

Tackling Income Inequality: What Works and Why?

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This article reviews the most recent and relevant evidence on key domestic policy interventions that are effective in reducing income inequality in developing countries, the benefits they generate, the choices that need to be made regarding their design and implementation, and the trade-offs that are associated with them. It focuses on a few policy areas in which there is a sufficient body of rigorous evidence to draw useful lessons with confidence: early childhood development, including breastfeeding; universal health care; good-quality education; conditional cash transfers; investments in rural infrastructure; and taxation. The review concludes that there are many pathways to reducing inequality, from narrowing gaps in income generation opportunities to narrowing the potential for inequalities in human capital development before the inequalities emerge, smoothing consumption among the most deprived, and redistribution in favor of the poor. Many interventions are simultaneously associated with equalizing outcomes, improved competition, and economic efficiency. Good interventions combining equality promotion and efficiency are possible in all settings and at different times; this includes interventions disproportionately benefiting the poorest in low-income countries during periods of crisis. Despite the significant increase in knowledge about equality interventions, the article makes a strong call for more microeconomic data and better—more precise—analysis to evaluate the effectiveness of interventions.

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Introduction

Recent years have witnessed increasing attention to inequality in both income and wealth, coinciding with the emergence of new social and political movements in rich countries.*¹ The topic of inequality has received a dedicated Sustainable Development Goal (SDG 10), as well as a more prominent role in the policy discourse of the International Monetary Fund, the Organisation for Economic Co-operation and Development, and the World Bank. Empirical evidence on inequality and its measurement has expanded, resulting in new global datasets, such as the World Income Inequality Dataset and All the Ginis (UNU-WIDER 2018 and Milanović 2018, respectively), new measures such as shared prosperity measures (World Bank 2016a), and increasing academic work (Atkinson 2015; Bourguignon 2015; Ferreira, Lustig, and Teles 2015; Piketty 2013; Milanović 2016).

It is now well known that inequality in income remains extensive globally despite a decrease driven by a rapid reduction in intercountry inequality as large, emerging economies shorten the income gap relative to industrialized countries (Milanović 2016). However, the story of within-country inequality is varied, complex, and changing (World Bank 2016a). Although the negative effects of inequality on governance, stability, economic growth, and the rate of poverty reduction have long been documented (World Bank 2005), the body of empirical evidence on policies that may narrow inequality, while preserving incentives to sustain growth and reduce poverty, is more limited.

This paper focuses on the knowledge gap and addresses the question of what policies are effective in reducing inequality and poverty within countries without compromising economic growth. It assesses what is known about domestic policy interventions that are effective in reducing inequality, the benefits they generate, the choices in design and implementation, and the associated trade-offs in terms of design and implementation, as well as in terms of efficiency and growth. The review focuses primarily on evidence on developing countries. However, it also selectively reports evidence on interventions implemented in high-income countries and discusses their potential effectiveness in developing countries.

There are two reasons for the focus on the developing world. First, extreme poverty and inequality constitute a more distinctly acute problem in developing

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countries. The most unequal countries in the world are all developing countries, and extreme poverty—both in relative and absolute terms—is concentrated in low- and middle-income countries.² Second, many interventions are neither replicable nor comparable between developed and developing countries because of differences in technical, logistical, human resource–related, and administrative aspects of policy implementation. Additionally, there are significant differences with respect to financial sustainability, governance, politics, corruption, attitudes toward certain programs, and so on.³ Yet, the review of policies in developing countries should be considered as a complement to other studies focusing on inequality in high-income countries that have analyzed drivers of inequality, such as labor market characteristics, technology, and regulation, to understand the trend toward increasing inequality in these countries (see Atkinson 2015; Keeley 2015 and references therein).

The following sections provide a comprehensive review of interventions (mainly in) the developing world from which lessons may be drawn with confidence: early childhood development (ECD), universal health care, good-quality education, conditional cash transfers (CCTs), investments in rural infrastructure, and taxation.⁴ The final section summarizes the key messages and lessons from this review and calls for more data on and a better analysis of the equalizing impacts of policies.

Early childhood development and nutrition

ECD interventions promote physical, socioemotional, language, and cognitive development during children’s early years. They help shape an individual’s educational attainment, health, social behavior, and earnings in adulthood (Duncan et al. 2007; Georgieff 2007; Glewwe, Jacoby, and King 2001; Grantham-McGregor et al. 2007; Hanushek and Woessmann 2008; Heckman, Pinto, and Savelyev 2013; Naudeau et al. 2011a, 2011b; Vegas and Santibáñez 2010; Walker et al. 2007; World Bank 2009). Nutritional deficiencies and cognitive underdevelopment during the first 1,000 days of life are associated with cognitive deficits in later life and lower academic achievement. Reducing inequality in access to ECD interventions therefore reduces inequalities in ability, educational achievement, health status, and expected adult earnings.

Children in more well off households enjoy greater access to ECD programs. In 21 of 27 low- or middle-income countries, preschool enrollment rates among the poorest quintile of the population are less than a third the rates among the richest quintile (Alderman 2011). Such disadvantages are compounded because poor children have less access to adequate nutrition, health care services, basic water and sanitation infrastructure, and childcare (UNICEF 2005; World Bank 2015a).

Investments in ECD interventions typically have economic benefits among individuals and society. For example, earnings at ages 28–40 among former partic-

ipants in the HighScope Perry Preschool Study in the United States in the 1960s were 28 percent higher among men and 22 percent higher among women relative to the earnings among the control groups (Heckman et al. 2010). Such direct benefits accruing to individuals represent only about a third to a half of the total payoffs from such interventions once social benefits—the reduced public spending to address grade repetition, social assistance transfers, and crime—are taken into account (Barnett and Masse 2007; Heckman et al. 2010; Reynolds et al. 2002). If one considers social benefits in addition to individual ones, the economic impact of exclusive breastfeeding until age 12 months or later has been estimated at US\$302 billion, 0.5 percent of the world's gross national income (Gillespie et al. 2016).

