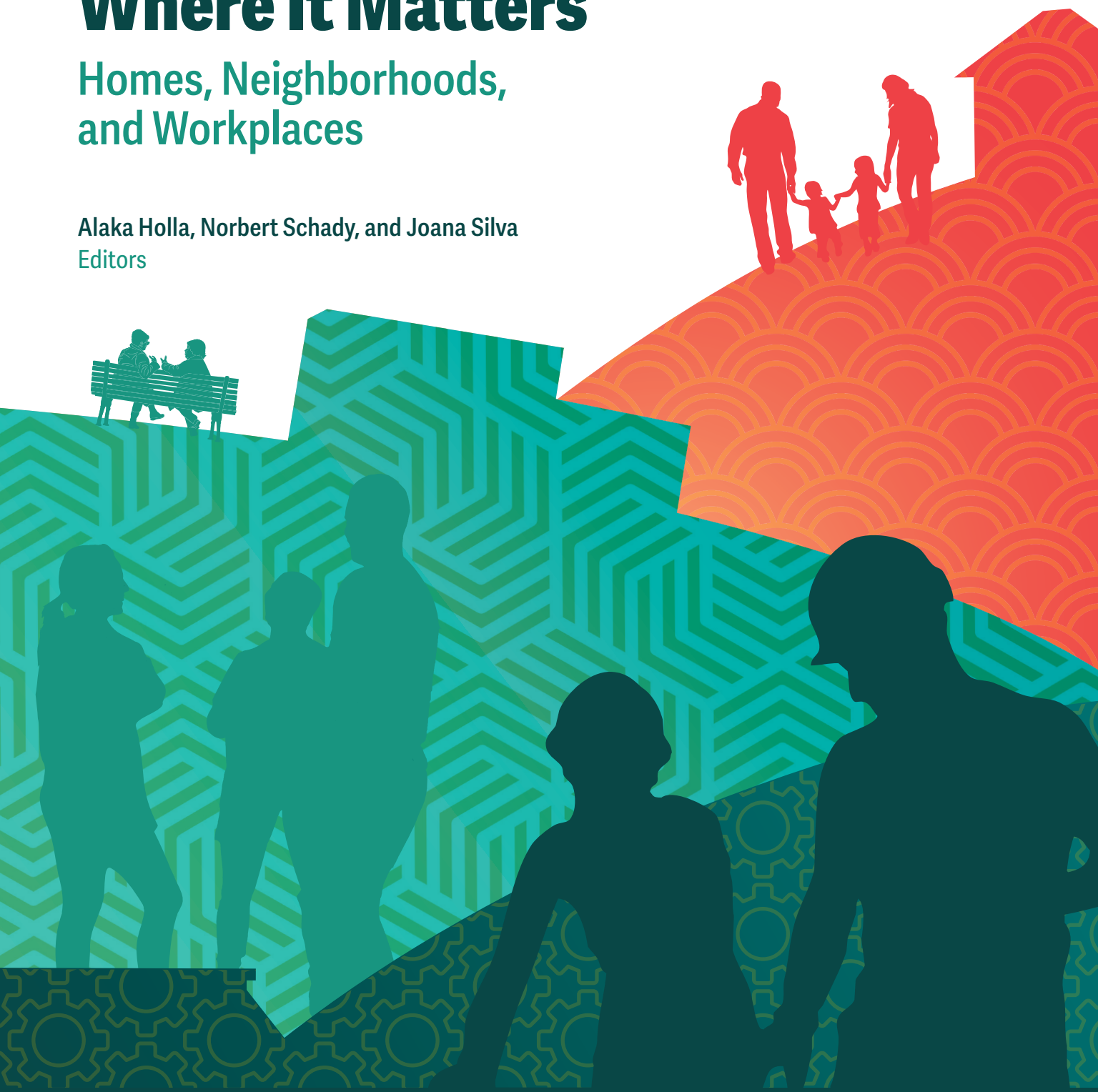
Building Human Capital Where It Matters

Homes, Neighborhoods, and Workplaces

Alaka Holla, Norbert Schady, and Joana Silva
Editors



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1 2 3 4 29 28 27 26

ISBN (paper): 978-1-4648-2277-3
ISBN (electronic): 978-1-4648-2316-9
DOI: 10.1596/978-1-4648-2277-3

Cover design: Nicole Hamam, Hamam Design. Further permission required for reuse.
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The Library of Congress Control Number has been requested.

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Foreword

Human capital—people's health, skills, and knowledge—is the most valuable asset any society possesses. It is the foundation of economic growth, poverty reduction, and shared prosperity. No country has achieved sustained development without investing in it.

Global trends in human capital outcomes show that progress in human capital is stalling if not reversing in many low- and middle-income countries. Children today are less likely than children 15 years ago to read with understanding or be able to do basic mathematics problems. Adult height—a marker of population health—has declined in many places. Most workers in low- and middle-income countries are in jobs with limited formal training or on-the-job learning opportunities. Women and youth are especially affected. Only 40 percent of women are in paid employment, and nearly one in five young people are neither working nor studying.

These trends matter because differences in human capital account for roughly two-thirds of the gap in per capita income between rich and poor countries. This report argues that reversing these trends requires rethinking how human capital policy is designed and delivered. Much of the existing policy and research agenda has focused on expanding access to and improving the quality of health and education services or on specific stages of the life cycle. While essential, these approaches are not sufficient. Human capital is built not only through systems but also in specific settings—most importantly in homes, neighborhoods, and workplaces—where daily decisions, interactions, and opportunities shape outcomes over time.

This report puts forward a simple but underappreciated observation: human capital is not built in sectors alone, nor only at specific stages of life. It is built—slowly, unevenly, and often invisibly—in places: through the health of a child, the quality of a classroom, the safety of a neighborhood, and the learning that takes place or fails to take place at work. In homes, nutrition, care, and early stimulation shape lifelong trajectories. In neighborhoods, the quality of schools, health services, infrastructure, safety, and social norms influence what people can become. And, in workplaces, skills are refined, or they are wasted, and learning by

doing can either accelerate productivity or leave workers stuck in low-return activities.

By adopting a settings-based lens, this report complements sectoral and life-cycle approaches and offers a more well-integrated framework for action. It shows how constraints in one setting can undermine investments made in another, and how coordinated action across homes, neighborhoods, and workplaces can unlock far greater returns. It also highlights the roles of public and private actors and the importance of more closely aligning financing, incentives, and institutions to support human capital accumulation where it actually happens.

At a moment when countries face overlapping challenges from demographic shifts and rapid technological change to climate shocks and fragility, investing more effectively in human capital is not optional. It is foundational.

This report offers practical insights and policy priorities to help countries move from fragmented interventions to coherent, people-centered strategies. It aims to support governments and partners in renewing progress on human capital accumulation and unlocking people's potential. And, in doing so, it seeks to restore progress where it has stalled and expand opportunities where they have been out of reach.

Mamta Murthi
Vice President, People
World Bank Group

Acknowledgments

This report would not have been possible without the generous support of a team of colleagues and collaborators.

Special thanks are due to Mamta Murthi, Vice President for the People Vertical of the World Bank Group, for her leadership. Dena Ringold, Director, Strategy and Operations for the People Vertical of the World Bank Group, provided valuable guidance and support. The report also benefited from the guidance of Hana Brixi, Eliana Carranza, Halil Dundar, Indermit Gill, Jamele Rigolini, Alberto Rodriguez, Michal Rutkowski, Fadia M. Saadah, and Jaime Saavedra.

The empirical analyses presented in this volume greatly benefited from the expertise and many contributions of Brian Stacy, who provided valuable inputs to chapter 1 and the publication as a whole. He led the production of the report's reproducibility package. Francisco Bivar, Sergio Padilla, and Shuqiao Sun in the People Chief Economist Office provided outstanding research assistance. Florence Kondylis supplied valuable material related to agricultural labor markets.

The report was shaped by multiple in-country consultations with government, civil society, and private sector representatives. The authors are especially grateful to Caroline Vagneron for leading these consultations and to Heba Elgazzar, René Antonio Leon Solano, and Facundo Cuevas for organizing these consultations in country and providing insights on the applicability of the report's findings to current policy agendas. In-person consultations were held in Brazil, Colombia, Côte d'Ivoire, El Salvador, Poland, Tajikistan, and Türkiye, complemented by shorter virtual events in other countries. Several consultations were also held with academia and international institutions, including Paris School of Economics, Institut d'Études Politiques de Paris, Opportunity Insights at Harvard University, University of Oslo, Organisation for Economic Co-operation and Development, Center for Global Development, and African Economic Research Consortium–Kenya.

The report benefited considerably from the comments and suggestions of peer reviewers, including Ndiame Diop, Roberta Gatti, Aart Kraay, Denis Medvedev, Martin Raiser, Martin Rama, and Hirokazu Yoshikawa, at the decision meeting

stage, and Pedro Carneiro, Ndiame Diop, Pascaline Dupas, Deon Filmer, Roberta Gatti, Aart Kraay, Santiago Levy, David McKenzie, and Carolina Sanchez Palermo, at the concept note stage. The analyses and interpretations also benefited from the generous insights of Gabriel Demombynes, Shanta Devarajan, Raquel Fernandez, Deon Filmer, John N. Friedman, Aart Kraay, Martin Rama, Michal Rutkowski, and Hirokazu Yoshikawa during a quality enhancement review.

The authors are grateful for the insightful comments of World Bank colleagues, including Luis Benveniste, Ousmane Dione, Doerte Doemeland, Elisabeth Huybens, Sebastian Molineus, Renaud Seligmann, Ayat Soliman, Juan Pablo Uribe, Anna Wellenstein, and Marina Wes.

The authors are very grateful to the External and Corporate Relations team of the World Bank, especially Christine Montgomery, Nandita Roy, Giannina Raffo, Margaret Allen, Erick Rabemananoro, Hellen Wagura, Joe Qian, Maria Elisa Costa, and Sidronio Araujo. Special thanks also go to Maarten Lambrechts and Divyanshi Wadhwa for their work on creating the interactive versions of figures that appear in the report, and to Karen Hoyos Baza for her assistance in keeping all report activities on schedule.

Nicole Hamam designed the volume, including the cover art. Nancy Morrison skillfully edited the report, which was copyedited by Robert Zimmermann. Gwenda Larsen and Ann O'Malley proofread the typeset pages, and Stephen Pazdan in the World Bank's formal publishing program coordinated production of the volume.

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Main Messages

Human capital—the health, knowledge, and skills of people—is what people need to thrive. It is what families and communities need to prosper and what individuals need to find good jobs. Building human capital is not only about *what* we do. It is also about *where* we do it. Policies usually focus on improving schools and health clinics to build more human capital. This report shows that a person's home, neighborhood, and workplace matter just as much and deserve more attention in policy.

The report begins by examining global trends in human capital development. There has been a shocking lack of progress in key outcomes. Despite rising incomes and reductions in poverty, two-thirds of low- and middle-income countries have experienced a decline in health, learning, or on-the-job skill development over the past 15 years. For example, average adult height—a marker of population health—has declined in many places. Student learning—measured by harmonized test scores—has remained stagnant in low- and lower-middle-income countries; in most countries, scores are even worse today than in 2010. Similarly, female labor force participation has remained low and stagnant in low- and middle-income countries.

Part of the strategy to reverse these disappointing trends must acknowledge all the settings where human capital is built. Investment in the home, the neighborhood, and the workplace needs to be accelerated.

THE HOME

What happens early in life—at home—is decisive for skill development and success. A family's resources and the choices families make about their children's care, health, and learning can have lifelong impacts. For instance, this report demonstrates that children and adolescents whose mothers have more education perform better in tests of vocabulary and mathematics than children whose mothers have less education. These gaps emerge before the age of 5. They remain constant throughout childhood and adolescence. Resources at home are clearly important. They allow families to buy books or pay university tuition.

But resources alone are not sufficient. The care a child receives at home is vital. Care involves nurturing, reading, and playing with children. Care involves helping children navigate emotions. Care involves keeping children safe. This report demonstrates that resources do not compensate for shortfalls in care.

Strengthening human capital accumulation at home calls for policies that increase resources within the home and that support families in providing the care children need to thrive. These include job programs and cash transfers for poor families. They also include providing parents with tools to create stimulating and nurturing home environments. The evidence summarized in this report from around the world shows that such programs improve educational attainment and lifelong health. They also translate into higher earnings when children join the labor force as adults.

THE NEIGHBORHOOD

Neighborhoods play a key role in productivity and people's well-being. They provide access to quality schools, health care, safe streets, and job opportunities. Two families with the same income may not build the same level of human capital if they live in different neighborhoods. For example, evidence from Brazil shows that a person who grew up in a low-income household in a low-income neighborhood earns half as much in adulthood as a person who grew up in a low-income household in a high-income neighborhood. Neighborhoods matter so much for two reasons. First, people typically go to schools and clinics in their own neighborhoods. If these services are inadequate, this will certainly affect learning and health outcomes. Second, even if schools and clinics are good in a neighborhood, other problems, such as violence and pollution, can limit access and opportunity.

For policy, a neighborhood lens means bringing together different sectors. Sometimes, unlikely partners, such as government departments focusing on education, the environment, and infrastructure, must act together to improve human capital outcomes.

THE WORKPLACE

The workplace matters for human development as well. People often think of a job as an end goal, the place where skills are put to use. Yet, learning continues in the workplace. Indeed, half the total human capital accumulated over a lifetime is acquired at work. Through training and experience, people build skills. This report shows that about 70 percent of workers in low- and middle-income countries are in small-scale agriculture, low-quality self-employment, or microfirms with no more than five workers. These jobs generally offer only limited opportunities for learning. Even with the same gain in experience, earnings increase only half as much among the self-employed as among salaried workers.

Countries need to invest more in policies that make work a better engine of learning. Governments and stakeholders can support employer-provided training and promote a learning culture in existing jobs. For example, in India, an on-the-job soft skills training program raised the productivity of garment workers by over 13 percent and improved the productivity of untrained coworkers by almost 12 percent. Stakeholders can also upskill labor market entrants and help them match with jobs through job platforms and formal and informal apprenticeships. This report's review of large-scale apprenticeship programs in Colombia, Côte d'Ivoire, and Nigeria shows that they increased both skills and earnings. Countries can also increase women's participation in the workforce by investing in childcare and ensuring a safe commute to work. Well-designed incentives and regulations that support firm growth can result in more high human capital jobs and, therefore, more learning on the job. In all these efforts, the private sector is an essential partner.

Recognizing the importance of the home, the neighborhood, and the workplace expands the set of policy options to improve productivity and well-being. This report provides examples of countries that have successfully integrated investments in these key settings, including collaboration with the private sector, to solve human capital challenges, such as malnutrition and low on-the-job learning. The report also argues for a more ambitious data agenda to track progress in these settings more closely and proposes the main building blocks of this agenda. An integrated settings approach and the collection and use of more data are what is needed to build human capital where it matters.

Executive Summary

Human capital—health, skills, knowledge, and experience—is what people need to thrive. It is also what is needed for families and communities to prosper and for people to find good jobs. No country has ever achieved sustained periods of economic growth or significant reductions in poverty without investing in human capital.

Much of policy and research on human capital has focused either on a sector (such as education, health care, or social protection), or on an age-group (such as children under age 5). This is not surprising. National ministries (or their subnational counterparts) are organized along sectoral lines. The life cycle, meanwhile, has been the standard organizing framework to analyze the accumulation of human capital for decades.

This report complements the sectoral and life-cycle approaches to human capital by focusing on the settings where human capital is built and what this implies for policies to increase human capital accumulation in an economy. The report takes stock of trends in human capital across the world and presents evidence that the home, the neighborhood, and the workplace are critical and are often missing from human capital policy (refer to figure ES.1). Understanding the dynamics of human capital accumulation in these places can present opportunities to deploy public and private financing more effectively to raise the stocks and flows of human capital.

The stagnation in human capital accumulation

Despite its importance to development, human capital accumulation has stagnated in many low- and middle-income countries (refer to chapter 1). In some dimensions, poorer countries exhibit *worse* outcomes today than they did two decades ago. For example, average adult height—a widely used proxy for latent health—rose by about 1 centimeter per decade in Western Europe during the twentieth century and

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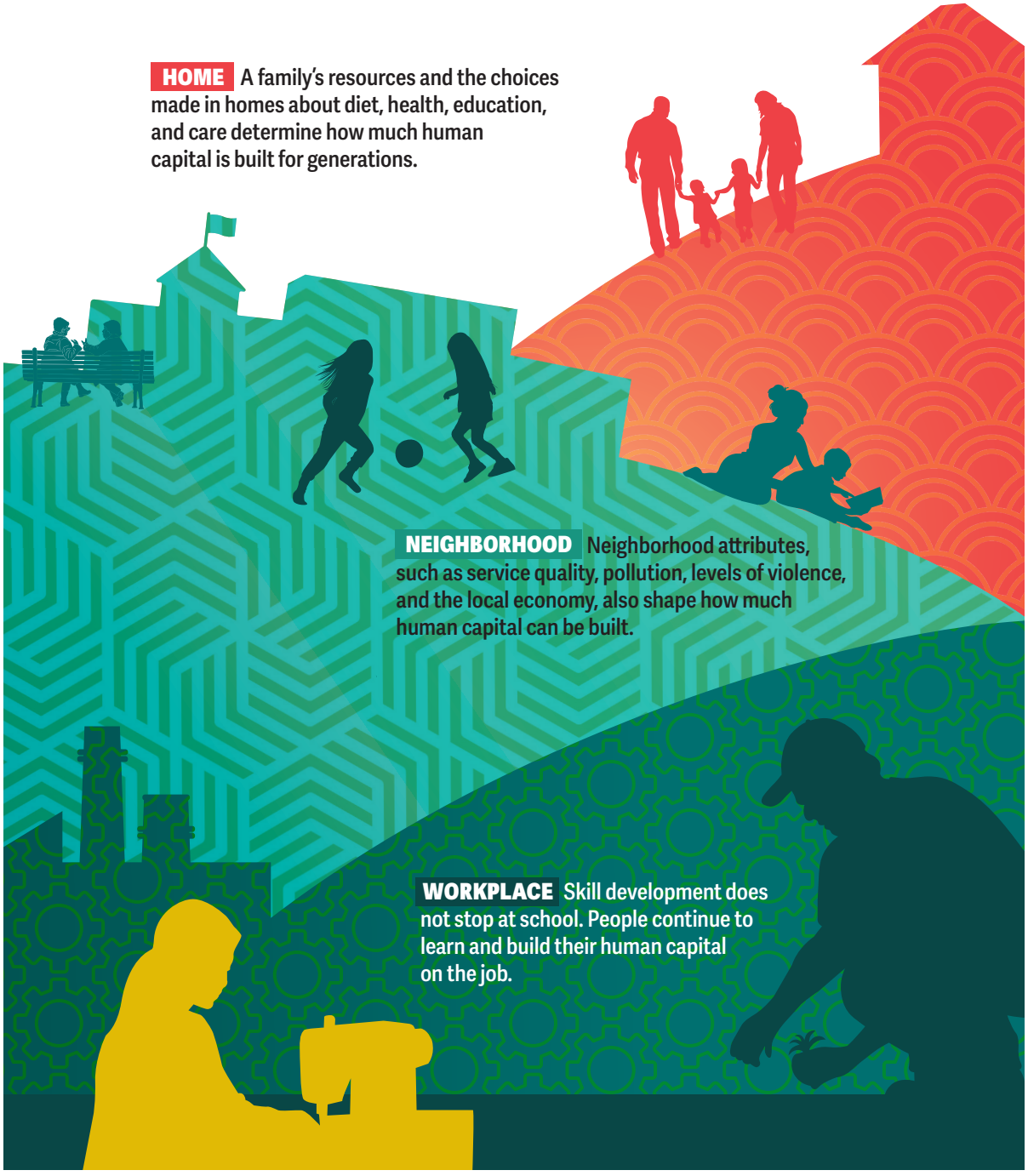
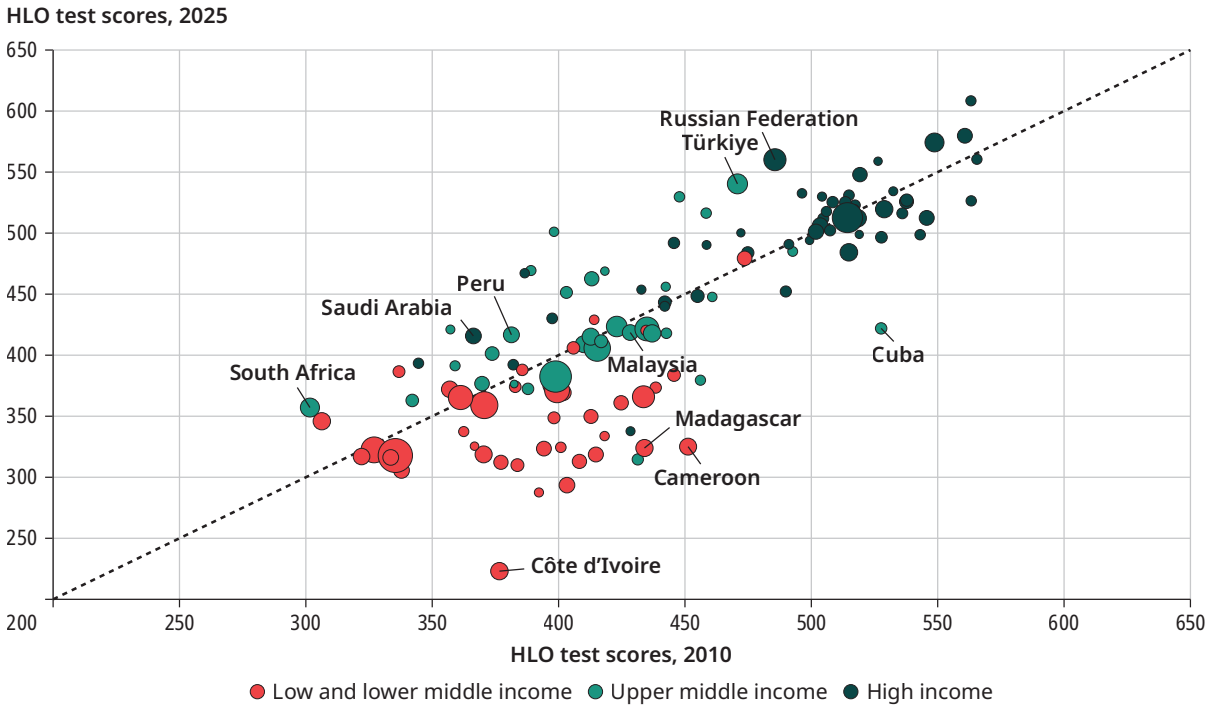
FIGURE ES.1 **Human capital is built in the home, in the neighborhood, and in the workplace**



Source: Original figure for this publication.

FIGURE ES.2 Learning has stagnated in many parts of the world



Sources: HLO (Harmonized Learning Outcomes) Database, World Bank, https://datacatalog.worldbank.org/search/dataset/0038001; World Bank Income Groups, 2024.

Note: The data displayed refer to countries with HLO data for both 2010 and 2025. Country groupings are based on the 2024 income classification. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

at a similar pace in China in recent decades, but, in several Sub-Saharan African countries, adults are shorter today than they were 25 years ago, indicating a deterioration in underlying health. Learning outcomes show an equally troubling pattern. On average, children in low- and lower-middle-income countries show lower achievement levels today than they did 15 years ago. The largest declines have been observed in Sub-Saharan Africa (refer to figure ES.2). Skill development at work also exhibits worrisome trends. On average, an individual acquires only about half as much human capital through work in India relative to Brazil, and an individual in Brazil only half as much as an individual in the United States.

A settings lens for human capital accumulation

Without significant investment in health care, education, and on-the-job learning, low- and middle-income countries will continue to fall behind. This report argues that focusing on how human capital outcomes are shaped

in the home, in the neighborhood, and in the workplace will help governments and stakeholders design more effective policies to increase human capital, which will lead to more well-paying jobs, less poverty, and higher levels of economic growth.

Human capital accumulation in the home

Family background shapes human capital accumulation from the start (refer to chapter 2). By the time they are 5 years old and before they have attended school, children in rural Peru whose mothers have primary educational attainment or less have roughly half the vocabulary relative to children whose mothers have completed at least secondary school. Broadly similar patterns are apparent in Ethiopia, India, and Viet Nam. The disadvantage persists throughout school age and adolescence (refer to figure ES.3). The children of mothers with lower educational attainment never catch up.

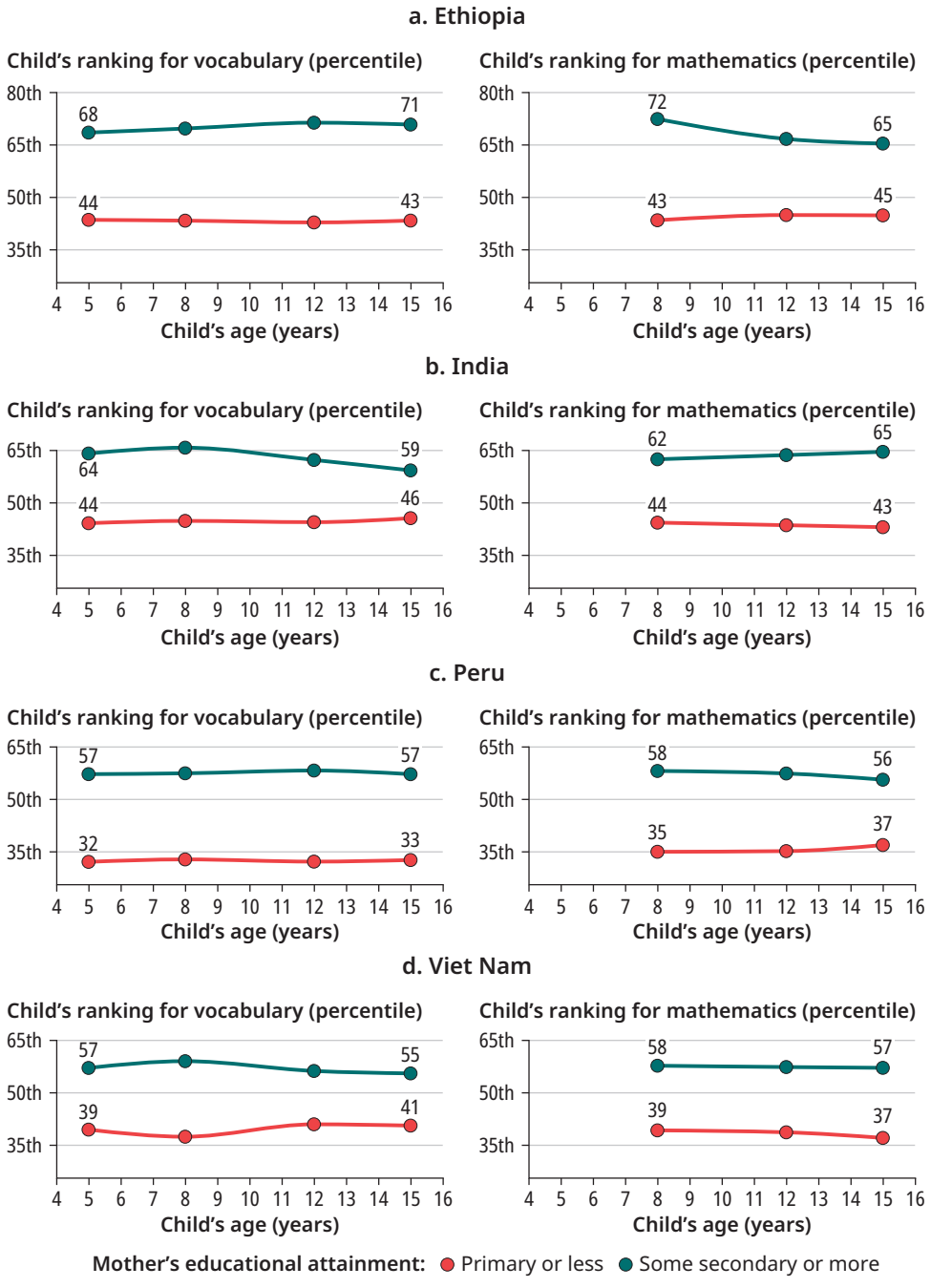
These patterns reflect differing conditions within the home. Why does the home matter so much? One reason is because families vary in their access to resources. To thrive, children need nutritious food, safe and sanitary living conditions, and opportunities to learn. Many of these needs can be met only if families spend money. Healthier foods and diets tend to cost more than less healthy options, and, even if schools and health care are provided free of charge, families still need to purchase books and medicines and cover transportation costs.

Homes also vary a great deal in the care environment, that is, how much time parents invest in helping children learn, how much they play with their children, their style in maintaining discipline, and how much social-emotional support they offer to children and adolescents. Children's early development increases with the number of care or stimulation activities at home, such as an adult singing or playing with a child.

Both resources and care matter, but resources cannot easily make up for low-quality care. This can be observed with data on China, where millions of children are left by their parents in the care of other relatives when the parents move from rural to urban areas in search of better jobs. These left-behind children live in homes with higher household income, but they do worse on tests of mathematics and language and exhibit higher levels of depression. In some parts of the world, there are also substantial differences by sex in the resources and care that children receive in the same household.

Because resources and care both matter, policies that increase resources or improve the quality of care generally improve human capital outcomes. The availability of more resources, either through higher earnings or through cash transfers, has been shown to improve child outcomes in many settings. Parenting programs that are aimed at changing the care environment in the home can also have large positive effects on

FIGURE ES.3 Early skill deficits persist



Source: Original figure for this publication, using data of Young Lives Study (dashboard), Oxford Department of International Development, University of Oxford, https://www.younglives.org.uk/.

Note: Percentile rankings were calculated separately by round, marked by points. Only the youngest cohort (individuals born in 2001) are included. The older cohort (children born in 1994) were not observed at age 5. Vocabulary refers to receptive vocabulary as measured by the Peabody Picture Vocabulary Test (Dunn and Dunn 1997). Mathematics skills are measured through a subset of questions from TIMSS (Trends in International Mathematics and Science Study) (data repository), International Association for the Evaluation of Educational Achievement, https://www.iea.nl/data-tools/repository/timss. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

children's human capital that can persist into adulthood. These interventions have frequently proven difficult to scale up, however. Alternatively, human capital accumulation can be achieved through programs that increase the coverage of preschool. These programs often allow women to join the labor force and, if the quality of preschool is high, can foster the development of cognitive and social-emotional skills that are rewarded in the labor market. Education can confer greater skills among parents as they build the human capital of their children. This is particularly true for women, who tend to bear most of the responsibility for providing care in the home. Therefore, policies that increase the education of girls will also increase the human capital of the next generation.

Human capital accumulation in the neighborhood

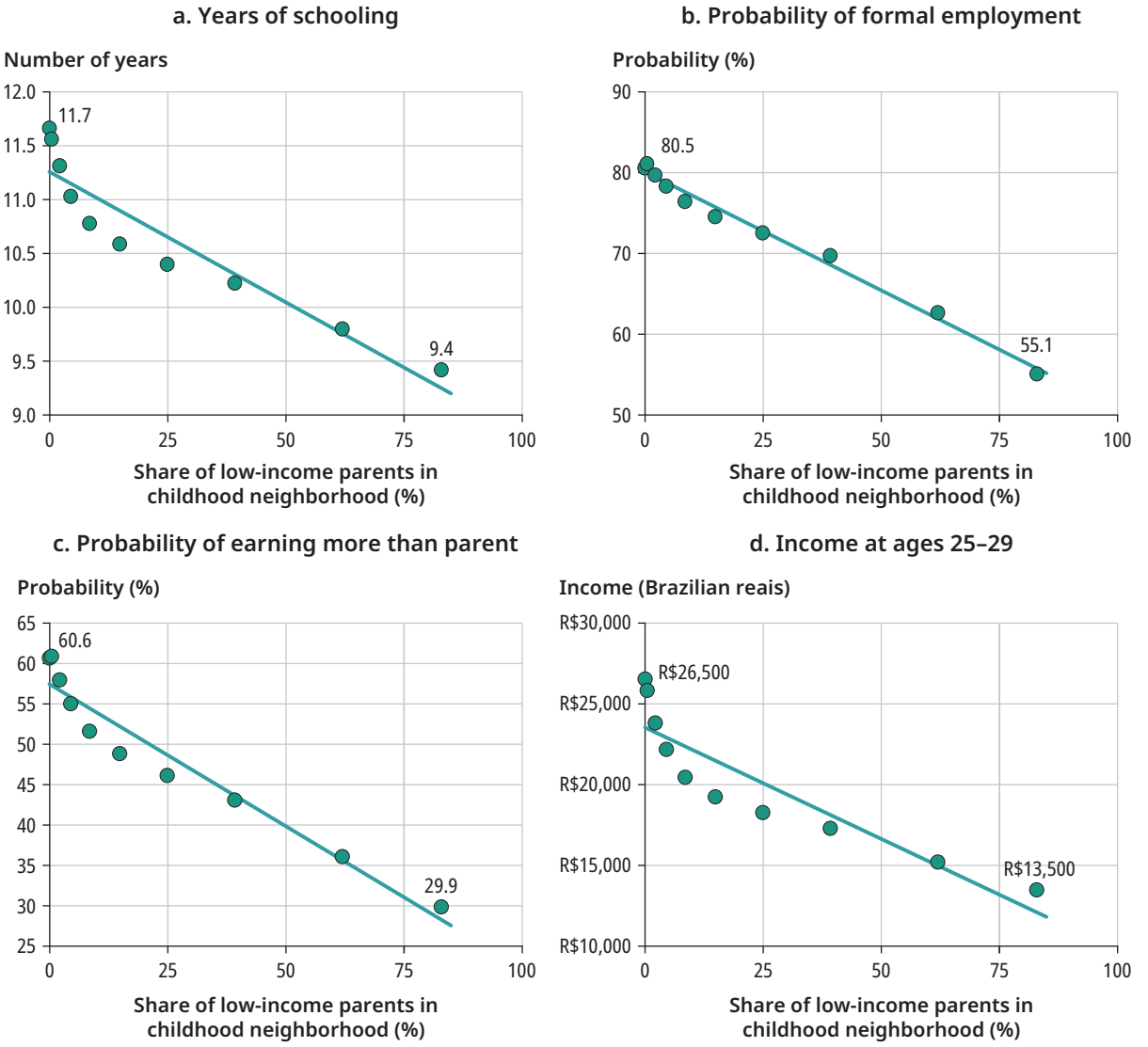
Although the children of parents who have more resources and more education generally have substantially better human capital outcomes, the neighborhood (or village) where children grow up can also have substantial effects on human capital trajectories (refer to chapter 3). This has been shown in the United States and, more recently, in Brazil, where the children of low-income parents will complete two more years of schooling, learn more while in school, and earn twice as much in adulthood, if they grow up in a rich neighborhood rather than a poor neighborhood (refer to figure ES.4).

Neighborhoods matter because families generally use their local school and local primary health center. In practice, the quality of these local services varies widely. In rural Punjab, Pakistan, for example, a child growing up in a village in the highest decile of school quality learns 44 percent more per year than a child in the lowest decile.

Service availability is not the only neighborhood attribute that matters. Air quality, clean water, and sanitation are largely shaped by where people live, and these conditions can vary considerably across neighborhoods or villages. In Indonesia, for example, children living in open defecation–free communities during their first two years of life are more than 10 percentage points less likely to be stunted and have higher cognitive test scores than children living in communities where all other households defecate in the open. In Mexico, exposure to lead from battery recycling plants reduced cognitive development and school performance among children living close to the factories emitting the toxins.

There is also substantial variation across neighborhoods in the exposure to violence that residents experience. In San Salvador, people living in gang-controlled neighborhoods had fewer assets, less income, and lower educational attainment even relative to people living only 50 meters away. Local role models matter, too. In India, exposure to the leadership of women on village councils has been shown to influence the career aspirations and educational attainment of adolescent girls.

FIGURE ES.4 Neighborhood characteristics shape human capital in Brazil



Source: Original figure for this publication, based on Britto et al. 2025.

Note: The figure shows the relationship between the share of low-income parents in the neighborhood during childhood and the following measures of average adulthood outcomes of children from low-income families growing up in these neighborhoods: years of schooling, probability of formal employment, probability of earning more than parent, and income at ages 25–29. The scatterplots use an aggregation of neighborhoods as the observation unit. Neighborhoods are divided into 10 equal groups based on the percentage of low-income parents in each. Low income is defined as income at or below the 33rd percentile of the national income distribution. The share of low-income parents in the childhood neighborhood is used as a proxy for neighborhood characteristics growing up. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

In terms of policy, this means that it is important to target struggling neighborhoods and identify the main constraints that individuals face to accumulate human capital in these neighborhoods. Policies should provide resources and incentives to improve service quality, environmental quality, and social capital in struggling neighborhoods.

Human capital accumulation at work

Traditionally, workplaces have been considered as settings where human capital is *used*. More recently, however, a consensus has emerged that human capital is also *built* at work. For example, a nurse will be more effective as she learns to work in a team of health professionals in a hospital and, critically, as she builds tacit knowledge on how to interact most effectively with patients.

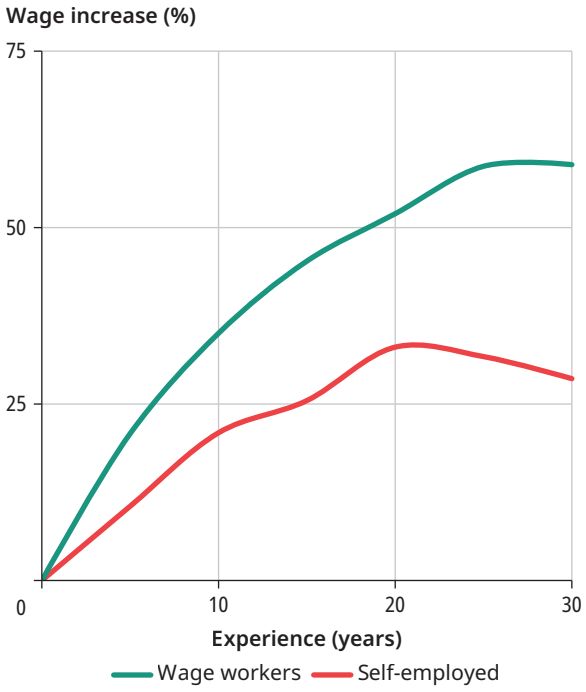
Although there is potential to accumulate significant human capital at work, relatively few people in low- and middle-income countries have an opportunity to do so (refer to chapter 4). Some people are not accumulating human capital at work because they are not even part of the labor force. In low- and middle-income countries, around 50 percent of women are out of the labor force, while around 20 percent of youth are neither studying nor working.

