent phases of schooling.

Curriculum and textbooks

The National Education Standards Board sets curriculum standards at the national level, which local governments then adapt. Both the government and private publishers develop textbooks. Nongovernment publications must undergo review before they can be distributed to schools.

Teachers

In 2005, Indonesia passed a Teacher Law, designed to improve the quality of teachers by introducing incentives, raising standards for qualification, and increasing teacher pay.

Japan

TABLE A.5 Selected indicators for Japan

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	126.9
GDP (US$, trillions)	4.1
GDP per capita (US$)	32,477
Adult literacy rate (%)	—
Unemployment rate (%)	3.7

table continues

TABLE A.5 Selected indicators for Japan *(continued)*

Indicator	Statistic
Student enrollment	
Preprimary	
Number enrolled	2,880,706
% female	—
Primary	
Number enrolled	6,714,539
% female	49
Secondary	
Number enrolled	7,227,485
% female	49
Tertiary	
Number enrolled	3,862,460
% female	—
Number of teachers	
Preprimary	113,043
Primary	408,247
Secondary	624,215
Tertiary	168,064
Education financing	
% of GDP	—
% of government spending	—
Average 2015 PISA scores	
Mathematics	532
Reading	516
Science	538

Sources: EdStats data (World Bank, various years) and Japanese Ministry of Education, Culture, Sports, Science, and Technology data; OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

Japan has a relatively centralized education system. The Ministry of Education sets high standards for teachers, schools, curriculum, and many other facets of education. High standards, combined with targeted financing, have produced one of the world's highest-achieving education systems: Japan's 21 million students regularly test near the top of international assessments. Japan employs about 1.3 million teachers in preprimary through tertiary institutions.

Administration

The Ministry of Education, Culture, Sports, Science, and Technology (MEXT) is the central government organ responsible for education. Every prefecture in Japan has a Prefectural Board of Education.

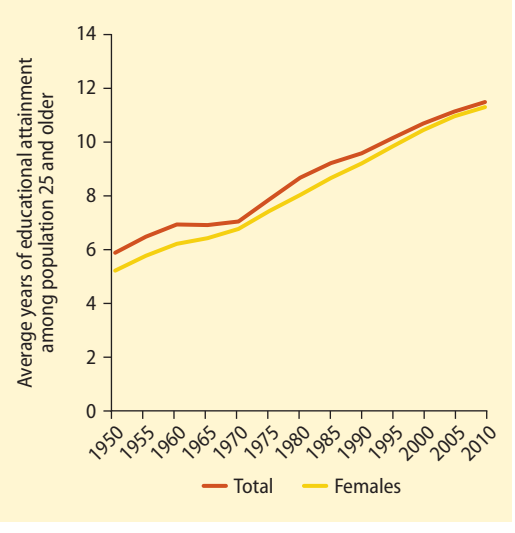
Compulsory education and testing

Compulsory education lasts nine years, although nearly all students continue through upper-secondary education. Students who complete the lower-secondary program of study are eligible to sit for the high school entrance exam, the results of which determine what school the student will attend. Upper-secondary is not compulsory but is free to students who pass their entrance exams and attend.

Curriculum and textbooks

MEXT develops Japan's curriculum at the national level, with input from the Central Council for Education as well as education experts from universities around the country. The curriculum is revised every 10 years to ensure that its content matches the needs of Japan's students and workforce. Japan's curriculum is highly focused, with most time spent on a narrow range of core subjects. Until recently, all textbooks were subject to MEXT approval before being introduced into the classroom. Given the highly structured nature of the curriculum, which allows publishers to produce textbooks with less oversight, MEXT has recently taken a step back from the textbook approval process, checking only to see that textbooks are not written in a biased manner.

FIGURE A.8 Average years of educational attainment in Japan, 1950–2010



Source: Barro and Lee 2013.

Teachers

Teachers in Japan are highly trained. MEXT requires all candidate teachers to attend a certified university program. Prefectural education offices invest significant resources in training both new and experienced teachers. Experienced teachers are assigned to mentor new teachers; these master teachers do not teach while assisting apprentice teachers during their first year of instruction.

Republic of Korea

TABLE A.6 Selected indicators for the Republic of Korea

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	50.6
GDP (US$, trillions)	1.4
GDP per capita (US$)	27,222
Adult literacy rate (%)	98.0
Unemployment rate (%)	3.5
Student enrollment	
Preprimary	
Number enrolled	1,278,960
% female	48
Primary	
Number enrolled	2,721,766
% female	48
Secondary	
Number enrolled	3,396,766
% female	45
Tertiary	
Number enrolled	3,268,099
% female	—
Number of teachers	
Preprimary	93,024
Primary	165,786
Secondary	239,996
Tertiary	47,491
Education financing	
% of GDP	5.1
% of government spending	—
Average 2015 PISA scores	
Mathematics	524
Reading	517
Science	516

Sources: EdStats data (World Bank, various years) and Korean Ministry of Education data; OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

Education is comparatively decentralized in the Republic of Korea, with significant independence given to individual schools to set curriculum and manage hiring. Korea invests significant resources in its education system, and society views education as highly important. Korea educates about 11 million students from preprimary through tertiary education and employs about 550,000 teachers in preprimary through tertiary institutions.

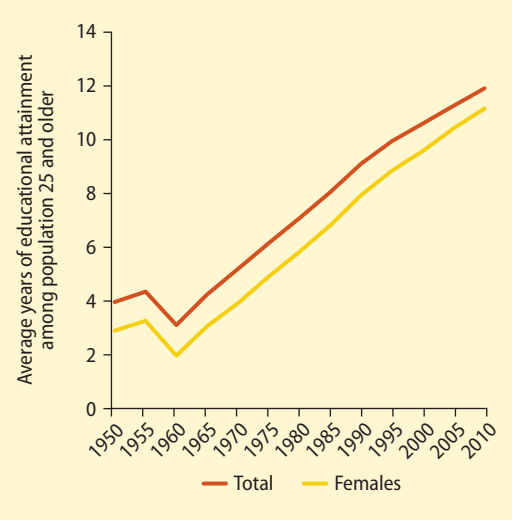
Administration

The Ministry of Education (formerly the Ministry of Education, Science, and Technology) is the principal government body responsible for education. Offices of Education oversee policy implementation and school management at the provincial, municipal, and county levels. Boards of Education at the subnational level oversee administrative and policy-related issues.