Parenting skills

Many ECD programs concentrate on parenting skills to promote greater cognitive stimulation among children. These programs generally involve one or more of three initiatives: home visits, group sessions, and clinic appointments. The most well known program of this kind in the developing world is a Jamaican intervention launched in 1986. The intervention targeted toddlers ages 9–24 months who suffered from stunting. It consisted of weekly visits by community health workers to teach parenting skills aimed at fostering cognitive and socioemotional development (Gertler et al. 2014). It also provided nutrition supplements and stimulation: mothers were taught to play and converse with their children in a way that encourages cognitive development. Undersized children benefiting from stimulation and nutrition supplements caught up with children of normal size 18 months after the start of the program, developing at a more rapid rate than undersized children who were not participating. Among the participants 20 years after the intervention, the groups receiving stimulation had 25 percent higher earnings than the control group. This increase in earnings had allowed those in the stimulation program to catch up completely with the nonstunted comparison group. Meanwhile, a nutrition-only group showed no statistically significant difference with the control group (Gertler et al. 2014).

Other countries have adapted the program. For instance, a recent program involving 1,400 children in Colombia that enlisted local mothers to make home visits found benefits in children's cognitive and language development (Attanasio et al. 2014). In Bangladesh, a program involving weekly group meetings, coupled with home visits, led to benefits in mental development (Hamadani et al. 2006, cited in Alderman 2011). A program in Ecuador improved language, memory, and fine motor skills, while a project in Brazil involving group workshops among mothers, along with home visits promoting play, showed benefits in mental and psychomotor development (Berlinski and Schady 2015; Eickmann et al. 2003; Rosero and Oosterbeek 2011). An evaluation in Antigua and Barbuda, Jamaica, and St. Lucia on the

impact of home visits and a package of instructional videos and materials shown to mothers found benefits in child cognitive development and parenting knowledge among mothers (Berlinski and Schady 2015; Chang et al. 2015). In Germany, a program that targeted disadvantaged mothers until their first child's second birthday showed significant improvements in cognitive development among the girls (Sandner and Jungmann 2017). In addition, targeting parenting classes on mothers was found to lead to the empowerment of women: more mothers joined the labor market and made household decisions regarding child-rearing and finances (Lavy, Lotti, and Yan 2016).

Preschool

By the age of 4, children in poorer households typically show less cognitive and language development than their peers (Berlinski and Schady 2015; Naudeau et al. 2011a). Two studies in the United States involve the most well known programs addressing such early cognitive and emotional delays through preschool education (Murphy et al. 2015). Initiated in 1962, the HighScope Perry Preschool Study randomly assigned 3- and 4-year-olds in low-income households to preschool or no preschool groups. By age 40, adults who had been in the preschool group had higher earnings, were more likely to be employed and to have graduated from high school, and were less likely to have been arrested, spent time in jail, or used drugs (Alderman 2011; Reynolds et al. 2007). The other study was launched in the early 1980s at the Chicago Child-Parent Center. By age 24, the participants showed better high school completion rates, greater rates of four-year college attendance, lower rates of incarceration, and lower incidence of depression. The estimated premium in lifetime benefits per participant was US\$78,000 (Reynolds et al. 2007). Other preschool programs evaluated in the United States suggest that the average benefit-to-cost ratio is between 1 : 6 and 1 : 7, that is, US\$6–US\$7 per US\$1 invested (Reynolds et al. 2007).

Several studies have investigated short-term impacts of preschool programs in the developing world. In Mozambique, a Save the Children pilot program begun in 2008 in 30 villages has shown positive results on an investment of under US\$3 per child per month. The program improves outcomes among children in cognitive, socioemotional, and fine motor development; increases the chances that children will be in primary school and at their age-appropriate grade; and improves self-reported parental behavior in early stimulation and discipline (Martinez, Naudeau, and Pereira 2012). In Argentina in 1993–99, the government built classrooms so an additional 175,000 children could attend preschool. A study in 2006 found that children attending one year at these preschools had higher test scores and better school learning behavior than nonattending children in the schools (Berlinski, Galiani, and Gertler 2006).

Improving preschool quality enhances outcomes among the most disadvantaged children. Quality refers to teacher-student interaction, curriculum selection, professional development, staff accreditation, classroom size, and learning materials. Higher quality generally leads to better learning outcomes, as demonstrated in Bangladesh and several countries in East Africa (Naudeau et al. 2011a). Evidence on preschools and primary and secondary education points to the experience and incentives of teachers rather than teacher training as the most effective drivers of improved learning (Araujo et al. 2016; Britto, Yoshikawa, and Boller 2011; Chetty, Friedman, and Rockoff 2014; Engle et al. 2011). However, a study in Danish preschools found that teacher training improved children's socioemotional development (Jensen, Jensen, and Rasmussen 2017).

Richer households are more likely to send their children to preschool, but the children of poor households enjoy bigger benefits if they attend preschool. A survey in 52 countries found a strong correlation between preschool attendance and parental wealth and a stronger correlation with mother's education (Alderman 2011). Studies in the United States and in the developing world show that children in households of low socioeconomic status or whose mothers have low educational attainment enjoy greater benefits from preschool relative to more affluent students (Naudeau et al. 2011a). These benefits include better nutrition status, mortality rates, cognitive and socioemotional development, and future earnings. The effects of the Head Start Program on improved test scores in the United States were especially large among disadvantaged children who would not have attended any kind of preschool otherwise (Kline and Walters 2016). Across several Eastern European countries, preschool was found to improve literacy rates among Roma children (Felfe and Huber 2017). In Nepal, Nicaragua, and Uruguay, preschool benefits poor children more than wealthier counterparts in terms of cognitive and socioemotional development and future educational attainment (Berlinski and Schady 2015). Thus, in Uruguay, among children of mothers with low educational attainment, those who had attended preschool were 27 percent more likely to remain in school at age 15 than a control group of children who had not participated in preschool. Among children of more well educated mothers, the corresponding effect of preschool was only 8 percent (Berlinski, Galiani, and Manacorda 2008). In line with this, a recent study in the United States finds that a free preschool program increases intergenerational earnings mobility and leads to lower income inequality in the long run (Heckman and Raut 2016).