Those who are employed, meanwhile, are concentrated in jobs where little learning occurs. Many workers are in small firms that operate with low technology and minimal organizational capital, often only front-line workers, without managers or engineers or other technical personnel. In fact, about 70 percent of workers in low- and middle-income countries, but only 20 percent in high-income countries, are working in small-scale agriculture, low-quality self-employment, or microfirms. These are generally jobs with limited formal training and few on-the-job learning opportunities. Even with the same gain in experience, earnings in low- and middle-income countries rise only half as much among the self-employed as among wage employees (refer to figure ES.5).

These challenges call for policies that expand learning on the job, ease transitions into work, and create more jobs with strong learning potential. Formal apprenticeships, for instance, have had positive effects on skills and earnings, even when implemented at scale, in numerous Sub-Saharan African countries. These policies should be supported by broader reforms that reduce market failures and misallocation.

Policies can increase learning on the job in all types of employment. Farmers can benefit from extension programs to learn new techniques and adopt new technologies. The self-employed can benefit from soft-skills and business training. Formal job training among wage workers can be effective, but it is undersupplied even in large firms. This is because workers can take their newly acquired skills and move to a different employer unless the training is firm-specific. Incentivizing firms

FIGURE ES.5 Returns to experience are lower among the self-employed than among wage workers in low- and middle-income countries



Sources: Original figure for this publication, based on data of GLD (Global Labor Database Repository), World Bank, https://worldbank.github.io/gld/README.html; I2D2 (International Income Distribution Database) (internal database, discontinued in 2020), World Bank; SEDLAC (Socio-Economic Database for Latin America and the Caribbean), https://www.cedlas.econo.unlp.edu.ar/wp/estadisticas/sedlac/.

Note: The figure shows estimated experience–wage profiles for working-age men grouped by potential experience. Hourly wages are total labor earnings, divided by hours worked. Returns are calculated in five-year experience bins, following Jedwab et al. (2023), using population weights. The results exclude high-income countries. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

to invest in on-the-job training, particularly in the formation of general skills, can therefore help.

Creating more jobs with stronger potential for learning requires incentives for firm growth and expanded education to develop needed talent. Governments and stakeholders can promote access to technology, finance, markets, and research and development (R&D), particularly among young, innovative firms that drive radical innovations and create jobs demanding skilled labor. Well-targeted R&D credits can have lasting effects on human capital and productivity. Facilitating firm growth and structural transformation—from subsistence agriculture and low-productivity services to modern firms—is therefore critical for human capital policy.

Integrating settings into policy to tackle long-standing challenges

Human capital enables people to contribute productively to society. Within countries, investments in human capital spur economic growth and reduce inequality. Despite these well-recognized benefits, trends in human capital accumulation in low- and middle-income countries over the last two decades paint a bleak picture. In many countries, the situation has gotten worse, rather than better.

This report argues that consideration of key settings in which human capital is built—the home, the neighborhood, and the workplace—allows governments to design and implement interventions more effectively to improve health status, raise educational attainment and achievement, and increase on-the-job learning. Figure ES.6 summarizes key policy priorities.

Policies to strengthen human capital would benefit from a settings lens. Strategies to address malnutrition, for example, must address constraints in the home. Families need resources to purchase and prepare nutritious food, and they should engage in early stimulation activities with their children. Other interventions will need to target the neighborhood, including policies to ensure garbage collection, provide clean water and sanitation, and offer access to health centers.

FIGURE ES.6 Policy priorities for the home, the neighborhood, and the workplace

HOME	
Key challenge	Improvements in care in the home
Priorities	Resources and jobs for the poor, parenting programs, and girls' education

NEIGHBORHOOD	
Key challenge	Opportunities to build human capital in struggling neighborhoods
Priorities	Resources and incentives to improve service quality, environmental quality, and social capital

WORKPLACE	
Key challenge	More jobs with stronger potential for skill development at work
Priorities	Apprenticeships, childcare, extension services, soft and business skills training, and incentives for firms to expand and to invest in on-the-job learning

Source: Original figure for this publication.

Workplaces are also important because parents and other caregivers need to have good jobs to be able to purchase the inputs required to provide a healthy diet. A policy to tackle malnutrition therefore requires coordinated action across the three settings: the home, the neighborhood, and the workplace. It also requires coordinated action across multiple sectors, including health care, social protection, agriculture, transport, water, sanitation, and labor, alongside regulation of the private sector and support for local food markets. The same logic can be used to design effective policies to increase learning or the acquisition of skills at work.

A policy that acknowledges the role of multiple settings requires tools that can help coordinate investments within and across settings. Social registries are information systems that aggregate socioeconomic information on individuals or households that can then be used in multiple programs to support households across settings. Social assistance centers can serve as single-window entry points that connect individuals and households to the full set of benefits and services for which they are eligible. Case management involves a trained professional who works closely with a household to identify the specific constraints it faces, codevelops a tailored plan, and coordinates access to the range of services needed. The common theme in all these approaches is that they attempt to coordinate multiple programs to reach the same household. Tools such as these could also be used to identify and design policy packages for struggling neighborhoods.

Tracking progress in human capital investment across homes, neighborhoods, and workplaces also requires clear metrics of success. Given current data availability, however, a more ambitious global and national data agenda is needed.

Human capital is essential to enable people to obtain good jobs and earn higher incomes. Despite tremendous progress in expanding access to education, health care, and social services, improvements in key outcomes have stagnated or declined in many low- and middle-income countries. This volume proposes an approach to tackle this stagnation. It argues that a careful consideration of the constraints and opportunities in three key settings—the home, the neighborhood, and the workplace—is needed to prepare people for jobs, to help them thrive, and to unlock productivity.

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Chapter 1

Introduction

Norbert Schady

Summary

This chapter serves as an introduction, motivation, and framing for the subsequent chapters in this report. It argues that human capital is multidimensional and encompasses all characteristics that make an individual more productive. Human capital is critical for development. It raises earnings, boosts economic growth, increases the likelihood that women join the labor force, and, because human capital is frequently the only capital that poor people have, has a disproportionate effect on poverty reduction. No country has gone through sustained periods of economic growth and concomitant reductions in poverty without first investing in human capital. The chapter demonstrates the considerable urgency in the need to address human capital shortfalls. In low- and lower-middle-income countries, many human capital outcomes have stagnated, including health, education, and the skills acquired at work, and, in some dimensions, outcomes are worse today than they were two decades ago. The chapter argues that a focus on the settings where human capital is built is important for policy design. Human capital policies have traditionally focused on specific sectors (for example, education, health, or social protection) or age-groups (for instance, children ages 5 or younger). The chapter posits, however, that focusing on how human capital accumulates in the home, in the neighborhood, and in the workplace is a useful complement to sectoral or age-specific approaches.

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Why is human capital so important?

The acquisition of talents during education, study, or apprenticeship . . . is capital in a person. Those talents are part of his fortune and likewise that of society.

—Adam Smith ([1776] 1937, chapter 1)

This report is about human capital: what it is, how it accumulates in distinct settings, such as the home, the neighborhood, and the workplace, and what this implies for policy design. Human capital is the health, knowledge, skills, and experience that people accumulate over their lifetimes. It encompasses all characteristics that make an individual more productive. It is combined with other factors (such as physical capital) in the production of goods and services. No country has ever achieved sustained periods of economic growth or significant reductions in poverty without investing in human capital.

This chapter provides an introduction to the report and establishes the motivation and framework for the chapters that follow. It shows why investments in human capital are critical for people and countries. The chapter argues that there is considerable urgency in the need to address human capital shortfalls. In low- and lower-middle-income countries, many human capital outcomes have stagnated, and, in a number of dimensions, outcomes are worse today than they were two decades ago. The chapter argues that the standard organizing framework for human capital policy, the life cycle, is insufficient on its own to support the design of effective policies. An approach that focuses more closely on the settings where human capital accumulation takes place can fruitfully widen the scope of human capital policy.

Human capital raises earnings and boosts growth

Globally, every additional year of schooling attained by individuals raises their earnings by about 10.0 percent, while every year of experience raises earnings by about 2.5 percent.[1] This means that, over a lifetime, a person with 10 years of education would earn about 50 percent more than a person with 5 years of education, while a person with 10 years of labor market experience should earn about 10 percent more than a person with 6 years of experience. School quality also yields large returns in the labor market.[2] Individuals who are in better health are more likely to work and earn higher wages, and some of these effects can be traced as far back as health in utero or in early childhood.[3]

Human capital is also critical for economic growth. In neoclassical growth models, human capital is an input into the production function of gross domestic product (GDP). So, increases in human capital directly raise aggregate income. Moreover, because human capital and physical capital are complements in

production, an expansion in human capital spurs additional investments in physical capital.[4] In endogenous growth models, human capital is even more important. It fuels innovation, accelerates the adoption of new technologies, and expands a country's productive potential.

Although human capital is thought to be critical to growth, quantifying the magnitude of the effect is a challenge. One approach, known as development accounting, estimates by how much the differences in per capita GDP between rich and poor countries would decline if their levels of human capital were equalized. Estimates indicate that human capital accounts for a substantial share of cross-country income differences: roughly two-thirds of the difference in per capita GDP between rich and poor countries is accounted for by differences in human capital.[5]

Human capital increases women's labor force participation

In rich and poor countries, most men enter the labor force as soon as they have concluded formal schooling, but a substantial share of women do not do so. Female labor force participation rates are particularly low in the Middle East and North Africa, where only one in five women are employed, and in South Asia, where the proportion is one in three. This represents an immense loss of talent, household income, and per capita GDP.

Education changes this picture. A woman with more schooling has higher potential earnings and more agency, that is, the ability to make choices about work and family. As a result, education increases the likelihood that women work. Globally, the gap in labor force participation between women with university education and women with no education is 24 percentage points.

Human capital reduces poverty

Labor income represents by far the largest share of income among the poor, and, so, investments that raise the productivity of labor—principally, investments in human capital—will have a larger effect on poverty than what one might expect simply based on the effects of human capital on growth. A recent paper tests this intuition by estimating the effect of increases in school attainment rates on global poverty reduction since 1980. It concludes that increases in school attainment rates account for 70 percent of income gains among the poor and for 40 percent of the global reduction in extreme poverty.[6]

Investments in human capital may reduce inequality

Human capital shapes income inequality primarily through its effects on wage inequality. Investments in human capital may therefore reduce inequality if they compress the wage distribution and weaken the link between family background and labor market outcomes. The total effect of investments in human capital on inequality is ambiguous, however, because such investments change both the

distribution of skills and the returns to skills.[7] The effect ultimately depends on who acquires the skills, how technology interacts with skills, and whether policies ensure that the returns to human capital are broadly shared. Empirically, in Latin America during the 2000s, rapid growth in the supply of skilled labor outpaced demand, contributing to lower skill premiums and declining wage inequality.[8] By contrast, wage inequality increased in China and India, alongside the rise in the returns to education and skills.[9] In Indonesia, rising wage inequality has been linked more directly to technological change that boosts the demand for skilled labor.[10]

In sum, human capital is clearly central to economic development. It raises individual earnings and makes women's entry into the labor market more likely. It is a principal determinant of aggregate economic growth rates, and it is key to reducing poverty and inequality.

Human capital: Stagnating in low- and lower-middle-income countries

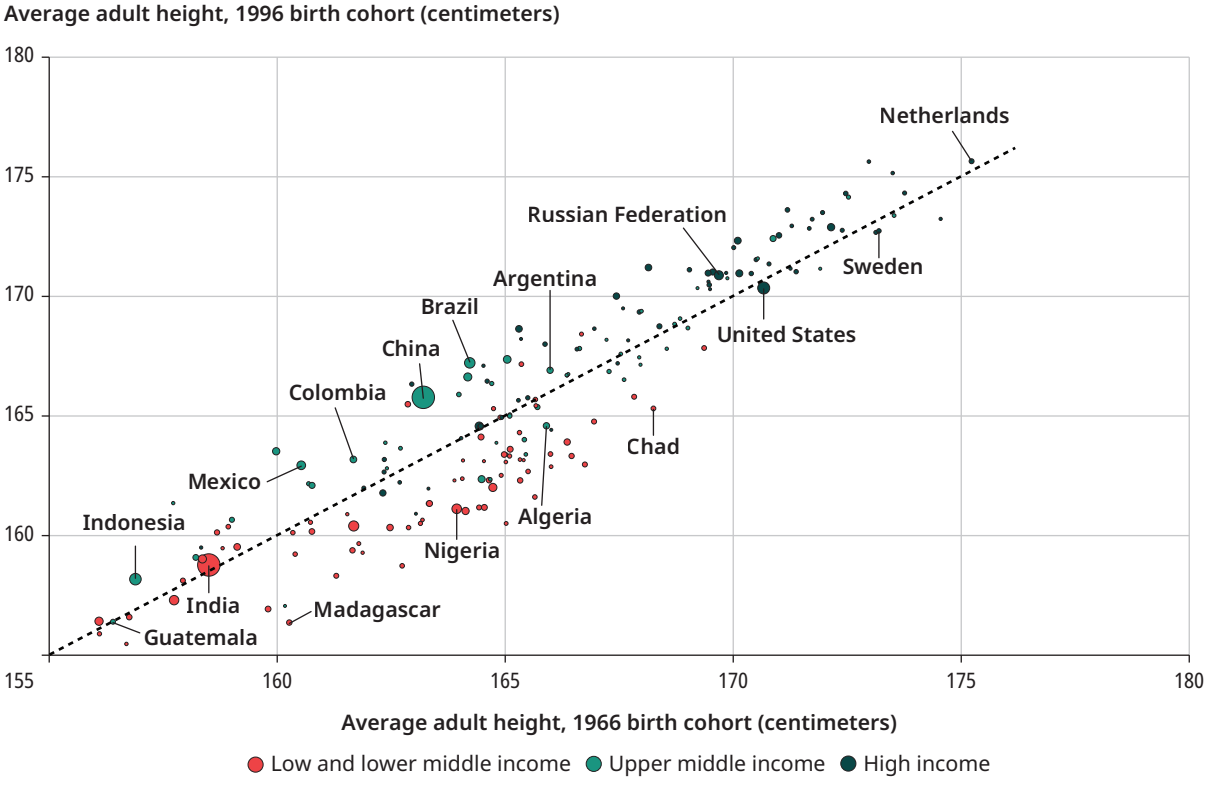
This section shows that human capital accumulation has stagnated in most low- and lower-middle-income countries. Indeed, in some dimensions, human capital outcomes in the poorest countries are lower today than 15 years ago. This has major implications for the ability of countries to grow, reduce inequality, and increase welfare.

Health

Health is an important dimension of human capital. The height of people in any country varies because of genetics, but the *average* height of adults is generally taken to be a measure of the latent health status of a population.[11] The average height in Western Europe rose by roughly 1 centimeter per decade in the twentieth century. This is also the rate at which height has increased among Chinese adults in recent decades.

The picture is much less encouraging in many other countries. Figure 1.1 plots the height of adults born in 1966 and 1996. Countries in which people have grown taller are shown above the 45-degree line, while countries in which people have become shorter are shown below the line. The figure indicates that the average adult in upper-middle- and high-income countries has become taller. Meanwhile, the average adult in low- and lower-middle-income countries is shorter today that the average adult was 30 years ago. In Sub-Saharan Africa, the average adult born in 1996 is 3 centimeters shorter than the average adult born in 1966. This indicates that latent health is worse today relative to past decades.

FIGURE 1.1 Changes in adult height, by country income group



Sources: 2017 data, Height (dashboard), NCD RisC (Non-Communicable Disease Risk Factor Collaboration), World Health Organization Collaborating Centre on NCD Surveillance, Epidemiology, and Modelling, Imperial College London, https://www.ncdrisc.org/data-downloads-height.html; World Bank Income Groups, 2024.

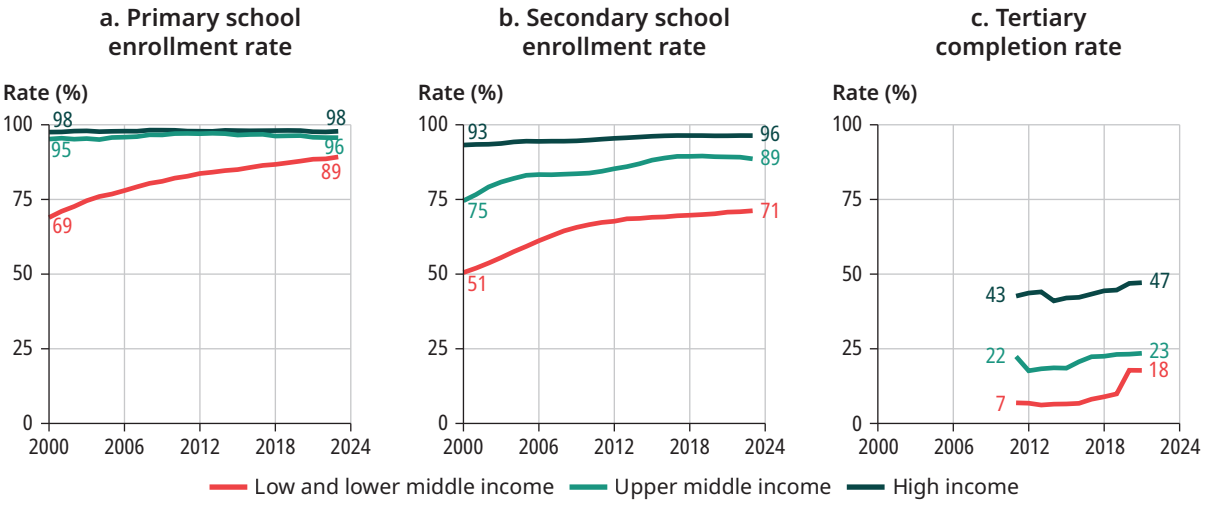
Note: Adult height data correspond to adults ages 18 or more by birth cohort.

Schooling

School enrollment and the average years of education completed—educational attainment—have risen sharply in most low- and middle-income countries (refer to figure 1.2).

It is also important to consider progress in learning (educational achievement). Has the increase in enrollment translated into increases in learning? This report uses data on Harmonized Learning Outcomes (HLOs), which render scores on various regional and global tests comparable for an examination of trends across countries. Figure 1.3 shows that little progress has been achieved overall since 2010 and that there is no evidence that poorer countries are gradually closing the gap relative to wealthier countries. In fact, on average, test scores have fallen in low-income and lower-middle-income countries (by 32 and 28 points, respectively), and the absolute declines in achievement are largest in the countries in Sub-Saharan Africa, the poorest region in the world.

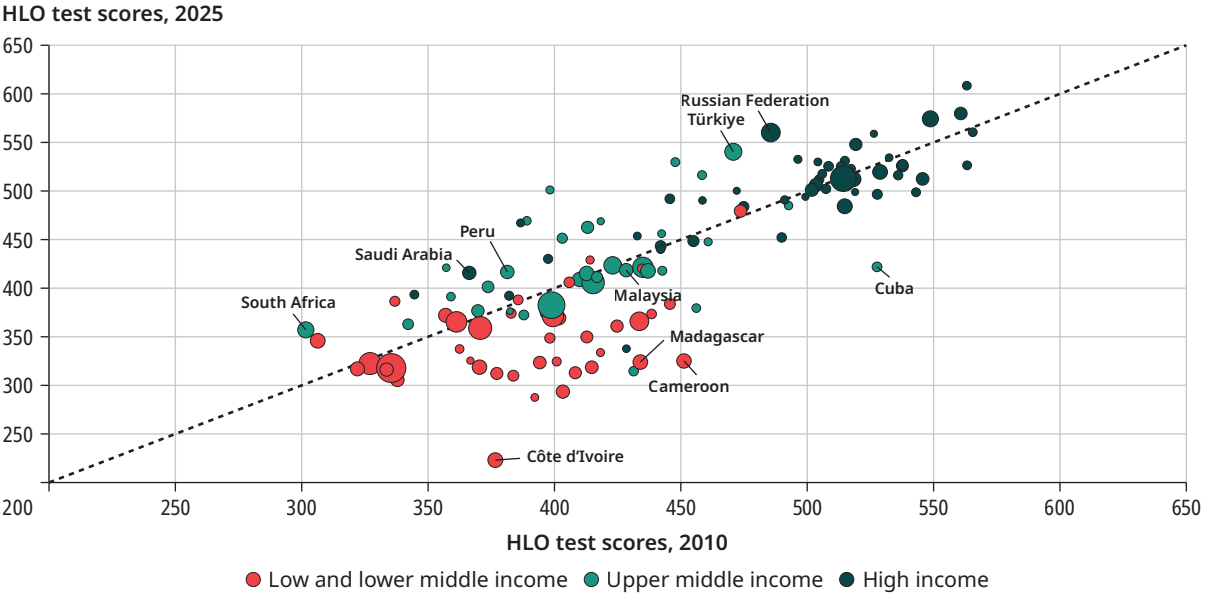
FIGURE 1.2 School enrollment and the tertiary completion rate



Sources: Data of Population with Tertiary Education (dashboard), OECD Data Explorer, Organisation for Economic Co-operation and Development, https://www.oecd.org/en/data/indicators/population-with-tertiary-education.html; UIS Data Browser (dashboard), Institute for Statistics, United Nations Educational, Scientific, and Cultural Organization, https://databrowser.uis.unesco.org/; WIDE (World Inequality Database on Education), Institute for Statistics, United Nations Educational, Scientific, and Cultural Organization, http://www.education-inequalities.org/; World Bank Income Groups, 2024.

Note: Primary and secondary enrollment rates are based on modelled estimates of the Institute for Statistics, United Nations Educational, Scientific, and Cultural Organization. Rates of four-year tertiary completion among individuals ages 25–34 are compiled based on household surveys. World Inequality Database on Education data are supplemented with tertiary completion data of the Organisation for Economic Co-operation and Development. Country-income group aggregates are population weighted and based on income classifications in 2024.

FIGURE 1.3 Student learning across countries



Sources: HLO (Harmonized Learning Outcomes) Database, World Bank, https://datacatalog.worldbank.org/search/dataset/0038001; World Bank Income Groups, 2024.

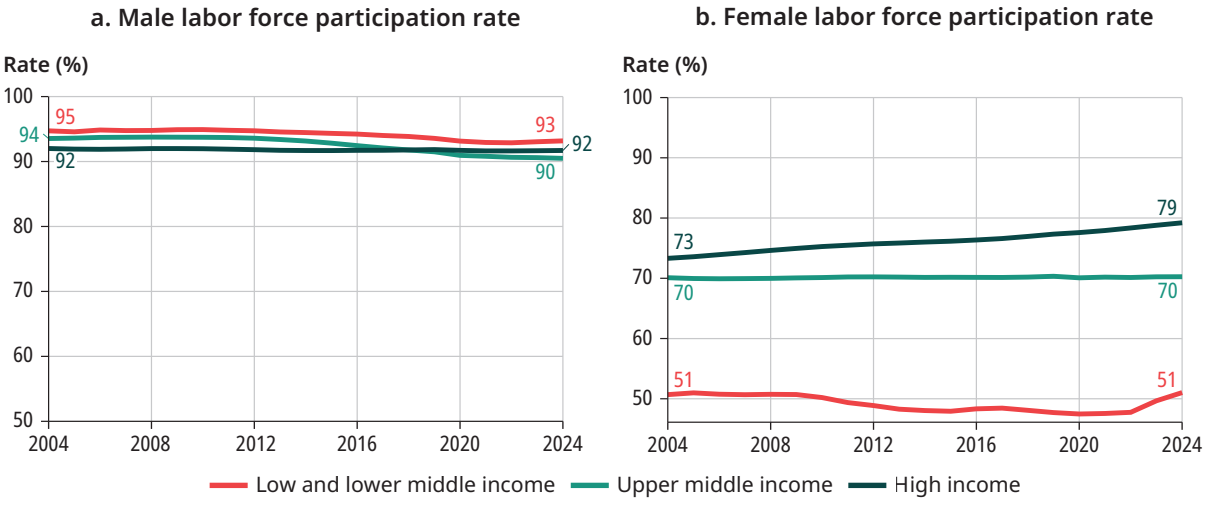
Note: The data displayed refer to countries with HLO data for both 2010 and 2025. Country groupings are based on the 2024 income classification.

On-the-job learning

Human capital accumulation does not end when people leave school. Individuals can continue acquiring human capital through work, but only if they work. Most men are in the labor force in all country income groups, and there has been little change over time (refer to figure 1.4, panel a). Meanwhile, female labor force participation rates vary widely across countries (refer to figure 1.4, panel b). There have been substantial increases in female labor force participation in high-income countries, but little change in low- and middle-income countries. This implies that the differences in the opportunities for human capital accumulation through work between richer and poorer countries are larger now than they were two decades ago.

How much human capital is acquired at work depends on both the share of the working-age population that is working and the amount of on-the-job learning that occurs. Quantifying this learning is not straightforward, but, if workers are paid their marginal product of labor, as would occur in a competitive market, the increase in labor income as people acquire work experience should be driven by an increase in skills, not merely seniority.[12]

FIGURE 1.4 Trends in labor force participation rates, prime-age adults, ages 25–54, 2004–24



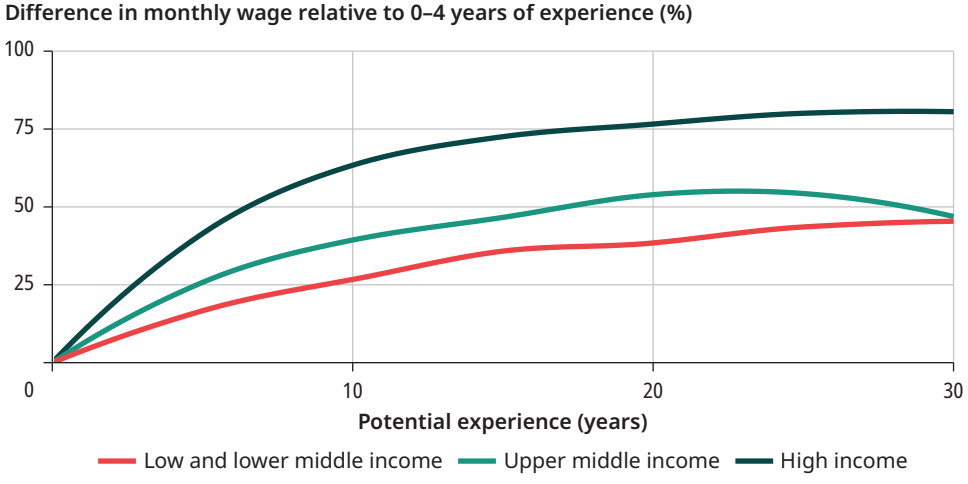
Sources: ILOEST Database (ILO Modelled Estimates Database), International Labour Organization, https://ilostat.ilo.org/methods/concepts-and-definitions/ilo-modelled-estimates/; ILOSTAT Indicators and Data Tools (dashboard), International Labour Organization, https://ilostat.ilo.org/data/; World Bank Income Groups, 2024.

Note: Labor force participation rates for population ages 25–54 are based on a combination of survey data and International Labour Organization modeled estimates. Statistics are produced using a five-year trailing average of labor force participation rates. All income group aggregates are population weighted and based on World Bank income classifications for 2024.

The wage-experience profile is steepest in high-income countries (refer to figure 1.5). On average, an individual acquires only about half as much human capital through work in India relative to Brazil, and an individual in Brazil only half as much as an individual in the United States.[13] This reflects the fact that the opportunities for learning offered by available jobs are greater in richer countries than in poorer countries.[14] In this dimension, too, there are large differences in human capital between richer and poorer countries.

In sum, critical human capital gaps between richer and poorer countries have widened substantially. In some measures, including height and learning, low- and lower-middle-income countries have worse outcomes than they had 15 years ago.

FIGURE 1.5 Labor income as a function of on-the-job experience, men ages 18–67, by country income status



Sources: Data of GLD (Global Labor Database Repository), World Bank, https://worldbank.github.io/gld/README.html; I2D2 (International Income Distribution Database) (internal database, discontinued in 2020), World Bank; World Bank Income Groups, 2024.

Note: The figure illustrates data on log wage increases by experience calculated from assorted labor force surveys. The data are limited to men because there is no straightforward way of accounting for selection into work by women, many of whom are not employed (refer to figure 1.4, panel b). Individuals with fewer than five years of potential experience are the omitted category.

The importance of settings to human capital policy

Human capital accumulates over the life cycle

Human capital accumulation is a dynamic process. The skills acquired in one stage of the life cycle affect both the initial conditions and the technology of learning at the next stage.

—Heckman and Carneiro (2003, 5)

The standard organizing framework to describe the process of human capital accumulation is the life cycle.[15] Human capital accumulation starts as early as conception. During early childhood (from gestation through age 5), children physically grow, acquire immunity to debilitating and fatal diseases, and develop the cognitive, language, social-emotional, and motor skills that not only prepare them for formal schooling, but also directly translate into health and labor market success in adulthood.[16] School-age children receive explicit instruction in school and continue to acquire skills and gain knowledge in subjects that are essential for contributing productively to society. In adulthood, skill acquisition continues through work, provided that people work and that the job they hold lends itself to on-the-job learning. Starting around age 50, human capital plateaus, on average, although there is a great deal of variation across individuals.[17] The depreciation of human capital starts in old age, as an individual's health declines and as the performance of productive tasks becomes more challenging than it was earlier in the life cycle.

Human capital formation is inherently cumulative. Each stage builds on previous foundations. In this sense, skills beget skills. The ability of school-age children to grasp mathematical concepts and to focus and process new information in a classroom is strongly affected by their experiences during early childhood. In some dimensions of skill, investments may also exhibit dynamic complementarities. This means, for instance, that greater investment during one period may raise the returns to future investment. Thus, high-quality schools may not only improve the skills with which young people enter the labor market, but may also increase the returns to further investment through on-the-job learning.[18]

Human capital accumulates in particular settings

The simple human capital investment model . . . does not address several important factors, such as where the . . . training takes place (school, on-the-job, at home), who provides . . . and pays for it, and what role the "state" or collective plays in these matters.

—Goldin (2016, 70)

Investments in human capital occur in different settings. The life-cycle model is an appealing framework because it stresses how investments made at different times may interact. This report complements the life-cycle approach by examining the settings in which human capital is built. The report considers three settings: the home, the neighborhood, and the workplace. The life-cycle approach reveals what investments are needed and when, while the consideration of settings reveals where and how these and potentially other human capital investments should occur.

The household is critical to human capital accumulation, particularly among children and adolescents. Decisions related to nutrition, play, and schooling occur within the home, as do decisions on employment. Households invest in work-related experience because household members typically decide as a unit who works, how much they work, and where they work.

Many policies are already designed with a view to the importance of the home. For example, early nutrition counseling tends to target mothers, and outreach related to essential childhood vaccinations or social services may include home visits. Nonetheless, the home is rarely recognized as a location in which learning occurs, that is, where individuals first pick up the cognitive and social-emotional skills that will position them for success in school and in the labor force. Missing from most human capital policy frameworks are strategies to ensure that this type of human capital is built in the home.

Similarly, neighborhoods or villages in rural areas are not merely agglomerations of people. They are spaces where families live, children grow up, and individuals interact with one another. Neighborhoods affect human capital accumulation through numerous channels in the life cycle. From early childhood to adulthood, from child mortality to lifetime income, places matter because the locations where people live determine their access to services and local markets and their exposure to environmental hazards and social dynamics. Neighborhoods condition the schools and health facilities that people use. They also affect human capital through the health of the local economy, environmental factors, and social dynamics, ranging from cohesion to exposure to crime.

Many policies recognize the importance of neighborhoods, such as housing policies and water, sanitation, and hygiene programs. Neighborhoods are,

however, rarely acknowledged as settings crucial to the broad range of human capital outcomes they influence. Most human capital policies fail to include strategies to internalize neighborhood externalities and engage additional sectors, such as infrastructure, sanitation, and urban planning.

The workplace is another key setting for human capital accumulation. Learning in the workplace occurs through explicit training and on-the-job learning. Farmers refine techniques through trial and error, peer exchanges, and extension services. The self-employed build skills through hands-on experience, business networks, and structured training. Wage workers learn by practicing advanced techniques, adopting technology, solving problems, engaging with peers, and undertaking formal or informal training.

Beyond these direct investments, the workplace has a pivotal role in shaping human capital accumulation. The returns to past human capital investments are reflected in wages and create incentives for additional investment.

Many policies recognize the workplace as a setting in which previously acquired skills are used. Yet, the workplace is rarely acknowledged as a crucial setting for skill development. As a result, most human capital policies fail to include effective strategies to expand public and private investment in on-the-job learning or to create incentives for businesses to invest in workplace attributes that foster skill development.

The settings that have received the primary attention in relation to human capital accumulation are government-provided services in formal facilities, such as schools or health centers. This is a narrow view of the way human capital is formed. The rest of this report argues that the role of government in human capital policy need not be limited to direct service provision, but may also encompass support for effective human capital formation by households, communities, and firms. The report (1) presents evidence on the importance of settings for human capital accumulation, (2) identifies the main reasons for underinvestment in each setting, and (3) articulates relevant policies for each setting that are supported by the extant evidence base in low- and middle-income countries.

The rest of the report is organized as follows. Chapter 2 focuses on the home and highlights the importance of resources and care to human capital accumulation. Chapter 3 concentrates on neighborhoods and the importance of the quality of local schools and primary health centers as well as the role of environmental factors, local economic conditions, and social interactions in education and health. Chapter 4 highlights the importance of the workplace and the characteristics that make the workplace more conducive to on-the-job learning. Chapter 5 describes broader reforms that could enable governments to design policies that activate these settings to promote human capital accumulation more effectively.

Notes

1. Labor force surveys do not generally collect data on the actual number of years worked. For this reason, the reference here is to potential experience, defined as age minus years of schooling, minus six. It is assumed that any experience before age 18 produces zero returns.
2. Card and Krueger (1992) use state and time variations in the pupil-teacher ratio, average term length, and relative teacher pay as measures of school quality. Numerous papers by Hanushek and coauthors also argue that higher school quality results in higher earnings and higher economic growth rates. Refer to Hanushek and Kimko (2000); Hanushek and Woessmann (2008). Chetty and coauthors use data on teacher quality to show that children who, for random reasons, were assigned to better teachers show higher earnings in adulthood. Refer to Chetty et al. (2011); Chetty et al. (2014).
3. Low birthweight babies have worse health in adulthood and earn lower wages, as shown in numerous country settings. In Norway, for example, a 10 percent increase in birthweight raises earnings in adulthood by 1 percent (Black et al. 2007). Other studies also show that birthweight affects school attainment, as well as longer-run outcomes, such as height, IQ at age 18, and earnings (Almond et al. 2005; Bharadwaj et al. 2018).
4. A simple neoclassical model is often expressed as $Y_c = A*H_c^{\alpha}*K_c^{1-\alpha}$, where Y_c is GDP, A is total factor productivity, H_c is the human capital stock, K_c is the physical capital stock, and the subscript c refers to countries. H_c may be rewritten as $L_c h$, where L_c is the number of workers, and h is the average human capital per worker. Estimates of α, the output elasticity of labor, are generally around 0.65, and the output elasticity of capital, 1–α, is around 0.35. In this formulation, increasing human capital by 1 percent would raise GDP by ~0.65 percent. But, because human capital and physical capital are complements, this increase in human capital, H_c, raises the marginal product of physical capital and thus prompts additional investments in physical capital, K_c. As a result, once the economy has fully adjusted, increasing H_c by 1 percent boosts GDP by 1 percent. The fact that the ratio between physical and human capital is stable in most countries over long horizons suggests that, if one input (physical or human capital) increases or decreases, the other input adjusts proportionately.
5. Hendricks and Schoellman (2018; 2023); Jedwab et al. (2023).
6. Gethin (2025).
7. The intuition is as follows. Consider an economy with three kinds of labor: unskilled (workers with primary educational attainment or less), medium skilled (workers with secondary educational attainment or less), and skilled (workers with tertiary educational attainment). If a country increases the share of medium-skilled workers, for example, by expanding access to secondary school, the increase in labor supply will tend to depress the wages of these workers relative to the wages of unskilled and skilled workers. The magnitude of the effect will depend on the elasticity of substitution between workers with different skill levels. In the long run, increases in the supply of these medium-skilled workers will lead to changes in demand, which will also affect wages. Refer to Acemoglu and Restrepo (2022); Autor and Dorn (2013); Manacorda et al. (2010).
8. Messina and Silva (2018).
9. Ge and Yang (2014); Lee and Wie (2017).
10. Lee and Wie (2015).
11. Deaton (2007, 13232) concludes: "Although there is a large genetic component to heights *within* populations, the contribution of genetics to variation in mean heights *across* populations is much smaller" (italics added).
12. Workers may also find a better match between their abilities and the tasks required in different jobs over time, as emphasized in search models of the labor market. This, too, could lead to an increase in wages as the workers acquire more experience. Refer to Lagakos et al. (2018) for a discussion.
13. Similar results are reported by Jedwab et al. (2023) and Lagakos et al. (2018).