Compulsory education and testing

Korea has nine years of compulsory education, although most students continue through upper-secondary and university education. Students who finish middle school can enter high school, although some high schools require an entrance exam, which is designed and administered by the provincial or municipal Board of Education. Students sit for the College Scholastic Ability Tests at the end of high school in order to gain admission to university.

FIGURE A.9 Average years of educational attainment in the Republic of Korea, 1950–2010



Source: Barro and Lee 2013.

Curriculum and textbooks

Within the Ministry of Education, the National Curriculum Division is responsible for providing the framework for curriculum development. Individual schools are responsible for designing their own curricula within the national framework.

Teachers

Teachers in primary education are generally trained at teachers colleges or departments of education within universities. Teachers who complete their course of study are awarded a teacher's certificate, for which the Ministry of Education sets the standards. To begin working at a public school, teachers must pass an exam offered by a provincial office of education. Teachers have access to significant in-service training opportunities.

Lao People's Democratic Republic

TABLE A.7 Selected indicators for the Lao People's Democratic Republic

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	6.8
GDP (US$, billions)	12
GDP per capita (US$)	1,812
Adult literacy rate (%)	58.3
Unemployment rate (%)	1.4
Student enrollment	
Preprimary	
Number enrolled	175,492
% female	50
Primary	
Number enrolled	850,466
% female	47
Secondary	
Number enrolled	640,231
% female	50

table continues next page

TABLE A.7 Selected indicators for the Lao People's Democratic Republic *(continued)*

Indicator	Statistic
Student enrollment (continued)	
Tertiary	
Number enrolled	130,191
% female	—
Number of teachers	
Preprimary	9,791
Primary	35,206
Secondary	34,200
Tertiary	6,902
Education financing	
% of GDP	3.3
% of government spending	12.2

Source: EdStats data (World Bank, various years).
Note: GDP = gross domestic product; — = not available.

Overview

The Lao People's Democratic Republic educates about 1.8 million students from preprimary through tertiary education and employs about 85,000 teachers in preprimary through tertiary institutions.

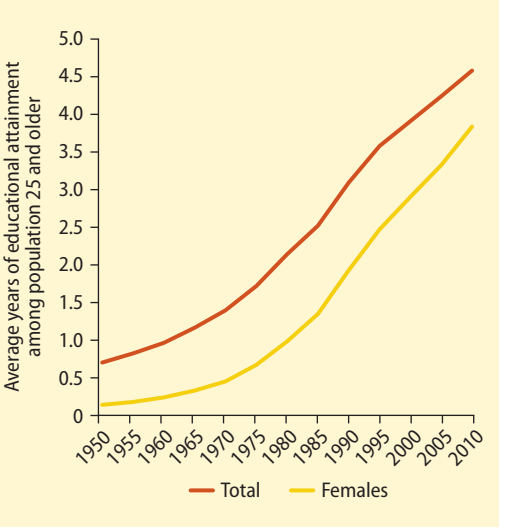
Administration

The Ministry of Education administers the system at the central level, but Provincial Education Services are responsible for local service delivery, including staffing, inspection, and school support. District Education Bureaus support schools by providing pedagogical advisers. Village Education Development Committees promote the involvement of the community in school affairs. Public and private institutions can provide education, as long as they adhere to the national curriculum approved by the Ministry of Education.

Compulsory education and testing

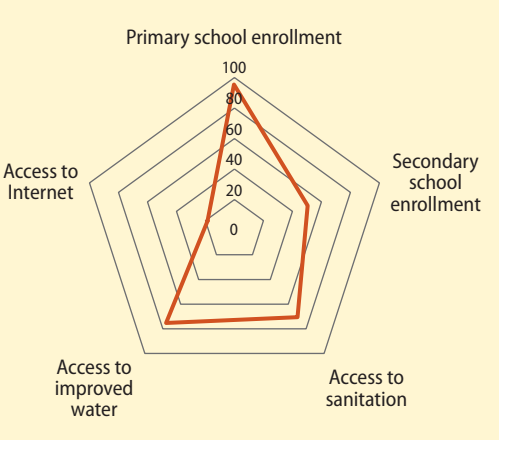
Primary education, which lasts five years, was made free and compulsory by decree in 1996. Examinations that certify completion (and are necessary for progression) are administered at the end of primary (grade 5), lower-secondary (grade 9), and upper-secondary (grade 12) school.

FIGURE A.10 Average years of educational attainment in the Lao People's Democratic Republic, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.11 Selected development indicators in the Lao People's Democratic Republic
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Curriculum and textbooks

The Research Institute for Educational Sciences, under the Ministry of Education, oversees curriculum and textbook development. In the context of the Education Sector Development Framework 2009–15, the national curriculum was reformed.

The changes affected early childhood education and school readiness, nonformal education, local curricula, and vocational skills.

Teachers

Lower- and upper-secondary teachers are required to have completed 11 years of formal schooling, followed by three years of preservice teacher training for lower-secondary teachers and four to five years for upper-secondary teachers. In-service teacher upgrading centers are located in various provinces.

Macao SAR, China

TABLE A.8 Selected indicators for Macao SAR, China

Indicator	Statistic
Demographic and macroeconomic indicators	
Population	587,606
GDP (US$, billions)	46
GDP per capita (US$)	78,586
Adult literacy rate (%)	96.5
Unemployment rate (%)	1.5
Student enrollment	
Preprimary	
Number enrolled	14,552
% female	48
Primary	
Number enrolled	24,252
% female	51
Secondary	
Number enrolled	30,088
% female	45
Tertiary	
Number enrolled	30,771
% female	—
Number of teachers	
Preprimary	916
Primary	1,722
Secondary	2,629
Tertiary	—
Education financing	
% of GDP	2.0
% of government spending	13.4
Average 2015 PISA scores	
Mathematics	544
Reading	509
Science	529

Sources: EdStats (World Bank, various years) and Macao Education and Youth Affairs Bureau data; OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

Macao SAR, China has one of the most decentralized systems in the region. Most schools are privately run by a variety of social and religious groups. Despite the prevalence of private education, most primary and secondary schools are either free or subsidized. Education is offered in Chinese, English, and Portuguese. Macao SAR, China educates about 100,000 students from preprimary through tertiary education and employs about 5,000 teachers in preprimary through secondary schools.