Breastfeeding and nutrition

The World Health Organization recommends that mothers start breastfeeding their infants within an hour of birth and exclusively breastfeed for the first six months of life (WHO and UNICEF 2003). Exclusive breastfeeding is correlated with lower

child mortality. Increasing the rate of exclusive breastfeeding to 90 percent worldwide would prevent up to 13 percent of child deaths (Naudeau et al. 2011a; Papp 2014). Nonbreastfed infants face eight times more risk of death than infants benefiting from exclusive breastfeeding in the first 12 months of life. These risks are larger among girls than boys (Sankar et al. 2015; WHO 2000). An analysis in low- and middle-income countries estimates that breastfeeding avoids about half of all cases of diarrhea and a third of respiratory infections among infants (Horta and Victora 2013). A study in Brazil reports the substantial effects of breastfeeding on intelligence, educational attainment, and adult earnings. Participants who had been breastfed for 12 months or more showed, 30 years later, higher intelligence quotients, more years of education, and higher monthly incomes relative to people who had been breastfed for less than a month (Victora et al. 2015). A randomized trial in Belarus estimated a systematic higher mean of about 6 intelligence quotient points among treatment children ages 6 who had been breastfed through their first 12 months of life (Kramer et al. 2008).

Breastfeeding is one of the few positive health behaviors in low- and middle-income countries that is more prevalent among poor women. Nonetheless, the additional promotion of breastfeeding among poor women could help reduce gaps in cognition, health, and future incomes. A program in Belarus randomly assigned maternity hospitals to encourage breastfeeding using the World Health Organization–United Nations Children’s Fund guidelines, while similar hospitals served as the control. The intervention led to much higher breastfeeding rates and lower diarrhea rates among infants (Der, Batty, and Deary 2008; Kramer et al. 2001, 2002, 2008; Oster 2015). Alive and Thrive, a program in Bangladesh, Ethiopia, and Vietnam, combines advocacy, community mobilization, and mass media to encourage exclusive breastfeeding. Since 2010, the share of infants ages under 6 months who are exclusively breastfed has increased from 49 percent to 86 percent in places that have received a comprehensive intervention. In Vietnam, exclusive breastfeeding tripled in areas where interpersonal counseling services in health facilities supported mass media campaigns.

Many women in the developing world do not visit health facilities for prenatal care or to give birth, especially among the poorest quintiles, raising the need for community- or home-based interventions (Berlinski and Schady 2015). Evidence on such interventions in Bangladesh, Burkina Faso, India, Mexico, South Africa, and Uganda shows success in initiating and extending the duration of breastfeeding (Bhandari et al. 2003; Haider et al. 2000; Morrow et al. 1999; Tylleskär et al. 2011). Bangladesh’s community-based nutrition program, Shouhardo II (strengthening household ability), reduced the prevalence of stunting among under-5-year-olds. Other countries have engaged in multidimensional strategies of behavioral change with the same sort of positive results (Berlinski and Schady 2015; Pérez-Escamilla et al. 2012).

Some programs also deliver complementary feeding. Beneficiaries of a protein supplement program in Guatemala completed more schooling, had higher cognitive skills, earned higher wages, and were more likely to be employed in higher-paying jobs. Women in the sample had fewer pregnancies and faced less risk of miscarriages and stillbirths (Hoddinott et al. 2011).

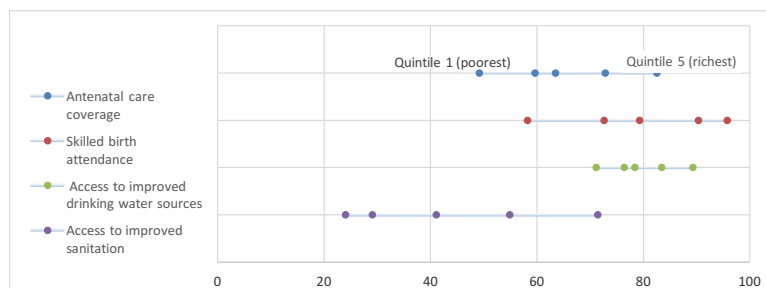
Nutrition programs that include psychosocial stimulation are generally more effective (Black et al. 2008; World Bank 2009). A program in rural Vietnam shows that infants who receive stimulation and nutrition do better than children who only receive stimulation in terms of cognitive outcomes (Naudeau et al. 2011a). In Burkina Faso, the Enhanced Homestead Food Production Program combined nutrition interventions with home gardening, small animal production, and behavioral change communication components among households over a two-year period. An evaluation reported a reduction in anemia, diarrhea, and wasting among children ages 3–12 months and increases in dietary diversity and the intake of nutrient-rich foods among all age beneficiaries (Gillespie et al. 2016). The success of the Shouhardo II Program in Bangladesh has been attributed to the combination of nutrition-specific maternal and child interventions and other interventions designed to empower women, promote livelihoods, and improve the health environment of households.

Health care and education

Achieving universal healthcare

The coverage of health services for children and reproductive and maternal health services is improving globally. Between 1994 and 2014, gains were made overall, but especially among poorer rural children and mothers. However, inequalities in the access to and the uptake of health services remain large despite this progress (Victora et al. 2017). In low- and middle-income countries in 2005–13, the median antenatal care coverage was less than 50 percent among the poorest quintile of households, compared with a median of 83 percent in the richest quintile (figure 1). In the same period, only 23 percent of households in the poorest quintile had access to improved sanitation, compared with 71 percent in the richest quintile. Immunization coverage and access to improved drinking water showed narrower disparities. Rural areas had lower median health care access than urban areas. Many women and girls are disadvantaged in health care access and outcomes. China and India are the only two countries in the world where girls are more likely than boys to die before age 5. Female infanticide and discrimination against girls in receiving vaccinations, medical care, and adequate nutrition are reportedly behind these gaps. One-third of the countries that are not making progress in reducing under-5 mortality and expanding immunization are in South Asia and Sub-Saharan Africa.

Figure 1
Median Coverage, Selected Health Care Interventions, by Wealth Quintile, Low- and Middle-Income Countries, Circa 2005–13



Sources: Based on a sample of 83 countries using 2005–13 data or data on the closest available year in STATcompiler (DHS Program STATcompiler) (database), ICF International, Rockville, MD, <http://www.statcompiler.com/>; MICS (Multiple Indicator Cluster Surveys) (database), United Nations Children’s Fund, New York, <http://mics.unicef.org/>.