14. These results are based on regressions of the natural logarithm of wages on years of schooling and indicator variables for five-year experience intervals, with the lowest experience category (0–4 years) as the omitted category. These results thus assume that schooling and experience are additively separable, as in the standard Mincerian formulation. In practice, the returns to experience are higher among more highly educated workers, and, because the average number of years of schooling is higher in richer countries than in poorer countries, a share of the difference in the returns to experience between richer and poorer countries is accounted for, mechanically, by the differences in schooling. Lagakos et al. (2018) estimate that this share is 25 percent–40 percent of the overall difference between poor and rich countries.
15. This follows Heckman's seminal work. Refer, for example, to Heckman (2007).
16. Almond and Currie (2011); Attanasio et al. (2020); Cunha et al. (2010); Grantham-McGregor et al. (2007); Heckman (2007).
17. Jedwab et al. (2023); Lagakos et al. (2018); Mincer (1974); Skirbekk (2004).
18. Caucutt and Lochner (2020); Cunha and Heckman (2007); Cunha et al. (2010).

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Chapter 2

Human Capital Accumulation in the Home

Alaka Holla

Summary

Human capital accumulation starts early and at home. Families spend resources and make choices that shape the health, skills, and work experience of all members of the household. Around the world, there are large gaps in nutritional status and cognitive skills based on family circumstance that are apparent in early childhood, before children start school, and that remain constant through adolescence. Deficits can emerge even if economic circumstances are similar, suggesting the strong role of care in the home. Policy can support human capital accumulation in the household by ensuring that households have more resources, but this will not be sufficient. It will also be critical for governments to deploy programs that target the care environments of children and adolescents. Because human capital investments during childhood not only yield lifelong benefits, but also extend to the next generation, policies that improve education today will also bolster human capital accumulation at home in the future.

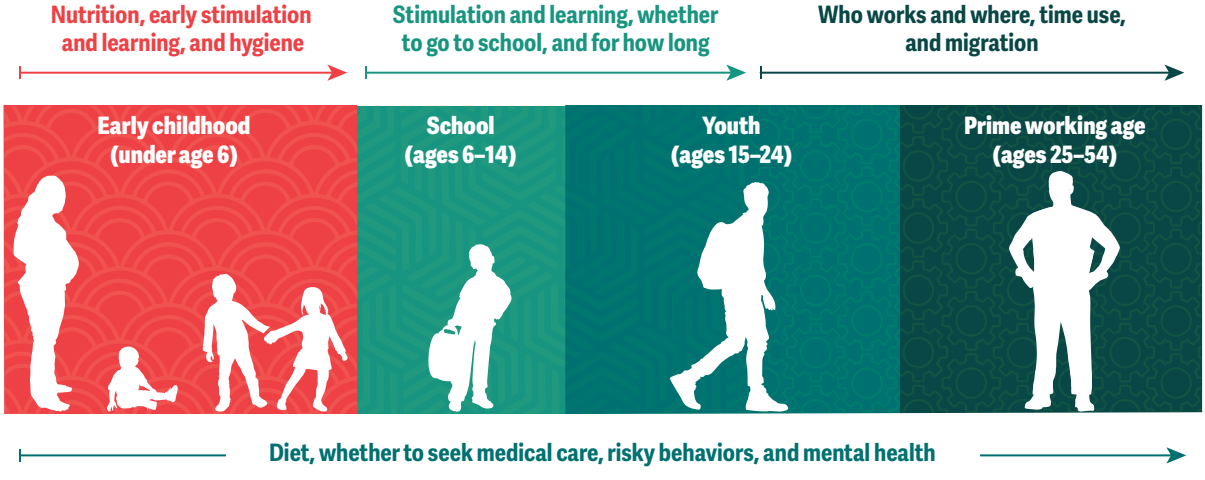
A reproducibility package is available for this book in the Reproducible Research Repository at https://reproducibility.worldbank.org/catalog/461.

The home matters

In the early 1990s, families in high-income countries began to adopt large numbers of Romanian orphans after learning about the living conditions in orphanages. In the orphanages, these children were often deprived of necessities, such as food and clothing. They did not live with adults who provided cognitive stimulation or emotional support. They sometimes even lacked human contact. A study that tracked what happened to orphans adopted by families in the United Kingdom found stark differences between orphans adopted after they had spent less than six months in orphanages and orphans who had spent more time in orphanages. Throughout childhood and adolescence, the orphans adopted before the six-month threshold could not be distinguished from other adoptees who had been born in the United Kingdom. The Romanian children who had spent more than six months in orphanages experienced a markedly different trajectory. They were much more likely to show symptoms of autism spectrum disorder, inattention and overactivity, and cognitive impairment throughout childhood, deficits that were still present at age 25.[1] Their earliest environments had been characterized by severe deprivation, and this seemed to have stuck with them for life.

The home environment is critical for human capital accumulation, particularly among children and adolescents (refer to figure 2.1). Young children spend most of their time with their families in the home and depend on family members almost entirely for nutrition, cognitive stimulation, social-emotional learning, and

FIGURE 2.1 Human capital investment at home across the life cycle



Source: Original figure for this publication.

protection from harm. During adolescence, decisions about staying in school, working, and time-use tend to be made in the home, often jointly among family members. Because human capital accumulates unevenly across the life cycle, these early investments can determine an individual's entire trajectory of human capital accumulation.[2]

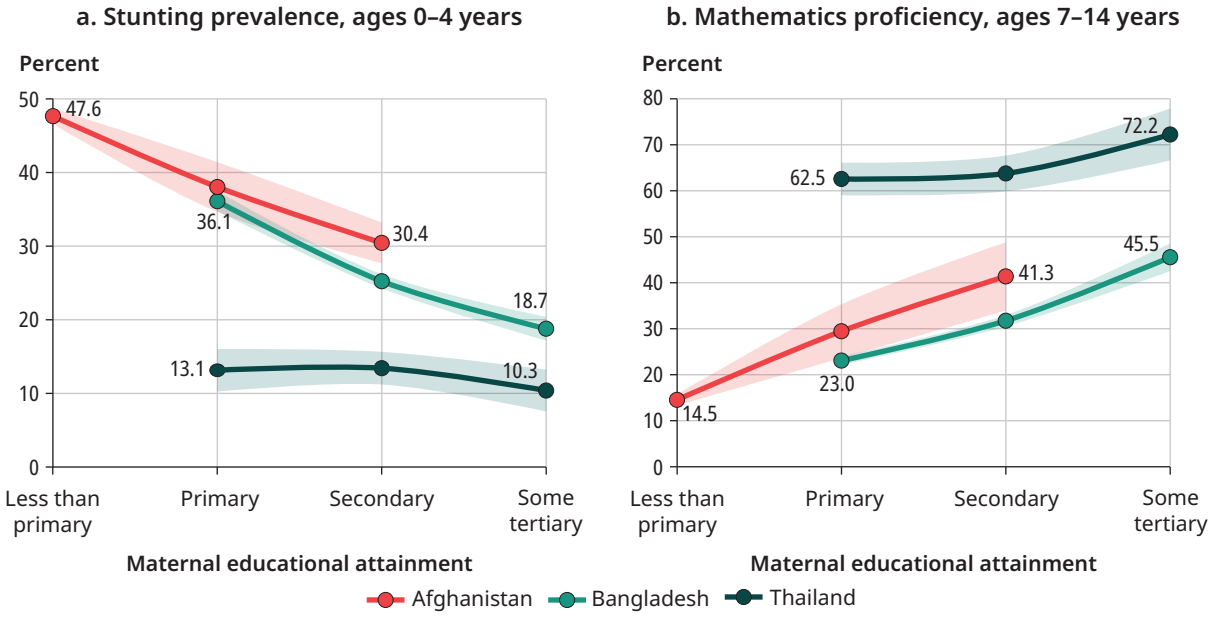
Many policies are already designed around the importance of the home. For example, early nutrition counseling tends to target mothers, and outreach related to essential childhood vaccination or social services may include home visits. The home, however, is rarely recognized as a place of learning, that is, as a place where individuals first acquire the cognitive and social-emotional skills that will smooth their path to success at school and in the labor force. Missing from most human capital policies are strategies to ensure that this type of human capital is built at home.

Data produced through nationally representative surveys show strong associations between early human capital accumulation and family background. Parental education proxies for a range of attributes that may be beneficial to the health and skill development of children and adolescents, such as resources and sanitation conditions within the home, knowledge, and access to services.

Figure 2.2 examines two outcomes—the prevalence of stunting among children under age 5 and mathematics proficiency among children ages 7–14—in a low-income (Afghanistan), lower-middle-income (Bangladesh), and upper-middle-income country (Thailand). Children whose mothers have higher educational attainment accumulate more human capital. In Afghanistan, for instance, children whose mothers have less than primary educational attainment are 47 percent more likely to be stunted than children whose mothers have at least some secondary education. (To examine these relationships in more countries, refer to the accompanying interactive graphs online, with the link provided in the figure note.) The relationship between educational attainment and children's human capital outcomes holds for paternal education as well.

While these results may not be surprising in the case of the younger children, who spend most of their time at home, the strong association between human capital and maternal educational attainment also holds for older children, who can attend school and acquire foundational skills, such as reading and mathematics, at school even if their families may not be equipped to encourage learning at home. In Bangladesh, children are around two times more likely to have attained minimal proficiency in mathematics if their mothers have completed some tertiary

FIGURE 2.2 **Child nutrition and skills, by maternal educational attainment**



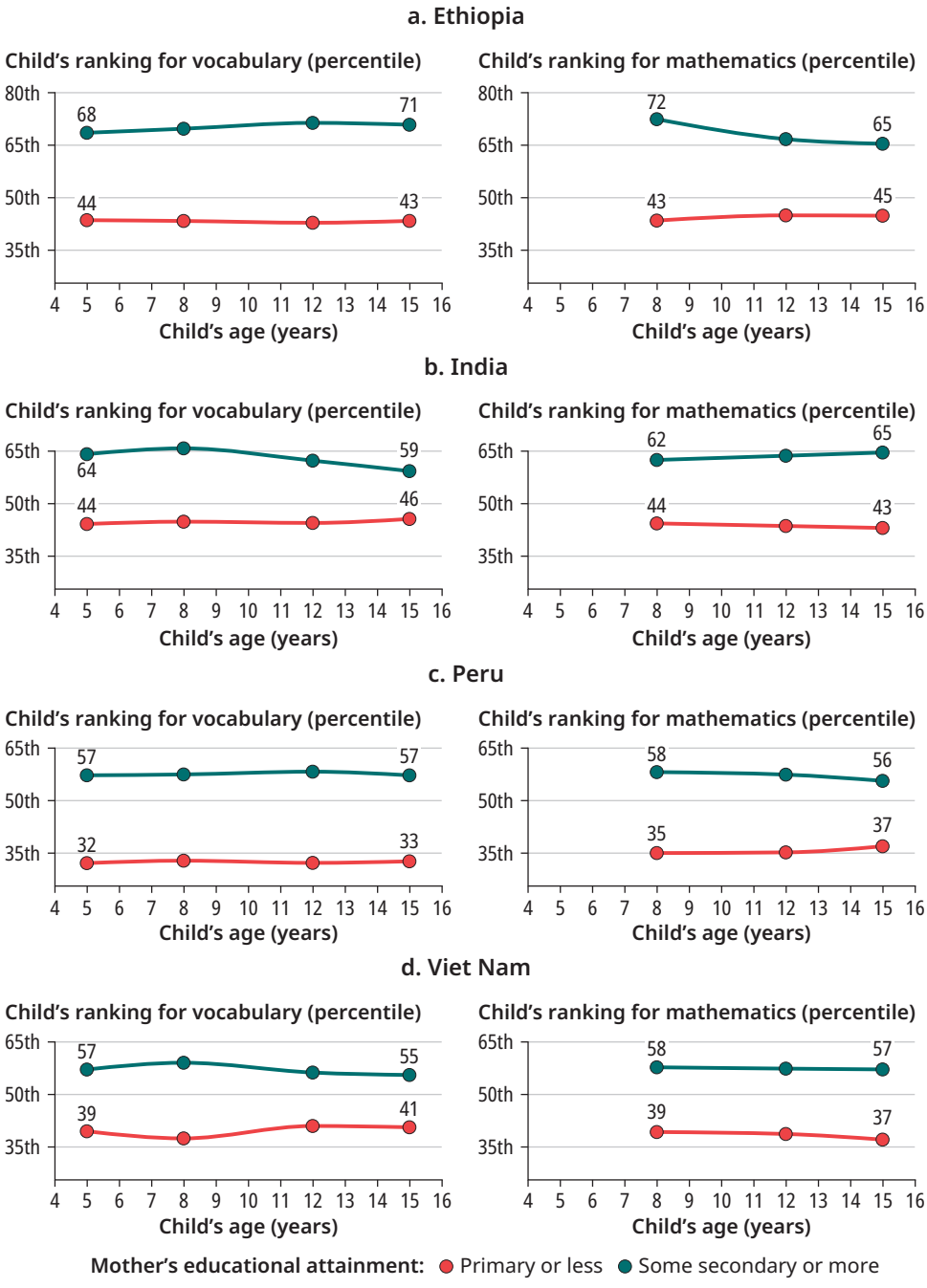
Source: Original calculations based on data on Afghanistan (2022–23), Bangladesh (2019), and Thailand (2019) from MICS (Multiple Indicator Cluster Surveys) (dashboard), United Nations Children's Fund, https://mics.unicef.org/.

Note: The "Secondary" school category for maternal educational attainment in Afghanistan includes "Some tertiary" as well. The sample size for "Some tertiary" for women in Afghanistan is too small to estimate stunting prevalence or math proficiency. For data on countries other than the three above, refer to the interactive graphs online, at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

education than if their mothers have completed only primary school or less. Even in Thailand, where fewer children are stunted and more children have attained proficiency in mathematics, there is a gradient in children's outcomes by maternal educational attainment.

These cross-sectional data demonstrate that there are stark differences in health and skills among children with different family backgrounds. Figure 2.3 presents findings from an analysis of longitudinal data from four countries that participated in the Young Lives Study, which has followed the same 12,000 children since 2002. The gaps in early vocabulary and mathematics among children whose mothers are at different levels of educational attainment are initially large (18–29 percentiles). They remain virtually constant throughout childhood and adolescence at a time when most children have attended some school.

FIGURE 2.3 Skill deficits among children, by maternal educational attainment



Source: Original figure for this publication, using data of Young Lives Study (dashboard), Oxford Department of International Development, University of Oxford, https://www.younglives.org.uk/.

Note: Percentile rankings were calculated separately by round, marked by points. Only the youngest cohort (individuals born in 2001) are included. The older cohort (children born in 1994) were not observed at age 5. Vocabulary refers to receptive vocabulary as measured by the Peabody Picture Vocabulary Test (Dunn and Dunn 1997). Mathematics skills are measured through a subset of questions from TIMSS (Trends in International Mathematics and Science Study) (data repository), International Association for the Evaluation of Educational Achievement, https://www.iea.nl/data-tools/repository/timss.

Why does the home matter?

What causes these differences among children with different family backgrounds? What attributes of the home environment are important in human capital accumulation?

Resources matter

A first source of variation is the fact that households differ in the resources available to them. To thrive, children require nutritious food, safe and sanitary living conditions, and opportunities to learn. Many of these needs can be met only if families spend money. Healthier foods and diets tend to cost more than less healthy options.[3] Even if schools and health care are provided free, households must still purchase books and medicines and cover transportation costs.

The presence of children's books in a home is particularly important for early language acquisition and cognitive development.[4] If parents engage in early reading activities with their children, they are helping build early skills in literacy, such as the skills associated with vocabulary and comprehension. These skills also facilitate the development of other cognitive skills, such as proficiency in mathematics. In nationally representative data from Madagascar, children living in homes with at least three children's books are around four times more likely to be proficient in mathematics than children without books at home (refer to figure 2.4, panel a). The data also demonstrate how infrequent the ownership of children's books is around the world. In Nigeria, for example, the average child has access to only one book at home.

FIGURE 2.4 Skills in childhood, by resources and care at home

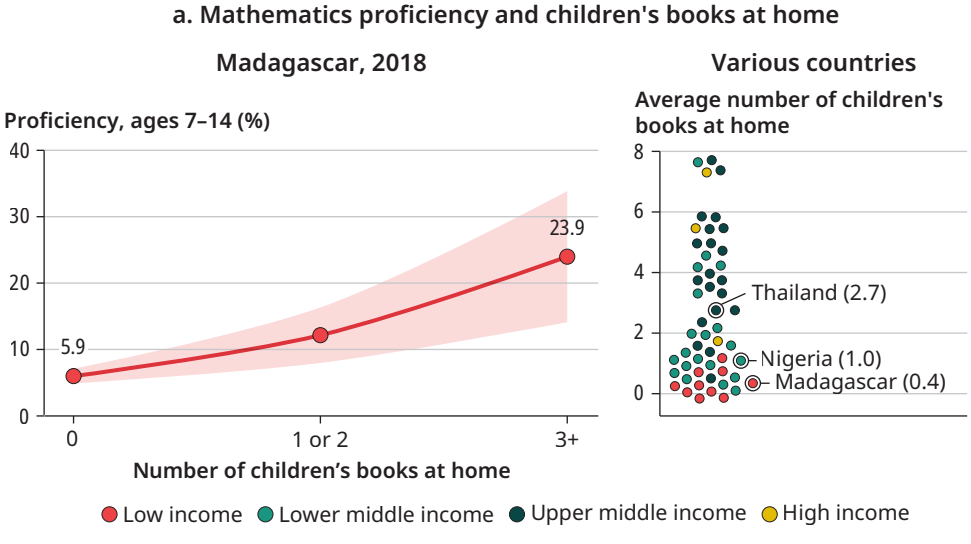


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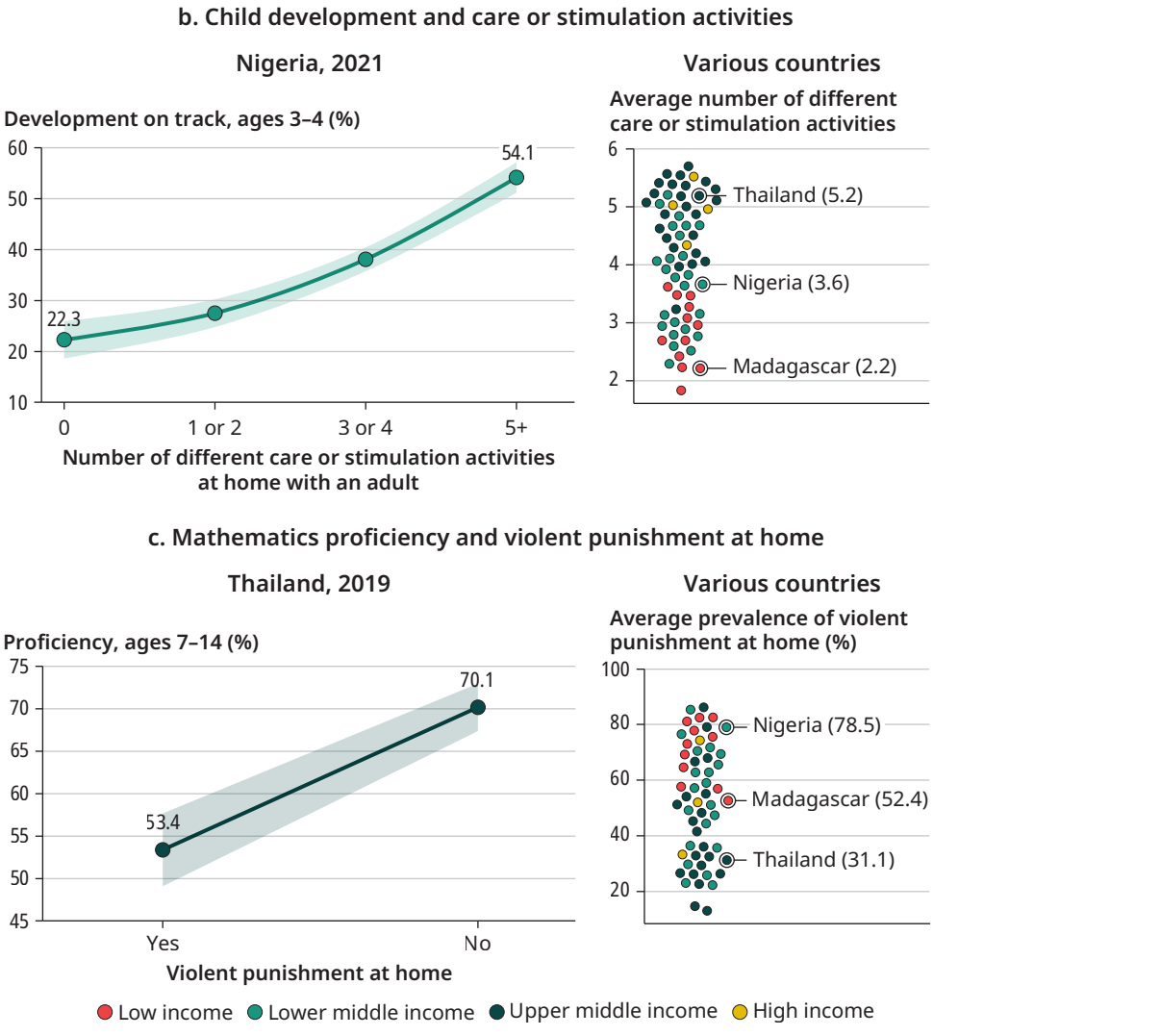
FIGURE 2.4 **Skills in childhood, by resources and care at home *(continued)***



Source: Original calculations based on data of MICS (Multiple Indicator Cluster Surveys) (dashboard), United Nations Children's Fund, https://mics.unicef.org/.

Note: The mathematics proficiency threshold is met if a child can respond correctly to six questions on reading numbers, five on number discrimination, five on addition, and five on number pattern recognition. Children face violent punishment if their caregiver reports they have been shaken, spanked, hit with a hard object, or beaten with an implement. The number of children's books are capped at 10 in the survey. For care or stimulation activities, the number of types of activities is graphed, and the maximum is capped at six in the survey.

Care matters

A second source of variation across households stems from the care environment in the home, that is, the amount of time parents invest in helping children learn and in playing with their children, their methods of maintaining discipline, and the amount of social-emotional support they offer to children and adolescents.

Children's early development, for example, increases with the number of care or stimulation activities at home, such as an adult singing or playing with a child. In Nigeria, for instance, only around one in five children who had experienced no care activities in the previous three days is developmentally on track (that is, exhibiting at least 80 percent of the skills deemed necessary to rule out developmental delays), whereas more than half of the children in homes reporting five or more activities were classified as developmentally on track (refer to figure 2.4, panel b).

By contrast, there is a negative association between children's skills and the use of violent punishment as a form of discipline. In Thailand, for example, nearly 70 percent of children exhibit proficiency in mathematics if their parents refrain from physically violent forms of punishment, while only 53 percent of the children who face such harsh discipline at home achieve mathematics proficiency (refer to figure 2.4, panel c). Global data suggest that the prevalence of this form of discipline in the home is substantial. In Nigeria, for instance, nearly 80 percent of parents report that they rely on violent punishment to discipline their children.

Box 2.1 defines violent punishment and presents data on its prevalence, alongside evidence on the belief among parents in the usefulness of physical violence in raising children. Though many parents report that they use physical violence, far fewer parents report that they believe that "to bring up, raise, or educate a child properly, the child needs to be physically punished." There thus seems to be a belief-behavior gap in disciplining children, suggesting that parents might need support in adopting alternative strategies to manage the behavior of their children.

BOX 2.1 Violent punishment at home: Belief versus behavior

In their survey responses, caregivers—typically mothers—report significant reliance on physical punishment to discipline their children (refer to figure B2.1.1). On average, in low- and middle-income countries on which data are available, 60 percent of children ages 1–14 experience violent physical punishment at home, including being shaken, spanked, hit with a hard object, or beaten with an implement.

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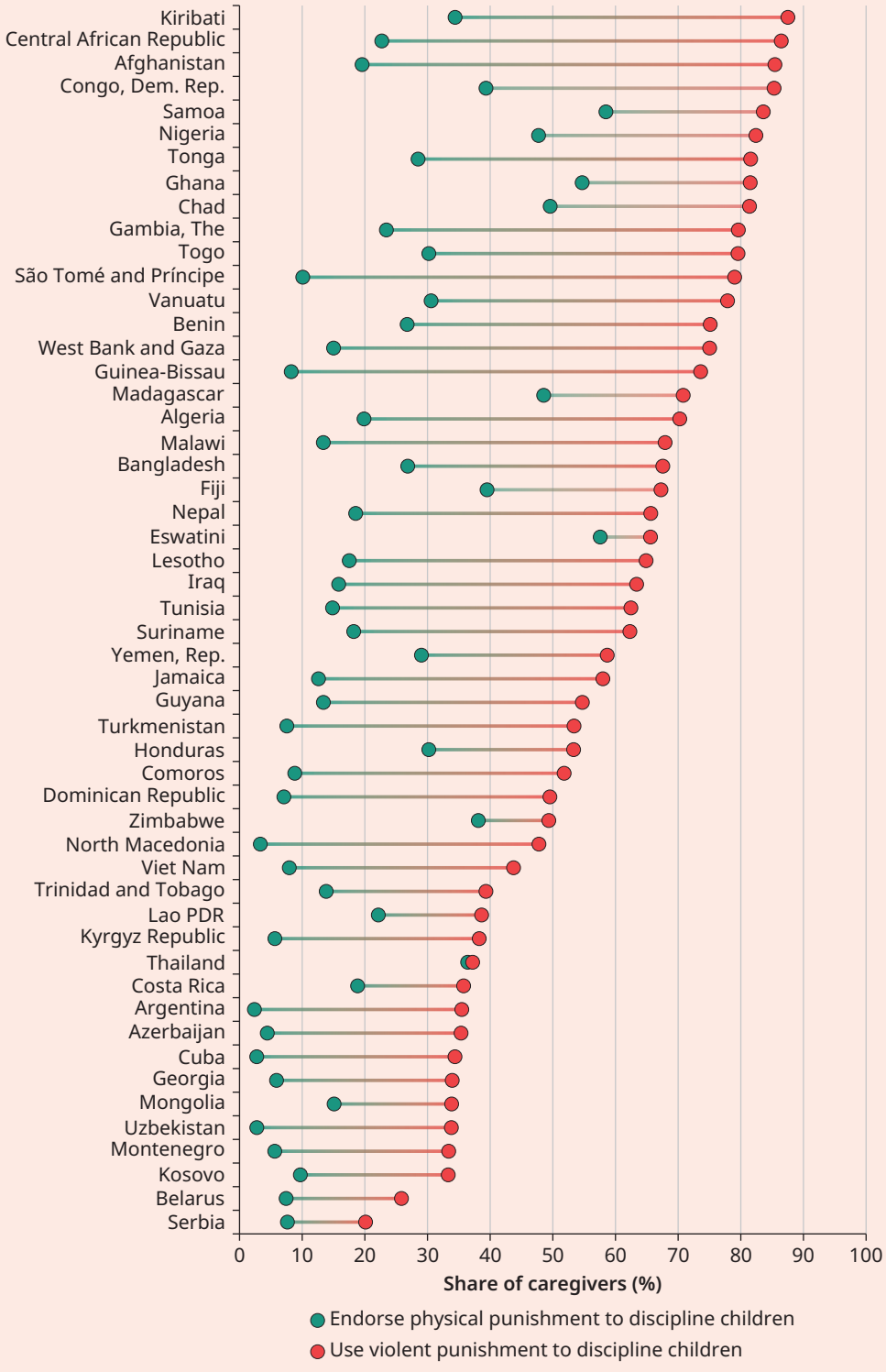
BOX 2.1 Violent punishment at home: Belief versus behavior *(continued)*

FIGURE B2.1.1 Use and endorsement of violent punishment to discipline children ages 1–14



Source: Original calculations based on data of MICS (Multiple Indicator Cluster Surveys) (dashboard), United Nations Children's Fund, https://mics.unicef.org/.

Note: Countries were omitted if the entire sample of children numbered fewer than 1,000. One country (Sierra Leone) was not included because no households reported endorsement, a pattern not found in any other data set.

(Box continues on next page)

BOX 2.1 Violent punishment at home: Belief versus behavior *(continued)*

This pattern contrasts with the evidence on gender-based violence. There is a limited set of countries that report women's average reported experience with intimate partner violence, but according to data on the World Bank Gender Data Portal, the countries in which women report a high prevalence of intimate partner violence are also the countries in which women themselves report that such violence is justified.[a]

a. Gender Data Portal (dashboard), World Bank, https://genderdata.worldbank.org/.

Causal evidence on resources and care

From these simple correlations in cross-sectional data, it is not possible to ascertain, however, what would happen if households had more resources or if they started to engage more regularly in care that is conducive to children's development. More well-educated mothers may possibly engage in other, unobserved behaviors that are correlated with resources and care and that are beneficial for their children, or the correlations between maternal education and children's outcomes may reflect the genetic transmission of human capital. Thus, a policy-induced increase in resources or care may not generate the higher levels observed in the cross-sectional comparisons of children. Moreover, it is possible that resources and care may be partial substitutes, that is, it may be possible to make up for the lack of one with higher levels of the other.

To assess whether policies that provide poor households with more resources or that seek to improve children's care environments will lead to improvements in human capital accumulation, it is useful to examine causal evidence or situations that help isolate the resource channel from the channel involving care. In particular, what happens to human capital if (1) households experience a change beyond their control (an exogenous change) in either resources or care and (2) some children receive less care despite the availability of equal or more resources in the household?

Fluctuations in household income often follow recessions or changes in the price of a cash crop. These shocks may alter investments in children's human capital and subsequent human capital accumulation. Children are especially

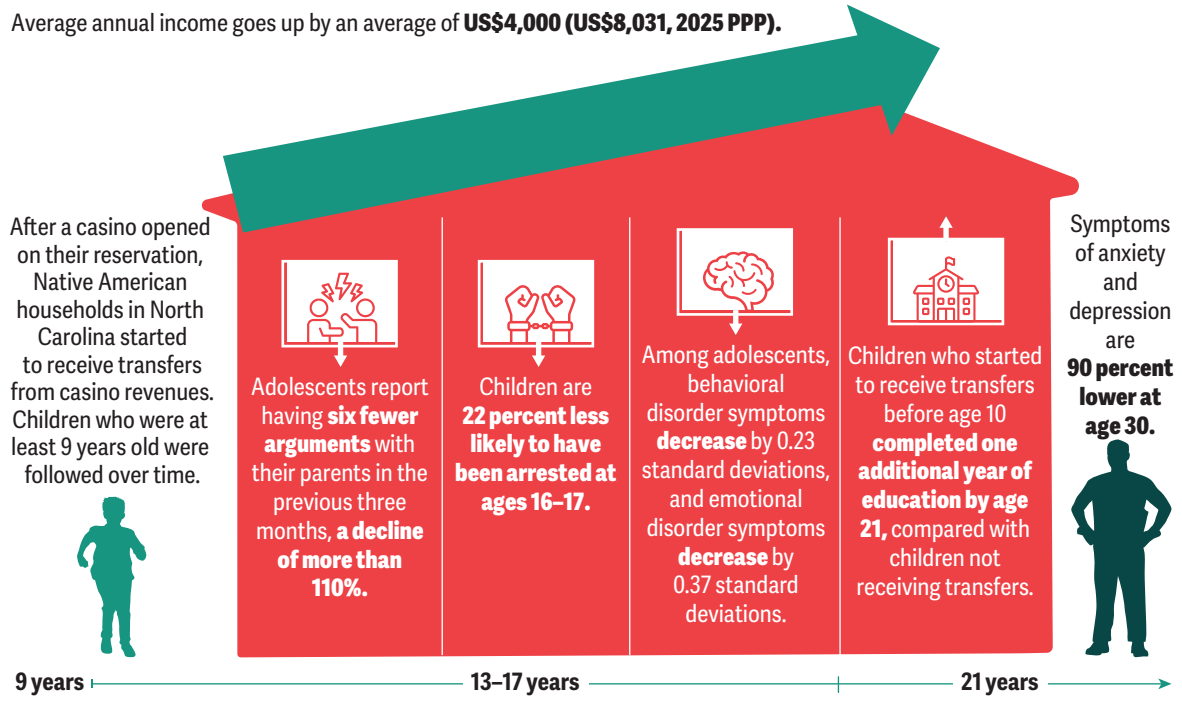
sensitive around the time of birth. Recessions in low- and middle-income countries—specifically, a 1 percent decline in GDP per capita—appear to raise the infant mortality rate by 0.25 to 0.40 for every 1,000 births.[5] Conversely, in Ghana, an increase in the price of cocoa, a cash crop, during the first year of life of a child leads to improvement in mental health observed in adulthood. A one standard deviation price increase at birth leads to a 3 percentage point (or 50 percent) reduction in severe mental distress decades later.[6]

What happens if a household suddenly begins receiving additional income? This occurred in the United States when a casino opened on an indigenous Native American reservation in the state of North Carolina in 1997, and a portion of the profits were distributed to all adult tribe members on a per capita basis every six months. Over the next four years, this raised average annual income by about US$4,000 (US$8,031 in 2025 purchasing power parity), approximately 20 percent of average annual income at the time. Increases in some years amounted to 60 percent of annual income.[7] Numerous studies have found lasting effects on children and their parents stemming from this large injection of resources (refer to figure 2.5). Children in poor households who began benefiting from the transfers before age 10 had, by age 21, completed one more year of education relative to children who had not benefited from the transfers and were 22 percent less likely to have committed a misdemeanor when they were age 16 or 17.[8] Children in households that had received cash transfers for four years also exhibited fewer symptoms of behavioral and emotional disorders as adolescents and fewer symptoms of depression and anxiety at age 30.[9]

These improvements in human capital may partly reflect changes in parent-child relationships. Parents receiving the casino payments reported increases in the amount of time they had spent supervising their children. Children reported that they had spent more time on enjoyable activities with their mothers and had engaged in fewer arguments with their parents.[10]

Other studies demonstrate the importance of resources that poorer households may often forgo because of budget constraints. For instance, a nutrient-rich diet may be expensive, particularly in remote areas with limited access to markets. Experiments have shown that small-quantity lipid-based nutrient supplements—concentrated doses of micronutrients that can be sprinkled on food—can help prevent stunting.[11] Likewise, a cement floor may be out of reach for many poor households, but replacing a dirt floor with a floor of concrete could decrease children's exposure to the fecal matter and parasites that cause nutritional deficiencies. In Mexico, for example, a program that replaced dirt floors with floors made of concrete improved children's cognitive development.[12]

FIGURE 2.5 Resources build human capital across the life cycle



Source: Original figure for this publication, based on Akee et al. 2010, Akee et al. 2018, and Akee et al. 2024.

Note: PPP = purchasing power parity.

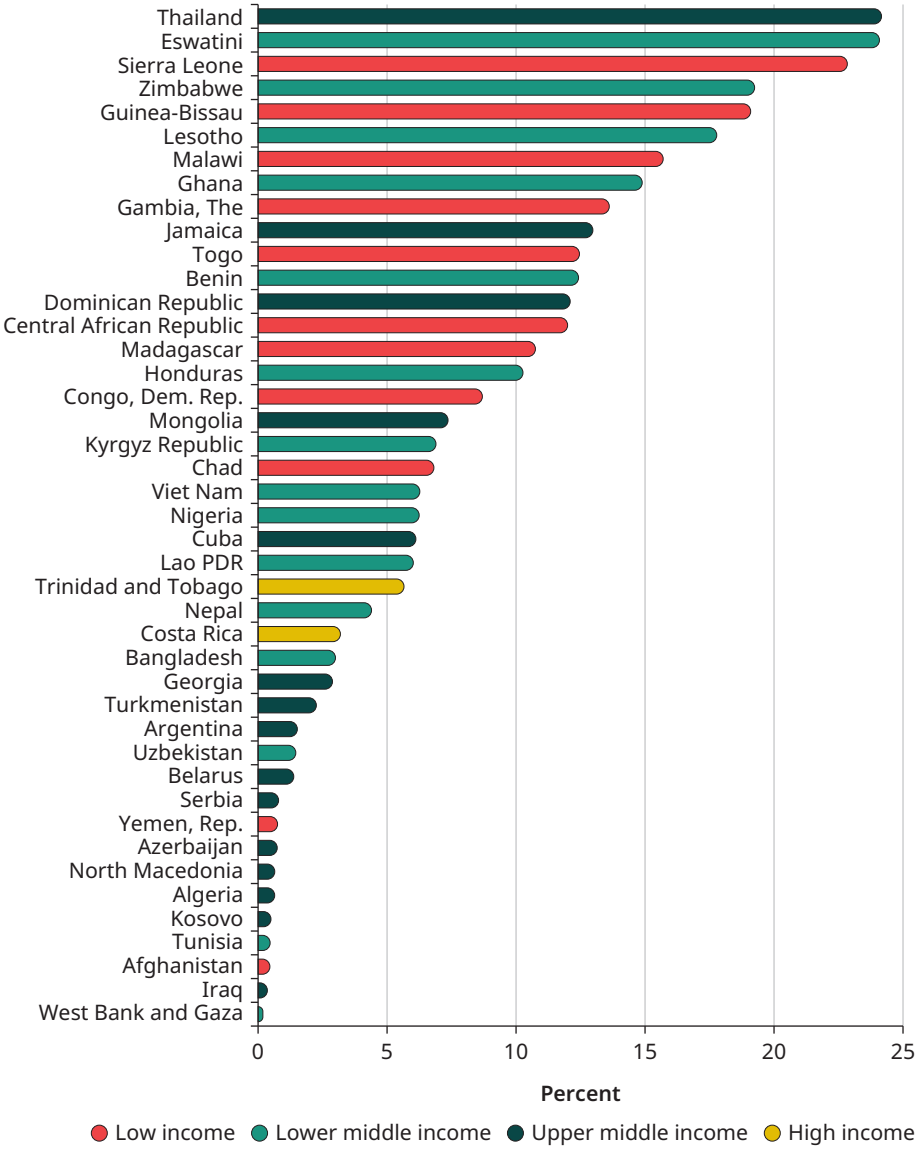
Some unfortunate situations provide evidence of the importance of nurturing care among children and adolescents. If parents suffer from an emotional or behavioral disorder, for example, they may face difficulty finding and keeping employment and emotionally connecting with their children.[13] Children with parents who are suffering from a mental health disorder are much more likely to become malnourished and experience injuries and bouts of diarrhea.[14] Indeed, declines in parental mental health, rather than declines in income, appear to underlie the negative impacts of parental job loss on children's school performance.[15] According to one estimate, many children may find themselves in this situation; close to one in five adults globally had a mental health disorder in 2021.[16]

Without adequate care at home, resources are insufficient

While receiving less care despite the availability of more resources may seem unusual, millions of children are in this situation if their parents migrate for work but leave them at home. In China, for instance, some parents in rural areas migrate to urban areas but leave behind their children, who would not be eligible for health or education services in the new work locations. In many other

countries, the number of children who are not residing with their parents is high (refer to figure 2.6). According to nationally representative household surveys in Eswatini, Sierra Leone, and Thailand, for instance, more than 20 percent of children ages 5–14 are not living with either parent although the parents are still alive.