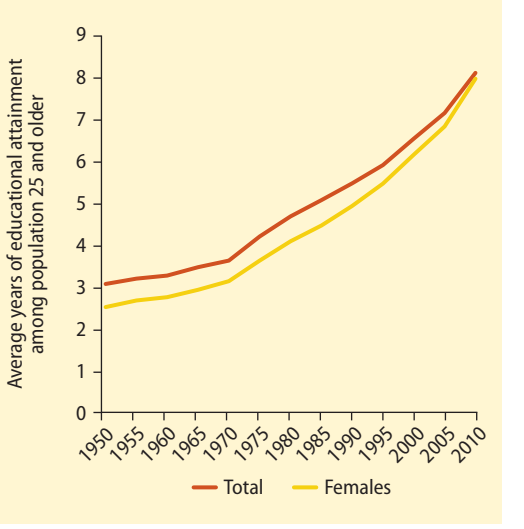
Administration

The Education and Youth Affairs Bureau manages the education system.

Compulsory education and testing

Macao SAR, China offers 15 years of free, compulsory education, from preprimary through upper-secondary. It participates in international assessments, including the Programme for International Student Assessment (PISA), where it has scored among the top in recent rounds.

FIGURE A.12 Average years of educational attainment in Macao SAR, China, 1950–2010



Source: Barro and Lee 2013.

Curriculum and textbooks

Private schools are encouraged to develop their own curricula. Public schools follow a government-developed curriculum.

Teachers

Teachers in private and public schools are required to have a postsecondary degree from a teachers college or equivalent program. The Education and Youth Affairs Bureau is responsible for checking teacher qualifications.

Malaysia

TABLE A.9 Selected indicators for Malaysia

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	30.3
GDP (US$, billions)	296
GDP per capita (US$)	9,766
Adult literacy rate (%)	93.1
Unemployment rate (%)	2.0
Student enrollment	
Preprimary	
Number enrolled	934,418
% female	49
Primary	
Number enrolled	3,107,870
% female	48
Secondary	
Number enrolled	2,991,123
% female	50
Tertiary	
Number enrolled	817,587
% female	—
Number of teachers	
Preprimary	60,704
Primary	269,757
Secondary	248,920
Tertiary	—
Education financing	
% of GDP	5.0
% of government spending	19.7
Average 2015 PISA scores	
Mathematics	446
Reading	431
Science	443

Sources: EdStats data (World Bank, various years); OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

A multicultural society with a history of colonial rule, Malaysia has faced challenges in providing high-quality education to its 8 million students over the past several decades. It has invested significant resources in addressing these issues and focused top-level attention with its National Education Blueprint 2013–2025. It employs about 580,000 teachers in preprimary through secondary schools.

Administration

The Ministry of Education manages education. It is organized into federal, state, district, and state levels. At the primary level, students are divided between schools instructing in Bahasa Melayu and schools instructing in Chinese or Tamil. Students who receive education in Chinese or Tamil generally receive an additional year of instruction after completing primary school to aid their transition to Bahasa Melayu instruction.

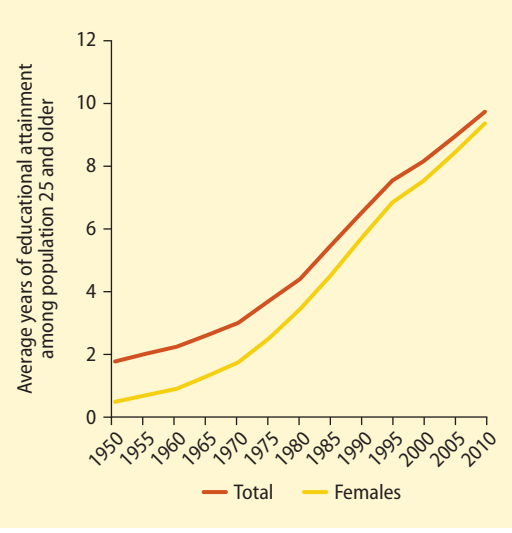
Compulsory education and testing

Malaysia requires just six years of compulsory education, although enrollment through lower-secondary is nearly 100 percent. It gives several nationwide exams during primary school to gauge student development and progress. Upon completion of lower-secondary school, students sit for a test to determine their eligibility for upper-secondary school. Depending on their score, students are sent to academic or vocational schools. Malaysia also participates in various international assessments, including PISA and Trends in International Mathematics and Science Study (TIMSS).

Curriculum and textbooks

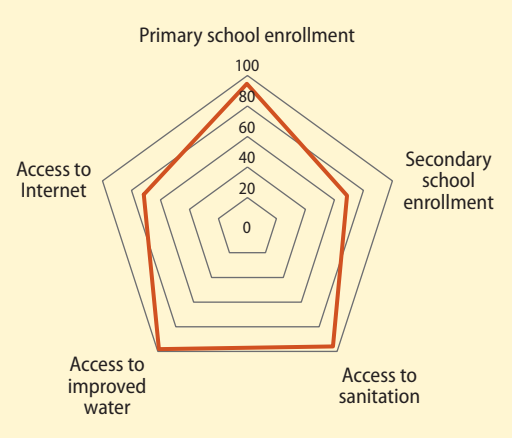
The Curriculum Development Division of the Ministry of Education is responsible for formulating and disseminating the curriculum. Students in the upper-secondary levels choose their own curriculum outside of the core classes.

FIGURE A.13 Average years of educational attainment in Malaysia, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.14 Selected development indicators in Malaysia
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Teachers

The Teacher Education Division within the Ministry of Education assists teachers colleges and universities in developing curriculum and training programs.