For the list of countries see www.STATcompiler.com

Improved health boosts income (Bloom and Fink 2013; Jamison et al. 2013). Studies find causal relationships between good nutrition and productivity among factory workers in China and farm workers in Indonesia (Alleyne and Cohen 2002). Thus, nonanemic workers in Indonesia were found to be 20 percent more productive. Another study in Indonesia concluded that the income gap between beneficiaries and nonbeneficiaries of iron supplements had increased by about 20 percent after four months of the intervention. In China, an analysis found a 17 percent rise in productivity among women cotton mill workers who had received 12 weeks of iron supplements (Basta et al. 1979; Li et al. 1994; Thomas et al. 2006).

Child-deworming interventions in Kenya reduce sickness and improve school attendance (Baird et al. 2015; Miguel and Kremer 2004). Among girls younger than 13 and all boys, school participation rose by 9.3 percent in the first year after deworming medical treatment. A study estimated the long-run increase in adult incomes deriving from mass deworming at 17 percent, similar to average estimates elsewhere in Africa, at 24 percent (Baird et al. 2015; Miguel and Kremer 2004).

The 2013 Lancet Commission estimated the costs and benefits of scaling up health interventions in 34 low-income countries and 48 lower-middle-income countries (Jamison et al. 2013). Feasible scenarios involving the narrowing of disparities would prevent about 10 million deaths by 2035 (Jamison et al. 2013). Other estimates suggest that expanding intervention coverage would cut deaths associated with pneumonia and diarrhea by two-thirds (UNICEF 2016). Similarly, expanding

access to 10 proven interventions, ranging from the treatment of acute malnutrition to vitamin A and zinc supplementation, would avert 900,000 deaths among under-5-year-olds in the 34 countries with the highest under-5 mortality rates. The study estimates that international funding for health research and development against the diseases most prevalent in low- and middle-income countries should increase from the current annual US\$3 billion to US\$6 billion by 2020 (UNICEF 2016).

Achieving universal health care requires the delivery of timely health services to those who need them, but who are unable to pay, geographically distant from providers, or constrained by cultural and gender norms or citizenship status. It also implies protection against catastrophic or impoverishing health service expenditures. To reach universal coverage, health care must expand more quickly among the poorest 20 percent of a population (UNICEF 2016). Yet, targeting should not exclusively focus on poor households, given that, because of intrahousehold inequality, many underweight women and undernourished children reside in nonpoor households (Brown, Ravallion, and van de Walle 2017).

There are multiple examples of progress toward universal health care among low- and middle-income countries. Thailand's Universal Coverage Scheme brings a large uninsured population under the umbrella of a national program (UNICEF 2016). Within a year of its launch, the scheme was covering 75 percent of the population, including 18 million previously uninsured (UNICEF 2016). In Cambodia, efforts to achieve more health service access are articulated through health equity funds, which are multistakeholder initiatives whereby nongovernmental organizations reimburse public health facilities for the treatment of poor patients, largely eliminating prohibitive fees and improving the quality of care (UNICEF 2016). By 2013, health funds were covering more than 2.5 million people. Between 2000 and 2015, the under-5 mortality rate fell from 108 to 29 deaths per 1,000 live births (UNICEF 2016). In Kwara State, Nigeria, a community health insurance scheme increased the use of health care by 90 percent among beneficiaries. It raised the use among beneficiaries of health care providers and facilities and cut their health expenditures by half. Beneficiaries incurred copremiums of US\$0.14 per person per year, but no other out-of-pocket payments (Gustafsson-Wright and Schellekens 2013). In Rwanda, the national health insurance program, *Mutuelle de Santé* (co-operative health fund), covers about 90 percent of the population and provides free care among the extreme poor (UNICEF 2016). Out-of-pocket spending fell from 28 percent to 12 percent of total health expenditures during the program's first decade. In India, community resource centers in urban informal settlements provide health services, but also information, day care, and general support. A randomized study found modest improvements in family planning and child nutrition (More et al. 2017). Another innovative project in Indian slums offered insurance policyholders a free consultation with a doctor for a general checkup. After this intervention, people were more likely to pay to renew their health insurance and to see a qualified

doctor in the future in case of illness. These effects were especially strong among poorer households (Delavallade 2017).

These and many other experiences confirm there is no unique model of success in universal health care (Wagstaff et al. 2016). Thus, direct public provision networks in China, Colombia, Mexico, and Thailand effectively cover everyone not covered by social health insurance mechanisms. Brazil and Costa Rica have unified government health insurance and the public provision network into a system aimed at covering everyone (Wagstaff et al. 2016). Most of these countries have defined a benefits package, while others simply guarantee a minimum package of services. Other countries have expanded coverage to specific groups or specific interventions to reduce coverage gaps. Thus, Indonesia, Tunisia, Turkey, and Vietnam have expanded programs to poor populations, while programs in Argentina, Ethiopia, India, Kenya, and Peru have focused on maternal and child health among the poor. Another Indian program focuses on inpatient care for the poor, while Jamaica has focused on the affordable provision of medicines for all (Wagstaff et al. 2016).

Successful experiences must typically overcome trade-offs, especially the trade-off between service coverage and financial protection. In addressing such trade-offs, countries choose interventions depending on the access to and availability of financing, political economy considerations among interest groups, government willingness to launch reforms, local technical capacity, and the evidence available to set coverage and targeting priorities (Wagstaff et al. 2016).