FIGURE 2.6 Share of children ages 5–14 living with neither parent



Source: Original calculations based on data of MICS (Multiple Indicator Cluster Surveys) (dashboard), United Nations Children's Fund, https://mics.unicef.org/.

Note: The coresidence status of children ages 5–14 is defined for children whose parents are not deceased, divorced, or separated.

Analysis of data of the China Family Panel Studies (CFPS), a survey conducted among households in China since 2010, suggests that at least 25 percent of rural children ages 5–17 have been left behind at some point during their childhood, typically with grandparents or other relatives, while their parents are away working as migrant labor.[17] These children report that they see their parents an average of zero times in a typical week.

What happens to these children? Does the additional income earned by their parents in migration help build human capital? Does the care they receive match what they would receive from their parents if their parents remained with them?

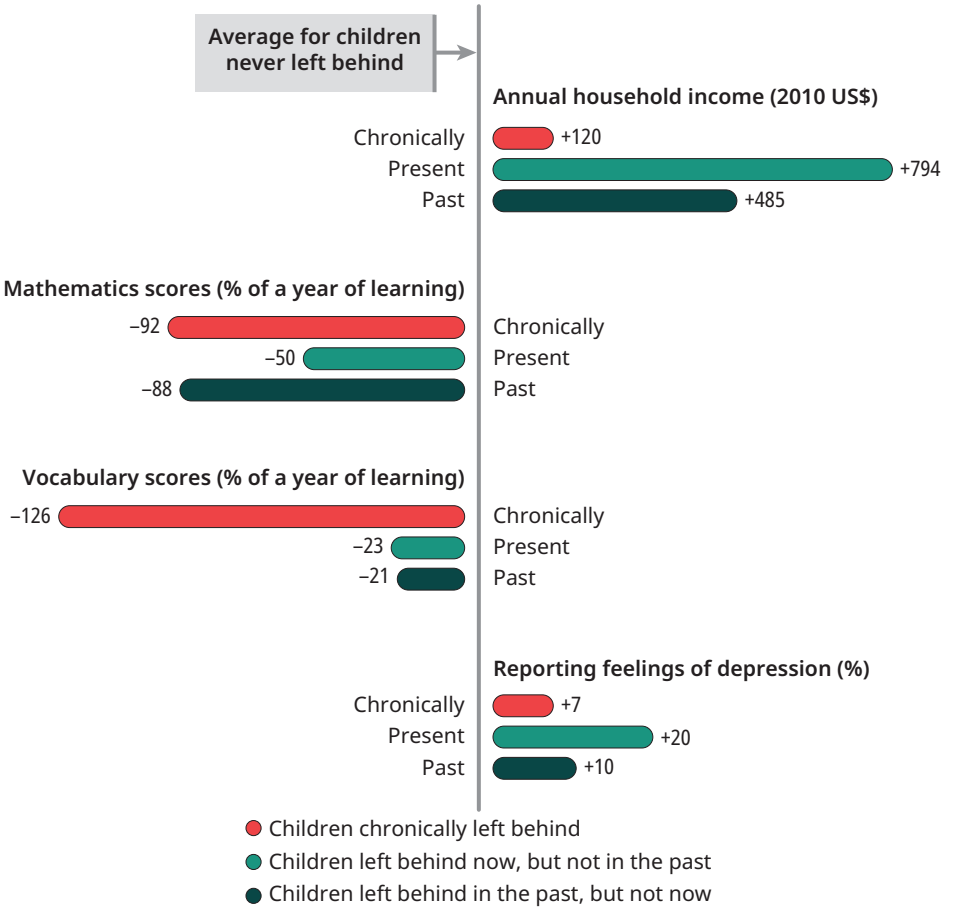
Identifying children as left behind if the survey reports that they do not see their parents at all in a typical week, figure 2.7 presents selected information on the welfare of such children, including household income, the scores of the children on tests of vocabulary and mathematics, and the children's own reports of how depressed they feel.

The results of the analysis suggest that the additional income earned by parents does not compensate for the parental care missed by the children who are left behind. Compared with children who have never been left behind, children ages 10–17 who reported that they were left behind during any period were living in households that enjoyed higher incomes. Children who are now left behind, but were never left behind in the past are members of households with an additional US$794 (2010 US dollars) per year, 14 percent more than the national average. Children who were left behind at some point in the past, but who now see their parents at least once a week are living in households with an additional US$485 a year, 9 percent more than the national average. Children who have been left behind in all periods—the chronically left behind—show a smaller, US$120 advantage, 2 percent more than the national average.[18]

Despite the resource advantage, children who have ever been left behind exhibit lower test scores and higher rates of reported depression. The effects are large in magnitude. For instance, children who are now being left behind are a half year behind in mathematics scores relative to children who have never been left behind. These children are also 20 percent more likely to report being depressed.

In other contexts, children living in the same home—with, in principle, the same access to infrastructure and resources—benefit from varying levels of care and human capital investment. In rural India, for example, parents spend much more time caring for infants who are boys than infants who are girls, devoting 60 fewer minutes a day if their youngest child is a girl. Male infants are also breastfed longer and are more likely to receive vitamin supplements.[19] Similarly, the prevalence of stunting in India is less widespread among eldest sons, who typically care for parents when they are elderly, than among daughters and younger sons, who tend to leave the home after marriage.[20]

FIGURE 2.7 Selected indicators of well-being, children ages 10–17, by left-behind status, China



Source: Original calculations based on data of CFPS (China Family Panel Studies) (dashboard), Institute of Social Science Survey, Peking University, https://www.isss.pku.edu.cn/cfps/en/.

Note: Children are considered left behind if they see both of their parents zero times in a typical week although the parents are still alive and the children are not in boarding school. The data are longitudinal. A child may therefore be left behind in some survey rounds, but not in others. Children are considered chronically left behind if they are left behind in all data rounds. Children are, on average, observed in three rounds.

Evidence from multiple countries indicates that older children, particularly older sisters, must provide childcare to younger siblings, leaving these caregivers with less time to study and invest in their own human capital. Among a sample in rural Mozambique in 2017, children ages 10–14 spent approximately two hours a week taking care of their siblings, the same amount of time they were able to devote to homework.[21] In a sample in rural Kenya, girls more often engaged in stimulating activities with their younger siblings than their mothers did.[22]

Overall, these findings suggest that resource availability in the home environment matters for children. Not only do children in a home with more resources exhibit greater human capital accumulation, but the responses of household members to exogenous changes in income show that human capital is sensitive to fluctuations in resources. The evidence also suggests, however, that resources alone are insufficient to build human capital effectively. The care environment of the home is a key determinant of human capital accumulation, specifically, the time parents spend supporting their children's health and cognitive, language, and social-emotional skills.

Policy recommendations

This chapter establishes that children and adolescents in some types of homes do not receive sufficient care and that resources alone are not sufficient to keep human capital accumulation on track. Because both resources and the care environment are important in human capital accumulation among children and adolescents, a policy agenda to promote human capital would address the immediate resource constraints faced by poor households and seek to improve the care children receive. While most countries implement some form of income redistribution, even if the goal is not to augment the economy's human capital, improving the care environment for the benefit of children is rarely a policy objective.

Increasing the resources of poor families

Table 2.1 lists two recommendations to increase the resources available to poor families and assesses the magnitude of the effects estimated in studies and the strength of the evidence. The table also details known challenges associated with implementation and the design features that still require experimentation.

Evidence on several countries shows that raising parental income through job programs or income support may significantly increase children's participation in school, academic achievement, and social-emotional development. In Uganda, for example, the Youth Opportunities Program raised the earnings of young adults by 38 percent and household consumption by 10 percent. Yet, because of the program, young people were also less likely to work and more likely to continue in school.[23] Likewise, in Nepal, programs offering vocational training and microcredit to women led to a 10 percentage point rise in maternal nonfarm self-employment and household earnings and higher school participation among their children.[24]

TABLE 2.1 Evidence on increasing resources at home among poor families

Pro-poor job programs Public works, self-employment support, incentives for skill development, and job-matching services.	
Estimates of impact on human capital: Medium[a]	**Strength of evidence:** Medium[b]
Summary: Increasing parental earnings translates into increased investments in children's human capital, particularly in terms of school participation. **Implementation challenges:** On employment and earnings, the general macroeconomic context may exert more influence than publicly funded programs. **Still to learn:** What types of employment support and for whom translate the most into human capital investments in children and adolescents?	
Cash transfers to poor families Payments directly to poor households made by the government.	
Estimates of impact on human capital: Medium[a]	**Strength of evidence:** High[b]
Summary: Cash transfers for poor households tend to increase food expenditures and the use of education and health services, particularly when payments are conditional on a minimum level of service usage. Their effects on skill formation and malnutrition of children and the mental health of adults have been negligible to modest.[c] **Implementation challenges:** Monitoring adherence to conditionalities can be complex and expensive. In some contexts, but not in others, the influx of cash increases price levels, and households just below eligibility thresholds have to reduce essential expenditures.[d] **Still to learn:** Should transfers target a specific household member (for example, mothers)? Should transfers be conditional or labeled for a specific purpose? How long should households have access to transfers? Is there a threshold value above which transfers may also more sizably and consistently improve skills, nutrition, and mental health?[e]	

Source: Original table for this publication.

a. The estimated impact is high if the estimated impacts on the human capital accumulation of children persist over multiple stages of the life cycle or generate immediate impacts equivalent to at least 0.5 standard deviations in low- and middle-income countries. It is medium if the immediate impact is between 0.25 and 0.50 standard deviations.

b. The strength of evidence is high if there are multiple meta-analyses focused on experimental or quasi-experimental evidence. At least one meta-analysis must include studies in low- and middle-income countries that find a significant average size in the effects. It is medium if there are more than five experimental or quasi-experimental studies in low- and middle-income countries. It is low if there are fewer than five studies in low- and middle-income countries or if all evidence is limited to high-income contexts.

c. Baird et al. (2013); Manley et al. (2022); McGuire et al. (2022).

d. Cunha et al (2019); Egger et al. (2022); Filmer et al. (2023).

e. Baird et al. (2016).

There is evidence that, if women earn more in the labor market, the human capital of their children increases.[25] An expansion in female labor force participation, however, need not occur at the expense of declines in care for children (refer to chapter 4, box 4.3).

By contrast, declines in labor income adversely affect the human capital of children. In Brazil, for instance, job losses among parents raised the risk of criminal behavior among both parents and children, although these effects were fully offset if unemployment insurance cushioned the income shock.[26]

Cash transfer programs, through which the government assigns payments directly to households, represent explicit attempts to augment the resources available in the home. Similar direct transfers of goods and money have been used by governments for thousands of years to (re)distribute income or to assist the vulnerable, such as children and individuals with disabilities or war-related injuries.[27] Between 2010 and 2019, they covered more than 400 million people in low- and middle-income countries. They reached a peak coverage of 900 million people during the COVID-19 pandemic.[28] These programs can provide regular, automatic payments to all households that meet certain socioeconomic criteria or they may condition payments based on household investments in children's human capital (for instance, attaining a minimum school attendance rate of 80 percent) or on the participation of adult household members in the labor market.

Cash transfers to poor families may increase human capital investments in children in the short term.[29] In a pilot trial in Malawi, for instance, cash transfers that were equivalent to approximately 10 percent of annual household expenditures and were conditional on school attendance by adolescent girls raised enrollment by 11 percentage points (or 16 percent). They also generated modest gains in reading and cognitive scores.[30] An unconditional variant of the program that did not require school attendance did not lead to these gains in education, but was associated with a reduction in teenage marriage (by 8 percentage points or 44 percent) and teenage pregnancy (by 7 percentage points or 27 percent).

While cash transfers may translate into human capital investments, the impact of cash transfers on outcomes among children—their physical growth and skill development—has been much more limited.[31] The available evidence shows that there is still much to learn about the design features in programs that lead to success, such as who is eligible, who within the household actually receives the transfers, and how long do they receive the transfers. Eligibility rules may become important if ineligible households are still vulnerable or if eligible households are not vulnerable. In the Philippines, for example, households that were ineligible for the transfers were priced out of some foods when the growth in demand associated with households that received the transfers led to higher prices. As a result, chronic malnutrition rose by 34 percent among some ineligible households.[32] Likewise, little is known about the optimal duration or size of transfers, and few governments in low- and middle-income countries would be able to finance transfers for years if the transfers represent substantial changes in income.

Improving the care environment of children and adolescents

What happens if programs or policies are aimed explicitly at altering the care environment children experience without augmenting resource availability? Table 2.2 lists recommendations for these types of programs, illustrates the magnitude and strength of the evidence base, and documents known implementation challenges and what remains to be learned.

Parenting programs

Parenting programs counsel parents on activities they can undertake in the home to provide early cognitive and social-emotional stimulation to their children, often with an element of demonstration. Parents may learn how to make simple toys using materials commonly found in the home and use them to promote early

TABLE 2.2 Evidence on improving care environments for children and adolescents

Parenting programs Counseling and demonstrations among parents to encourage early cognition stimulation and social-emotional support, typically implemented during home visits or small group sessions.	
Estimates of impact on human capital: High[a]	**Strength of evidence:** High[b]
Summary: Parenting programs tend to improve children's early cognitive, motor, and social-emotional skills and may help reduce violence in the home. Longitudinal evidence shows long-term benefits in adulthood on earnings, proclivity to commit crime, and mental health.[c] **Implementation challenges:** The estimated effects of parenting programs tend to decline with scale. Implementation fidelity tends to be weak. Home visits occur at a lower frequency than anticipated. Front-line workers often need to shift attention to other tasks, such as nutrition counseling.[d] **Still to learn:** • Should households be targeted according to poverty status, maternal education, or a measure of child development? • What qualifications do front-line staff require? Should they dedicate their time to parenting programs, or can workers take on delivery as an additional task? Should personnel be paid through a salary or stipend? • How effective are parenting programs for school-age children and adolescents?	
Preprimary education Center- or school-based education among children ages 3–6.	
Estimates of impact on human capital: High[a]	**Strength of evidence:** High[b]
Summary: Preprimary education immediately improves children's behavior and their skills in literacy, mathematics, and social-emotional learning. Benefits persist into adulthood. As adults, the individuals eventually complete more education, earn more, and commit less crime.[e] **Implementation challenges:** If preprimary expansion causes students to switch schools (because of a subsidy, school construction closer to home, and so on), children's skills may decline if they were previously attending higher-quality schools. Improving quality in existing schools does not appear to be a challenge, however.[f] **Still to learn:** • Can preschools be used to improve nutrition and health among children?[g] • Do the services offered to parents (such as job training or mental health counseling) augment impacts?	

(Table continues on next page)

TABLE 2.2 Evidence on improving care environments for children and adolescents *(continued)*

Mental health care among adults	
Estimates of impact on human capital: Medium[a]	**Strength of evidence:** High[b]
Summary: Psychotherapy tends to improve the mental health of adults, who then invest more in their children's education. While mental health impacts can be large and persistent, the effects on children's education are modest.[h] **Implementation challenges:** Delivery first requires the screening and diagnosis of mental health disorders, but mental health care personnel tend to be scarce in low- and middle-income countries.[i]	

Source: Original table for this publication.

a. The estimated impact is high if the estimated impacts on the human capital accumulation of children persist over multiple stages of the life cycle or generate immediate impacts equivalent to at least 0.5 standard deviations in low- and middle-income countries. It is medium if the immediate impact is between 0.25 and 0.50 standard deviations.

b. The strength of evidence is high if there are multiple meta-analyses focused on experimental or quasi-experimental evidence. At least one meta-analysis must include studies in low- and middle-income countries that find a significant average size in the effects. It is medium if there are more than five experimental or quasi-experimental studies in low- and middle-income countries. It is low if there are fewer than five studies in low- and middle-income countries or if all evidence is limited to high-income contexts.

c. Gertler et al. (2014, 2021); Grantham-McGregor et al. (1999); Hamadani et al. (2006); Jensen et al. (2021); Jeong et al. (2020); Jervis et al. (2023); Walker et al. (2022); Yousafzai et al. (2014).

d. Andrew et al. (2018); Araujo et al. (2021); Bos et al. (2024); Ganimian et al. (2024); Kirkwood et al. (2023).

e. Bailey et al. (2021); Holla et al. (2021).

f. Berkes et al. (2024); Dean and Jayachandran (2020); Ganimian et al. (2024); Gray-Lobe et al. (2022); Wolf et al. (2019).

g. Carneiro and Ginja (2014); Sommer et al. (2024).

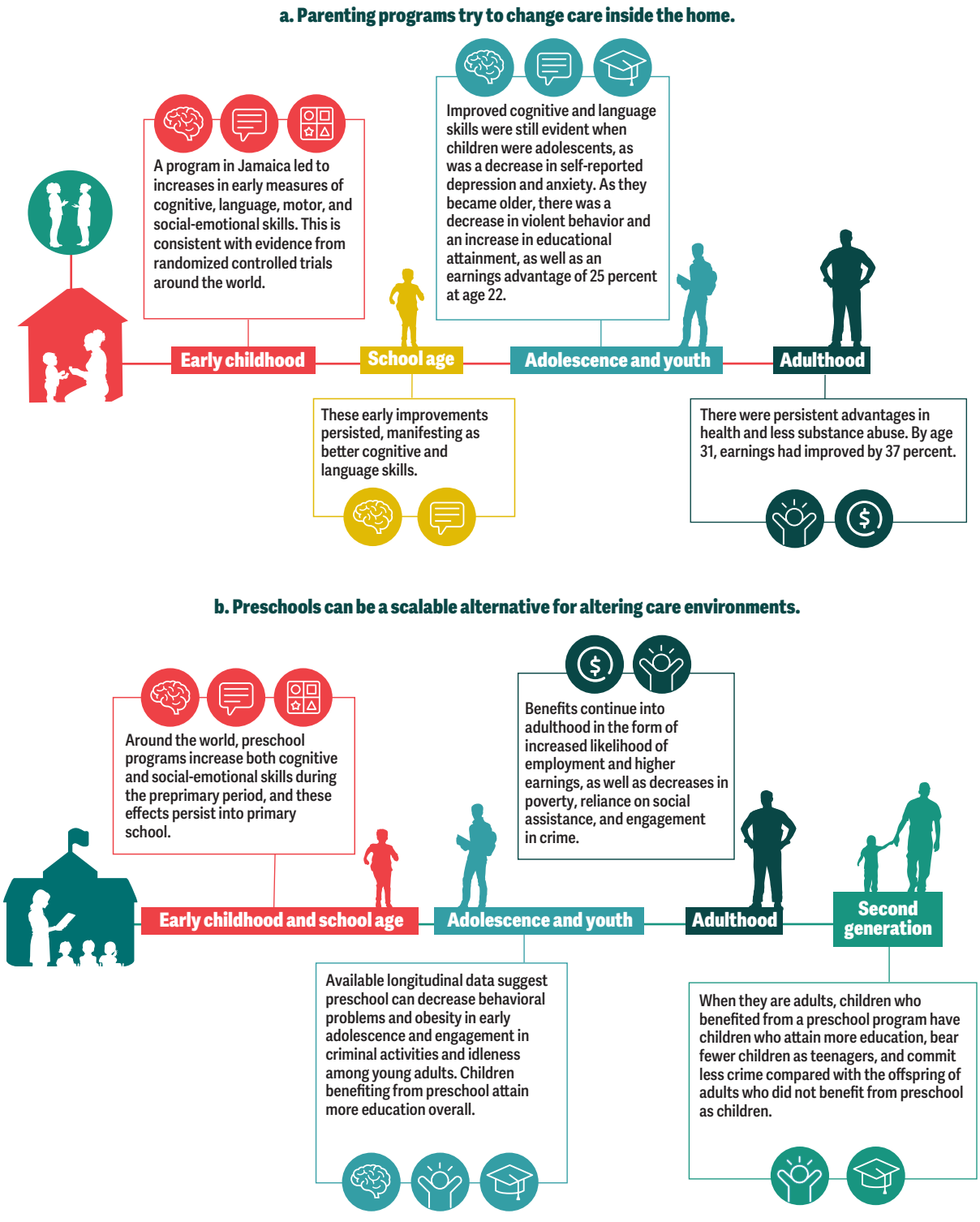
h. Baranov et al. (2020); Bhat et al. (2022); Lund et al. (2024); Tol et al. (2019).

i. WHO (2021).

numeracy skills among children under age 3, or they may learn how to reduce their reliance on physical violence to maintain discipline. Though most parents do not endorse the use of violent punishment, many report that they use such measures in the home (refer to box 2.1).

Evidence from numerous small-scale randomized controlled trials suggest that parenting programs are effective in immediately improving children's cognitive, motor, and social-emotional skills.[33] Longitudinal evidence from randomized controlled trials shows impacts that persist into adulthood (refer to figure 2.8). Children benefiting from early stimulation programs exhibit higher educational attainment, earn more when they enter the labor market as adults, commit fewer crimes, and face a lower probability of suffering from mental health disorders.[34] In an experiment in Jamaica, for instance, community workers made weekly home visits to households with stunted toddlers to demonstrate the way to provide cognitive and social-emotional stimulation to the young children. These children grew up to have 43 percent higher wages as adults and lower rates of depression and substance abuse compared with children who had not benefited from the program.[35]

FIGURE 2.8 Lifelong effects of preschool and parenting programs



Source: Original figure for this publication.

Parenting programs have proven difficult to scale, however.[36] Home visits involve one-on-one interactions between parents and facilitators, and programs designed to have frequent visits can encounter difficulty in achieving implementation fidelity.[37] The large documented effects have been estimated in small-scale studies evaluating programs that cater to as few as 70 children and that achieve a high frequency of home visits (weekly) over a long period (24 months).

Evidence is emerging that group sessions in which 8 to 12 parents in a community meet a facilitator can achieve impacts equivalent to individual home visits at a much lower cost.[38] Little evidence is available on whether parenting programs can be virtual or implemented using text, voice recordings, or phone calls. Some evidence indicates that virtual interventions can improve parenting practices and children's outcomes, but other studies find no impact on child development.[39]

More research is required to learn about optimal design beyond scale. For example, should these programs target households with few resources, similar to the way social assistance may be targeted? Or should the programs rely on other markers to indicate the need for improvement in the care environment, such as maternal education or characteristics of children, including their nutritional status or early vocabulary skills?

Many programs operate through existing service delivery infrastructure and add parenting programs to the tasks of existing community health workers, many of whom are part-time and not paid regular salaries. It is an open question whether implementation fidelity could improve with a dedicated, professionalized workforce.

Most trials have been focused on young children, typically younger than age 6. Parents, however, likely need advice on promoting the cognitive development and mental health of their children during later stages of childhood, including adolescence. Evidence shows that these programs can also improve parenting practices and children's outcomes if they are implemented during adolescence, but this is an emerging field of research.[40]

Mental health care for adults

A randomized controlled trial in rural Pakistan among pregnant women and mothers of newborns who exhibited depressive symptoms demonstrates how parental mental health can interfere with human capital investments in children. When these women participated in the cognitive behavioral therapy delivered in their homes by community health workers through the Thinking Healthy Program, they exhibited lower probability of postpartum depression over the next year.[41] They were 26 percentage points (or 60 percent) more likely to report that they spent time playing with their children than mothers who had not received treatment through the program. The children of the treated mothers were also

10 percent more likely to have completed their scheduled immunizations by the time they were 12 months old. The mental health benefits among the mothers persisted even seven years after the program. The children benefited because their parents invested more time and money in education by, for example, paying for more expensive, higher-quality schools and helping their children study at home.[42]

Nonspecialist counselors have delivered treatments in high-impact trials. This type of worker may be needed to deliver programs addressing mental health because there is a severe shortage of mental health personnel around the world. Globally, there are 13 mental health workers for every 100,000 people, and fewer than 2 for every 100,000 in low-income countries, compared with more than 60 in high-income countries.

Preprimary education

Given the challenges related to scale and the inherent difficulty of changing behavior within the home, it may be easier and more cost-effective to use preschools to provide an alternative care environment for children. Preschools exhibit wide coverage in upper-middle-income and high-income countries and have been used to deliver other services, such as basic health care services for children. Global evidence shows that children's health and the development of both cognitive and social-emotional skills improve if children attend preschool, even in low-resource settings.[43] A community preschool scale-up in Mozambique, for instance, improved skills in the preprimary period, increased school attendance during the primary period a few years later, and expanded the study time of older children who would have otherwise had to care for their preschool-age siblings.[44] Longitudinal evidence available only on high-income countries indicates that preschool, similar to the effects of parenting programs, confers lifelong benefits (refer to figure 2.8). Children grow up to complete more education, commit less crime, earn more in the labor market, and rely less on social assistance.[45] Their own children also accumulate more human capital.[46]

If preschool services are to be effective, however, they must provide care and stimulation that is better relative to what is provided to children at home or through other care arrangements. As the evidence presented in this chapter demonstrates, the average home environment in many contexts in low- and middle-income countries may not be conducive to the development of the early numeracy and literacy skills children will need to be prepared to learn in primary school. If preschool expansion leads children already participating in preprimary or primary education to switch to new schools, their skill development may not accelerate or may even decline if they switch out of schools of equal or higher quality.[47] Thus, expansion would ideally first target those children who would not otherwise attend preschool.

In contrast to parenting programs, preschool has been successfully scaled up in many countries. Teachers need not have as many qualifications or as much training as teachers in higher grades. In India, secondary-school graduates with only two weeks of training were able to accelerate skill development.[48] Teachers in Kenya with fewer qualifications than standard civil service teachers were able to generate skill improvements equivalent to more than one year of learning if they followed a structured curriculum and established recommendations for pedagogy.[49] Preschool pupils also need not have as much instructional time as children in higher grades. In Bangladesh, two hours a day was sufficient to improve literacy, numeracy, and social-emotional skills among four-year-old children.[50]

The learning agenda in preprimary education policy involves complementary programs that may provide other services for children and their families, such as health screenings, counseling, cash transfers, or job training. Such a two-generation approach would simultaneously supply services to support skill development among children and interventions to bolster the livelihoods and well-being of parents and their relationships with their children.[51]

Increasing the education of future parents

Increasing the resources of parents, parenting programs, and preprimary education can immediately address shortfalls in the resources and care required for human capital accumulation at home. Given the large differences observed across the world among children whose mothers vary in educational attainment, and given the evidence establishing a causal link between the human capital of individuals and the subsequent human capital accumulation among their children, investments in education today might be considered investments in the human capital of future parents.[52] They are thus likely to increase the resources and care invested in human capital accumulation in the home.

In a randomized controlled trial in Ghana, for example, girls who were offered a scholarship for secondary school were 28 percentage points (63 percent) more likely to complete secondary school and 7.1 percentage points (36 percent) more likely as adults to have partners who had completed tertiary education. They also went on to have children who were healthier—they were much less likely to die as infants or toddlers—and who exhibited more advanced cognitive skills than the children of women who had not been offered a scholarship.[53] These effects do not appear to operate through increases in earnings or purchases of inputs, which were similar among mothers who had not been offered secondary-school scholarships when they were younger. Instead, the mothers who had won scholarships earlier talked more with their children and provided more stimulation. Thus, education confers parents with skills that are useful in producing human capital within the home. Over the long term, increasing and

improving the education of future parents may therefore be critical to enhancing human capital accumulation.

In sum, human capital accumulation starts early and starts in the home. The family exerts a powerful influence on child and adolescent health and skill development through the resources available at home for purchasing important inputs, such as nutrient-rich foods or children's books, and through the amount of nurturing care household members provide to stimulate learning and keep children safe. Policies need to target the entire home, both the resources and care environments that are essential for human capital accumulation.

While increasing resources among poor households is already a policy goal to keep families from falling into poverty and to protect them from income shocks, policies that increase these resources, such as jobs programs or cash transfers, are typically not considered instruments for improving learning and educational attainment or mental health among adolescents. This chapter provides evidence that these policies do indeed yield the types of impacts that are often more closely associated with schools and clinics.

Increasing resources for poor families will not be enough, however. Policies will need to address the care environment as well. While influencing how parents raise their children may seem an intrusion of policy into the private sphere of the household, the evidence presented in this chapter indicates that programs offering parents the tools to stimulate their children, provide social-emotional support, and rely on nonviolent behavior management yield large benefits throughout the life cycle, such as higher educational attainment and earnings and less reliance on social assistance and criminal activity. While the school is often considered the proper place to integrate the delivery of many services, such as education, nutrition, and health care, the home may also be viewed as an appropriate place to undertake such service integration. Likewise, the evidence shows that the home is not important solely for young children. The resources and care supplied within the home also affect human capital accumulation among adolescents.

Increased support for human capital accumulation at home may require an expansion in the scope of activities in some sectors. While social protection programs sometimes deploy social workers for home visits, and the health system may rely on outreach by community health workers, current services reaching the home tend not to reflect how critical the home is in the development of cognitive and social-emotional skills. Integrating programs that represent an acknowledgment of this important role of the family will prepare children and adolescents to make the transitions to higher stages of school and to work that will determine health and labor productivity in adulthood. These transitions will occur when other places, such as the neighborhood and the workplace, begin to exercise greater relevance in human capital accumulation.

Notes

1. Sonuga-Barke et al. (2017).
2. Almond and Currie (2011); Heckman (2006).
3. Rao et al. (2013).
4. Hargrave and Sénéchal (2000); Knauer et al. (2020).
5. Baird, Friedman, et al. (2011).
6. Adhvaryu et al. (2019).
7. Akee et al. (2010); Akee et al. (2018).
8. Akee et al. (2010).
9. Akee et al. (2018); Akee et al. (2024).
10. Akee et al. (2018).
11. Dewey et al. (2022).
12. Cattaneo et al. (2009).
13. Cuijpers et al. (2015); Lund et al. (2024).
14. Pierce et al. (2020).
15. Rege et al. (2011).
16. Data of GBD 2021 (Global Burden of Disease Study 2021) Data Resources, Global Health Data Exchange, Institute for Health Metrics and Evaluation (accessed June 4, 2025), https://ghdx.healthdata.org/gbd-2021. Mental disorders include depressive disorders, anxiety disorders, schizophrenia, autism spectrum disorders, bipolar disorder, conduct disorder, idiopathic developmental intellectual disability, eating disorders, and attention-deficit hyperactivity disorder.
17. Refer to CFPS (China Family Panel Studies) (dashboard), Institute of Social Science Survey, Peking University, https://www.isss.pku.edu.cn/cfps/en/.
18. These income advantages relative to children who have never been left behind persist among all categories of children who have ever been left behind if income is measured on a per capita basis across all categories, except for children who are chronically left behind.
19. Barcellos et al. (2014).
20. Jayachandran and Pande (2017).
21. Martinez et al. (2017).
22. Jakiela et al. (2024).
23. Blattman et al. (2014).
24. Chakravarty et al. (2019).
25. Jayachandran and Voena (2025).
26. Britto et al. (2022).
27. Gentilini (2024).
28. Gentilini et al. (2022).
29. Baird, McIntosh, et al. (2011); Fernald and Hidrobo (2011).
30. Baird, McIntosh, et al. (2011).
31. Baird et al. (2014); Manley et al. (2022).
32. Filmer et al. (2023).
33. Jeong et al. (2021); Jervis et al. (2023).
34. Garcia et al. (2016); Heckman et al. (2013).

35. Gertler et al. (2021); Walker et al. (2022).
36. Araujo et al. (2021).
37. Andrew et al. (2018); Bos et al. (2024); Kirkwood et al. (2023).
38. Grantham-McGregor et al. (2020).
39. Arteaga et al. (2023); Arteaga et al. (2025); Dinarte-Díaz et al. (2023); Francis et al. (2024); Rafla et al. (2024).
40. Cluver et al. (2018); Goagoses et al. (2023).
41. Rahman et al. (2008).
42. Baranov et al. (2020).
43. Holla et al. (2021).
44. Martinez et al. (2017).
45. Bailey et al. (2021); Gray-Lobe et al. (2023); Havnes and Mogstad (2011); Heckman et al. (2010).
46. Rossin-Slater and Wüst (2020).
47. Bouguen et al. (2018); Dean and Jayachandran (2020).
48. Ganimian et al. (2024).
49. Gray-Lobe et al. (2022).
50. Spier et al. (2020).
51. Sommer et al. (2024).
52. Heckman and Karapakula (2019); Rossin-Slater and Wüst (2020).
53. Duflo et al. (2024).

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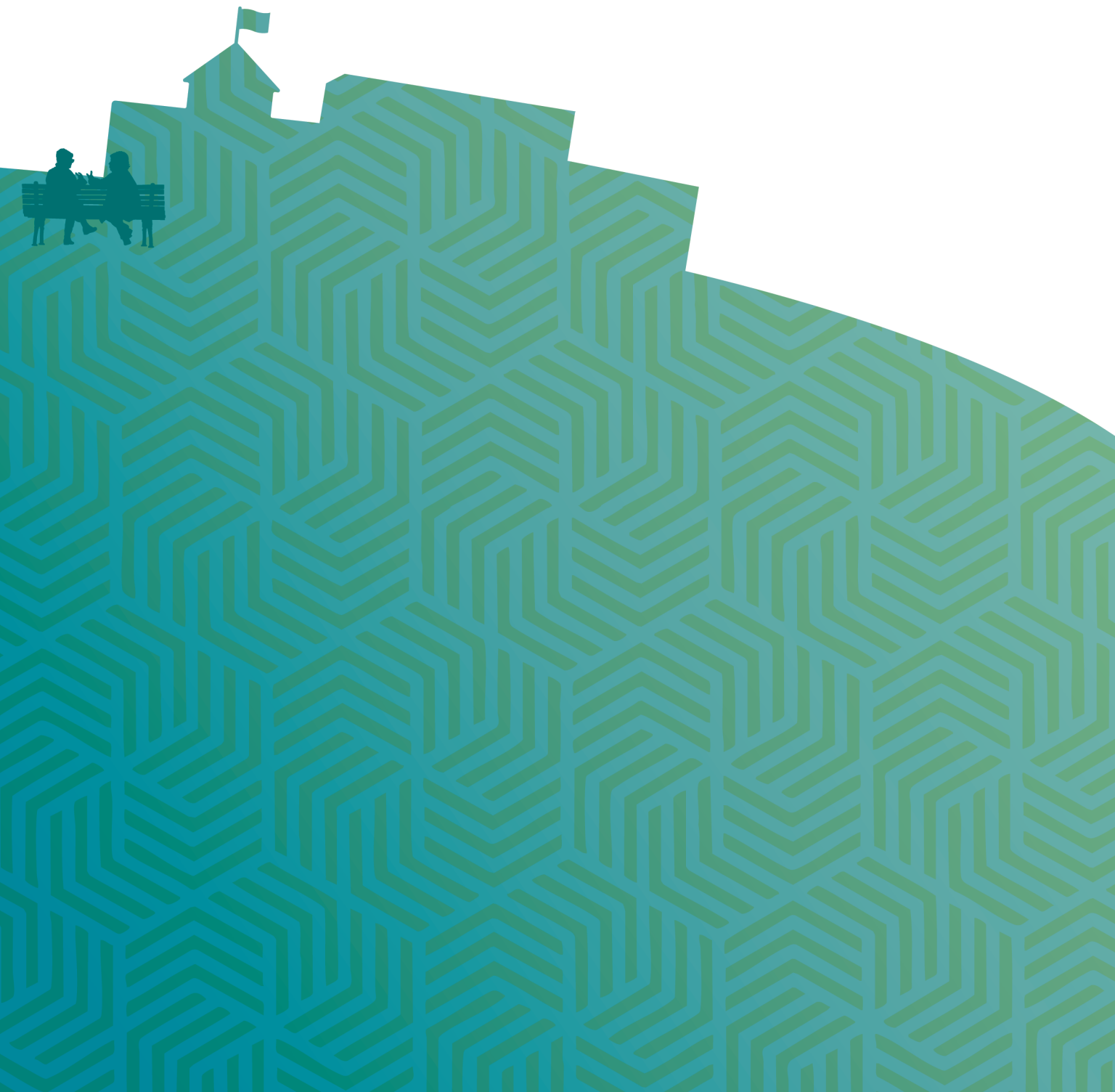
Chapter 3

Human Capital Accumulation in Neighborhoods

Andres Yi Chang, Patrick Hoang-Vu Eozenou, and Ildo Lautharte



Summary

Human capital accumulation is influenced by where people are born, grow up, and live. Neighborhoods provide access to schools, health care, the community, safe streets, a clean environment, and job opportunities—all shaping human capital. A good neighborhood can help an individual thrive; a bad neighborhood can restrict and entrap.

This chapter examines the effect of the neighborhoods on human capital. Families at similar incomes may vary in the opportunities they offer to their children depending on where they live. Even at identical household incomes, children who grow up in a wealthier neighborhood tend to earn significantly more as adults than individuals who grow up in a poorer neighborhood.

While improving schools and health clinics in a struggling neighborhood is necessary, it may not be sufficient if other problems, such as violence and pollution, are undermining human development. The challenges are often interconnected, requiring coordinated solutions across an entire neighborhood. Addressing the challenges may require the targeting of struggling neighborhoods to improve service quality, address environmental hazards, and strengthen social capital.

A reproducibility package is available for this book in the Reproducible Research Repository at https://reproducibility.worldbank.org/catalog/461.