Mongolia

TABLE A.10 Selected indicators for Mongolia

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	3.0
GDP (US$, billions)	11.8
GDP per capita (US$)	3,973
Adult literacy rate (%)	98.3
Unemployment rate (%)	5
Student enrollment	
Preprimary	—
Primary	
Number enrolled	251,204
% female	51
Secondary	
Number enrolled	281,961
% female	50
Tertiary	
Number enrolled	179,540
% female	—
Number of teachers	
Preprimary	4,907
Primary	8,901
Secondary	20,908
Tertiary	—
Education financing	
% of GDP	4.6
% of government spending	12.2

Source: EdStats data (World Bank, various years).
Note: GDP = gross domestic product; — = not available.

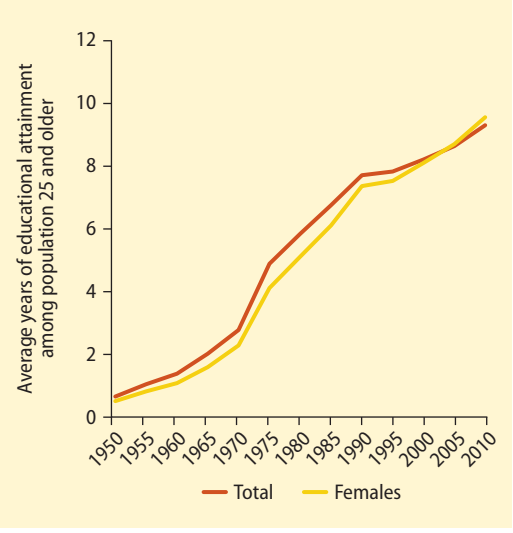
Overview

Mongolia educates about 700,000 students from primary through tertiary education and employs about 35,000 teachers in preprimary to secondary schools.

Administration

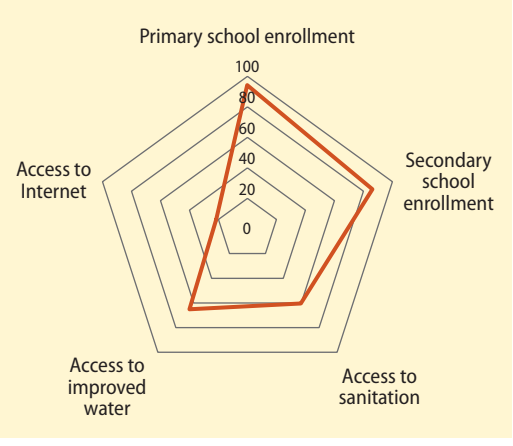
The Ministry of Education, Culture, and Science is responsible for all education-related supervision, from the preprimary through the tertiary level, as well as technical and vocational education and training and nonformal education. Education and Culture Departments in each province oversee financing, administration, quality assurance, and school administration staffing. The State Inspectorate of Education, Culture, and

FIGURE A.15 Average years of educational attainment in Mongolia, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.16 Selected development indicators in Mongolia
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Science monitors the implementation of education policy and regulation. At the school level, school boards (comprising teachers, parents, and representatives) are responsible for managing school affairs.

Compulsory education and testing

Primary and lower-secondary school are compulsory in Mongolia. Mongolia participated in the 2007 round of TIMSS but did not appear in any international comparisons due to inability to meet sampling criteria. It did not participate in subsequent rounds, and it has not participated in PISA.

Curriculum and textbooks

The Ministry of Education, Culture, and Science is responsible for developing, approving, and publishing textbooks and the national curriculum.

Teachers

Teachers must have a four-year degree from a teachers college.

Papua New Guinea

TABLE A.11 Selected indicators for Papua New Guinea

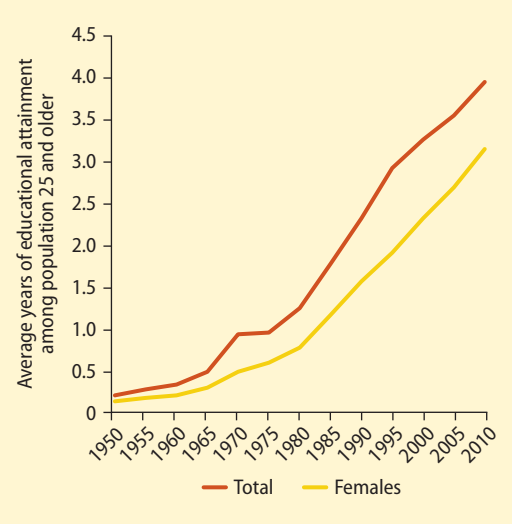
Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	7.6
GDP (US$, billions)	17.9
GDP per capita (US$)	2,268
Adult literacy rate (%)	—
Unemployment rate (%)	3
Student enrollment	
Preprimary	
Number enrolled	177,660
% female	—
Primary	
Number enrolled	1,426,884
% female	46
Secondary	
Number enrolled	378,365
% female	—
Tertiary	
Number enrolled	—
% female	—
Number of teachers	
Preprimary	—
Primary	31,586
Secondary	13,804
Tertiary	—
Education financing	
% of GDP	—
% of government spending	—

Source: EdStats data (World Bank, various years).
Note: GDP = gross domestic product; — = not available.

Overview

Papua New Guinea educates about 1.9 million students from the preprimary through the secondary levels. It employs about 45,000 teachers in primary and secondary schools.

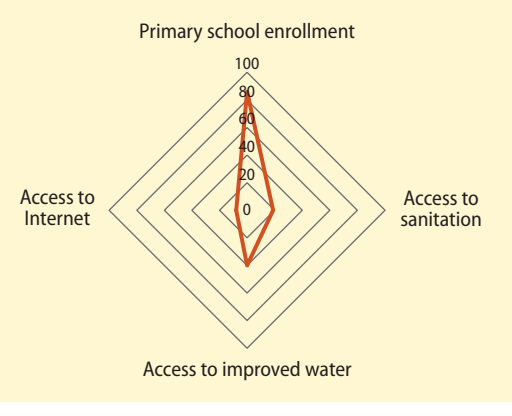
FIGURE A.17 Average years of educational attainment in Papua New Guinea, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.18 Selected development indicators in Papua New Guinea

Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Administration

The Organic Law on Provincial and Local-Level Government of 1995 regulates decentralization and focuses on district and local communities. The National Department of Education is responsible for preparing education plans, including curriculum, standards, and teacher education and training. Provincial governments are responsible for providing services (operational costs). Communities are responsible for providing land for school infrastructure.