Shifting the focus from raising enrollments to learning for all

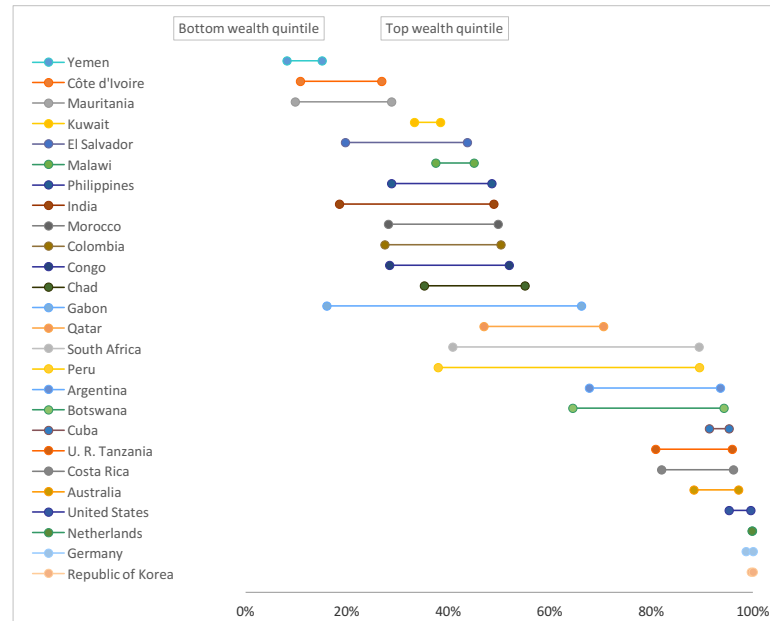
Universal access to education remains elusive, and progress toward good-quality education is uneven. In 2000, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) adopted the target of achieving Education for All by 2015 (UNESCO 2000). The effort consisted in reaching measurable goals in promoting gender parity and education quality. Worldwide, there was a 64 percent rise in enrollment in preschool education, and 80 million more children are now enrolled in school. Yet, only a third of countries had met all the goals by 2015. UNESCO data show that 58 million children of primary-school age and 63 million children of lower-secondary-school age are currently not in school (World Bank 2016b). At least 250 million children of primary-school age fail to advance to grade 4 or do not achieve the minimum learning targets in a given year. In India, 47 percent of children in grade 5 were unable to read a second-grade text; in Peru, half of grade 2 pupils could not read (ASER Center 2011; Crouch 2006; Das, Pandey, and Zajonc 2006).

Poor-quality education has a strong socioeconomic dimension. The poorest children are four times less likely than the richest children to receive primary education. Among the estimated 780 million illiterate adults worldwide, nearly two-

thirds are women. Certain groups—the poor, women, rural residents—face greater hurdles in gaining access to education. Children in the poorest households systematically score below children in the richest households in mathematics tests (figure 2).

Figure 2 about here These educational disparities exacerbate inequalities in

Figure 2
Mathematics Scores, by Household Income, Selected Countries, Circa 2007–11



Source: Based on data in WIDE (World Inequality Database on Education), United Nations Educational, Scientific, and Cultural Organization, Rome, <http://www.education-inequalities.org/>.

Note: The figure indicates the share of primary-school students who satisfy international test standards in mathematics and who are in households in the bottom wealth quintile or the top wealth quintile.

knowledge, skills, employability, and economic prospects (World Bank 2016b). They lead to persistent intergenerational poverty gaps because the lack of education among segments of a society feed into economic and political inequalities and differences in life chances and opportunities (World Bank 2005). Thus, higher scores on international assessments of reading and mathematics among students are associated with appreciably higher annual per capita growth in gross domestic product (GDP) (Becker 1962; Becker, Murphy, and Tamura 1990; Hanushek and Woessmann 2008, 2010a; Lucas 1988; Rebelo 1991; Romer 1990; Schultz 1961).

Cross-country comparisons of educational achievement and aggregate growth rates show that an increase of one standard deviation in student reading and mathematics scores is associated with a rise of 2 percent in annual GDP per capita growth (Hanushek and Woessmann 2010b; World Bank 2011a). In India, farmers who exhibit a higher level of skills are able to adapt more effectively to new technologies, and regions characterized by better rates of schooling show higher rates in the adoption of newer farming techniques and technologies (Mittal and Tripathi 2009; Rosenzweig and Foster 2010). Schooling has been linked to more productive non-farm activities in China, Ghana, and Pakistan (Fafchamps and Quisumbing 1999; Jolliffe 1998; Yang 1997). More well educated parents enjoy better health and a greater ability to cope with economic downturns (Corbacho, Garcia-Escribano, and Inchauste 2007; Frankenberg, Smith, and Thomas 2003; Gakidou et al. 2010). Developing countries characterized by relatively poor and unequal access to schooling and inadequate education quality suffer a persistent handicap in growth prospects.

Regarding quality of education, estimates on the United States indicate that pupils taught by teachers who are at the 90th percentile in effectiveness are able to learn 1.5 years' worth of material, whereas those taught by teachers at the 10th percentile learn only a half-year's worth (Araujo et al. 2016). Quality teaching helps instill in children skills and behaviors that are rewarded by labor markets (Araujo et al. 2016). These include attentiveness, memory, self-control, and the ability to shift attention among competing tasks, all developed early in life and proven to be affected by teaching quality (Heckman and Kautz 2012). Evidence on the impact of teachers on long-term outcomes from Ecuador and the United States suggests that the way children are taught affects their future earning trajectories (Araujo et al. 2016; Bau and Das 2016; Chetty, Friedman, and Rockoff 2014). In Chile, a study found that gender-biased teaching lowered test scores among girls, but this gender bias decreased if the students were taught by more effective teachers (Bassi, Blumberg, and Mateo Díaz 2017). A study in the United States found that higher spending on public schools significantly increased earnings among adults and reduced future poverty, especially among children from poor families (Jackson, Johnson, and Persico 2016).

Quality teaching depends on interactions with children through emotional support, classroom organization, and instruction (Araujo et al. 2016). A teacher program in rural Kenya involving scholarships and incentives improved student test scores, although the benefits were only temporary. In an intervention in rural India, salary incentives among teachers helped improve student scores, but the impact was greater if the incentives went to individual teachers rather than collectively. There is also evidence in rural India that student attendance rises if incentives are introduced to reduce teacher absenteeism (Bau and Das 2016; Fryer 2013; Springer et al. 2012).

In Ecuador, children assigned to rookie teachers learned less than children

taught by experienced teachers. A study found that teacher intelligence quotients and personality have no significant influence on differences in student learning. Instead, the quality of interactions was found to correlate positively with higher test scores and children's attention, self-control, and memory skills.⁵ This is consistent with evidence gathered in the United Kingdom suggesting that strategies aimed at raising teaching quality involving greater engagement with pupils and a more open intellectual environment are more effective than additional formal teacher training (Higgins et al. 2015). A study conducted in rural Pakistan found that contract teachers outperformed permanent ones. Teachers also performed more effectively if they received higher wages or if they had been recruited locally (De Talancé 2016). In India, Kenya, and the United States, teacher certification, tenure, and type of contract seem not to make a difference in children's learning (Dobbie and Fryer 2013; Duflo, Dupas, and Kremer 2011; Kane and Staiger 2008; Muralidharan and Sundararaman 2011).