The neighborhood matters

Imagine two groups of children born on the same day and possessing similar individual and family characteristics. One group is raised in a neighborhood where the opportunities to build human capital are plentiful, and the other group is raised in a neighborhood where the opportunities are scarce. Children in the first group will grow up playing in safe spaces, breathing clean air, and attending good local schools. They will be treated by well-trained doctors and benefit from strong social networks that will influence their life choices and the likelihood they will obtain good first jobs. Children in the second group, meanwhile, will grow up in an area with pollution and poor infrastructure and will attend schools with poorly performing teachers. The neighborhood may be controlled by a gang. As these children grow up, they might have limited job opportunities and fewer resources to invest in themselves and their families. By the time the two groups of children reach adulthood, their health, education, skills, job prospects, and life trajectories will appear quite different. This chapter discusses why.

What's so special about neighborhoods? They provide access to schools and health facilities. They are characterized by distinct environments (refer to box 3.1). Local streets may not be safe, or the air and water may not be clean. The job opportunities and social dynamics may differ, ranging from cohesion to exposure to crime.

BOX 3.1 Defining neighborhoods as a geographic concept

In this chapter, neighborhood refers to a physical space that is defined geographically rather than based on the identity of a community. Neighborhoods and villages are microareas within larger administrative units, such as municipalities or districts. The practical definition of neighborhood often depends on the availability of the data or topic relevance. In the study of labor markets, researchers may use commuting zones; in education, school districts; and in health care, clinic service areas.

Unlike definitions based on shared identity, culture, or social network, the geographic framework focuses on physical proximity. People living in the same neighborhood share a common geographic environment (the same local services, infrastructure, environmental conditions, and job opportunities), regardless of whether they identify as part of the same community.

As the ability of people to move freely increases, their concept of a neighborhood may expand. While the neighborhood of a child might be a couple of blocks around the child's home and school, it expands later when the child reaches adulthood and attends college or commutes to work.

Throughout this chapter, neighborhoods and villages refer to the places where people live, interact, and influence one another's behaviors and decisions.

FIGURE 3.1 Neighborhoods affect human capital through distinct channels

Source: Original figure for this publication.

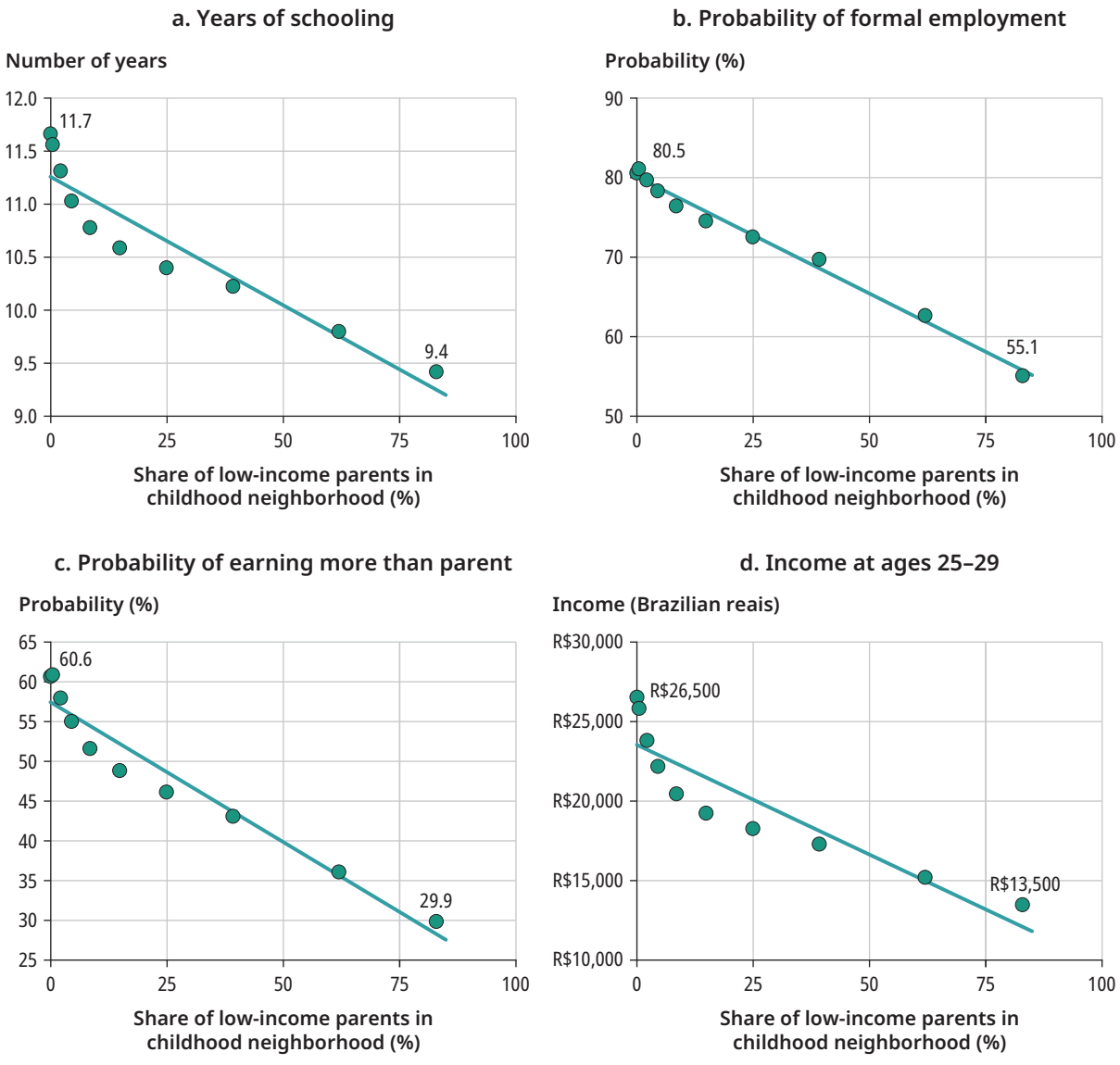
Consider four factors (refer to figure 3.1). First, access to services: in some neighborhoods, children may be obliged to walk several kilometers to reach an overcrowded school with few trained teachers, and the only health clinic often lacks medical staff, vaccines, or medications. Second, environmental conditions: in flood-prone areas, repeated exposure to contaminated water may lead to chronic illness and stunting among young children. Third, social dynamics: in neighborhoods with high crime and weak community attachments, parents may be discouraged from allowing their children to play outside or walk to school because of persistent conflict between gangs and police. Fourth, job opportunities: in poor urban neighborhoods, only informal low-wage jobs are available, imposing a limit on household resources and children's exposure to professions where they may continue learning.

Neighborhoods shape human capital outcomes beyond individual and household characteristics.[1] Recent evidence shows that up to half of the variation in earnings, educational attainment, and employment among individuals may be explained by the neighborhood where people grew up.[2] Moving children from disadvantaged to advantaged neighborhoods, regardless of their family or personal characteristics, can have a long-term effect on their life chances.

Figure 3.2 uses data from Brazil to compare children in households with identical incomes who grew up in neighborhoods where most people were poor (the points on the right in each panel) or who grew up in neighborhoods where few people were poor (the points on the left in each panel). The children who grew up in wealthier neighborhoods complete 2.3 more years of schooling, are 25 percentage points more likely to have a formal job, 31 percentage points more likely by age 29 to earn

more than their parents, and earn twice as much, on average, as the individuals who grew up in poorer neighborhoods. These differences are large, and the bulk of the differences appear to be causal effects of neighborhoods, rather than the sorting of particular kinds of households into better or worse neighborhoods.[3]

FIGURE 3.2 Neighborhood poverty in childhood and outcomes in adulthood, Brazil



Source: Original figure for this publication, based on Britto et al. 2025.

Note: The figure shows the relationship between the share of low-income parents in the neighborhood during childhood and the following measures of average adulthood outcomes of children from low-income families growing up in these neighborhoods: years of schooling, probability of formal employment, probability of earning more than parent, and income at ages 25–29. The scatterplots use neighborhoods as the observation unit, divided into 10 equal groups based on the percentage of low-income parents in each. Low income is defined as income at or below the 33rd percentile of the national income distribution. The share of low-income parents in the childhood neighborhood is used as a proxy for neighborhood characteristics growing up.

Why neighborhoods matter

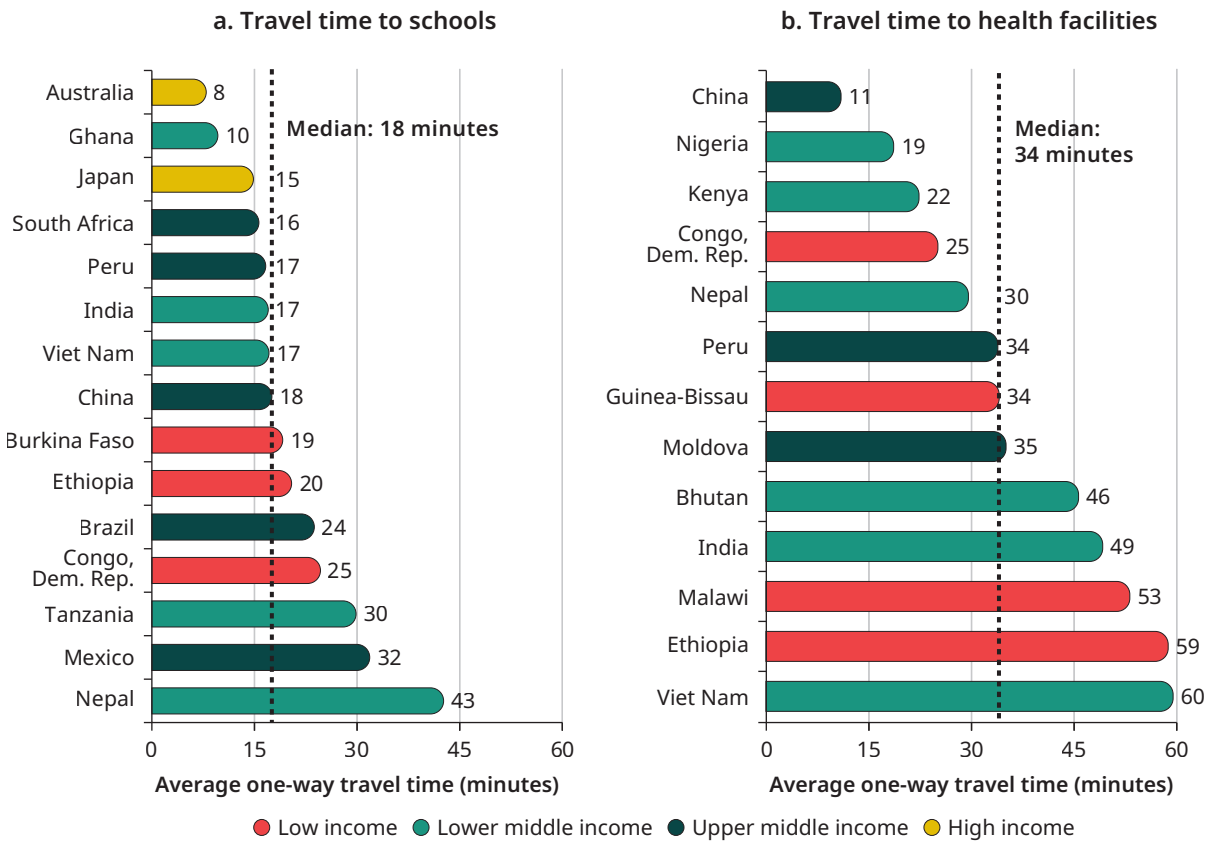
Neighborhoods affect human capital accumulation through numerous channels. From early childhood to adulthood, and from child mortality to lifetime income, where people live matters because it influences access to services and local markets and the amount of exposure to environmental hazards and social dynamics.

Neighborhoods shape access and quality in education and health care

Most people live near school and health care facilities. According to recent estimates based on the geolocation of road networks, at least 82 percent of the world population lives no more than 30 minutes away by motorized vehicle from a health facility.[4] The share is similar for primary schools. Household surveys and patient interviews reinforce this conclusion. Results indicate a median travel time of around 18 minutes to a school and 34 minutes to a location offering medical treatment (refer to figure 3.3). Recent studies in various parts of India find that most of the rural and urban population use health services that are within two to four kilometers of their homes, and, in Pakistan, 92 percent of children attend schools that are within a 15-minute walk.[5] Overall, access to basic social services does not appear to be the main local impediment to human capital accumulation.

Steady gains in access to schools and health facilities have not been matched by improvements in service quality, and the quality of services depends largely on the place where people live. For instance, figure 3.4, panel a, illustrates the average quality of health facilities across 817 rural villages in 19 of India's most populous states (excluding New Delhi), grouped into 10 quality bins. It shows that fewer than 50 percent of the health providers in the lowest-quality facilities could correctly diagnose tuberculosis, compared with 90 percent in the top 10 percent of villages. Figure 3.4, panel b, is based on comparisons of school quality across 112 rural villages in Punjab, Pakistan. Villages are grouped into 10 quality bins. Moving a child from a village in the bottom 10 percent in school quality to one in the top 10 percent would raise the mean school quality by 0.65 standard deviations, or the learning equivalent of 44 percent of a school year.

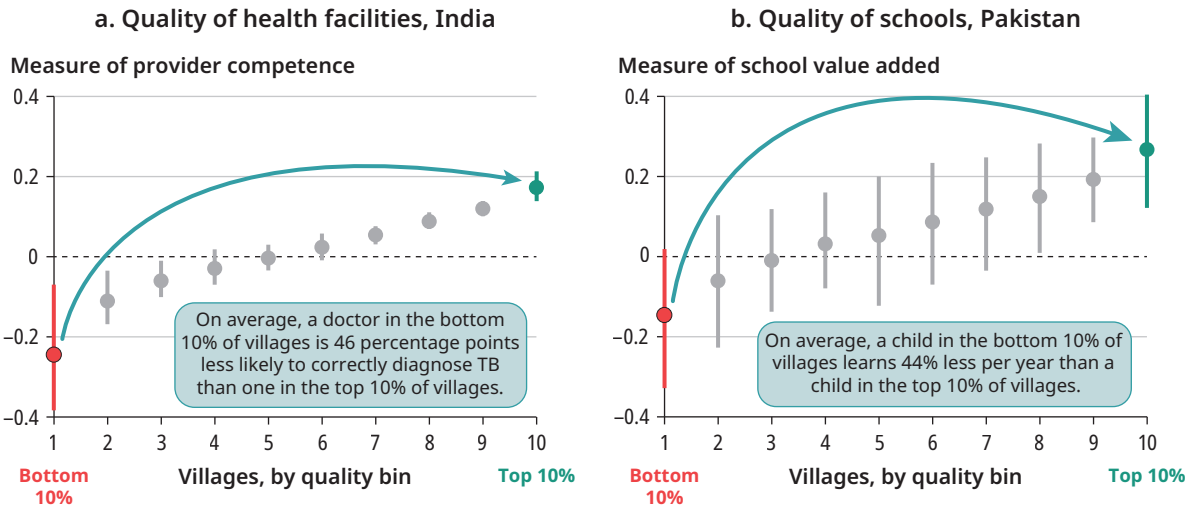
FIGURE 3.3 Households use local schools and local health facilities



Sources: Original figure for this publication, based on Bautista-Hernández 2023; CBS 2011; Ding and Feng 2022; Fink et al. 2022; Malone and Rudner 2011; NBS 2022; 2019 data of SAEB (Basic Education Assessment System, Brazil) (dashboard), National Institute of Educational Studies and Research, https://data-basis.org/dataset/e083c9a2-1cee-4342-bedc-535cbad6f3cd?table=d429a79a-eca1-461c-9c1f-ce65d61048a1; SDI (Service Delivery Indicators) (dashboard), World Bank, https://www.worldbank.org/en/programs/service-delivery-indicators; 2006 data of Young Lives Study (dashboard), Oxford Department of International Development, University of Oxford, https://www.younglives.org.uk/.

Note: The data are derived from nationally representative surveys and smaller-scale studies. School coverage varies by grade and depends on data availability. Health care coverage estimates are based on patient exit interviews, for example, patients seeking family planning services in Kenya, parents of children under age 5 in Malawi, and adult patients in Nigeria.

FIGURE 3.4 School and health care quality varies substantially across villages



Sources: Andrabi et al. 2025; Das et al. 2022.

Note: Each panel shows the 20 percent–80 percent range (vertical line) and mean (dot) of health care provider competence and school quality across villages in India and Pakistan, grouped into 10 equal bins based on quality. Health care provider competence is computed using item response theory on the ability of a provider to diagnose and treat tuberculosis, preeclampsia, diarrhea, and dysentery. School quality is measured according to school value added. The sample in panel a includes 817 rural villages in the 19 most populous states in India (excluding New Delhi) that are representative of more than 90 percent of India's rural population based on the 1991 census. The sample in panel b includes 112 rural villages in three districts in Punjab, Pakistan, that are representative of more than 60 percent of the provincial population by the time of the survey in 2003. Bins are constructed using village averages. TB = tuberculosis.

Neighborhoods determine job opportunities in a local economy

How much does the place where people are born, grow up, and live matter in productivity and life income? In the United States, half the variation in mean earnings across commuting zones is attributable to place effects.[6] People cannot accumulate human capital at work if they do not work, and higher incomes allow parents to make more investments in children. So, differences in employment and earnings translate into large differences in future human capital.[7] In addition, local unemployment increases the proportion of single-parent households, harms mental health, raises the likelihood of substance abuse, and increases crime, all factors that result in less human capital accumulation.[8]

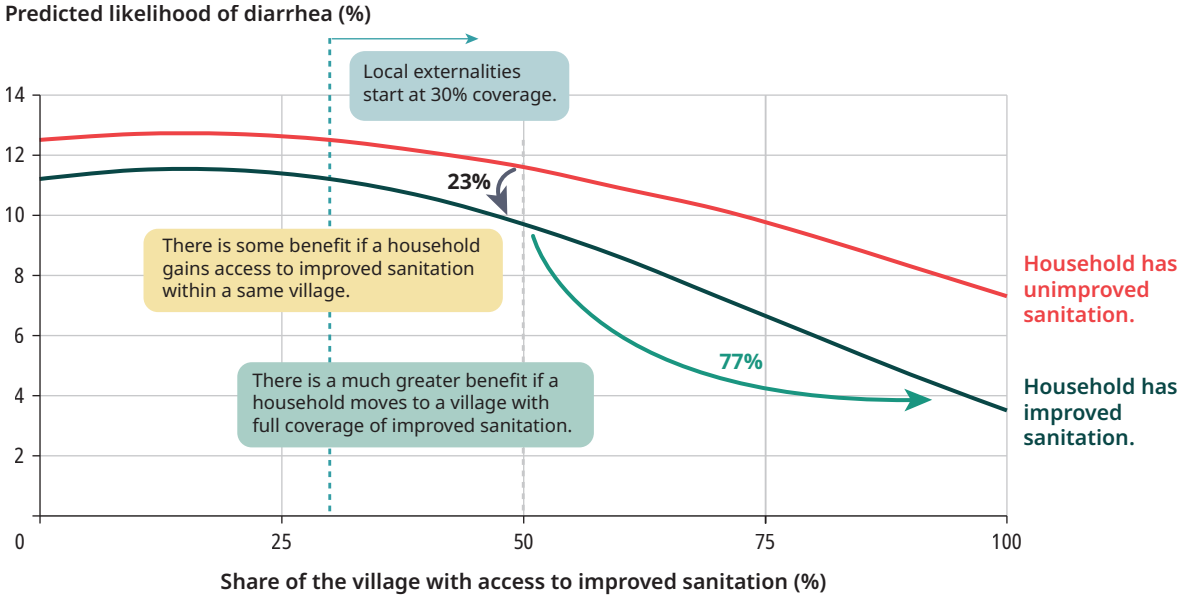
Neighborhoods determine the exposure to environmental conditions

There are large differences across neighborhoods in air quality, access to clean water and sanitation, and waste disposal. Individuals may take protective measures, such as using masks or air filters, but local environmental conditions

and community behavior may matter more than individual action. An individual is less likely to become ill if others nearby are not ill. Poor water, sanitation, and hygiene infrastructure contributes to the spread of waterborne diseases, increasing childhood illness and mortality.[9]

Figure 3.5 illustrates the health benefits of sanitation in India. It shows that reductions in diarrhea in households with improved sanitation are quite modest unless others in the village also have access to improved sanitation. Similar patterns have been reported in Indonesia, Mali, and Tanzania, where overall child health gains occur only if village sanitation coverage reaches 50 percent.[10] The benefits are not limited to health. In Indonesia, for example, children living in open defecation–free communities during their first two years of life are more than 10 percentage points less likely to be stunted, and they exhibit higher cognitive test scores than children in communities where all other households defecate in the open.[11]

FIGURE 3.5 Village sanitation coverage is key to controlling waterborne disease in India



Source: Original figure for this publication, based on Andrés et al. 2017.

Note: The figure plots the predicted likelihood of diarrhea prevalence across different shares of village coverage. The vertical dashed line at 30 percent marks the threshold at which local externalities begin to emerge. The vertical dashed line at 50 percent is a reference line for the decomposition example of a household in a village at 50 percent improved sanitation and a household that moves from such a village to a village at 100 percent improved sanitation. The arrows and highlighted percentage labels are associated with these examples.

Exposure to pollution leads to worsening health outcomes, impairments in cognitive development, declines in long-term educational attainment, and rises in the probability of poverty among adults who, as children, have been so exposed.[12] In Mexico, for instance, exposure to lead emanating from industrial activities restricts cognitive development and school performance among children residing close to the factories emitting the toxins.[13] Children attending a school 1 kilometer farther from areas polluted with toxic waste in Chile exhibit significantly higher mathematics and language scores than children living closer.[14] The lifetime cost associated with each affected child is estimated at more than US$60,000. In India, children living near a coal plant are 0.1 standard deviations shorter than unexposed children, and, the closer they live to the coal plant, the larger is the observed effect.[15] Data linked to more than 2,000 industrial mines in 26 African countries show that, after a mine opens in a river watershed, there is a 25 percent rise in child mortality rates in villages downriver relative to villages upriver.[16]

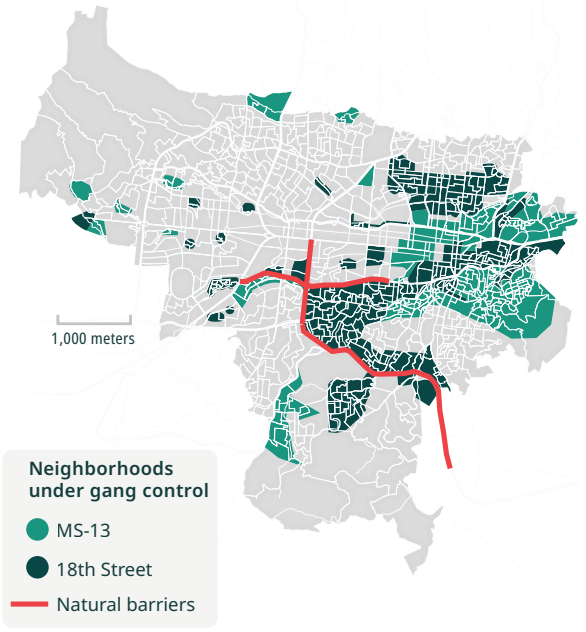
Neighborhood effects on human capital: Social dynamics and interaction

Neighborhoods are a basis of social dynamics. Decisions to focus on studying, stay in school, seek medical care, find a good job, or commit a crime are influenced by interactions with friends, peers, classmates, coworkers, and professional contacts. Often, these interactions occur in neighborhoods. In Chile, potential college applicants who are eligible for a student loan are significantly more likely to attend and complete university if their closest neighbors were also eligible for a student loan and enrolled in university.[17] In India, exposure to women's leadership in village councils influences the career aspirations and educational attainment of adolescent girls.[18]

In similar fashion, a local environment where there is widespread violence can depress human capital. This is evident in historical data on San Salvador, El Salvador, where gangs restricted mobility, limited the access of residents to better job opportunities, and substantially reduced secondary-school graduation rates (refer to map 3.1 and figure 3.6). Similarly, in Peru, children who grew up in villages where coca was cultivated, typically to produce cocaine, and who were exposed at an early age to illegal labor markets were around 26 percent more likely to drop out of school to participate in illegal farming.[19]

In sum, neighborhoods not only shape the quality of schools and health services and the access of individuals to them, but also expose individuals to localized conditions, such as environmental factors, infrastructure quality, safety, and social cohesion, that have a substantial impact on human capital accumulation.

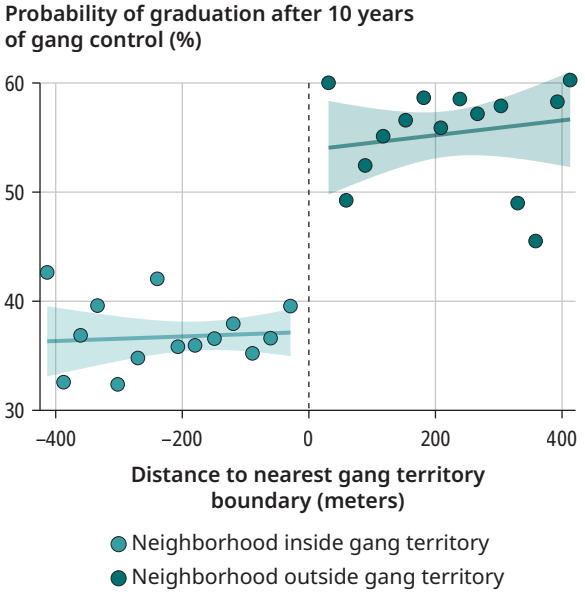
MAP 3.1 Gang control, by neighborhood, San Salvador, El Salvador



Source: Melnikov et al. 2025.

Note: Neighborhoods under the control of two of El Salvador's most prominent gangs, Mara Salvatrucha (MS-13) and Barrio 18 (the 18th Street Gang), are highlighted. A major government crackdown launched in 2022 drastically reduced crime, but dramatically increased the incarceration rate in El Salvador.

FIGURE 3.6 Probability of secondary-school graduation, by gang territory, San Salvador, El Salvador



Source: Melnikov et al. 2025.

Note: Negative distance values indicate individuals living inside gang territory. Positive values indicate individuals living outside gang territory.

Policy implications

This chapter highlights that neighborhoods are important in human capital not only because of the schools and health care they provide, but also because of the community, safe streets, clean environment, and job opportunities they offer. While improving schools and clinics in struggling neighborhoods is necessary, it may not be sufficient if other problems, such as violence and pollution, are holding back human development. Some of these challenges are interconnected and require coordinated solutions across the entire neighborhood as a unit.

What can be done? Policy should provide resources and incentives to enhance the quality of services, the environment, and the social capital in struggling neighborhoods. From a human capital perspective, this requires three concrete approaches (refer to table 3.1).

TABLE 3.1 Human capital policies for struggling neighborhoods

Policy approach	Initiatives
Improving service quality	• Financial incentives to encourage local governments to improve outcomes in low-performing facilities • Investments in and support for qualified staff to serve in remote communities (for example, community health workers)
Improving environmental conditions that affect human capital	• Joint program design and targeting across sectors that focus on human capital improvement as a shared priority • Programs that reduce air and water pollution and improve waste collection • Programs that reduce crime and violence in neighborhoods
Improving social capital	• Programs that foster positive social interactions • Mobilization of local actors to ensure relevance, accountability, and collective action • Reductions in neighborhood violence

Source: Original table for this publication.

Improving service quality: Policies implemented in the same way everywhere can still lead to substantial inequality in the access to good schools and health care. Some policies must be spatially targeted to allocate resources and services to fill gaps.

Improving environmental conditions that affect human capital: Struggling neighborhoods often lag in multiple dimensions, including air pollution, contamination associated with inadequate waste disposal, and inadequate access to clean water and sanitation. These shortcomings may depress human capital accumulation. Moreover, policies to improve environmental conditions are frequently associated with positive local externalities. This underscores the importance of acting at the neighborhood level.

Improving social capital: Neighborhood social dynamics can be used to enhance policy effectiveness. Social dynamics—norms, peer effects, and exposure to role models—shape the incentives for individuals to invest in education, skills, health, and work, thereby directly influencing human capital formation. They are also a key factor if collective action is needed to achieve human development goals.

Making progress in human capital, whether by improving service quality, environmental conditions, or social capital, requires policy makers to think about neighborhoods in a comprehensive manner.

Creating incentives for local governments to improve lagging schools and clinics

Incentivizing and equipping local governments to improve education and health outcomes in neighborhoods served by underperforming facilities may be an

effective policy. Such an approach was successfully implemented in the state of Ceará, Brazil, in the early 2000s. The state government focused on lagging areas and relied on a results-based financing system as part of a broader national education reform. Anchored in regular student assessments and performance-based funding, the system motivated municipalities to prioritize advances in learning. Stakeholders in Ceará aligned the mechanism with an equity agenda. Thus, schools in disadvantaged neighborhoods received additional technical support and were rewarded if they made progress. Low-performing school principals were paired with peers from more well performing schools in similar socioeconomic settings. Local education teams also received technical assistance tailored to the needs of their schools and communities. By concentrating on enhancing the quality of services in these underperforming areas, the authorities in Ceará reduced spatial disparities.[20]

Beyond promoting equity, targeting lagging neighborhoods may also be more efficient. Consider two hypothetical villages. Village A has one of the best health facilities in the country, and its residents are generally healthy. Village B has one of the worst health facilities in the country, and its residents experience poor health outcomes. While investing additional resources in village A might lead to marginal improvements, the potential for impact is limited because residents are already receiving adequate and timely care from qualified professionals and have access to vaccines and essential medicines. In village B, however, even modest investments would probably lead to substantial health gains. Providing basic services such as vaccinations or access to a doctor can dramatically reduce preventable illnesses and improve early treatment before health problems become severe. Raising the standard of care in village B may also be more feasible. Policy makers may replicate initiatives that have already produced good results in places such as village A. Targeting underperforming neighborhood schools or health centers, therefore, not only enhances equity, but also raises the likelihood of propelling these communities closer to their production possibility frontier, that is, their full potential.

Investing in and supporting staff to serve in remote communities

Lagging neighborhoods are often in remote rural villages. Targeting these areas through sustained investment in and support for professional staff can help deliver better services. In health care, training and deploying community health workers have been shown to be effective in enhancing health outcomes in remote villages, including by reducing malaria, asthma, and infant and child mortality and by improving maternal health, breastfeeding rates, and child nutrition.[21] In Sub-Saharan Africa, community health programs delivering curative treatments for malaria, diarrhea, and pneumonia have achieved significant reductions in child mortality, especially if they are combined with other preventive measures.[22]

In education, financial incentives and behavioral strategies targeted at teachers have been effective in expanding recruitment and reducing turnover in schools facing difficulties in attracting staff, while also increasing teacher quality.[23] Programs offering nonfinancial support to teachers in remote areas have also yielded positive outcomes. For example, the standardization of pedagogy and school management have produced positive results on learning in Kenya and elsewhere.[24] Combining standardized lesson plans with paraprofessional teachers delivering supplementary after-school classes and frequent monitoring has also generated substantial learning gains among children in rural villages in The Gambia and India.[25] Together, these examples show that well-designed community health worker and teacher policies can play a critical role in improving education and health in underserved and remote communities.

Mobilizing local actors to ensure relevance, accountability, and action

Policy makers can enhance the impact of health and education services by working closely with key local actors, such as community members, parents, school committees, and health user groups, to monitor services and hold providers accountable. If key actors within a neighborhood are informed and organized, they are well positioned to spot problems and advocate for better results.[26] For instance, providing local actors and communities in Uganda with information about the poor quality of health services and facilitating meetings between them and providers reduced provider absenteeism, increased utilization, and improved health outcomes.[27] Similarly, providing school and child test scores to communities in Pakistan led parents to choose better schools, and it led schools to strive to be more competitive and efficient, resulting in higher test scores, lower private school fees, and greater enrollment.[28] In some cases, however, programs that seek to mobilize local actors and empower communities fail to meet their objectives because of design flaws, elite capture, limited capacity, or unintended social consequences. For instance, in India, village education committees that sought to improve school quality through oversight had no impact on community involvement, teacher effort, or learning outcomes because the process was dominated by elites, while other committee members had limited authority and capacity.[29] Such examples show that neighborhoods are not merely the places where people live. They may also be powerful platforms for improving public service delivery.

Accounting for local externalities and general equilibrium effects

Some interventions are more effective if they are adopted widely in a community, such as vaccinations, deworming, or removing stagnant water to prevent malaria.[30] This is because they benefit not only those people who are directly targeted, but also individuals in close proximity who benefit from the lower rate of illness and disease. In practice, this means that these types of interventions need to target the neighborhood as a whole.

Consider again the case of India illustrated in figure 3.5. Imagine a policy that aims to reduce child diarrhea through improved sanitation. The effect of the policy on a particular household would be a 12 percent reduction in the incidence of diarrhea if no one else in the village has improved sanitation, compared with a 32 percent reduction in a village that has reached full coverage. This shows the large difference in policy effectiveness based on community-wide adoption. Increased benefits from wider coverage can also encourage individual households to adopt improved sanitation, creating a positive reinforcement loop.[31] Programs with strong neighborhood effects should prioritize achieving high coverage within selected communities to maximize impact and efficiency. Unlike traditional models that favor spreading investments thinly, the concentration of resources in fewer areas can yield greater returns because collective uptake enhances outcomes.

Policies that account for broader market responses within a neighborhood or village—that is, local general equilibrium effects—can also substantially amplify the overall impact. For instance, in Pakistan, providing grants to all public schools in a village spurred competition, prompting private schools to improve quality and raising student test scores across both types of schools, making the program 85 percent more cost-effective than another program variant that provided grants to a single school in a village.[32] Similarly, in rural villages in Mexico, an in-kind transfer program that supplied basic food items to poor households drove down the prices of transferred food items by 4 percent by increasing the availability of food items in the market. This generated an extra indirect transfer to consumers of about 14 percent of the direct transfer.[33] As this demonstrates, policies can leverage local market responses to increase their impact.[34]

Making human capital gains a shared priority in program design and targeting

Maximizing the impact of human development policies requires deliberate coordination across sectors. Such coordination is often most effective if carried out within neighborhoods. If actors in local education, health care, and social protection coordinate with infrastructure, transport, and urban planning teams, interventions can be more effective, equitable, and sustainable. For instance, designing transport systems and policies to promote safety within the context of human development goals—such as ensuring safe, affordable, and reliable connections to schools, health clinics, and workplaces—can remove critical access barriers. In Chile and Mexico, investments in transportation infrastructure allowed some families to send their children to better schools.[35] In Kenya, better roads have been linked to improved health service delivery because they have helped attract more highly qualified staff and eased supply logistics.[36] Similarly, in El Salvador, the Safe Schools Program reduced dropouts and gang recruitment by placing local police officers near schools during arrival and dismissal times.[37] These examples underscore the importance of integrated neighborhood planning to help ensure that

local actors and agencies across sectors work together to improve human capital outcomes.

The most effective way to support human capital accumulation may sometimes involve prioritizing a sector that is not traditionally the focus of social policy. A compelling example emerged during consultations for this report with education authorities in Rio de Janeiro. In Brazil, all graduating secondary-school students are required to take a national college entrance examination, which is administered on designated days. In the favelas of Rio de Janeiro, however, police operations targeting criminal groups can sometimes coincide with examination dates, creating serious safety risks that prevent students from reaching test centers and potentially derailing their chances of gaining access to higher education. Only after education authorities had coordinated with law enforcement to avoid operations during examination days could students safely sit for the tests, demonstrating how aligning security policy with human development goals can sometimes remove critical barriers to educational opportunity.

Delivering programs that foster positive social interactions

Providing opportunities for positive neighborhood interactions has been beneficial among some at-risk populations, such as youth or adults vulnerable to violent behavior. Various school-based group counseling, mentoring, and cognitive behavioral therapy programs have resulted in a reduction in violence and antisocial behaviors and improvements in educational outcomes in violent contexts, including in Chicago, Liberia, and San Salvador.[38] These programs are relatively low in cost, but they have all been delivered by local community members, such as school tutors, mentors, and the staff of local nongovernmental organizations, who were in a unique position to connect and engage with youth at risk of violent behavior. Similarly, a successful program in Türkiye among academically strong but socially disruptive adolescents reduced their antisocial behavior and assisted them in gaining admission to more highly selective secondary schools, thereby improving schools and communities.[39]

Conclusion: Putting it all together

The place where people live—their neighborhood or village—plays a crucial role in shaping human capital outcomes and should be central to policy design. Beyond individual or household traits, neighborhood conditions influence access to quality education and health care, exposure to environmental risks, the availability of jobs, and social dynamics. In many cases, neighborhood characteristics explain a large share of the differences in earnings, educational attainment, and health outcomes observed across communities.

Recognizing the neighborhood as a central space for human capital development has important implications for policy. In some cases, improvement in outcomes requires that the entire neighborhood is targeted, not just individual families or

service facilities. For instance, interventions focusing on sanitation, public safety, or pollution control are only effective if they are implemented broadly, with collective participation. In other cases, certain neighborhoods may need to be prioritized because they are unable to deliver basic quality services on their own. Even well-designed national policies can lead to large disparities in school and health care quality if local conditions are ignored. A neighborhood-focused approach encourages coordination across traditionally separate sectors. Only if they work together can sectors adequately address the complex and interrelated barriers that limit human capital accumulation.