Compulsory education and testing

Universal basic education is a policy goal, but there are no legal provisions regarding free or compulsory education. Up to grade 7, assessment is school based; the Primary Education Certificate Examination at the end of grade 6 certifies completion of basic education. In grades 8–12, school-based and standardized assessments are administered.

Curriculum and textbooks

The National Department of Education prepares policies on curricula; local-level governments and district administrations are responsible for developing and producing curriculum materials. At the primary level, teachers are involved in developing components of the curriculum. More than 800 languages are spoken in Papua New Guinea. Local languages are used in primary education; English is the main language of instruction at higher levels. An outcome-based curriculum was introduced in 2005.

Teachers

Primary teachers train at community-based teachers colleges; secondary education teachers are trained at national teachers colleges or universities, which typically provide three-year training programs. Local communities select teachers. Provincial inspectors rate them.

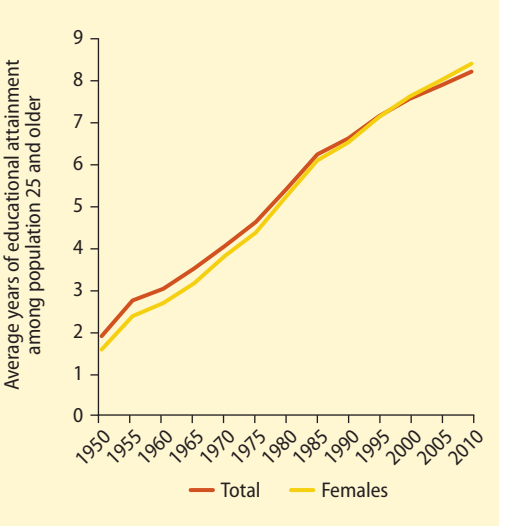
The Philippines

TABLE A.12 Selected indicators for the Philippines

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	100.7
GDP (US$, billions)	292
GDP per capita (US$)	2,899
Adult literacy rate (%)	96.4
Unemployment rate (%)	7.1
Student enrollment	
Preprimary	
Number enrolled	1,165,771
% female	—
Primary	
Number enrolled	13,686,643
% female	48
Secondary	
Number enrolled	6,766,952
% female	51
Tertiary	
Number enrolled	2,625,385
% female	—
Number of teachers	
Preprimary	—
Primary	435,385
Secondary	194,373
Tertiary	—
Education financing	
% of GDP	2.7
% of government spending	13.2

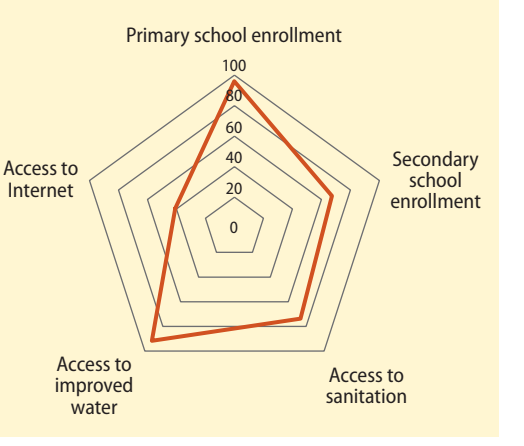
Source: EdStats data (World Bank, various years).
Note: GDP = gross domestic product; — = not available.

FIGURE A.19 Average years of educational attainment in the Philippines, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.20 Selected development indicators in the Philippines
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Overview

The Philippines is in the middle of implementing an ambitious slate of reforms, including the extension of secondary education and the shift to 13 years of compulsory education. It educates about 24 million students from preprimary through tertiary education and employs about 630,000 teachers in primary and secondary schools.

Administration

The Department of Education is the main administrative body responsible for formulating and implementing education policy as well as managing education infrastructure and resources. Under the central department, regional and division offices manage the education system at the local level, performing school quality audits, providing resources, and managing administrative services.

Compulsory education and testing

In 2012–13 the Philippines extended compulsory education to 13 years, including one year of kindergarten, and added two years of schooling to upper-secondary, delaying entrance into tertiary education. It uses several nationwide exams to gauge student learning, including the National Achievement Test, given at the primary and secondary levels. It also participates in TIMSS, scoring near the bottom.

Curriculum and textbooks

The Curriculum Development Division of the Department of Education is responsible for managing and developing national curriculum standards. The Instructional Materials Council, attached to the Department of Education, is responsible for textbook-related policies.

Teachers

All teachers in the Philippines must have completed a four-year degree in education. Secondary school teachers must also have tertiary-level instruction in the subject they teach. Hiring takes place at the school level.

Singapore

TABLE A.13 Selected indicators for Singapore

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	5.6
GDP (US$, billions)	293
GDP per capita (US$)	52,889
Adult literacy rate (%)	96.8
Unemployment rate (%)	3.0
Student enrollment (number enrolled)	
Preprimary	—
Primary	294,602
Secondary	232,003
Tertiary	198,634
Number of teachers	
Preprimary	—
Primary	16,893

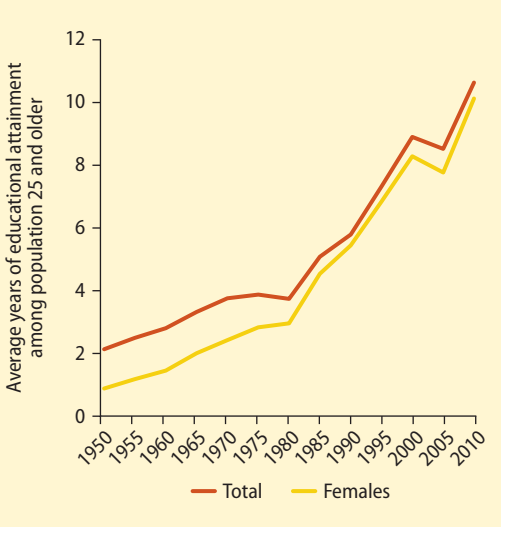
table continues

TABLE A.13 Selected indicators for Singapore *(continued)*

Indicator	Statistic
Number of teachers (continued)	
Secondary	15,560
Tertiary	6,051
Education financing	
% of GDP	2.9
% of government spending	20.0
Average 2015 PISA scores	
Mathematics	564
Reading	535
Science	556

Sources: EdStats data (World Bank, various years); OECD 2016b.
Note: Gender disaggregated data for enrollments not available in EdStats. GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

FIGURE A.21 Average years of educational attainment in Singapore, 1950–2010



Source: Barro and Lee 2013.