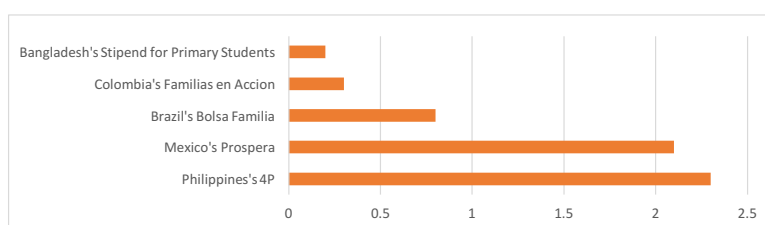
Evaluations confirm that numerous interventions are correlated with improvements in test scores. The gains occur across educational levels, class sizes, income groups, and settings. Interventions that focus on improvements in facilities, books, teaching materials, and school management such as the Programa Escuelas de Excelencia para Abatir el Rezago Educativo (schools of excellence program to reduce educational backwardness) in Mexico or the supplementary classes and library initiatives among children in the Pratham Shishuvachan Program in the slums of Mumbai improved the test scores of poor students (He, Linden, and MacLeod 2009; Kremer, Brannen, and Glennerster 2013; Lopez-Acevedo 1999). Similarly, lengthening the school day had a positive effect on scholastic achievement in some Latin American countries, particularly among the deprived. Expanding compulsory schooling has had an impact on educational outcomes in Turkey, Norway, the United Kingdom, and the United States (Angrist and Krueger 1991; Black, Devereux, and Salvanes 2011; Kirdar, Dayioğlu, and Koç 2016; Oreopoulos 2006).

Such interventions show great promise for realizing education for all and reducing learning gaps among the poorest children. The same is true of emphasizing the measurement of educational achievement based on learning even in countries with chronic shortages of physical inputs. This calls for greater reliance on robust, consistent data using sources such as the Trends in International Mathematics and Science Study and the Programme for International Student Assessment.⁶ Efforts to monitor progress in learning achievement and socioeconomic correlates include the World Bank's Systems Approach for Better Education Results and UNESCO's Global Education Monitoring Report and World Inequality Database on Education.⁷

Conditional cash transfers

CCTs help smooth the consumption of the poor in the face of shocks (Gill, Revenga, and Zeballos 2016). They enable households to take up investments in their children’s education and the purchase of livestock or other productive assets (Gill, Revenga, and Zeballos 2016). CCTs may have equalizing effects in the short run by targeting the most needy households. World Bank simulations suggest reductions in the Gini index by 0.2–2.3 points across the five largest CCT programs worldwide (Figure 3).

Figure 3
Median Coverage, Selected Health Care Interventions, by Wealth Quintile, Low- and Middle-Income Countries, Circa 2005–13



Sources: Based on a sample of 83 countries using 2005–13 data or data on the closest available year in STATcompiler (DHS Program STATcompiler) (database), ICF International, Rockville, MD, <http://www.statcompiler.com/>; MICS (Multiple Indicator Cluster Surveys) (database), United Nations Children’s Fund, New York, <http://mics.unicef.org/>.

For the list of countries see www.STATcompiler.com

CCTs have been designed and implemented with focused policy objectives, such as in the Bolsa Escola (school allowance) and Bolsa Família (family allowance) programs in Brazil and the Prospera (thrive) Program in Mexico. The broad impacts of these programs span children’s education and health, household consumption expenditures, and many other areas.

CCTs have generally been successful in improving child development and nutritional outcomes. In Bangladesh, the Shombob pilot program—conditional on regular growth monitoring among children and the participation of mothers in nutrition-related awareness sessions—reduced wasting among 10- to 22-month-old infants by 40 percent (Ferré and Sharif 2014). Mexico’s Prospera Program has added the equivalent of about 1 centimeter to the mean growth rate per year among infants ages 12–36 months. It has reduced the probability of child stunting by about a sixth among the same age-group and the incidence of illness among participants ages 0–5 years by 12 percent (Behrman and Hoddinott 2005; Gertler

2004). Nicaragua's Red de Protección Social Program (social protection network) increased children's height 1.7 times more than the rate of annual improvement nationally between 1998 and 2001 (Maluccio and Flores 2005). In Lesotho, an unconditional cash transfer scheme has been associated with a drop in the risk of malnourishment among beneficiary children (Pellerano et al. 2014). In Ecuador, cash transfers helped increase the height of preschool children in the poorest households (Paxson and Schady 2010).

CCTs have been used to promote health care services by helping defray the costs to households and by encouraging healthy lifestyles. Such CCTs focus on expanding the use of preventive health care through regular checkups and vaccinations (Ahmed and Morgan 2011). CCTs can be effective at increasing antenatal visits, the incidence of childbirth attended by skilled health professionals, delivery at health facilities, and the rate of tetanus toxoid vaccination among mothers (Glassman et al. 2013; Lagarde, Haines, and Palmer 2009). Mexico's Prospera Program has helped reduce infant mortality and maternal mortality by 11 percent (Fiszbein and Schady 2009, citing Hernández et al. 2005). Beneficiaries ages 18–50 had 17 percent fewer sick days and 22 percent fewer days bedridden with illness (Gertler and Boyce 2001). Women receiving Peru's Juntos cash transfer are 91 percent more likely to be attended by a doctor at childbirth (Perova and Vakis 2012). The Keluarga Harapan (family hope) CCT program in Indonesia led to greater reliance on primary health services among covered households (Orbeta et al. 2014). Antenatal visits rose by over 7 percent, and the share of assisted deliveries increased by 5 percent (World Bank 2011b). In India, the expansion in the use of health facilities attributed to the Janani Suraksha Yojana (mother security scheme) CCT program resulted in 4.1 fewer perinatal deaths per 1,000 pregnancies, 2.4 fewer neonatal deaths per 1,000 live births, and a 9.1 percent rise in fully vaccinated children (Carvalho et al. 2015; Lim et al. 2010).