Notes

1. Chyn and Katz (2021); Sharkey (2016).
2. Britto et al. (2025); Chetty and Hendren (2018a), (2018b); Chetty et al. (2026).
3. The evidence that neighborhoods causally affect human capital outcomes is provided by studies that isolate place effects (that is, the benefits deriving from better services, environments, and networks) from sorting effects (that is, households self-selecting into neighborhoods). Researchers rely on three main strategies, as follows: (a) rich administrative data to compare children—often siblings—who move at different ages; (b) randomized relocation through programs such as housing lotteries (for example, the Moving to Opportunity for Fair Housing randomized social experiment in the United States); and (c) forced relocation associated with events, such as natural disasters or housing demolitions, which offer quasi-experimental variation.
4. Weiss et al. (2020). However, not everyone has access to a motor vehicle. Only 57 percent of the world population is within a 60-minute walk of a health facility. The shares are smaller in low-income countries and among households at lower socioeconomic status within each country. Prioritizing access is therefore still relevant in many places.
5. Andrabi et al. (2017); Das and Hammer (2007); Das and Mohpal (2016).
6. Card et al. (2025).
7. Moretti (2024).
8. Autor et al. (2019); Diette et al. (2018); Pierce and Schott (2020).
9. Lepault (2023).
10. Cameron et al. (2022).
11. Cameron et al. (2021).
12. Aizer and Currie (2019); Clay et al. (2025); Heissel et al. (2022); Persico (2024); Persico et al. (2020).
13. Tanaka et al. (2022).
14. Rau et al. (2015).
15. Vyas (2025).
16. Gittard and Hu (2024).
17. Barrios-Fernández (2022).
18. Beaman et al. (2012).
19. Sviatschi (2022).
20. Loureiro et al. (2020).
21. Nkonki et al. (2017).
22. Christopher et al. (2011).
23. Ajzenman et al. (2026); Evans and Mendez Acosta (2023).

24. Gray-Lobe et al. (2022).
25. Eble et al. (2021); Lakshminarayana et al. (2013).
26. World Bank (2003).
27. Björkman-Nyqvist and Svensson (2010).
28. Andrabi et al. (2017).
29. Banerjee et al. (2010).
30. Ahuja et al. (2017).
31. Deutschmann et al. (2024).
32. Andrabi et al. (2024).
33. Cunha et al. (2019). Caution is warranted because the effects had the opposite implication for food-producing households in the recipient village. Overall welfare effects may thus depend on the composition of the local economy.
34. Local market responses can sometimes also work against policy objectives. For instance, in the Dominican Republic, the expansion of public schools resulted in the closure of some private schools of relatively higher quality (Dinerstein et al. 2020). In other contexts, if a large share of households in a village receive cash transfers, increased demand for locally traded goods can drive up prices, including food prices, making essential nutrition less affordable for transfer-ineligible households. In the Philippines, this dynamic led to higher malnutrition and stunting rates among children not eligible for cash transfers (Filmer et al. 2023).
35. Dustan and Ngo (2018); Herskovic (2020).
36. Becerra Luna et al. (2022).
37. Castro et al. (2025).
38. Blattman et al. (2023); Dinarte-Díaz et al. (2024); Heller et al. (2017).
39. Alan and Kubilay (2025).

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Chapter 4

Human Capital Accumulation at Work

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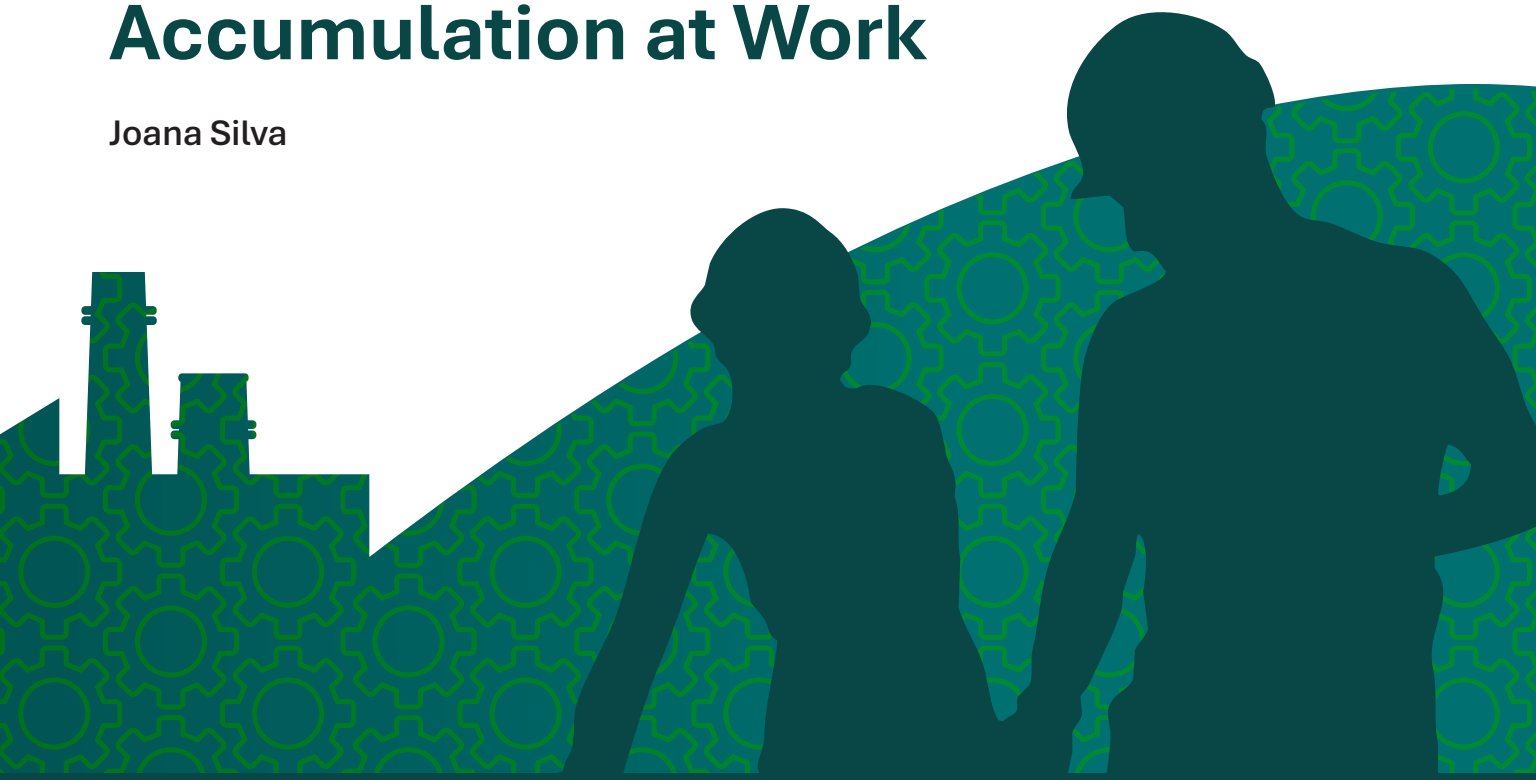

Summary

Human capital formation does not stop at school. It continues at work. Work is not only where skills are used, but also where they are built—through practice, exposure to technology, interactions with peers and managers, and training.

This chapter examines how people learn at work, how much skill development occurs in the workplace, why investment in human capital in these settings is low, and what policies can help. It shows that learning at work varies systematically across job types. The same increase in experience generates only about half as much learning among the self-employed relative to wage workers, and, among wage workers, there is twice as much learning in large firms as in small firms. One challenge is that around 70 percent of workers in low- and middle-income countries are employed in jobs with limited learning potential, such as small-scale agriculture, low-quality self-employment, and microenterprises. Unlocking learning in current jobs and expanding the availability of jobs associated with substantial human capital formation are therefore essential to raising productivity and incomes. A second challenge is the misallocation of talent. About 50 percent of women are out of the labor force, and 20 percent of youth are neither working nor in education. Removing barriers to their participation in labor markets would enable more skill development at work.

These challenges call for policies that expand learning on the job, ease transition to employment, and create more jobs with strong learning potential, supported by broader reforms that reduce market failures and misallocation.

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The workplace matters

People accumulate significant human capital at work through on-the-job experience, training, and advancing to jobs with stronger potential for learning (refer to table 4.1). New evidence indicates that work experience and education may be equally important in explaining income gaps between low-income, middle-income, and high-income economies.[1] Learning at work is critical for countries to move up the value added ladder, sparking productivity and innovation that lead to job creation. Together with education, learning at work shapes what countries produce and how they produce it.

The notion that learning at the current job occurs solely through explicit training is incorrect. Learning occurs through on-the-job practice (as one performs a task, one learns how to improve the performance), exposure to technology, the acquisition of more responsibilities, and interactions with peers and managers. This shapes both technical and soft skills, such as teamwork and decision-making. Joint tasks with coworkers foster collaboration, and the quality of workplace interactions influences knowledge diffusion and productivity.[2]

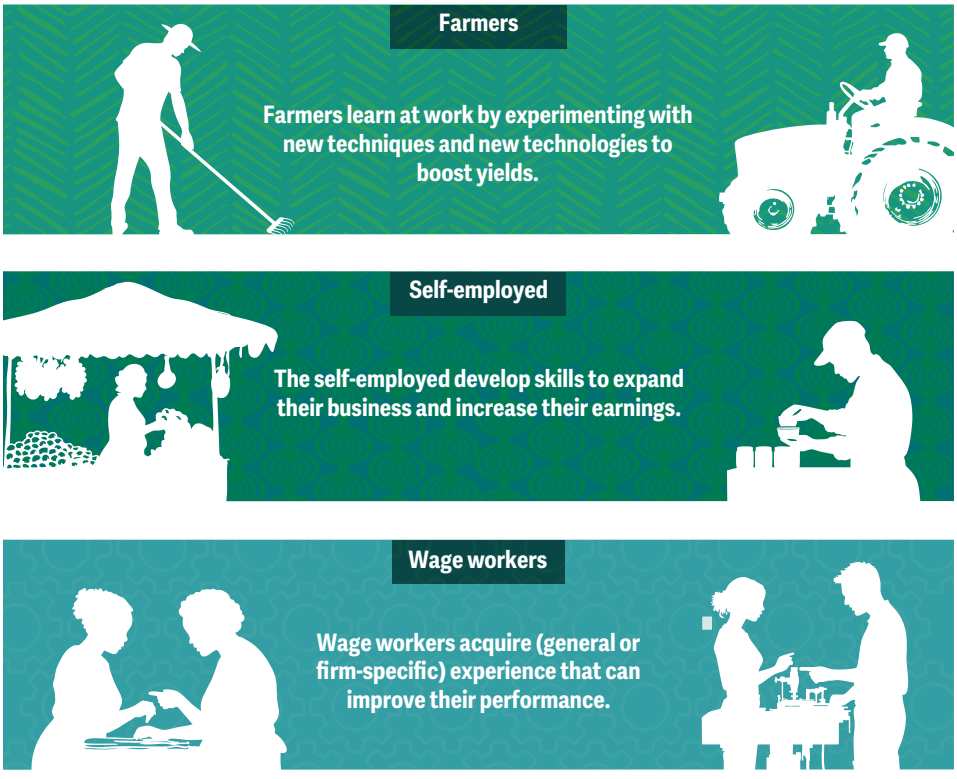
Building human capital varies by type of job and workplace (refer to figure 4.1). Among farmers, this means learning new agricultural techniques or improving current ones to boost yields. Farmers learn not only how much input to use, such as fertilizer or improved seeds, but also how to use more productive technologies. Among the self-employed, building human capital involves acquiring know-how and business skills that enhance the production, profitability, and sustainability of their businesses. Among wage workers, it entails acquiring experience that can improve performance. This knowledge can be general (and therefore transferable) or firm-specific (and therefore lost if a worker changes firms).

TABLE 4.1 How human capital accumulates at work

Channels	Sources of learning
Be employed.	Participate in the workforce (no one can learn on the job if they do not have a job).
Learn at the current job.	*On-the-job learning:* Learn through practice, technology, and peers and managers. *Explicit training:* Participate in training programs.
Move to a new job with stronger potential for learning.	Advance to a job entailing more learning and greater productivity.

Source: Original table for this publication.

FIGURE 4.1 How learning occurs in various contexts



Source: Original figure for this publication.

Learning mechanisms also vary by job. Farmers refine techniques through trial and error, peer exchanges, and extension services. The self-employed build skills through hands-on experience, business networks, and structured training. Wage workers learn by practicing advanced techniques, adopting technology, solving problems, engaging with peers and managers, and receiving formal or informal training.

What limits human capital accumulation at work?

There are three main challenges in building human capital at work in low- and middle-income countries: (1) low learning through jobs, (2) low labor force participation, and (3) a shortage of jobs that entail high skill development at work (that is, high human capital jobs).

Low learning through jobs. On-the-job learning is often more restrained in these countries. When businesses lack resources, they may invest little or nothing in workplace learning. Market failures, such as limited access to credit or uncertain business conditions, further constrain investment. Even when resources are available, businesses may underinvest in training if the expected returns are low. One key reason is that trained workers may leave the firm before the investment is

recouped, especially in high-turnover environments, which are common in low- and middle-income countries.[3] Another reason is the absence of complementary investments and assets. Skills and technology are complements, and exposure to the latter accelerates skill development at work, particularly among more educated workers.[4] Weak management may also be a constraint. When management quality is low, workers learn less from supervisors, and the returns to training diminish.[5] The same holds for coworkers. When peers lack human capital, opportunities to learn from them are limited. Learning from peers and managers at work also requires an organizational structure and information flows that enable such interactions (refer to table 4.2).

The constraints are even greater in firm-sponsored external training. Many businesses consider training an expense rather than an investment. A lack of expertise and resources, combined with the lack of high-quality, relevant, and flexible programs, often because of coordination failures and misaligned incentives, discourages participation. In small firms, where every worker matters, releasing staff for training is especially challenging. Even if resources are available, which is more unlikely in economies dominated by small firms, training systems often fail to deliver the skills firms need, resulting in low returns.

Low labor force participation. Many women and young people are not in education, employment, or training (NEET), limiting human capital accumulation through work. If individuals are matched with jobs for which they lack the required skills, or if high-talented individuals are not matched to roles that foster learning, aggregate human capital accumulation will be lower. According to recent estimates, reductions in the misallocation of talent, largely driven by women starting to work, accounted for 20 percent to 40 percent of US economic growth between 1960 and 2010.[6] Recent analysis focusing on the effects of removing barriers to women's entrepreneurship in India shows that the labor force participation costs among women are about twice what they are among men.

TABLE 4.2 Opportunities for human capital accumulation, by job type

Job type	Learning through practice	Technology exposure	Learning from peers and managers	Explicit training
Out of the labor force	None (no job, no experience to apply)	None	None	None
On-farm employment	High potential, but current setup limits scope	Low technology use	Limited peer interaction	Dependent on extension services
Self-employment	Limited tasks and innovation; requires business expansion for growth	Mostly low-skill manual jobs	Fewer or no peers from whom to learn	Dependent on access to business network
Wage employment	More diverse tasks; career progression opportunities	Varies; more intensive in large firms	Dependent on manager quality, internal organization, workforce composition	Dependent on profitability

Source: Original table for this publication.

Removing these barriers would double female labor force participation in India and increase real GDP by 43 percent.[7]

A shortage of jobs that entail high skill development at work. A high human capital job is one in which substantial skill acquisition takes place. These jobs are typically wage jobs in the modern sector. As the subsequent section will show, the problem is that most workers in low- and middle-income countries are not working in these jobs.

In what follows, we examine what is constraining learning at work in low- and middle-income countries.

Employment is concentrated in jobs in which less learning occurs

Where do people work? In low- and middle-income countries, around 70 percent of workers are employed in small-scale agriculture, low-quality self-employment, or microfirms (fewer than five workers). These jobs typically offer limited opportunity for on-the-job learning. The pattern is even more pronounced in low-income countries, where these types of jobs employ about 80 percent of workers, while only 20 percent work in positions that support learning on the job.

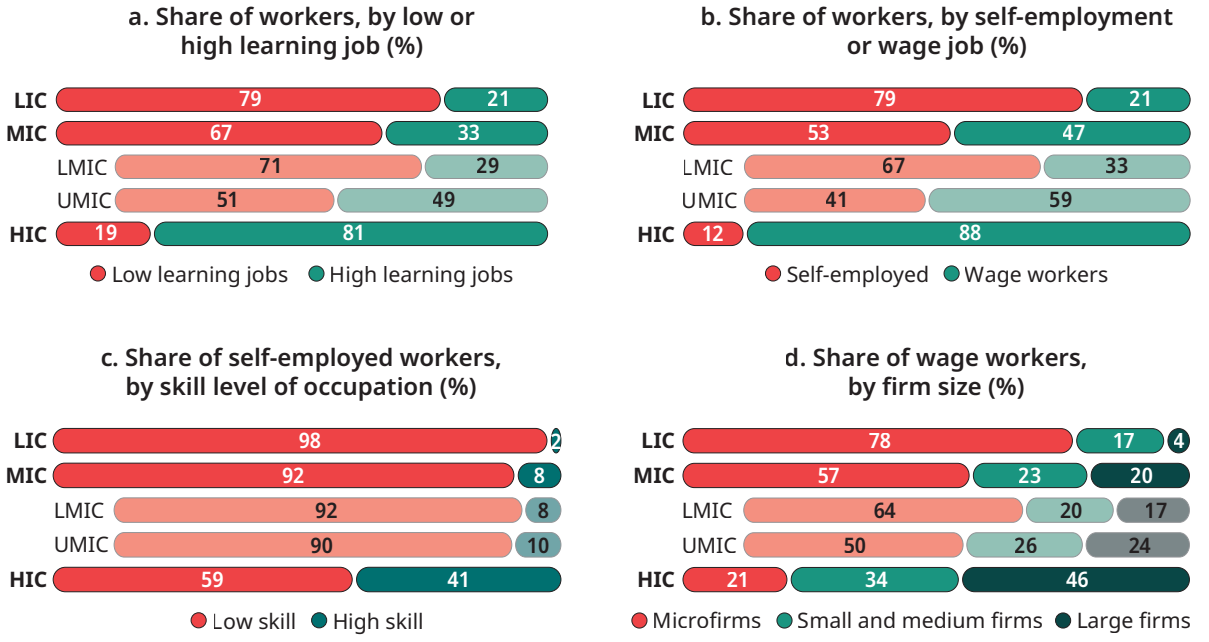
In high-income countries, the pattern is nearly reversed: approximately 80 percent of workers hold high-learning jobs, while only 20 percent are in jobs that offer little opportunity for learning at work (refer to figure 4.2, panel a).

In terms of occupations, in low- and lower-middle-income countries, 71 percent of all employed people work in agricultural, domestic, or manual occupations. Only 16 percent are clerks or sales or services workers, and 13 percent are technicians, professionals, or managers. In contrast, in high-income countries, the shares are reversed, with the latter two groups making up 71 percent of total employment.

Self-employment is prevalent in low- and middle-income countries (79 percent and 53 percent, respectively) and significantly higher than in high-income countries (12 percent).[8] Within middle-income countries there are large differences. In lower-middle-income countries, 67 percent of workers are self-employed, but this share drops to 41 percent in upper-middle-income countries (refer to figure 4.2, panel b).

Most self-employment in low- and middle-income countries takes place in low-skill occupations, such as farmers working on small plots or street vendors selling phone chargers, rather than high-skill occupations, such as doctors in private medical practice. In low- and middle-income countries, more than 90 percent of self-employed workers are in low-skill employment (many in subsistence farming), while fewer than 10 percent are in high-skill employment (mostly self-employed professionals). Meanwhile, the share of the self-employed working in professional or other high-skill occupations in low- and middle-income countries is only about one-quarter that observed in high-income countries (refer to figure 4.2, panel c).

FIGURE 4.2 Most people are in jobs that offer little opportunity for learning at work



Source: Original figure for this publication, based on labor statistics of ILOSTAT (dashboard), International Labour Organization, https://ilostat.ilo.org/.

Note: Percentages refer to share of the employed population. Low-learning jobs include small-scale agriculture, low-quality self-employment, or microfirms. Low-skill occupations include clerical support workers; service and sales workers; skilled agricultural, forestry, and fishery workers; craft and related trade workers; plant and machine operators and assemblers; and elementary occupations. High-skill occupations include managers, professionals, technicians, and associate professionals. Microfirms are firms with up to five workers. Small and medium firms are firms with up to 50 workers. Large firms are firms with 50 or more workers. HIC = high-income country; LIC = low-income country; LMIC = lower-middle-income country; MIC = middle-income country; UMIC = upper-middle-income country. MIC = LMIC + UMIC. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

Evidence on Latin America shows that there is a marked decline in the likelihood of self-employment along the income distribution. The probability of self-employment is three times greater in the bottom (poorest) quintile of the income distribution than in the top quintile, whereas, in the United States, self-employment is slightly U-shaped over income, which means that both the lowest and highest earners are more likely to be self-employed.[9]

Most wage workers in low-income countries are employed in microfirms, an average of 78 percent, and, in middle-income countries, 57 percent (refer to figure 4.2, panel d). In sharp contrast, the share is only 21 percent in high-income countries. This reflects the underlying firm-size distribution. A disproportionately large share of firms in low- and middle-income countries are small, even after accounting for the differences in production structure across industries.[10] In Africa, small and informal firms, including self-employed workers and subsistence farmers, account for about

86 percent of all jobs and roughly 50 percent of economic output.[11] Meanwhile, large highly productive firms remain scarce.[12] Manufacturing employment in enterprises with fewer than 10 employees exceeds 50 percent in many African countries. It reaches 80 percent in Ghana. This compares with less than 5 percent in the United States.[13]

On-the-job learning by job type

Among the three main types of employment—farming, self-employment, and wage work—how much learning is occurring at work? Measuring learning on the job is not straightforward, as discussed in box 4.1, but much less of it happens in poorer countries than in richer countries.

Learning in on-farm employment is a known driver of growth in agriculture.[14] Yet, in poorer countries, a large productivity gap persists in agriculture relative to other sectors. Using plot-level data from the Living Standards Measurement Study, figure 4.3 illustrates the relationship between agricultural productivity—proxied by total factor productivity—and years of farm experience among smallholder farmers in six Sub-Saharan African countries. The evidence suggests that farmer productivity does not rise significantly with experience in these settings.

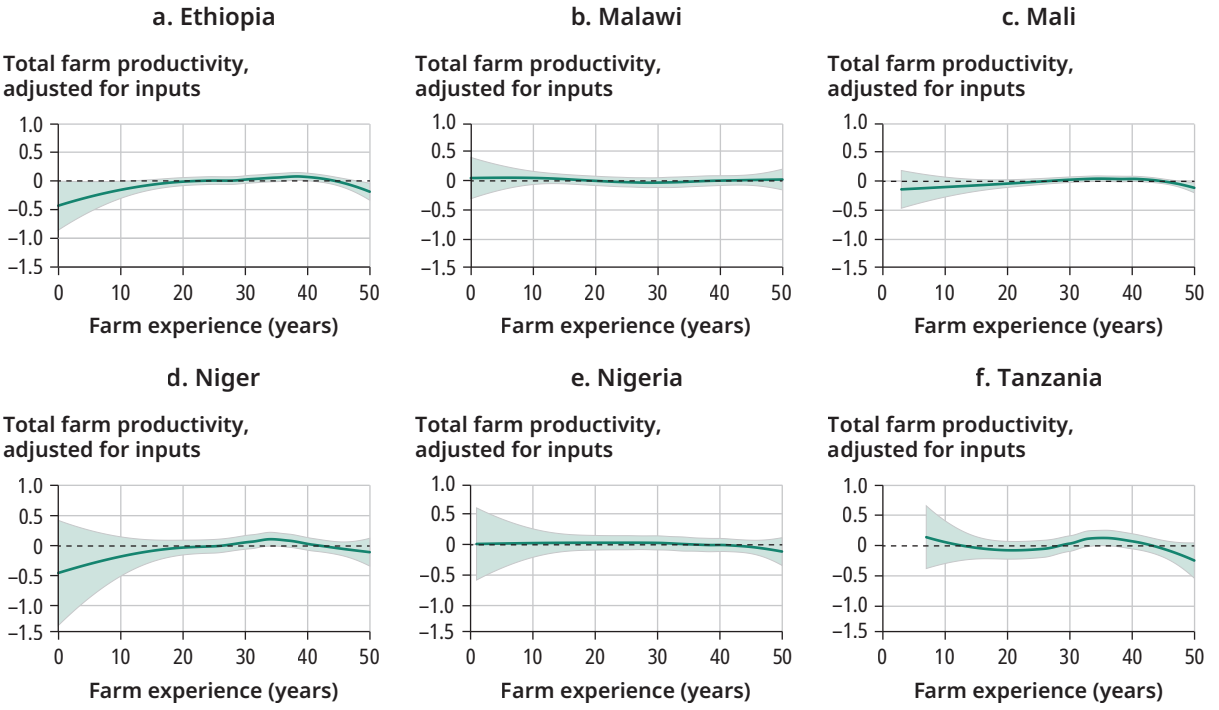
BOX 4.1 Measuring learning at work

How should learning on the job be estimated across types of jobs in the absence of direct measures of cognitive and noncognitive job skills? Ideally, researchers would use a measure that captures the progression of job-related skills. However, such data are not available in most countries. The literature therefore relies on indirect measures, such as improvements in productivity and yields among farmers, business practices, performance and profits (that is, output, net of input costs) among the self-employed, and wage growth among salaried workers.

The underlying assumption is that, while indirect, these measures largely reflect increases in the marginal product of labor, thereby capturing the skills and knowledge gained through experience on the job. Among farmers and the self-employed, studies proxy learning by tracking how revenues evolve, accounting for the fact that the incomes of farmers and the self-employed represent payment to labor income and capital income.[a] Among wage workers, studies use wage growth as an indicator of increases in the marginal product of labor, capturing skills and knowledge gained through experience. While this growth may not represent human capital accumulation in a narrow sense, it does signal improvements in labor productivity.

a. Gollin (2002).

FIGURE 4.3 Farmer productivity on small plots in Sub-Saharan Africa does not increase much with experience

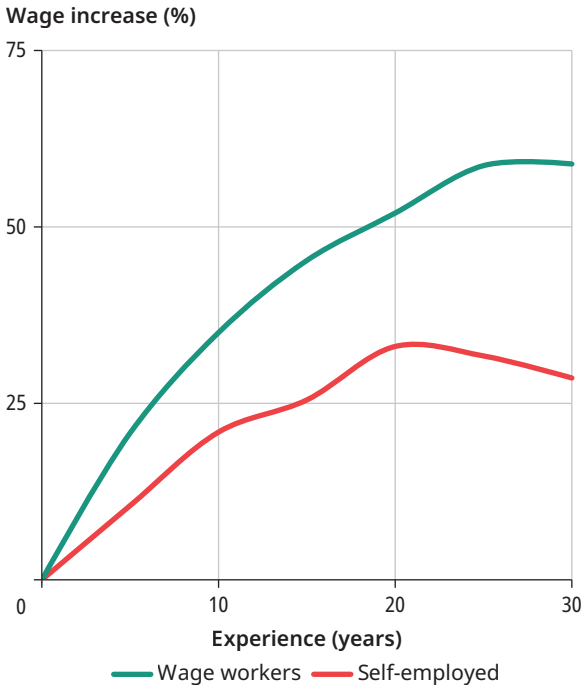


Sources: Original calculations for this publication, based on Bentze and Wollburg 2024; LSMS-ISA (Living Standards Measurement Study: Integrated Surveys on Agriculture) (dashboard), World Bank, https://www.worldbank.org/en/programs/lsms/initiatives/lsms-ISA.

Note: Productivity is measured using total factor productivity, estimated as the residual from a Cobb-Douglas production function, with log yield (kilograms per hectare) as the dependent variable. Regressors include inputs (capital, labor, land), plot, and manager characteristics. Plot sizes (small, medium, large) are defined by country-specific terciles of plot size distribution. The plot-level data are harmonized.

Among the self-employed, evidence indicates that returns to experience are limited in low- and middle-income countries. On average, in low- and middle-income countries, one additional year of self-employment experience yields a return of 1.4 percent, compared with 2.5 percent among wage workers. This means that the average increase in earnings that one additional year of experience generates among the self-employed is half that generated among wage workers (refer to figure 4.4). This pattern can be observed in cross-sectional data in which the wages of workers with different levels of experience are compared. It may also be observed in panel data on Brazil, China, and India when the same individuals are followed as they switch between wage work and self-employment (refer to box 4.2).

FIGURE 4.4 Returns to experience are lower among the self-employed than among wage workers



Sources: Original figure for this publication, based on data of GLD (Global Labor Database Repository), World Bank, https://worldbank.github.io/gld/README.html; I2D2 (International Income Distribution Database) (internal database, discontinued in 2020), World Bank; SEDLAC (Socio-Economic Database for Latin America and the Caribbean), https://www.cedlas.econo.unlp.edu.ar/wp/estadisticas/sedlac/.

Note: The figure shows estimated experience–wage profiles for working-age men grouped by potential experience. Hourly wages are total labor earnings, divided by hours worked. Returns are calculated in five-year experience bins, following Jedwab et al. (2023), using population weights. The results exclude high-income countries. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

BOX 4.2 Labor income grows more slowly during periods of self-employment or during work at small firms

Convincingly estimating the causal returns to work experience across various sorts of jobs is difficult because of selection. Workers with distinct skills, both observed and unobserved, may select into different kinds of jobs. Under these circumstances, it is not clear whether any observed differences in the returns to experience are driven by worker selection into jobs or by more learning in some types of jobs relative to others.

The best evidence on the amount of on-the-job learning that occurs across workplaces is supplied by data on the same workers as they change jobs over time.

(Box continues on next page)

BOX 4.2 Labor income grows more slowly during periods of self-employment or during work at small firms *(continued)*

This is most convincing because, in following the same workers, the associated estimates control for all fixed (time-invariant) characteristics that make some workers more productive than others.

Drawing on panel household surveys from China and India that repeatedly interview the same individuals, we estimate the wage returns to self-employment versus wage employment. Adapting Jedwab et al. (2023), we regress log hourly earnings on experience bins after partitioning each worker's potential experience into three mutually exclusive elements: years accumulated before the worker first appears in the panel (unobserved experience), tenure in wage jobs observed during the panel period, and tenure in self-employment observed during the panel period. By including the unobserved component alongside year fixed effects and education controls, the specification cleanly identifies the returns to additional time spent in wage employment relative to self-employment. In both countries we consider all employed workers (without occupational or sectoral restrictions) for whom we can trace experience—either as self-employed or wage worker—over time and classify them as self-employed or wage workers.

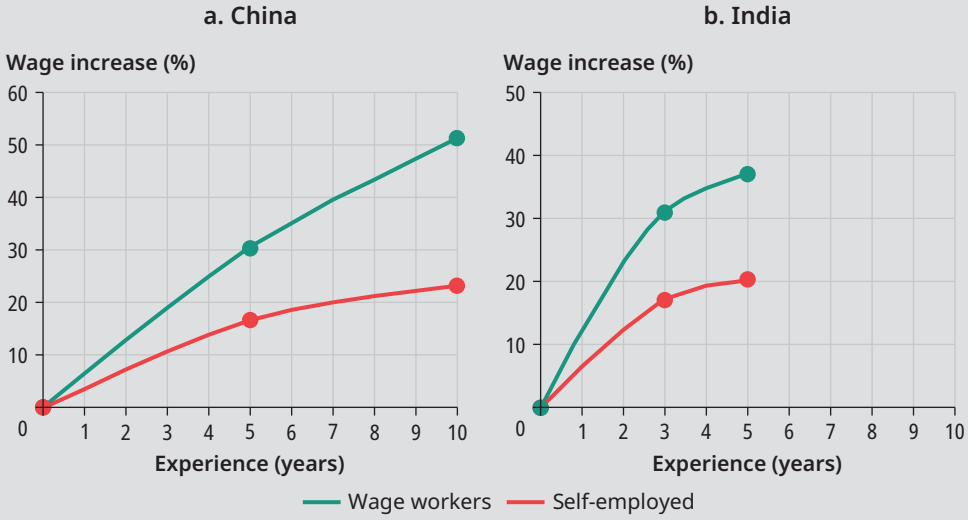
In both countries, the returns to experience during self-employment are substantially lower than those from wage work, controlling for year fixed effects, educational attainment, and unobserved experience (refer to figure B4.2.1). For wage work in India, the annualized returns to experience after 5 years are 6.5 percent. For the self-employed, the experience premium is roughly half as large, a 3.8 percent annualized return. In China, the annualized return to wage employment in the first 5 years is 5.5 percent, compared to 2.2 percent among the self-employed.

The same logic can be used to study how much on-the-job learning occurs if wage employees are employed in large firms, rather than small firms. Matched employer-employee data on Brazil shows that wages increase by twice as much if a worker is employed in a large firm rather than a small firm, but it also shows that moving from a small to a large firm leads to an immediate 10.5 percent wage gain. Thereafter, wages increase more rapidly for workers who moved, at an annual average rate of 3.3 percent, compared to 1.8 percent among workers who stayed in a small firm during the entire period.

(Box continues on next page)

BOX 4.2 Labor income grows more slowly during periods of self-employment or during work at small firms *(continued)*

FIGURE B4.2.1 Panel data confirm low returns to experience during self-employment in China and India

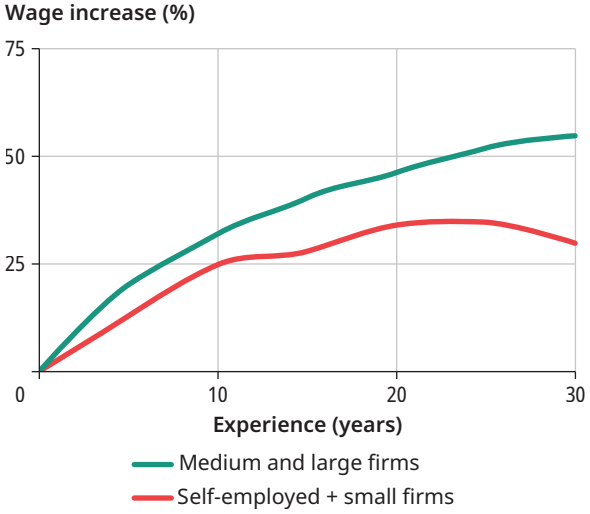


Sources: Original figure for this publication, based on data of CFPS (China Family Panel Studies) (dashboard), Institute of Social Science Survey, Peking University, https://www.isss.pku.edu.cn/cfps/en/; CPHS (Consumer Pyramids Household Survey) (dashboard), Consumer Pyramids$_{dx}$, Centre for Monitoring Indian Economy, https://consumerpyramidsdx.cmie.com/.

These patterns reflect a broader reality. Opportunities for learning through more complex tasks and from peers are limited because self-employed individuals often work in isolation, and, in low- and middle-income countries, most engage in low-skilled manual tasks. These constraints reduce the ability of the self-employed to convert learning into innovation and productivity gains, especially if business expansion is required to apply new skills.

Among wage workers in low- and middle-income countries, returns are lowest in microfirms, where most workers are employed, and highest in large firms. On average, the wage premium for experience in medium and large firms is twice as high as it is in small firms and self-employment (refer to figure 4.5). Relative to a job at a smaller firm, a job at a larger firm offers higher wages, more performance-enhancing experience, and more opportunities to apply the skills that are learned. Larger firms are more likely to adopt technology conducive to learning because they have greater access to lenders and investors, are able to access growth capital, and can compete for government contracts.[15]

FIGURE 4.5 Returns to experience are lower for the self-employed and wage workers in small firms than for wage workers in medium and large firms



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Note: The figure shows average wage differentials across seven experience bins for country subgroups, following Jedwab et al. (2023). It compares the experience profiles of workers in firms with more than 10 employees with the experience profiles in smaller firms and among the self-employed. The results exclude high-income countries. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

Firms provide few explicit training opportunities

In addition to the limited learning opportunities afforded by type of job and type of firm, explicit training opportunities are scarce in low- and middle-income countries. Only a small share of smallholder farmers have access to extension services, and, in most countries, the share of self-employed workers who have access to formal training is low.[16] Training is also infrequent among workers in small businesses.

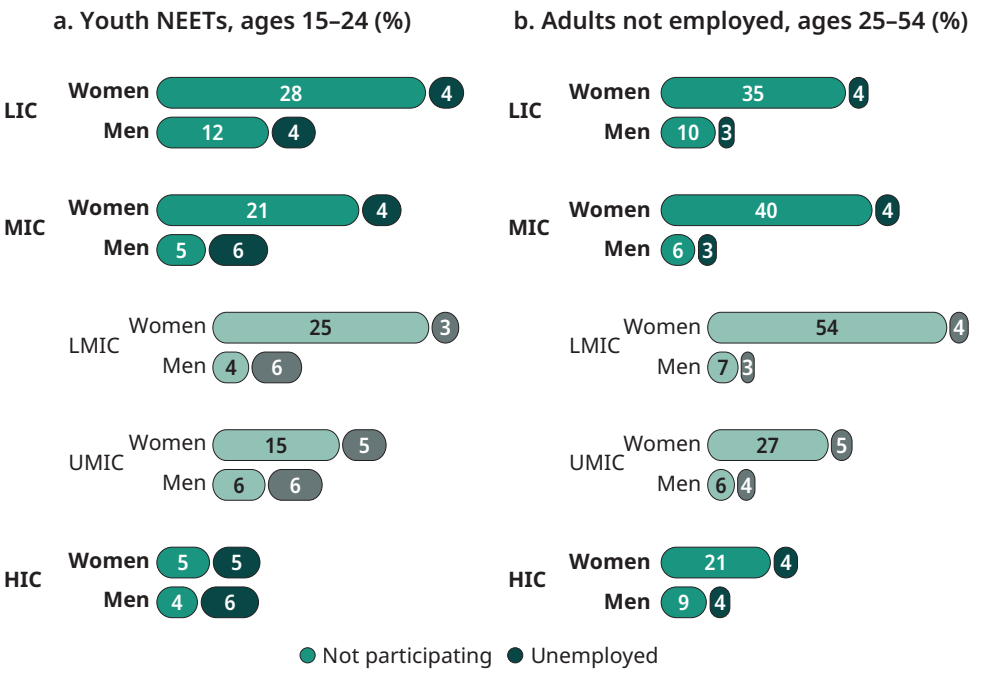
In practice, even among wage workers, any explicit training provided by firms is often limited in low- and middle-income countries. In low-income countries, only around 4.5 percent of firms provide training, while 9.3 percent of wage workers report that they receive such training. Comparable shares in middle-income countries are 18.2 percent and 30.3 percent.[17] Overall, in low- and middle-income countries, only 17 percent of workers receive explicit training provided by their firms.