Overview

One of Asia's highest-performing education systems, Singapore is also one of the smallest systems in the region, with only about 725,000 students enrolled in primary through tertiary and about 40,000 teachers. Singapore's highly functioning system has served as an example for others in the region and around the world.

Administration

The Ministry of Education governs education. In addition to controlling government-run schools, it supervises Singapore's private schools. Singapore also has an extensive private school system, overseen by the Council for Private Education.

Compulsory education and testing

Singapore has nine years of compulsory schooling. At the end of sixth grade, students sit for the Primary School–Leaving Examination, which determines what course they take in secondary school. In addition to national exams, Singapore participates in a wide range of international exams, including PISA and TIMSS, scoring first among all participants in both examinations in 2015.

Curriculum and textbooks

The Curriculum Planning and Development Division of the Ministry of Education is responsible for the curriculum framework. Recent changes to the national curriculum have emphasized noncognitive competencies in addition to traditional academic domains.

Teachers

Singapore has one teacher training institute, the National Institute of Education.

Taiwan, China

TABLE A.14 Selected indicators for Taiwan, China

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	23.5
GDP (US$, billions)	530
GDP per capita (US$)	22,540
Adult literacy rate (%)	98.7
Unemployment rate (%)	3.8
Student enrollment	
Preprimary	492,781
Primary and junior-secondary	1,861,086
% female	48

table continues

TABLE A.14 Selected indicators for Taiwan, China *(continued)*

Indicator	Statistic
Student enrollment (continued)	
Upper-secondary	694,025
Tertiary	1,309,441
% female	51
Number of teachers	
Preprimary	47,184
Primary and junior-secondary	143,156
Upper-secondary	54,575
Tertiary	48,096
Education financing	
% of GDP	3.8
% of government spending	20.5
Average 2015 PISA scores	
Mathematics	542
Reading	497
Science	532

Sources: OECD 2016b; Taiwan Ministry of Education, Taiwan Bureau of Statistics data.
Note: Gender disaggregated data for enrollments not available from public ministry data for preprimary and upper-secondary. GDP = gross domestic product; PISA = Programme for International Student Assessment.

Overview

Taiwan, China is in the midst of reforming its education system, moving from decades of a highly centralized system that focused on rote memorization to a more student-centered system that prioritizes the needs of a changing economic landscape. It educates about 4.4 million students from preprimary through tertiary education and employs about 300,000 teachers in preprimary through tertiary institutions.

Administration

The Ministry of Education oversees the administration and regulation of the education system at the national, provincial, and municipal levels. It is also responsible for private educational institutions, setting standards and requirements for their establishment and administration.

Compulsory education and testing

Taiwan, China recently moved from 9 to 12 years of compulsory education. The move was part of a broader reform aimed at

modernizing the education system, including updating and decentralizing curriculum design, and reducing the testing burden in advancement to upper-secondary. Taiwan, China participates in international educational assessments, scoring high in the most recent round of PISA.

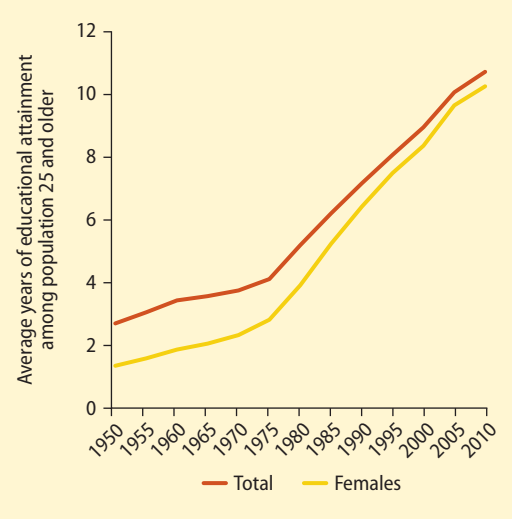
Curriculum and textbooks

Recent reforms have focused on decentralizing and streamlining the curriculum. The curriculum was revised at the central level with the move to 12 years of compulsory education. It provides a cohesive framework and guidelines for schools rather than mandates. The new curriculum moves away from rote memorization and teacher lectures and toward a more student-centered approach.

Teachers

All teachers are trained at either a teachers college or the education department of a university. Upon completion of their studies, candidates must take the Teacher Qualification Exam to begin working at a public school. Taiwan, China recently established the Nationwide Teacher In-Service Education Information Web, which provides information on training opportunities for teachers to continue their skills development. Along with the curricular reforms, Taiwan, China is working to improve its training programs to move teachers from lecture-style classes to more student-centered lessons.

FIGURE A.22 Average years of educational attainment in Taiwan, China, 1950–2010



Source: Barro and Lee 2013.