CCTs are policy instruments in education. The most common demand-side interventions involve stipends to poor households that are conditional on school enrollment, performance, attendance, and graduation. Thus, the Nahouri Pilot Project in Burkina Faso is credited with raising primary and secondary enrollment rates by 22 percent among boys (Akresh, de Walque, and Kazianga 2013). Chile Solidario boosted preschool enrollments by 4 percent–5 percent and increased the probability of enrollment among children ages 6–14 by 7 percent (Galasso 2006). In Cambodia, CCTs have been used to raise secondary-school attendance by 26 percent, while, in Malawi, the Philippines, and Zimbabwe, the rise in secondary-school attendance was 5 percent–10 percent. Evidence on the effects of CCTs where eligibility is limited to girls, such as in Bangladesh and Pakistan, demonstrates enrollment increases of 11 percent–13 percent. Mexico's Prospera Program has helped reduce the drop-out rate during the transition between primary and lower-secondary school and between lower-secondary and higher-secondary school (Fiszbein and Schady

2009, citing Schady and Araujo 2008). In addition to expanding school attendance, the Female Secondary Stipend in Bangladesh also delayed the timing of the marriages among and the first births to program participants (Sayeed 2016).

Studies have found increases in language and behavioral skills among child beneficiaries of CCTs in Ecuador and Nicaragua even following only brief program exposure. Evidence points to greater benefits among children in poorer households (Behrman, Parker, and Todd 2009; Macours, Schady, and Vakis 2008; Maluccio and Flores 2005; Schady and Araujo 2008). In Malawi, enrollments, test scores in English, and the probability of remaining in school among girls in grades 5–8 have risen among recent dropouts, who were typically poorer and had fewer baseline cognitive skills (Baird, McIntosh, and Özler 2009; Filmer and Schady 2009). In Ecuador, the Bono de Desarrollo Humano (human development benefit) led to improvement in cognitive skills among children in the poorest households. In Nicaragua, the Atención a Crisis (crisis assistance) Program resulted in similar cognitive skill improvements. This CCT program requires children to attend school and have health checkups. It also provides grants to start nonagricultural businesses. The program led to reduced overall child labor (Del Carpio, Loayza, and Wada 2016).

Several studies have found that cash transfers improve mental health and psychosocial well-being. An unconditional cash transfer scheme in Kenya significantly reduced the incidence of depression among young men (Kilburn et al. 2016). Qualitative evidence from Ghana, Lesotho, and Zimbabwe also suggests that cash transfers improve mental health (Attah et al. 2016). And an Indian cash transfer scheme has been shown to reduce maternal depression; the effect was strong and clinically meaningful (Powell-Jackson et al. 2016).

A frequent criticism of CCTs is that they may negatively affect incentives or be misspent. Yet, evaluations in Brazil, Chile, Honduras, Mexico, Nicaragua, and the Philippines do not show reductions in the labor market participation of beneficiaries or increases in gambling or the consumption of alcohol or tobacco (Evans and Popova 2017). In the Philippines, a 39 percent decline in alcohol consumption occurred among beneficiary households (Walker et al. 2011). These programs may have also helped reduce street crime and interpersonal violence in Brazil and Ecuador (Chioda, de Mello, and Soares 2012; Hidrobo et al. 2012; Walker et al. 2011). In Ecuador, transfers targeting women also helped drive down intimate partner violence, including physical violence, sexual violence, and controlling behavior (Hidrobo, Peterman, and Heise 2016). No effects were found in the total fertility rate among beneficiaries of Prospera in Mexico or among beneficiaries of the Zambian Child Grant, and only a 2 percent–4 percent rise in the fertility rate was revealed among beneficiary households in Honduras (Palermo et al. 2016; Stecklov et al. 2007).

CCT programs frequently identify eligible recipients geographically and through

means testing. Typically, programs incur low administrative costs. The five largest CCT programs in the world spend small shares of GDP. However, the low costs mask a trade-off between benefit size and coverage. Only about a third of households in the poorest quintile are covered by CCTs worldwide.⁸ The average benefit is small in most countries, especially low-income countries. The average transfer in the five largest CCT programs worldwide is about 15 percent of the average household consumption among the poorest quintile (World Bank 2015b).

Part of the trade-off between benefit size and coverage is explained by fragmentation in interventions and poor targeting. Fragmentation occurs if small, unconnected programs target the same groups, regions, or vulnerabilities without coordination or cost-benefit considerations. Multiple ministries often have responsibility for program implementation, making coordination cumbersome and requiring an institutional vitality that is rare in many low-income countries. An example of an effort to tackle fragmentation is Vietnam's commitment to broaden coverage, expand the profile of beneficiaries, and integrate the multiple objectives of its cash transfer programs targeted on poor rural regions that, until recently, were not covered by labor market programs (Robalino, Rawlings, and Walker 2012).

Poor targeting occurs if programs fail to reach part of the target population. Weak governance and weak administrative capacity, seasonality, household preferences, and community dynamics affect the capacity of programs to deliver benefits accurately (Gentilini 2014). Thus, cash transfers are often preferred over in-kind transfers in locations with well-functioning food markets where recipients can exercise their budgetary options. In-kind transfers are preferred where the market prices for food are volatile and transfer distribution is reliable. Another example is the preference of women for in-kind transfers in social and household contexts in which women have less control over the cash.

Design factors also determine program success. Expanding the size of transfers often raises program impact. One study concludes that doubling the amount of the transfer in Brazil's Bolsa Escola Program would cut in half the share of children in poor households who do not attend school (Bourguignon, Ferreira, and Leite 2003; Todd and Wolpin 2006). In Cambodia, the impacts of a program that delivers transfers to students based on poverty status are not linearly correlated with transfer size. The differences in student enrollments associated with no stipend relative to a stipend of US\$45 were large, but there was no observable difference in outcomes between a stipend of US\$45 and one of US\$60 (Filmer and Schady 2009). In Malawi, variation in the size of transfers to the parents of adolescent girls did not cause differences in enrollment rates or literacy test scores. However, the amount of cash given directly to schoolgirls was associated with improved school attendance and progress if it was conditional on school attendance (Lundberg, Pollak, and Wales 1997).