Many women and young people are neither working nor studying

A high share of youth are NEET and therefore not accumulating human capital either in education or at the workplace. From a human capital perspective, this untapped potential represents approximately 20 percent of all individuals ages 15–24. In high-income countries, this share is around 10 percent (refer to figure 4.6, panel a). Regional disparities are significant; in some regions, such as the Middle East and North Africa, NEET rates reach nearly 29 percent.

Men and women NEETs face different challenges. While most women NEETs are out of the labor force (that is, not looking for work), men NEETs are more evenly split between nonparticipants in the labor force and the unemployed (that is, looking for work, but not in a job) (refer to figure 4.6, panel a). Systemic barriers limit the human capital accumulation that young people in low- and middle-income countries acquire at work. Some relate to individual factors, for example, low-quality education and a lack of skills that render individuals difficult to

FIGURE 4.6 Population not accumulating human capital through work



Source: Original figure for this publication, based on labor statistics of ILOSTAT (dashboard), International Labour Organization, https://ilostat.ilo.org/.

Note: NEETs refers to youth not in education, employment (paid work or self-employment), or training. HIC = high-income country; LIC = low-income country; LMIC = lower-middle-income country; MIC = middle-income country; UMIC = upper-middle-income country. For data by region and country, refer to the interactive figures online at https://humancapital.worldbank.org/en/building-human-capital-where-it-matters.

employ until they gain experience. Others relate to regulations, for instance, labor protections favoring older workers. Yet others relate to economic conditions generally, for example, the availability of few good-quality jobs.

Another source of untapped potential is adult women. Approximately 50 percent of working-age women in low- and lower-middle-income countries are not participating in the labor force, compared with 7 percent of men. In high-income countries, these shares are 21 percent and 9 percent, respectively (refer to figure 4.6, panel b). The regional levels vary considerably. In particular, the share of women out of the labor force is as high as 79 percent in the Middle East and North Africa and 63 percent in South Asia.

Preferences may contribute to the lower labor force participation of women, but the evidence suggests that institutional constraints are a major factor, including limited access to childcare, employer discrimination, and legal or regulatory restrictions, as are cultural factors and security concerns, including restrictive gender norms, unequal care responsibilities at home, and harassment during

commuting or at work, and economic barriers, such as gaps in education and skills and a lack of good job opportunities.[18]

Overall, the sum of evidence suggests that, while people may accumulate significant human capital at the workplace, few do so in low- and middle-income countries. Relatively few women are in paid employment. Many young people are neither studying nor working, and, among those young people who do work, a large share of employment is concentrated in low-quality jobs where little learning occurs. Most workers are in small-scale agriculture or low-quality self-employment, and, even among wage workers, most are in small firms that operate with low technology and minimal organizational capital and that rarely offer formal on-the-job training opportunities.

Policy recommendations

Traditionally, the workplace is considered a setting in which human capital is used. But under appropriate circumstances, it is also a place where a great deal of human capital is built through on-the-job learning and training. This chapter presented evidence that most people in low- and middle-income countries work in jobs that require little human capital, and, even if structural transformation creates more jobs with strong potential for learning at work, transitions take time. In the short and medium term, it is important to maximize the human capital potential of current jobs. How can learning on the job become a more powerful engine of human capital accumulation? Which policies promote more learning at work? The chapter also showed that a substantial share of people in low- and middle-income countries are not in the labor force, particularly women and young people who are NEETs. How can these populations join the labor force to start building their human capital at work?

More learning on the job

Governments spend billions of dollars every year on traditional forms of training provided by training institutions. Meta-analyses indicate that these programs yield positive, but only modest results. Employment gains are on the order of 2 to 4 percentage points. Returns are even lower among many large-scale government-run programs.[19]

Instead of taking responsibility for the provision of training programs, governments can offer incentives to firms to invest in job training, leaving the organization and management of the training to the firms themselves (refer to table 4.3). For example, in Colombia, firms received training subsidies and regulatory incentives. There were training quotas linked to firm size, and options to reduce workers' wages during training or pay a fee to opt out of training.[20] Yet, global evidence shows that, even when they are offered generous wage subsidies, firms may still choose not to invest in on-the-job learning if they face challenges associated with

TABLE 4.3 Evidence on policies that promote more learning on the job

Incentivize firms to invest in job training. On-the-job training could focus on practical, problem-solving, and communication skills.	
Estimates of impact on human capital: High	**Strength of evidence:** Medium
Summary: Increases skills and productivity among workers, promotes business growth among entrepreneurs. **Implementation challenges:** Firms viewing training as a cost center (not a profitable investment) may resist adoption. Smaller businesses may lack supportive organizational structures, information flows, and management practices and thus require the collaboration and involvement of business associations. Initial incentives may be costly. Experimentation is needed. **Still to learn:** What is the best method to incentivize firms? To standardize provision? To mobilize business networks?	
Encourage peer-to-peer learning at work. Promote farmer-to-farmer learning and the use of social and business networks to support learning.	
Estimates of impact on human capital: Medium	**Strength of evidence:** Low
Summary: Enhances skill diffusion, knowledge sharing, and the adoption of better practices, especially if formal training is limited; stronger impact if combined with supportive culture and management practices. **Implementation challenges:** Effectiveness depends on selecting and supporting appropriate peer leaders. Requires trust, motivation, and a conducive workplace or community culture. Social norms, weak management capacity, and weak incentives can limit take-up. Networks may not reach the least connected. **Still to learn:** Best ways to sustain engagement, structure peer selection, and design incentives. How to scale across sectors and integrate peer learning into broader management and training systems?	
Promote the effective use of technology. Promote the use of digital technologies in training.	
Estimates of impact on human capital: Medium	**Strength of evidence:** Medium
Summary: Digital tools reduce training costs and expand access. **Implementation challenges:** Technology adoption requires up-front investment, skills, and access to capital—often lacking in smaller firms. Many firms lack internal capacity to integrate new tools effectively. **Still to learn:** What combinations of technology, management support, and delivery channels work best across sectors and firm types. How to reach smaller or informal firms that have limited infrastructure.	

Source: Original table for this publication.

Note: The strength of evidence is high if there are multiple meta-analyses focused on experimental or quasi-experimental evidence. At least one meta-analysis must include studies in low- and middle-income countries that find a significant average size in the effects. It is medium if there are more than five experimental or quasi-experimental studies in low- and middle-income countries. It is low if there are fewer than five studies in low- and middle-income countries or if all evidence is limited to high-income contexts.

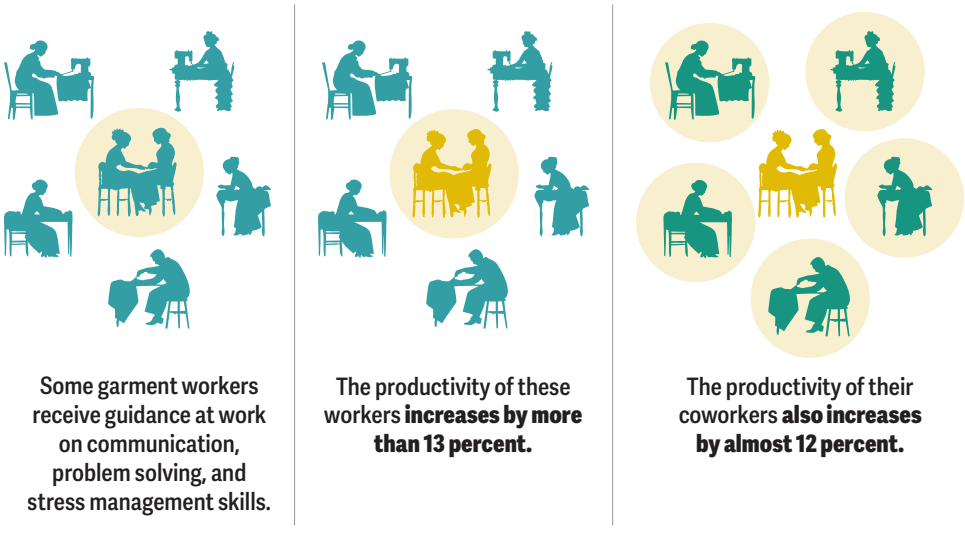
matching frictions or worker retention.[21] Without mechanisms such as retention incentives and strong certification systems, firms' investment in broad-based training may remain limited.[22] In Burundi, for instance, a retention guarantee made employers 50 percentage points more likely to invest in training, increasing adoption of new techniques and profits.[23]

Public incentives can also focus on general rather than task-specific skills, which have higher returns, but may require additional support because firms fear losing trained workers. In Brazil, for example, around 80 percent of job training

is provided by the training arm of the National Confederation of Industry. This training is occupation-specific, but not task-specific, and has high wage returns for workers and firms.[24] In Togo, a psychology-based personal initiative program targeting small business entrepreneurs that was designed to develop proactive entrepreneurial thinking led to a 30 percent increase in profits. This impact is three times that of traditional training, and the effects lasted more than eight years.[25] And in India, a workplace on-the-job soft skills training for garment workers that focused on communication, time management, problem solving, decision-making, and effective teamwork raised productivity among those who received training by more than 13 percent. Through positive knowledge spillover, it also raised the productivity of other workers on the same production line by almost 12 percent although they had not received the training (refer to figure 4.7).

In some cases, more specialized training is needed. In India, management consultants diagnosed operational inefficiencies and provided coaching to manufacturing firms on core management practices, including monitoring, target setting, and incentive systems. This led to increased productivity, lower defect rates, and substantial improvements in firm learning and management practices that persisted.[26] And in Mexico, Nigeria, and Uganda, consulting for microenterprises and small firms helped them expand paid employment and improve business practices.[27]

FIGURE 4.7 Soft skills training on the job raises productivity among trained workers and has knowledge spillovers to untrained coworkers



Source: Adapted from Adhvaryu et al. 2023.

Another avenue by which governments might promote on-the-job learning is through support for technology adoption. Technology is an important driver of on-the-job learning (refer to table 4.3). Digital tools, for example, can reduce the cost and complexity of finding information, managing workflows, and staying connected. In six African countries, evidence shows that firms with better internet connectivity are more likely to provide on-the-job training. They also export and sell more.[28] In India, access to government-sponsored call centers increased adoption of high-yielding seeds.[29] In Bangladesh, the distribution of flood-resilient seeds among many farmers to conduct small-scale demonstrations doubled the adoption of the seeds within a year relative to one centralized demonstration plot.[30]

More people in jobs

Many youth who are NEET and women are not participating in the workforce and thus cannot build human capital at work. This subsection focuses on supply-side barriers specific to youth and women. When the demand for the labor of these populations is absent, broader reforms that address structural barriers may be required.

Youth

For youth, first jobs are often hard to access. Yet, they play a crucial role in building experience and, evidence shows, they shape careers in the long term. Policies should focus on upskilling these soon-to-be labor market entrants, matching them with jobs and removing barriers to better allocation.

In most low- and middle-income countries, formal education systems do not adequately provide youth with the skills needed for jobs, including technical and soft skills. Apprenticeships have been an important way to provide these skills to youth and to facilitate matching. Traditionally, apprenticeships entail on-the-job training with a master craftsperson. They are sometimes combined with center-based vocational training.

Large-scale interventions to improve apprenticeships have shown promising results in Côte d'Ivoire, Ghana, Nigeria, and Uganda, including gains in youth earnings and skills.[31] These interventions shifted away from traditional, unpaid models, whereby families pay to place youth as helpers with a master craftsperson, toward more formal 12- to 24-month apprenticeships in which apprentices receive subsidies, are placed in firms with vacancies, receive general (not firm-specific) skills training from local institutions, and receive certification upon completion. Strong results were also achieved in Latin America, where apprenticeship programs combined technical and behavioral training by private providers, workplace-based learning, small stipends, and job placement services. Effects on employment have been positive and long lasting (refer to table 4.4 later in this chapter).[32]

Women

Women face additional constraints in participating in the labor market because of the dominant role they tend to play in care activities in the home. Evidence on Brazil, China, Mexico, and other contexts demonstrates that access to public childcare significantly increases female labor force participation. However, global evidence shows that success is not guaranteed. Challenges related to cost and quality, registration barriers, and a lack of equivalence between childcare hours and working hours can undermine their positive impact (refer to box 4.3).[33]

BOX 4.3 Childcare and women's labor force participation

Chapter 2, which focuses on human capital accumulation in the home, emphasizes the importance of care at home for human capital formation throughout childhood and adolescence. While care responsibilities do not fall solely on women, global data show that women spend more time involved in childcare than men.[a] This chapter focuses on human capital accumulation at work and makes the economic case for reducing barriers to women's labor force participation. These two objectives can be in tension. Policies that raise female labor force participation may expand household resources and support women's skill development at work, but they may also reduce the quality or availability of care at home.

This tension between women's labor force participation and the need for childcare is typically used to explain the child penalty, that is, the larger employment and earnings effects of parenthood on women relative to men. A recent global examination of the child penalty finds that there is considerable heterogeneity within and across countries and that the child penalty in employment is more pronounced in higher-income countries. Moreover, the extant evidence consistently shows a positive impact of center-based childcare interventions—day care, preschool, and kindergarten—on the labor force participation of mothers in low- and middle-income countries and even in rural areas.[b]

For example, because of high demand and limited availability, authorities in Rio de Janeiro used a citywide lottery to allocate day-care slots. Winning the lottery led to a 21 percentage point increase in the likelihood that grandparents, particularly grandmothers, entered the workforce, resulting in a 55 percent rise in the incomes of the households in which the grandparents resided.[c] Similarly, the probability

(Box continues on next page)

BOX 4.3 Childcare and women's labor force participation *(continued)*

that siblings worked, especially sisters, rose by 16 percentage points, with a corresponding 51 percent boost in income. More caregiver time away from home did not negatively affect children. Instead, it enhanced the nutritional status and cognitive development of the children.

Meanwhile, research in China indicates that access to kindergarten significantly raises the likelihood that rural mothers will engage in nonagricultural employment and that their working hours will expand in the relevant sectors.[d] This shift is primarily attributable to a reduction in the time spent on agricultural tasks and unpaid domestic duties. By contrast, the research finds no substantial impact on the employment of urban mothers, possibly because of the greater availability of private childcare options in urban areas. The positive effects on rural mothers are more pronounced among low-income households, nuclear families, and households that adhere closely to traditional gender norms. The research also indicates that kindergarten eligibility enhances nonagricultural employment opportunities among grandmothers in rural settings who reside in the households. Other studies have also found positive effects on female labor force participation.[e]

Yet, there is widespread concern that the labor force participation of mothers is detrimental to children. Nearly 60 percent of World Value Survey respondents agree or strongly agree that a preschool child suffers if the mother is working (refer to figure B4.3.1), a trend common across both men and women respondents. The concern is greatest in the regions with the lowest female labor force participation, that is, the Middle East and North Africa and South Asia. This raises a critical question: While expanding access to childcare increases female labor force participation, does it also benefit the human capital of children?

A review of 71 studies of center-based childcare interventions in low- and middle-income countries finds that most—93 percent of the studies and 81 percent of the estimates—show positive effects on children. Girls tend to benefit more than boys, but poorer children do not consistently benefit more or less than wealthier children. These results hold across experimental and quasi-experimental studies.[f]

(Box continues on next page)

BOX 4.3 Childcare and women's labor force participation *(continued)*

FIGURE B4.3.1 Survey response: Do you agree that a preschooler suffers if the mother is working?

Source: Data of WVS (World Values Survey), Wave 7 (2017–2022) (dashboard), King's College, https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp.

(Box continues on next page)

BOX 4.3 Childcare and women's labor force participation *(continued)*

An expansion in good-quality childcare interventions might help resolve the tension between an increase in women's work outside the home and the care needs of young children. The policy challenge lies in guaranteeing quality, while overcoming the perception that the care for children will be undermined if mothers participate in the labor force.[g]

a. ILO (2018); World Bank (2011).

b. For a review of the evidence, refer to Evans et al. (2021); Halim et al. (2023).

c. Attanasio et al. (2022).

d. Fang and Miao (2024).

e. Havnes and Mogstad (2011); Kleven et al. (2019); Olivetti and Petrongolo (2017).

f. Refer to Evans et al. (2024) for a review of the evidence.

g. Bendini and Devercelli (2022); Devercelli and Beaton-Day (2020).

Importantly, childcare provision alone may not be sufficient if gender perceptions at home or at work impede women's labor force participation (refer to box 4.4).

Even when the barriers to employment confronting youth and women are removed, matching with employers needs to occur for employment to materialize. Such matching can be harder for some groups of people. Inexperienced workers, for instance, may not know how to search effectively or signal their skills. In fragmented and informal labor markets, job-seekers may lack information about vacancies and face challenges in accessing the pool of job openings, while employers may struggle in identifying the abilities of candidates.

BOX 4.4 Shifting gender perceptions and addressing security concerns

Evidence shows that perceptions about the role of women in the household and at work affect female labor force participation, but that these can shift. In workplaces, through exposure, norms can change. For instance, a field experiment in 24 large garment factories in Bangladesh explored how to overcome the underrepresentation of women in supervisory roles, despite women's dominance in other areas of garment production. The study identified men and women candidates for line supervisor positions and randomly assigned them to manage production lines. While women supervisors initially faced lower productivity among their teams and received poorer

(Box continues on next page)

BOX 4.4 Shifting gender perceptions and addressing security concerns *(continued)*

evaluations (largely because of the negative perceptions of workers about women in leadership), the gaps disappeared within four to six months.[a]

At home, correcting misperceptions is critical. For example, in Saudi Arabia, men underestimated how many other men supported women working outside the home. When exposed to accurate information, men became significantly more likely to support women's activity on job-matching apps.[b]

Another important barrier to female labor force participation is sexual harassment in public places. This may limit women's mobility, education choices, and workforce participation. Policies such as women-only subway cars and buses, as through Mexico City's *Viajemos Seguras* program, create safer spaces and reduce harassment during peak travel hours. Evidence from Rio de Janeiro showed that reserving spaces for women on trains reduced physical harassment by 50 percent. However, the take-up of these safe spaces was concentrated among women who experienced more frequent harassment and who perceived strong social stigma against using mixed-gender spaces, highlighting how social norms shape both exposure to risk and the use of protective measures. Complementary enforcement approaches are also important. Police patrols, such as India's Safety, Health, and Environment Police Units (SHE Teams), have been effective in reducing street harassment by boosting officer presence in known hot spots.[c]

Commuting interventions, such as fare subsidies or woman-only transport, may have limited effects on employment if they are not paired with access to desirable jobs among women. Evidence from New Delhi shows that the addition of transit stations triggered the opening of businesses nearby, creating economic hubs in peripheral neighborhoods. The new businesses—mostly retail and service stores—were precisely the types that employ more women. This underscores the role of transit-oriented development and mixed-use zoning around stations in bringing employment opportunities closer to underrepresented workers.[d]

a. Macchiavello et al. (2020).

b. Bursztyn et al. (2020).

c. For evidence on Mexico, India, and Brazil, respectively, refer to Aguilar et al. (2021); Amaral et al. (2025); Kondylis et al. (2025).

d. Kovvuri and Sharma (2025).

Effective job placement services can close these information gaps, equip job-seekers with strategies and incentives for an efficient and effective worker-job match, and reduce reliance on informal job search based on a person's connections, which are normally weaker among poorer job-seekers. Modernizing public employment services by investing in staff training, digital platforms, and outreach to employers can enhance job placement outcomes through improved employer engagement and tailored support for job-seekers (refer to table 4.4).[34]

TABLE 4.4 Evidence on policies that remove barriers to the participation of women and youth in the labor markets

Expand access to quality childcare. Subsidized access to daycare and childcare	
Estimates of impact on human capital: High	**Strength of evidence:** High
Summary: Increases labor force participation among women. **Implementation challenges:** Ensuring quality at low cost; low participation because of a lack of information on the program or difficult registration process, and misalignment with working hours. **Still to learn:** Who should be subsidized and how? How to increase take-up?	
Promote apprenticeships. First job opportunities, combining on-the-job training with instruction, governed by a contract and leading to certification	
Estimates of impact on human capital: High	**Strength of evidence***:* High
Summary: Increase earnings and skills. **Implementation challenges:** Effectiveness may be limited if hiring is weak, or apprentices replace existing workers. At scale, positions may be scarce. Without targeting, low-skill youth may be left out. Limited monitoring, weak certification systems, and inadequate public-private coordination may hinder implementation. **Still to learn:** Which workers should be targeted? How to ensure strong skill development, early employer involvement, collaboration with training providers, and effective certification and quality assurance?	
Support employability and inclusion programs. Job placement, soft skills, and mentoring	
Estimates of impact on human capital: Medium	**Strength of evidence:** Medium
Summary: Increase employment, but not necessarily wages. Economic inclusion (or graduation) programs for the poor that have an important training component have been rigorously evaluated and show sustainable impacts up to 15 years after treatment. **Implementation challenges:** Cost-effective, but impact limited if formal vacancies are scarce (for instance, informal markets, recessions). Difficult to integrate low-skill workers in formal placement services; incentive systems are difficult to design. Good evidence for soft skills and mentoring in high-income countries; limited in low-income countries. **Still to learn:** How to establish effective public-private partnerships for placement services? Is the role of government to create the digital platform and then focus on complementary services? What works in reaching and supporting low-skill, disadvantaged workers? How to design effective performance incentives for providers? What are scalable models for soft skills and mentoring in low-income contexts?	

Source: Original table for this publication.

Note: The strength of evidence is high if there are multiple meta-analyses focused on experimental or quasi-experimental evidence. At least one meta-analysis must include studies in low- and middle-income countries that find a significant average size in the effects. It is medium if there are more than five experimental or quasi-experimental studies in low- and middle-income countries.

More jobs with stronger learning potential

While it is not the role of government to create jobs, government functions are fundamental to sustained job creation. In an ideal scenario, schools would equip young people with the relevant skills needed for work and life; labor markets would be inclusive and adaptable; and firms would be dynamic, grow, and generate more high–human capital jobs. Much of this chapter focuses on supply-side interventions aimed at enhancing human capital within existing jobs under the prevailing economic structure, the distribution of jobs between rural and urban areas, the distribution of firm size, and the share of workers in self-employment versus wage employment. But these policy efforts need to be complemented with demand-side policies.

As shown earlier in this chapter, workers build more human capital in wage employment than in self-employment, especially wage employment in medium and large firms. Removing disincentives for firm growth should therefore be a priority. Tax breaks or regulatory exemptions tied to firm size can inadvertently incentivize firms to remain small, resulting in labor misallocation, less human capital accumulation in the workplace, and reduced aggregate productivity.[35]

Importantly, policies that promote firm growth can also serve as human capital policies. For example, governments can improve access to finance and to research and development (R&D), particularly among young, innovative firms. These firms are often the most dynamic, capable of driving radical innovation and creating jobs that demand skilled labor.[36] Well-targeted R&D credits can have lasting effects on long-term human capital and productivity.[37] Reducing financial frictions that constrain firm entry, growth, and innovation is also important, as shown by evidence on the Republic of Korea and the United States.[38] In other contexts, targeted policies have addressed bottlenecks, with enterprise support programs in Colombia and Nigeria encouraging innovation and improving employment and sales, and export promotion in the Arab Republic of Egypt fostering learning by exporting and raising firm productivity.[39]

To support the growth of firms in which human capital is built, countries must also invest in foundational education. Skills gained during early childhood and through basic education are essential building blocks for skill development in adulthood. Job readiness begins early and continues to evolve through work experience. The distribution of skills in the workforce can affect the type of firms that are born and whether they grow over the life cycle.[40] Well-educated people are likely to underpin high-quality entrepreneurship and determine whether firms can populate management and professional positions and accumulate firm-specific knowledge.[41] This type of organizational capital allows workers within firms to take on roles as middle technicians and supervisors.

This dynamic is evident in numerous sectors. For instance, in agriculture, skilled labor is needed not only in farming, but also for value added functions, from processing, packaging, and marketing to tasks performed by scientists and engineers. In garments and electronics, firm competitiveness hinges on capabilities in design, production, logistics, and sales, functions that rely on a pipeline of medium- and high-skill workers.[42]

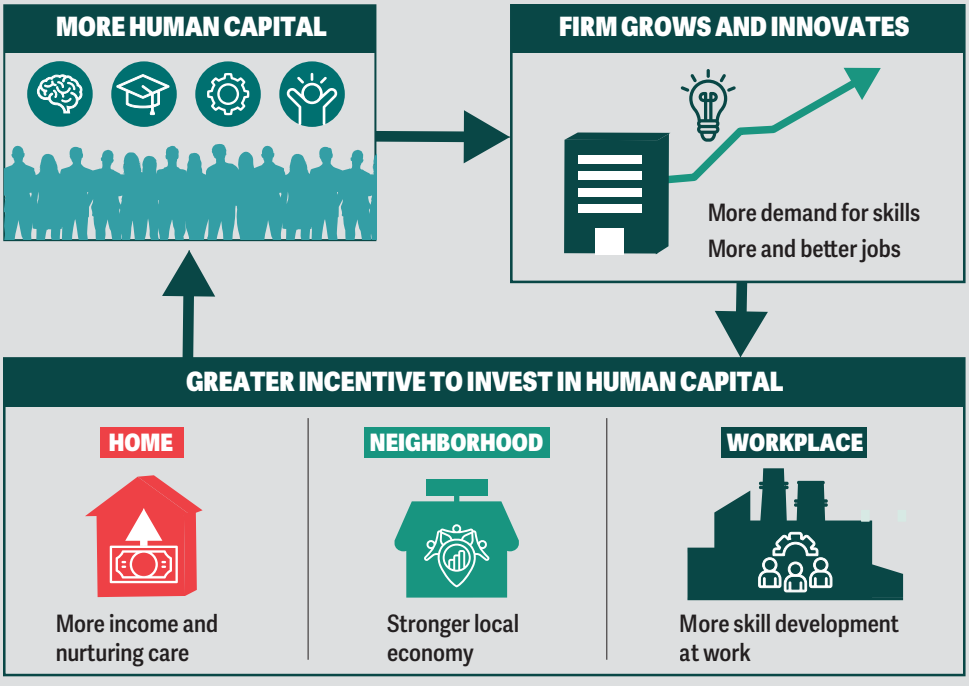
The distribution of skills in the workforce affects the ability of firms to innovate and the nature of technological change (refer to box 4.5). When human capital is abundant, technological adoption is more likely to reward skills.[43] Over time, a virtuous cycle may emerge. As more firms are created and grow, they demand skilled workers, offer better pay, and invest in training. In turn, these rewards incentivize people to invest in their own education and skills, raising the stock of human capital in the next generation.

BOX 4.5 Expanding the focus of human capital policy to the workplace is critical for jobs

In a well-functioning economy, the bulk of jobs are created by the private sector. The human capital of the workforce affects the ability of firms to grow and innovate. Firms are embedded in particular markets, and the distribution of skills shapes the type of firms that are born and whether they grow over their life cycle.[a] A higher overall stock of human capital promotes firm creation and growth of better firms.

The creation and growth of high–human capital firms can then generate a virtuous cycle in which productive firms demand highly skilled workers, pay them more, and provide incentives for investment in human capital in homes and neighborhoods (refer to figure B4.5.1).

FIGURE B4.5.1 The virtuous cycle of more human capital and better jobs



Source: Original figure for this publication.

a. Moreira et al. (2025); Queiró (2022).

In sum, the distribution of skills in the workforce affects firm dynamics. Economies that complement supply-side investments with demand-side policies—thereby fostering firm dynamism, improving market conditions, and supporting innovation—will not only raise productivity, but also build human capital across generations (refer to table 4.5).

TABLE 4.5 Evidence on policies to create more high human capital jobs

Remove barriers to firm growth. Remove tax breaks or regulatory exemptions tied to firm size and distortions in labor regulations that discourage hiring.	
Estimates of impact on human capital: Medium	**Strength of evidence:** Low
Summary: Policies supporting small and medium enterprises may unintentionally discourage firm growth and formal hiring, limiting learning opportunities and productivity gains associated with larger firm size. **Implementation challenges:** Political economy resistance from firms benefiting from distortions; difficult to reform without transitional support. **Still to learn:** How changes in firm-size–linked distortions affect skill use?	
Facilitate access to credit and R&D. Support access to finance, markets, and R&D for young firms.	
Estimates of impact on human capital: Medium	**Strength of evidence:** High
Summary: Support for firm growth, especially among young, high-potential firms, raises demand for skilled labor and fosters learning-by-doing. Improved access to finance, markets, and R&D enables innovation, productivity, and job quality upgrades. **Implementation challenges:** Targeting is difficult. Most small firms stay small, while high-growth firms are rare and difficult to identify ex ante. Risk of misallocation if support is not linked to performance. **Still to learn:** What mix of financing, R&D incentives, and market access drives sustained skill-intensive growth? How can firm–growth support be integrated with requirements for broader on-the-job training, for example, through technology subsidies, combined with soft-skills training for workers?	
Invest in public goods and in education in particular. Expand education to develop the skilled talent for firm growth, the entrepreneurs for new firm entry, and the innovators to accelerate technology adoption.	
Estimates of impact on human capital: Medium	**Strength of evidence:** Low
Summary: Expanding post–basic education can expand the supply of skilled workers and entrepreneurs. **Implementation challenges:** Lag between education reforms and firm-level effects. **Still to learn:** Should firm and education policies be jointly targeted, combining expansions in education with support for firms and entrepreneurs to absorb the new skilled workforce?	

Source: Original table for this publication.

Note: The strength of evidence is high if there are multiple meta-analyses focused on experimental or quasi-experimental evidence. At least one meta-analysis must include studies in low- and middle-income countries that find a significant average size in the effects. It is medium if there are more than five experimental or quasi-experimental studies in low- and middle-income countries. It is low if there are fewer than five studies in low- and middle-income countries or if all evidence is limited to high-income contexts. R&D = research and development.

Conclusion: Putting it all together

Although the potential for human capital accumulation in the workplace is substantial, too little of it occurs in low- and middle-income countries. A first major reason for this limited human capital is that the composition of employment—the dominance of self-employment, agricultural labor, and small firms—is not conducive to high learning on the job. In these jobs, there is little incentive and funding for investment in explicit training, nor is there much opportunity to learn from peers or from the use of technology. A second reason is the low labor force participation among women and youth. It is impossible to acquire human capital at work without working.

Remedying this will require reforms that increase labor force participation and employment, and create more high human capital jobs that encourage both learning on the job (through practice, exposure to technology, interactions with peers and managers, and training), and investments in education. Seizing these opportunities to encourage more human capital accumulation at work will also serve to create a virtuous cycle in which greater human capital accumulation spurs the growth of good jobs, which then increase human capital accumulation at work and the returns to investment in human capital at home and in the neighborhood.

Notes

1. Jedwab et al. (2023).
2. Amodio and Martinez-Carrasco (2018); Bandiera et al. (2010, 2013).
3. Caicedo et al. (2022); Donovan et al. (2023).
4. Akerman et al. (2015); Bartel and Sicherman (1998); Brynjolfsson et al. (2025).
5. Bloom et al. (2014).
6. Hsieh et al. (2019).
7. Chiplunkar and Goldberg (2024).
8. Gollin (2002, 2008).
9. Eslava et al. (2021).
10. Bento and Restuccia (2017); Fattal Jaef (2022); Poschke (2018).
11. Bonnet et al. (2019).
12. To illustrate, Kenya and the Republic of Korea possess similar populations, yet the number of Korean firms with five or more workers surpasses the number of comparable firms in Kenya by a factor of three (Cruz et al. 2025).
13. Refer to Cruz et al. (2025). It is also well established that, in the United States, new businesses tend to start small and grow as they age, whereas they have lower size at entry and grow less over the life cycle in low- and middle-income economies (Dunne et al. 1989; Haltiwanger et al. 2013; Hsieh and Klenow 2014).
14. Schultz (1961).

15. Cusolito et al. (2021).
16. Ma et al. (2024) document that self-employment is associated with low rates of formal training in low-income economies. Data on Ethiopia, Malawi, Tanzania, and Uganda indicate that access to public agricultural extension services among smallholder farmers (less than two hectares) is limited, at approximately 14 percent. Refer to LSMS-ISA (Living Standards Measurement Study: Integrated Surveys on Agriculture) (dashboard), World Bank, https://www.worldbank.org/en/programs/lsms/initiatives/lsms-ISA.
17. Calculations based on data of WBES (World Bank Enterprise Surveys) (dashboard), World Bank, https://www.enterprisesurveys.org/en/enterprisesurveys.
18. Macchiavello et al. (2020) show that gender bias constrains women's advancement, though workplace norms may shift through exposure to the presence of women at the workplace. The World Bank report *Women, Business and the Law 2024* (World Bank 2024) documents the legal barriers to female labor force participation. Devoto et al. (2024) find that, while social norms deter women's work, suitable job opportunities increase participation.
19. Agarwal and Mani (2025); Carranza and McKenzie (2024).
20. Caicedo et al. (2022).
21. Carranza and McKenzie (2024).
22. Alfonsi et al. (2020).
23. Cefalà et al. (2024).
24. Bastos et al. (2016); Blyde et al. (2023); Silva et al. (2015).
25. Campos et al. (2017). Now implemented in over a dozen countries, such programs require skilled facilitation, a potential constraint on scalability in many contexts. Refer to McKenzie et al. (2023).
26. Bloom et al. (2013).
27. For evidence on Nigeria, Uganda, and Mexico, respectively, refer to Anderson and McKenzie (2022); Anderson et al. (2021); Bruhn et al. (2018).
28. Hjort and Poulsen (2019).
29. Gupta et al. (2024).
30. Kondylis et al. (2023).
31. Alfonsi et al. (2020); Crawford et al. (2021); Crépon and Premand (2025); Hardy and McCasland (2023).
32. Refer to Fazio et al. (2016) for a review of evidence on lessons from long-established systems in Australia, Austria, Germany, and the United Kingdom that are comparable with systems in Latin America. Refer to Attanasio et al. (2011) and Kugler et al. (2022) on Colombia; Corseuil et al. (2019) and Da Mata et al. (2025) on Brazil.
33. Attanasio et al. (2022); Fang and Miao (2024); Talamas Marcos (2023).
34. An innovative example to facilitate better matches between job-seekers and employers is the modernization of the Public Employment Service in France. The service brings job-seekers and employers together, thereby relieving small and medium enterprises from the burden of prescreening job applicants. It has increased relevant vacancy announcements by 21 percent and hiring by 7 percent. Such services can clearly have an active role in linking job-seekers to firms where human capital accumulation is more likely (Algan et al. 2020).
35. Bachas et al. (2019); Garicano et al. (2016); Guner et al. (2008).
36. Acemoglu et al. (2022); Akcigit and Kerr (2018).
37. Akcigit et al. (2025); Bøler et al. (2015).
38. Kim and Loayza (2019) on Korea; Siemer (2019) on the United States.
39. Anderson and McKenzie (2022); Atkin et al. (2017); Iacovone et al. (2022).
40. Moreira et al. (2025); Queiró (2022).

41. Akcigit et al. (2025); Atkeson and Kehoe (2005).
42. Bloom et al. (2013); Verhoogen (2008).
43. Carneiro et al. (2023).

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Chapter 5

Implementing a Settings Approach in Policy

Alaka Holla, Norbert Schady, and Joana Silva

Summary

Many global challenges—malnutrition, low reading proficiency, youth unemployment—require action in the key settings of human capital accumulation described in this volume: the home, the neighborhood, and the workplace. This chapter focuses on broader reforms that would enable governments to design policies that effectively activate these settings to foster human capital formation. Foundational human development outcomes, such as healthy nutrition, reading proficiency, and on-the-job skill acquisition require a settings-based perspective to identify areas for investment. The chapter highlights critical reforms to establish a policy architecture that supports the cross-sectoral collaboration needed to integrate investments within each setting, including partnerships with the private sector. It also describes the national and global data agenda required to track progress in human capital accumulation in the home, the neighborhood, and the workplace. The policy agenda, together with the associated measurements, is essential to achieving progress in key areas that have remained stagnant in many low- and middle-income countries.

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Human capital enables people to contribute to the productivity of society. It is essential in securing a good job and higher income. Investments in human capital spur economic growth and can reduce inequality.[1]

Despite these well-recognized benefits, trends in global human capital accumulation over the last two decades paint a picture of stagnation. In many low- and lower-middle-income countries, the situation has gotten worse rather than better (refer to chapter 1). The lack of progress in human capital will constrain improvements in productivity and stymie economic growth in these countries, ultimately stifling any progress toward reducing poverty and increasing shared prosperity.

This report draws on existing research and new evidence that demonstrate that human capital accumulation can accelerate if policies reach beyond schools, clinics, and job training centers—the settings in which governments typically invest in human capital—to include the home, the neighborhood, and the workplace. Skill gaps emerge before children start school, when they have spent most of their time at home, and do not close in subsequent periods of childhood and adolescence (refer to chapter 2). The care environment, which is not a usual focus of policy, turns out to be crucial in providing young people with the means to achieve success at school and in the labor market. The characteristics of the neighborhood, such as low-quality schools and primary health centers, poor sanitation, pollution, and exposure to violence, can hold back foundational human capital outcomes such as good health and learning (refer to chapter 3). The workplace, where people spend far more time than they did in school, accounts for around half of lifetime skill development (refer to chapter 4). Yet, most jobs in low- and middle-income countries, such as employment in small-scale agriculture, low-quality self-employment, and microfirms, offer few opportunities for learning. Women's low participation in paid employment and the persistently high rates of youth who are in neither education nor employment restrict the acquisition of skills at work.

Chapters 1 through 4 highlight policies that have improved the care environments of children and adolescents at home; engaged more sectors, such as infrastructure, sanitation, and social development, in neighborhoods to achieve better human capital outcomes; and increased public and private investment in on-the-job learning, while creating incentives for firms to invest in the workplace in ways that foster skill development.

This chapter examines broader reforms that enable governments to design policies that activate the home, the neighborhood, and the workplace to promote human capital accumulation more effectively. It first shows how a settings-based perspective is critical to identifying areas for investment in human development, such as nutrition, reading and mathematics proficiency, and on-the-job skill acquisition. The chapter next highlights investments and strategies that have been successful in integrating the initiatives of various sectors in homes, neighborhoods, and the workplace. The chapter then articulates a global and national data agenda to track progress in each setting and identifies open questions for future work.