Thailand

TABLE A.15 Selected indicators for Thailand

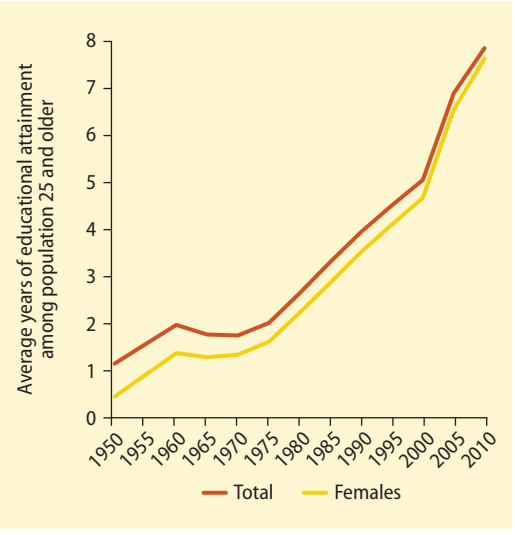
Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	68.0
GDP (US$, billions)	395
GDP per capita (US$)	5,816
Adult literacy rate (%)	93
Unemployment rate (%)	0.9
Student enrollment	
Preprimary	
Number enrolled	1,636,244
% female	46
Primary	
Number enrolled	5,081,079
% female	48
Secondary	
Number enrolled	6,757,174
% female	46
Tertiary	
Number enrolled	2,235,450
% female	—
Number of teachers	
Preprimary	—
Primary	300,968
Secondary	240,005
Tertiary	—
Education financing	
% of GDP	4.1
% of government spending	18.9
Average 2015 PISA scores	
Mathematics	415
Reading	409
Science	421

Sources: OECD 2016b; UIS data.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

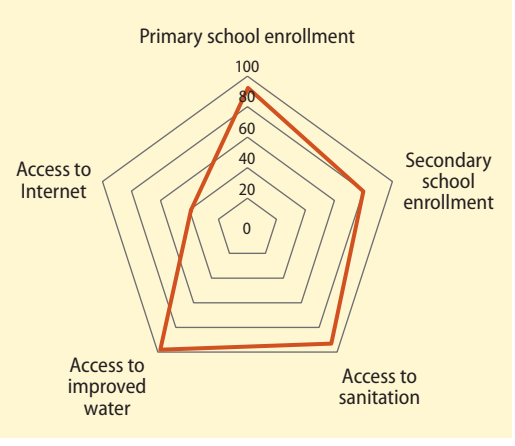
Thailand has made the transition from a largely agrarian, low-income society to an upper-middle-income country. It educates about 16 million students from preprimary through tertiary education and employs about 550,000 teachers in primary and secondary schools.

FIGURE A.23 Average years of educational attainment in Thailand, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.24 Selected development indicators in Thailand
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Administration

The Ministry of Education regulates and supervises both public and private schools. The Office of Higher Education Commission, a department of the Ministry of Education, administers and controls public and private universities.

Compulsory education and testing

The constitution guarantees 12 years of free basic education; nine years of school attendance is compulsory. Admission to upper-secondary school is regulated through an entrance exam. Upon graduating from high school, students need to pass the CUAS (Central University Admission System). Half of the CUAS is the Ordinary National Educational Test and the Advanced National Educational Test results; the other half is the fourth-level grade-point average.

Curriculum and textbooks

With reforms in 2001 and 2008, Thailand shifted its content-based curriculum to a standards-based approach (OECD 2016a).

Teachers

Teacher training is offered at universities and teachers colleges. The mainstay of teacher output is the government-run Rajabhat Universities (formerly Rajabhat Institutes), the traditional teacher training colleges in most provinces.

Timor-Leste[a]

TABLE A.16 Selected indicators for Timor-Leste

Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	1.2
GDP (US$, billion)	1.4
GDP per capita (US$)	1,131
Adult literacy rate (%)	58.3
Unemployment rate (%)	4.7

table continues next page

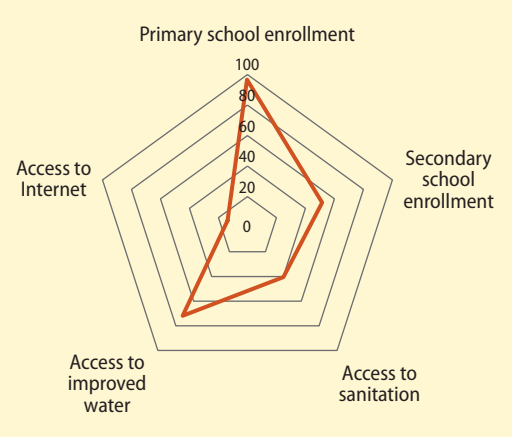
a. An educational attainment line graph is not provided for Timor-Leste; those data are not available.

TABLE A.16 Selected indicators for Timor-Leste *(continued)*

Indicator	Statistic
Student enrollment	
Preprimary	
Number enrolled	16,206
% female	50
Primary	
Number enrolled	245,847
% female	48
Secondary	
Number enrolled	118,935
% female	55
Tertiary	
Number enrolled	18,553
% female	—
Number of teachers	
Preprimary	615
Primary	7,714
Secondary	4,441
Tertiary	—
Education financing	
% of GDP	6.6
% of government spending	7.7

Source: EdStats data (World Bank, various years).
Note: GDP = gross domestic product; — = not available.

FIGURE A.25 Selected development indicators in Timor-Leste
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Overview

Timor-Leste is still dealing with the legacy of its independence movement and the management of internal and external conflicts. Large youth populations, significant refugee issues, a young government, and issues related to the language of instruction present challenges, but Timor-Leste is pushing forward with reform plans.

Administration

The Ministry of Education is responsible for the design and implementation of education policies. Centrally located schools offer all nine years of compulsory education; smaller local schools generally offer only primary education (first through fourth grade).

Compulsory education and testing

Timor-Leste has nine years of compulsory education, separated into three cycles (grades 1–4, 5–6, and 7–9). Students sit for a national exam upon completion of ninth grade. Access rates for education are high through ninth grade but fall off for upper-secondary school. Timor-Leste has not participated in any international education assessments. It conducted three rounds of Early Grade Reading Assessments (EGRAs), in 2009, 2011, and 2017.

Curriculum and textbooks

Timor-Leste has struggled with curriculum because of the lack of ubiquity of its two official languages, Portuguese and Tetum. The lack of a shared language has made it difficult to develop a comprehensive curriculum for all students. Additionally, low levels of technical and pedagogical competence among teachers make delivery of the existing curriculum difficult.