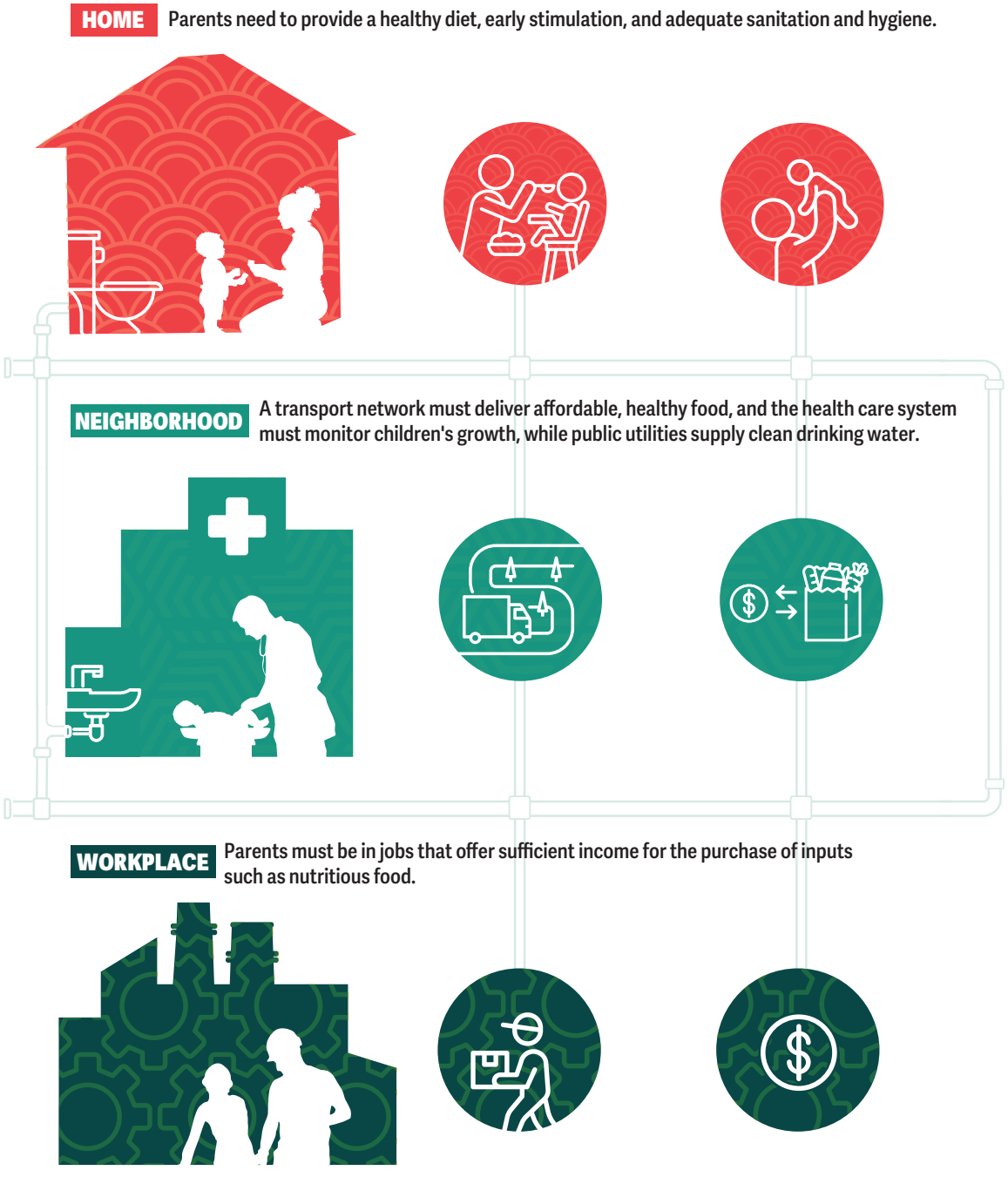
A settings lens to solve human development challenges

More than 150 million children under age 5 (more than one in five) were stunted in 2024. Another 35 million children (around 6 percent) were overweight, a growing concern worldwide. Under- and overnutrition not only affect cognitive development,[2] they also increase the risk of chronic diseases that reduce labor productivity in adulthood.[3]

To understand the value of a settings lens, consider all that needs to occur in the home, in the neighborhood, and in the workplace to avoid malnutrition (refer to figure 5.1). At home, families need sufficient resources to purchase and prepare nutritious food. Research shows that other dimensions of care, such as early stimulation and good sanitation and hygiene, contribute to healthy physical growth because children must be protected from contaminated water so that they can absorb the nutrients in the food they consume.[4] In neighborhoods, nutritious food needs to be available and affordable for purchase. Health services should help parents monitor and assess their children's growth, and local utilities should provide access to clean water and sanitation. Parents and other caregivers need to be active in good jobs so that they can purchase the inputs required to provide a healthy diet and protection from nutrient-depleting pathogens. Tackling malnutrition therefore requires coordinated action across the three settings and across multiple sectors, including health care, social protection, agriculture, transport, water, sanitation, and labor, alongside regulation of the private sector and support for local food markets.

A similar logic applies to skills for work. Low skill levels among the workforce are another global challenge confronting low- and middle-income countries, and a settings-based approach can help identify areas that require greater investment. Homes provide the first learning environment for cognitive skills, such as early literacy and mathematics, and for social-emotional skills, such as perseverance and impulse control, both of which contribute to higher earnings in adulthood.[5] Parents provide direct care that promotes this skill development—for example, by reading with a child. They also model behaviors.[6] For older children and youth, parents often pay school tuition and must cover the costs of learning materials and transportation. Neighborhoods directly influence skill development through the availability and quality of local schools and through environmental attributes, such as pollution and violence, that can impede the acquisition of skills.[7] Disadvantaged neighborhoods expose children to peers with lower levels of skills, which can depress learning.[8] Likewise, workplaces directly and indirectly shape skills. For the employed, firm size, job type (salaried work versus self-employment), sector, access to technology, and distance from public transportation affect whether an individual works and how much an individual can learn on the job.[9] The existence of a job or entrepreneurship opportunity can modify perceived and actual returns to education and thus influence aspirations and educational attainment.[10]

FIGURE 5.1 What needs to happen in the home, in the neighborhood, and in the workplace to avoid malnutrition



Source: Original figure for this publication.

Reforms aimed at settings can spur gains in human capital

A settings lens uncovers multiple investments required across the home, the neighborhood, and the workplace to solve some of the main global challenges in human development. These investments, however, span multiple actors, including private firms with limited experience working together in a coordinated way. Yet some programs have achieved successful integration through convergence designs that tackle numerous constraints across homes and neighborhoods together. National programs in Indonesia and Peru have reduced the prevalence of stunting through such an approach (refer to box 5.1).

BOX 5.1 Reducing malnutrition in Indonesia and Peru

In both Indonesia and Peru, success in combatting stunting resulted from a combination of long-term political commitment, cross-sectoral collaboration, results-based financing, strong technical support, and measurement systems that informed decision-making.

Indonesia

The government of Indonesia launched the National Strategy to Accelerate Stunting Reduction (StraNas Stunting) in 2018, formalized by Presidential Regulation 72/2021, to provide a package of high-impact nutrition-specific services, to pregnant women and to children during their first 1,000 days of life. These included (a) maternal and child health services; (b) integrated nutrition counseling; (c) water, sanitation, and hygiene services; (d) social protection and food assistance; and (e) early childhood education and development services. The strategy operated at scale. Early implementation focused on the 100 districts with the highest prevalence of stunting, before expanding nationwide. By 2024, the initiative covered more than 75,000 villages across all districts.

Convergence was at the heart of the strategy. Resource allocation, planning, and service delivery were coordinated across 23 ministries across districts and down to the village level. A dedicated human development worker in each village connected households to services and monitored delivery of the integrated package. Because the districts were primarily responsible for the delivery of basic services, the government introduced a set of convergence actions to be implemented by district governments to promote a coordinated, multisectoral approach to the planning,

(Box continues on next page)

BOX 5.1 Reducing malnutrition in Indonesia and Peru *(continued)*

budgeting, and implementation of priority interventions. Financing mechanisms, including intergovernmental transfers to districts for convergence in stunting interventions and allocations of transfers to villages, reinforced multisectoral coordination.

Findings from an impact evaluation that has followed the program's phased rollout indicate that the reductions in stunting reached up to 10 percentage points among the earliest cohort targeted in high-prevalence locations. The country's overall stunting rate fell from 30.8 percent to 19.8 percent in 2018–24, an 11 percentage point reduction that exceeded the 6.2-point decline that had been observed during the previous five years.[a]

Peru

Peru implemented a multisectoral national strategy to reduce stunting. In 2006, 10 presidential candidates endorsed the 5-by-5-in-5 commitment, a pledge to reduce stunting among children under age 5 by 5 percentage points in 5 years. By 2016, the strategy had expanded to all regions and more than 1,800 municipalities, with initial efforts concentrated in the poorest districts with the highest prevalence.

The government prioritized a core group of evidence-based interventions, including micronutrient supplementation; maternal health and prenatal care; infant and young child feeding counseling; growth monitoring and promotion; expansion of water, sanitation, and hygiene services; and community health outreach. These were delivered through health posts, community agents, family support programs, and municipal governments. Multiple ministries—development and social inclusion, economy and finance, and health—worked with municipal and regional governments responsible for front-line implementation. Results-based budgeting linked public resources to specific outcomes in child nutrition, health, and early development. Regions and institutions received allocations tied to the achievement of measurable targets, while inefficient or duplicative programs were restructured or closed.[b] Stunting declined from 28 percent to 13 percent in 2005–16, a 15 percentage point reduction in about a decade. The largest improvements occurred in historically lagging regions.

a. Suhenda (2025).

b. Marini and Rokx (2017).

The convergence approach does not require the delivery of numerous services from multiple sources through one large program. Indeed, one unit or department can take the lead and coordinate the participation of other entities. For instance, Chile's *Nadie es Perfecto* (No one is perfect) is a nationwide parenting program delivered through the national health system but also supported by local nurses, psychologists, educators, and social workers. Parents attend eight weekly sessions. A randomized controlled trial shows progress in children's cognition that can be observed three years later.[11] Likewise, the Integrated Child Development Services scheme in India—which operates through more than 1.4 million community centers, making it the largest public early childhood program in the world—is implemented by the Ministry for Women and Child Development, which coordinates with other ministries to provide services, including supplementary nutrition, nutrition and health education, immunization, health checkups, referral services, and preprimary education.

Similarly, in programs targeting households, such as cash transfers, additional services can be layered on for subsets of beneficiaries. Cash plus programs combine regular cash transfers with complementary services, such as nutrition counseling, parenting support, health services, and training. The combinations have been numerous, but positive effects on human capital beyond the cash are evident in packages that include high-quality nutrition and health counseling or sustained coaching.[12] For example, evidence from northern Nigeria shows that the combination of cash transfers, asset transfers, and health counseling among mothers resulted in a 10 percent increase in household expenditures and a 6 percentage point reduction in stunting even two years after the intervention had ended.[13] Variants of these programs have been implemented in Bangladesh, India, and several countries in Sub-Saharan Africa.[14]

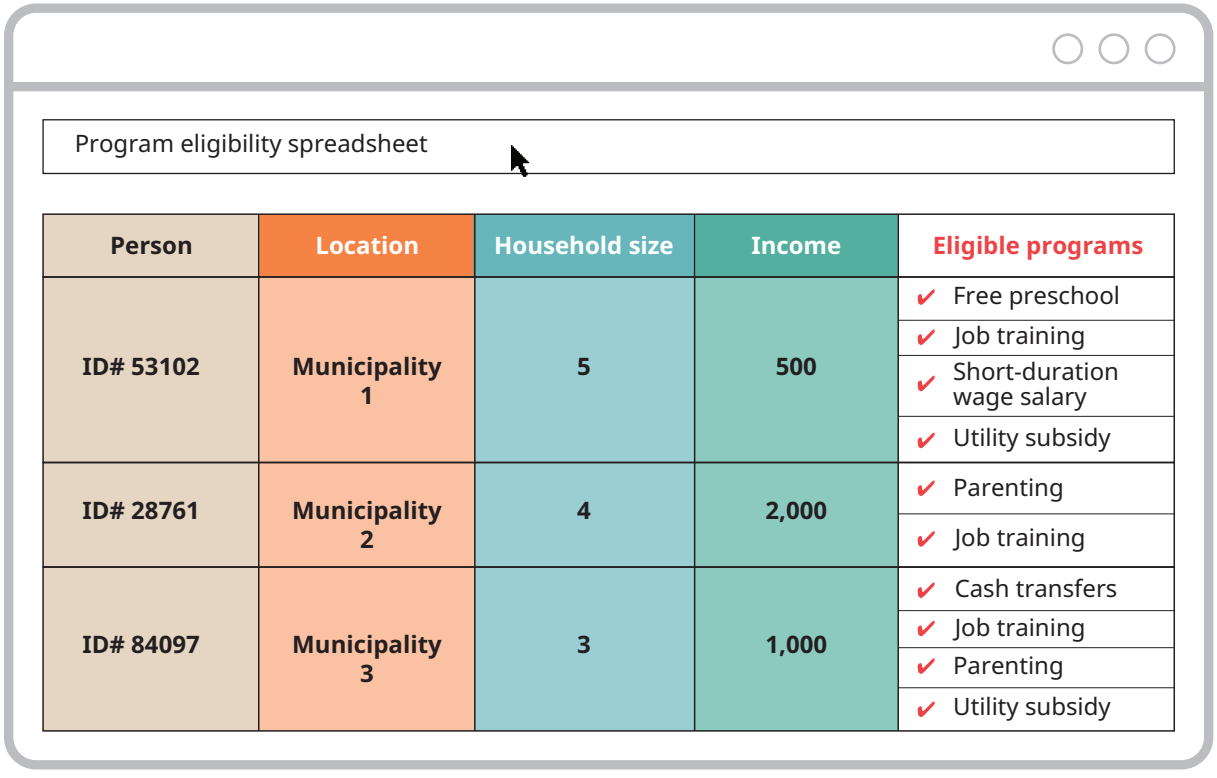
Tools for integration

The task of integrating or coordinating activities across multiple sectors in different settings can be facilitated through investments in data architecture and processes for delivering programs, such as social registries, single-window entry points, and case management.

Social registries

A social registry is an information system that aggregates socioeconomic information on individuals or households and that can be used to identify and reach populations eligible for social programs (refer to figure 5.2). As of June 2025, 62 countries had social registries, covering approximately 1.1 billion people. Nearly half of the countries with operational social registries (29 of 62) use them in social protection programs and to support labor market programs, health care, education, subsidy allocation and monitoring, and other services.[15]

FIGURE 5.2 Profile of a social registry



Source: Original figure for this publication.

By consolidating data across ministries on program eligibility and participation, these registries help governments make informed decisions on program coordination or consolidation (refer to box 5.2). The data they aggregate support the selection of households for programs, help identify needs and gaps that can be addressed through case management, and enable joint targeting across programs. Institutions can reuse and update registry data instead of conducting separate data collection exercises, thus reducing duplication, administrative costs, and fragmentation, while enhancing coordination. This also lessens the burden on potential beneficiaries, who no longer need to apply separately for each benefit and service.

BOX 5.2 A social registry as a tool for integration

Brazil

Cadastro Único, Brazil's social registry, contains data that allow the identification of low-income families and that records their socioeconomic condition and the assistance they receive through programs.[a] It is used to target a broad suite of interventions (currently more than 60), including housing, utilities,

(Box continues on next page)

BOX 5.2 A social registry as a tool for integration *(continued)*

and vocational training. Covering 94.5 million people, the registry is fully interoperable with other government databases and can therefore support coordinated service delivery across sectors beyond social protection.

Rwanda

Imibereho, the social registry in Rwanda, serves as a national platform for data-driven targeting across social protection and health programs.[b] Before its introduction, the government relied on a community-based classification system to identify beneficiaries. This system suffered from significant errors of inclusion and exclusion, that is, they provided benefits to households that should not have qualified and left out many that needed support. To address this challenge, the government designed Imibereho as a digital registry that allows real-time updates and uses up-to-date data to deliver support. The registry uses national IDs and is interoperable with more than 10 government databases, including civil registration and land records.

Today, Imibereho covers 13.8 million people and informs eligibility decisions for programs such as the Vision Umurenge Program (the flagship social protection program) and Mutuelle de Santé (the community-based health insurance scheme).

a. Cadastro Único (dashboard), Ministério do Desenvolvimento Social, Assistência, Família e Combate à Fome (Ministry of Social Development and Assistance, Family, and Fight against Hunger), https://www.gov.br/mds/pt-br/acoes-e-programas/cadastro-unico.

b. Imibereho (Imibereho Dynamic Social Registry), Ministry of Local Government, https://www.minaloc.gov.rw/services.

Single-window entry points

Social assistance centers can serve as single-window entry points that connect individuals and households to the benefits and services for which they are eligible. In Brazil, for instance, municipal social assistance centers (centros de referência de assistência social) help identify vulnerable households, facilitate enrollment in social assistance programs, and link families to a range of services. These single-window entry points can coordinate the delivery of services, cash transfers, and other benefits and play a major role in integrating programs in neighborhoods.

Preschools can also serve as single-window entry points. Teachers can be trained to recognize neglect or abuse and make referrals to social services. Children can receive health screenings at school, and their families can receive health or employment services. For example, Head Start, a nationwide program in the

United States, offers free early childhood services and preschool to disadvantaged households but also provides home visits and mental health and employment counseling among parents. In addition to improving children's early learning and progression through school, Head Start has also benefited children's health.[16] As adults, children who had participated in the program were more likely to be employed and less likely to be living below the poverty line.[17]

Case management

Case management is an important tool in implementing the settings approach. Through case management, a trained professional works closely with a household to identify the specific constraints the household faces, develop a tailored plan, and coordinate access to the services needed. Because it begins with an assessment of needs across domains, including care responsibilities, health and mental health difficulties, disability, food insecurity, and housing instability, case management can be an instrument in integrating support in the home so that interventions are not delivered in isolation but are sequenced and combined in ways that reflect the household's needs and capacity to absorb solutions.

Examples of case management can be found across contexts. In Jamaica, it supports vocational training, mental health services, and domestic violence interventions. In Mozambique, case management is used in the child subsidy (*Subsídio para a Criança*) program and is being progressively extended.[18]

Guaranteed minimum income schemes in the European Union increasingly incorporate case management, including tailored inclusion plans, multidimensional needs assessments, and single points of contact for service referrals.[19] A recent randomized evaluation in the United States illustrates the potential of case management. It found that a program combining individualized case management, regular coaching, service referrals, and flexible financial assistance led to improvements in labor market outcomes.[20]

Engaging with the private sector

In addition to program convergence and better coordination across public sector implementers, adopting a settings approach to human capital requires engaging with numerous stakeholders, including parents in homes (chapter 2), local and state governments and community members in neighborhoods (chapter 3), and firms and entrepreneurs in the workplace (chapter 4). For instance, to achieve improvements in educational outcomes in violent contexts, parents are crucial agents in the home, while local community members, such as school tutors, mentors, and staff at local nongovernmental organizations, are critical in neighborhoods. These actors deliver school-based group counseling, mentoring, and cognitive behavioral therapy in contexts as diverse as Chicago, Monrovia, and San Salvador.[21] This does not mean

public financing should be reduced or replaced with the contributions of parents, communities, or the private sector, nor does it necessarily diminish the importance of high-quality public services. Rather, the settings lens underscores the need to integrate the home, the neighborhood, and the workplace into policy design. The input of these locations should be identified and encouraged, and the role of parents, communities, and the private sector as critical agents in making sectoral investments in schools, health facilities, and job centers effective should be recognized and promoted.

The private sector plays an important role in human capital accumulation. In homes, for example, private food producers and distributors strongly influence the nutrition that households can access and afford. Their marketing strategies and market penetration influence household choices, underscoring the need for governments to regulate practices, such as the marketing of breast milk substitutes or the advertising of low-nutrition food and beverages to children.[22]

The private sector is important in addressing gaps in childcare and preprimary education services in neighborhoods. The private sector is also an important and, in some cases, the biggest provider of primary health and basic education in countries. The key challenge facing public policy in these circumstances is how to regulate and ensure quality.

Most learning in the workplace occurs in private firms. Firms often underinvest in training, however, because they cannot capture its full benefits. Workers may leave and apply their new skills in other jobs. Governments can shrink the gap between social and private returns to skill acquisition on the job by providing firms and entrepreneurs with wage subsidies, training vouchers, or cofinancing schemes as incentives to undertake training. If well designed, such incentives tend to raise the training provision of firms and the participation of workers, with positive effects on skills, wages, and productivity.

Market imperfections—limited credit, lack of certification, inadequate management capacity—can also hold back skill investment in private firms. In these cases, governments can subsidize access to professional services, in effect supporting access to external human capital through the market. In Nigeria, government subsidies that enabled small and medium enterprises to insource or outsource specialized functions, such as marketing and finance, led to substantial improvements in business practices, increases in product innovation, and, in the case of outsourcing, higher sales and profits.[23] These impacts were markedly larger than those from training among business owners alone. Similarly, in the Republic of Yemen, matching grants allowed small and medium firms to pay for consulting services in accounting, marketing, and business training, leading to large increases in new product development and the adoption of better business practices.[24]

Tracking progress: A national and global data agenda

Tracking progress in human capital investment across homes, neighborhoods, and workplaces requires clear metrics of success. Given current data availability, this will require a more ambitious national and global data agenda.

It is possible to increase inputs, such as school enrollment, and still have near total stagnation in outcomes, such as learning. More direct proxies of human capital are therefore needed to measure the effectiveness of policies or programs and to monitor real progress in human capital accumulation.

The indicators would ideally lend themselves to frequent measurement at scale. Monitoring and adjusting policy in response are difficult if data are produced and disseminated only in cycles of 10 years. Table 5.1 lists these types of outcome indicators with suggestions for the mode and frequency of measurement. Many of these indicators are already a part of the World Bank Group Scorecard, which tracks progress toward the World Bank's mission across 22 indicators.[25]

For example, at home, measuring children's heights and weights, which would permit the calculation of the prevalence of both stunting and obesity, provides a direct measurement of children's nutritional status. Likewise, early vocabulary would help measure the extent to which children are learning skills at home that will prepare them to learn once they attend school. Deficits in these early skills predict skill shortfalls throughout school age and in adolescence when children are at school.

To understand whether neighborhood attributes are holding back human capital accumulation, tracking variation across neighborhoods is important. Typically, household surveys are not representative at this level. Identifying whether there are neighborhoods in which human capital outcomes are especially poor and why this may be so will thus require investments in the production, processing, and use of administrative data.

Because an individual needs to be employed to acquire human capital on the job, tracking employment is a way to monitor whether there are sufficient opportunities to build human capital at work, particularly among groups underrepresented in the workforce, such as women and youth. If workers are paid according to their contributions to output (that is, if they are paid their marginal product), then tracking earnings as the workers gain experience should provide an indication of whether the workers are gaining job-relevant skills at work. Distinguishing among occupations, such as own farmwork, small business, and office work, will be useful in identifying whether there are segments of the workforce that may not be acquiring sufficient human capital at work.

TABLE 5.1 Outcome measures to track progress in human capital accumulation

Example indicators	*Mode*	*Frequency*
HOME		
Stunting prevalence, children under age 5[a]	Household survey	Three times in 10 years
	Administrative data	Ongoing
Vocabulary	Household survey	Three times in 10 years
Reading proficiency at end-of-primary school age[a]	Household survey	Three times in 10 years
	National assessment	Annual
Prevalence of mental health disorders	Household survey	Three times in 10 years
	Administrative data	Ongoing
NEIGHBORHOOD		
Stunting prevalence, children under age 5[a], by neighborhood	Administrative data	Ongoing
Reading proficiency at end-of-primary school age[a], by neighborhood	National assessment	Annual
Mortality, by neighborhood	Vital statistics	Ongoing
WORKPLACE		
Employment, by gender, occupation, and firm size	Labor force survey	Annual
Youth not in education, employment, or training[a]	Household survey	Three times in 10 years
	Labor force survey	Annual
Labor earnings or profits, by tenure and occupation	Administrative data	Annual
Worker productivity (value added per worker)	Administrative data	Three times in 10 years

Source: Original table for this publication.

a. Indicators on the World Bank Group Scorecard, which tracks progress toward the World Bank's mission across 22 indicators.

The home, the neighborhood, and the workplace are important settings for building human capital either because some investments take place in these settings, such as the purchase of children's books, or because these locations moderate exposure, such as exposure to particulate matter in the air. In addition to measures of outcomes, it will also be important to measure the inputs associated with the home, the neighborhood, and the workplace (refer to table 5.2).

TABLE 5.2 Input measures to track progress in human capital accumulation

Example indicators	*Mode*	*Frequency*
HOME		
School enrollment, ages 4–24	Household survey	Three times in 10 years
	Administrative data	Ongoing
Children's books at home	Household survey	Three times in 10 years
Severe violent punishment at home	Household survey	Three times in 10 years
NEIGHBORHOOD		
Number of health and education facilities available in the neighborhood	Administrative data	Annual
School enrollment, ages 4–24, by neighborhood	Administrative data (population census and school census)	Once in 10 years (population census), annual (school census)
High-school graduation and dropout, by neighborhood	Administrative data (population census and school census)	Once in 10 years (population census), annual (school census)
Percentage of people exposed to crime, by neighborhood	Crime monitoring (for example, homicides)	Ongoing
Percentage of people exposed to hazardous air quality[a], by neighborhood	Air quality monitors	Ongoing
WORKPLACE		
Percentage of employed total and by occupation and gender[a]	Labor force survey	Annual
Firm size	Enterprise survey	Three times in 10 years
Number of organizational layers in a firm	Enterprise survey	Three times in 10 years
On-the-job training provided to own workers in a firm	Enterprise survey	Three times in 10 years

Source: Original table for this publication.

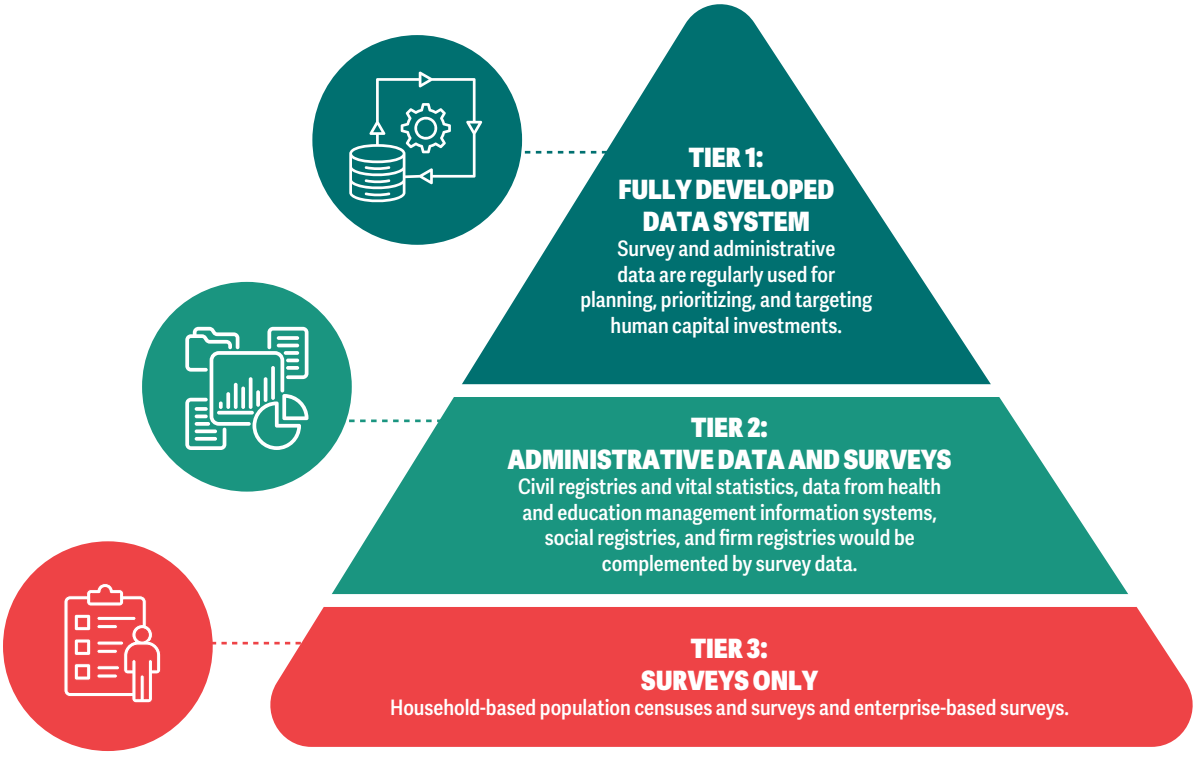
a. Indicators on the World Bank Group Scorecard, which tracks progress toward the World Bank's mission across 22 indicators.

While not exhaustive, these outcome and input indicators should provide a snapshot of how well homes, neighborhoods, and workplaces are contributing to human capital accumulation. The progression toward a data system covering these indicators may start with household-based surveys, population censuses, and enterprise surveys that generate the core indicators needed to understand human capital outcomes. As a country's data architecture becomes more

sophisticated, administrative data—particularly civil registries, vital statistics, education system data, social protection system data, and firm registries—will provide more frequent high-quality data. A fully developed data system would produce, process, and use these core indicators to support planning, prioritization, and targeting in human capital investment (refer to figure 5.3).[26]

Linked to this data agenda must be a research agenda to identify cost-effective and scalable implementation approaches to improve human capital formation in the home, the neighborhood, and the workplace (refer to box 5.3). While substantial research exists on individual programs, key questions remain. For instance, relatively less is known about whether complementarities exist across programs, that is, whether programs should be undertaken in combination or in a certain sequence, or how implementation might be adapted if an entire population requires the intervention, for example, populations in fragile and conflict-affected contexts with limited capacity or populations with high rates of extreme poverty.

FIGURE 5.3 The progression toward a fully developed data system



Source: Original figure for this publication.

BOX 5.3 A research agenda

The research for this report addressed three questions on each setting: (a) In which ways does the setting matter in human capital accumulation? (b) Why are investments low in low- and middle-income countries in these settings? and (c) Which policies can help? For each setting, the report identifies a set of policies to promote human capital, along with broader reforms that would enable governments to activate these settings for human capital accumulation. For each policy, chapters 2 through 4 also report on the strength of the evidence; whether impacts estimated in research have been low, medium, or high; and what remains to be learned. These policy unknowns suggest the following research agenda.

The home

This report advocates for policies that ensure households have more resources and that governments deploy programs targeting the care environment of children and adolescents. New research could provide insights into issues of implementation and scale.

For cash transfers, which are one method to increase household resources among the poorest, future research could help establish the combination of transfer duration, value, employment support, and targeted population that translates most effectively into improvements in human capital.

For parenting programs, there is little evidence of success at scale. Key questions on the design of these programs relate to the targeting criteria (for example, age of the child, poverty status, maternal education, or child development measures), the qualifications and remuneration of front-line staff, and effective complementary programs (for instance, mental health counseling for parents). Likewise, relatively little is known about the effectiveness of additional components in augmenting the impacts of preschool, such as health or child protection services for children or job training and employment services for parents.

The neighborhood

This report advocates for engaging more sectors, such as infrastructure, sanitation, and social development, in neighborhoods to achieve better human capital outcomes. New research could shed light on how these sectors can be integrated most effectively.

(Box continues on next page)

BOX 5.3 A research agenda *(continued)*

There is also a great deal to be learned on how communities can best become involved without elite capture, how schools and health facilities could be used as entry points for integrated interventions at the local level, and what combination of policies yields the largest sustained human capital returns per dollar in low-resource neighborhoods.[a] Understanding when local general equilibrium effects are important should also be a priority.[b] Situations of fragility, conflict, and violence and other situations in which capacity is limited present particular implementation challenges, and research on how best to implement policies to raise human capital in these fragile settings would be valuable.

The workplace

This report advocates for increased public and private investment in on-the-job learning and for establishing incentives for firms to invest in workplace attributes that foster skill development. Topics that would particularly benefit from more research revolve around issues of effectiveness. Here, too, there are clear implementation challenges that have received less attention. Limited monitoring, weak certification systems, and inadequate public-private coordination may hinder effective implementation.

In terms of creating more high–human capital jobs, research is needed to understand the mix of financing, research and development incentives, and market access that can drive sustained skill-intensive growth. Another question is whether firm and education policies should be jointly targeted, combining expansions in education with support for firms and entrepreneurs to absorb the newly skilled workforce.

a. Elite capture is the diversion for private gain by powerful individuals or groups (the elite) of public resources, development assistance, or policy or political plans or programs intended to benefit the general population.

b. Local general equilibrium effects are the adjustments in prices, wages, consumption, or investments that follow localized economic shocks, such as policy changes, cash transfers, or a crisis or a disaster.

Conclusion

Human capital is essential for people to obtain good jobs and earn higher incomes. Despite tremendous progress in expanding access to education, health care, and social services, improvements in critical outcomes have stagnated or declined in many low- and middle-income countries. This report proposes an approach to tackle this lack of progress.

First, a settings lens is appropriate for identifying the investments required to address the global challenges to human development. A narrow focus on solutions based on facilities provides an incomplete picture of the underlying causes of the challenges. Substantial evidence shows that human capital accumulates in places beyond schools, clinics, and job training centers. For example, skill gaps emerge before children start school and do not narrow in childhood or during adolescence. Shortages in nurturing care at home explain a large share of the disadvantage. Similarly, good outcomes in nutrition and learning are held back by adverse neighborhood characteristics, such as poor sanitation, pollution, and exposure to violence. Because people spend more time in jobs than in schools, the workplace is responsible for around half of lifetime skill development. The interactions and dynamics in these settings lead directly to the deficits observed in workplaces.

Second, reforms that integrate the efforts of sectoral actors and stakeholders in homes, neighborhoods, and workplaces are needed to activate these settings for greater human capital accumulation. Implementing multisectoral policies presents two key challenges. First, sectoral actors have distinct mandates, and, second, homes, neighborhoods, and workplaces are not the settings in which most line ministries typically operate. Addressing these challenges requires aligning sectors around a shared goal, such as reducing malnutrition, poverty in learning, or deficits in skills, and establishing mechanisms that integrate services across these settings. It also entails combining interventions targeted by location and complementary actions at the national level, such as regulatory reform. A convergence orientation that tackles the constraints in homes and neighborhoods simultaneously can help overcome the barriers. Social registries, single-window service platforms, case management, and other tools have proven especially effective in supporting this type of integration. The settings approach also requires engaging with many stakeholders, including parents in the home, community associations in the neighborhood, private firms and entrepreneurs in the workplace, and local and state governments.

Third, tracking progress in homes, neighborhoods, and workplaces will require more ambitious national and global data agendas. Data on core inputs and outputs in each setting are missing or out-of-date in many low- and middle-income countries; administrative data systems are often weak, and the data that are collected are often not used to plan, prioritize, or target investments.

The three components of a solution—the settings lens, tools for integrating services in settings, and an ambitious data agenda for tracking progress—can turn today's human capital stagnation into tomorrow's acceleration to drive economic growth and more widespread opportunities among people.

Notes

1. Galor and Moav (2004); Goldin and Katz (2007); Hendricks and Schoellman (2018); Khanna (2023).
2. Barham et al. (2013); Black et al. (2007).
3. Aizer and Currie (2014); Weil (2007).
4. Gertler et al. (2014); Spears (2013); Walker et al. (1991).
5. Attanasio et al. (2020); Borghans et al. (2008); Gensowski et al. (2024); Heckman et al. (2013).
6. Gensowski et al. (2024).
7. Arceo-Gomez et al. (2016); Melnikov et al. (2020); Sviatschi (2022a), (2022b); Tanaka et al. (2022).
8. Chetty and Hendren (2018); Lavy et al. (2012); Sacerdote (2011).
9. Atkin (2016); La Porta and Shleifer (2014); Tsivanidis (2019).
10. Crépon and Premand (2025); de Mel et al. (2008); McKenzie (2017).
11. Carneiro et al. (2024).
12. Hidrobo et al. (2020); Sedlmayr et al. (2020).
13. Carneiro et al. (2021).
14. Banerjee et al. (2021).
15. Guven et al. (2025).
16. Bailey et al. (2021); Carneiro and Ginja (2014); Kline and Walters (2016).
17. Bailey et al. (2021).
18. Refer to Case Compass (dashboard), World Bank, https://www.case-compass.org/.
19. Marzi et al. (2024).
20. Evans et al. (2025).
21. Blattman et al. (2023); Dinarte-Díaz and Egaña del Sol (2024); Heller et al. (2017).
22. Cairns et al. (2013).
23. Anderson and McKenzie (2022).
24. McKenzie et al. (2017).
25. Refer to the World Bank Group Scorecard (dashboard), World Bank, https://scorecard.worldbank.org/en/home.
26. These functions are part of the integrated national data system described in World Bank (2021).

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Human capital—the health, knowledge, skills, and experience that people accumulate throughout their lives—is essential for productivity and economic growth. Yet, progress has stalled, and there have even been reversals in human capital accumulation over the last 15 years. Two-thirds of low- and middle-income countries experienced declines in nutrition, learning, or workforce skill development between 2010 and 2025.

Building Human Capital Where It Matters argues that, to accelerate human capital development and accumulation, the focus of policy needs to be expanded beyond schools and clinics to include other key settings where human capital is built: the home, the neighborhood, and the workplace. This settings approach provides an understanding of some of the crucial drivers of human capital accumulation, such as care for children and adolescents in the home, the social dynamics and the quality of the environment in neighborhoods, and job attributes that foster learning at work. It also makes evident the benefits of collaboration across various departments of governments and between the public and private sectors and the need for a more ambitious data agenda that tracks progress in human capital in the home, the neighborhood, and the workplace.

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ISBN 978-1-4648-2277-3

SKU 212277

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