Teachers

Teachers in Timor-Leste are not highly qualified: less than 40 percent of teachers in basic education have university education. Policy makers are seeking to address these issues with a variety of in-service training programs as well as a teacher management system that tracks teachers' academic and professional experience in order to deliver targeted training. The lack of experience at the system level has impeded progress.

Vietnam

TABLE A.17 Selected indicators for Vietnam

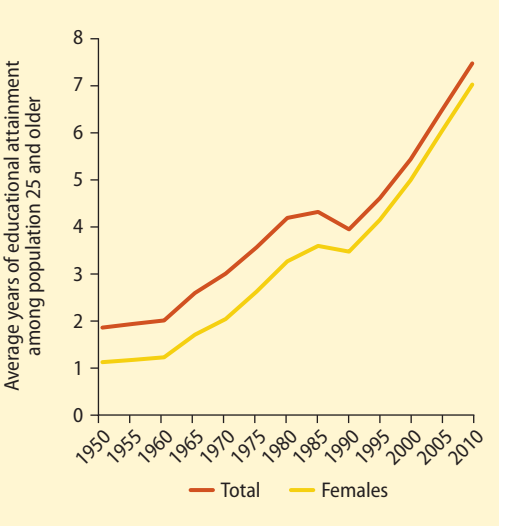
Indicator	Statistic
Demographic and macroeconomic indicators	
Population (millions)	91.7
GDP (US$, billions)	193
GDP per capita (US$)	2,111
Adult literacy rate (%)	93.5
Unemployment rate (%)	2.3
Student enrollment	
Preprimary	
Number enrolled	3,754,975
% female	47
Primary	
Number enrolled	7,543,632
% female	49
Secondary	
Number enrolled	7,463,517
% female	—
Tertiary	
Number enrolled	2,466,643
% female	—
Number of teachers	
Preprimary	215,518
Primary	392,136
Secondary	150,133
Tertiary	34,461
Education financing	
% of GDP	5.7
% of government spending	18.5
Average 2015 PISA scores	
Mathematics	495
Reading	487
Science	525

Sources: EdStats data (World Bank, various years); OECD 2016b.
Note: GDP = gross domestic product; — = not available; PISA = Programme for International Student Assessment.

Overview

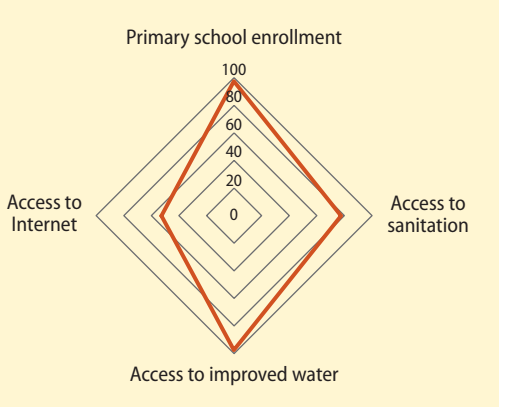
Vietnam has one of the highest gross domestic product (GDP) growth rates in the region. Its education system has received much attention in recent years, thanks to its outstanding results on the last two PISA assessments. Vietnam educates about 21 million students from preprimary through tertiary education, employing about 800,000 teachers (preprimary through tertiary). It has more than 30,000 primary and secondary schools.

FIGURE A.26 Average years of educational attainment in Vietnam, 1950–2010



Source: Barro and Lee 2013.

FIGURE A.27 Selected development indicators in Vietnam
Percent



Sources: National statistical authorities and World Development Indicators data (World Bank, various years).

Administration

The Ministry of Education and Training oversees the education sector. It is responsible for setting policy directions for all levels of education. Provincial Departments of Education and Training and District Bureaus of Education and Training oversee school

management, staffing, and distribution of financial resources.

Compulsory education and testing

Vietnam has nine years of compulsory education. Policies introduced in 2014 aim at universalizing access to preprimary. About 92 percent of children age three to five were enrolled in preprimary school in 2017. Access to senior-secondary school (grades 10–12) is rationed through exams developed and delivered at the provincial level. Students who complete upper-secondary school are eligible to sit for the *Kỳ thi Trung học phổ thông quốc gia*, a standardized test that certifies completion of secondary education and determines college admissions based on score points.

Curriculum and textbooks

The Ministry of Education and Training regulates curriculum and textbook design. Vietnam's major education reform, passed by the National Assembly in 2014, mandates a renovation of the national curriculum following a competency-based approach to allow students to develop 21st century skills and the ability to apply knowledge. Together with the roll-out of the new curriculum anticipated for 2019–22, Vietnam plans to move from a single set of textbooks, currently provided by the Educational Publishing House, an agency of the Ministry of Education and Training, to multiple sets of textbooks.

Teachers

Ninety-five institutions offer preservice training for teachers. All teachers must meet minimum academic requirements, and secondary school teachers must have attended a teachers college or university to be certified. Teachers are required to participate in at least 30 days of in-service training a year.

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One-quarter of the world's school-age children live in East Asia and Pacific. During the past 50 years, some economies in the region have successfully transformed themselves by investing in the continuous upgrading of the knowledge, skills, and abilities of their workforce. Through policy foresight, they have produced graduates with new levels of knowledge and skills almost as fast as industries have increased their demand for skilled workers.

Yet the success of these high-performing systems has not been replicated throughout the region. Tens of millions of students are in school but not learning, and as many as 60 percent of students remain in school systems that are struggling to escape from the global learning crisis or in systems where performance is likely poor. Many students in these systems fail to reach basic levels of proficiency in key subjects and are greatly disadvantaged because of it.

Growing Smarter: Learning and Equitable Development in East Asia and Pacific focuses on the experiences of economies in the region that have been able to expand schooling and learning and showcases those that have managed to pursue successful education reforms at scale. By examining these experiences, the report provides both diagnoses and detailed recommendations for improvement not only for education systems within East Asia and Pacific but also for countries across the globe. In East Asia and Pacific, the impressive record of success in education in some low- and middle-income countries is proof of concept that schooling in resource-constrained contexts can lead to learning for all. This report identifies the policies and practices necessary to ensure that students learn and suggests how countries can improve learning outcomes.

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