Conditionality may determine program impact. School enrollment was lower

among households in Ecuador and Mexico that believed their cash transfers were unconditional, although the benefits were conditional on school attendance (de Brauw and Hoddinott 2008; Schady and Araujo 2008). Simulations in Brazil conclude that CCTs would have had no impact on enrollment if they had been delivered as unconditional transfers, while, in Mexico, the simulated impact of unconditional transfers on educational attainment would have been only 20 percent of that of conditional transfers (Bourguignon, Ferreira, and Leite 2003; Todd and Wolpin 2006). However, the Malawi evaluation shows that the impacts of the transfers on school enrollment and test scores and the probability of early marriage and pregnancy did not vary across girl beneficiaries whether the transfers were conditional or unconditional. In Zambia, two unconditional cash transfer programs had strong effects on the intended target—food security—and on productivity and future income (Handa, Natali, and Seidenfeld 2016). One of these programs—the Child Grant Program—also increased women’s participation in household decisions (Bonilla et al. 2017).

Lessons on implementation may be drawn from recent programs. First, all transfer programs benefit from the adoption of technological innovation. Technology helps improve targeting. This was the case of the biometric smart cards used in the Targeted Public Distribution System in Andhra Pradesh, India. Electronic cash disbursements based on smart cards and mobile banking resulted in lower transaction costs and reduced the opportunities for corruption and other losses. The electronic payment of a social transfer in Niger cuts the travel time required to collect cash transfers by three-quarters (Aker et al. 2013). In South Africa, the cost of disbursing social grants using smart cards is a third of the cost involved in cash disbursements (CGAP 2011). In Argentina, electronic payments for Plan Jefes (head of household plan), a national antipoverty program, eliminated kickbacks, which had stood at 4 percent of the payments when these were in cash. The ease of accessing program benefits and improved targeting have boosted the adoption of programs even in low-income countries (Aker et al. 2013; Muralidharan, Niehaus, and Sukhtankar 2014; Omamo, Gentilini, and Sandström 2010; Vincent and Cull 2011).

Second, CCT programs are enhanced by monitoring, evaluation, and adjustment (Berlinski and Schady 2015). Eligibility must be governed by transparent rules that are frequently fine-tuned and flexible. Rigorous evaluations are being used to assess the direct and spillover effects of interventions integrated within safety nets. This is the case of an experimental evaluation of multiple interventions involving transfers of cash and productive assets, technical skills training, nutrition and hygiene programs, and access to bank accounts in Ethiopia, Ghana, Honduras, India, Pakistan, and Peru (Banerjee et al. 2015). Spillover effects can be large, in which case partial equilibrium studies severely underestimate a program’s benefits. An economy-wide estimate of the impact of Malawi’s Farm Input Subsidy Program found large indirect effects, leading to a benefit-cost ratio that was signifi-

cantly larger than previously thought (Arndt, Pauw, and Thurlow 2016). Successful CCT programs are associated with efficient beneficiary identification and targeting, but also precise evaluations of effectiveness. This is the case of programs in Brazil, Chile, Ethiopia, Mexico, and the Philippines. Evaluations show that part of the success of CCT programs integrated among safety net interventions is flexibility. Thus, the ability of safety nets in Ethiopia (the Productive Safety Net Program) and the Philippines (the Pantawid Pamilya Pilipino Program [bridging program for the Philippine family]) to reach millions of new beneficiaries after catastrophic events indicates that the coordination of cash transfers, emergency response, and postdisaster reconstruction is effective in protecting the poor from natural disasters. During emergencies, the Philippine program CCTs are delivered without the normal conditions, and the program beneficiary list is updated every two months (Hallegatte et al. 2016).

Third, CCT programs need to ensure local ownership. A study in Nicaragua found that including women leaders in the program shifted local attitudes with regard to traditional gender roles, and this change persisted long after the end of the intervention (Macours and Vakis 2016).

Rural infrastructure

Investing in rural roads

New or improved rural roads reduce transportation costs, facilitate labor relocation, foster livelihood diversification, enhance market and service access, and promote human capital investments. Good transportation infrastructure fosters growth, poverty reduction, food security, and income equality (Calderón and Chong 2004; Calderón and Servén 2004, 2008; Estache, Foster, and Wodon 2002; Ndulu 2006; Seneviratne and Sun 2013; Stifel and Minten 2017; World Bank 2005). Along with communication and power infrastructure, the quantity and quality of transportation infrastructure are positively correlated with growth and negatively correlated with income inequality (Calderón and Servén 2008). The links among infrastructure, growth, and equality are generally recognized across various types of infrastructure. One type—roads—is particularly relevant in rural areas. Of the world's rural population, about a third—one billion people—live in settlements that are each more than 2 kilometers away from the nearest paved road (World Bank 2015c).

All-weather roads reduce the transportation and time costs of reaching markets. The enhanced market access allows farmers to obtain higher output prices and pay lower prices for inputs and consumer goods. Improved roads reduce barriers to labor reallocation away from agriculture and contribute to local market development.⁹ The incentive to invest in physical and human capital increases as off-farm income-generating opportunities emerge because of new or improved rural roads.

These opportunities may affect the returns to education, including the education of women and girls.

Although most of these programs are designed not to narrow inequality, but to promote connectivity, they become equalizing because they disproportionately benefit the poorest. This occurs if the roads benefit smallholding farmers and landless workers, help diversify earning activities among workers involved in low-productivity activities or household chores, such as women, or contribute to reducing discrimination by allowing low-caste villagers to abandon agriculture and seek more well paid activities (Asher and Novosad 2016; Khandker, Bakht, and Koolwal 2009; Lokshin and Yemtsov 2005).

The Pradhan Mantri Gram Sadak Yojana (the prime minister's rural roads scheme) in India has provided paved roads for more than 110 million people. The benefits in newly connected districts include reductions in food prices (Aggarwal 2015; Asher and Novosad 2016). The cultivated area treated with fertilizers has been expanded, while fewer households report agriculture as the main source of income. Household earnings have risen an average of 8 percent because of wage labor. Enrollment rates among children ages 5–14 have increased, although enrollments among the 14–20 age-group have declined, suggesting that rural roads have boosted education returns among younger children and employment opportunities among young people.

In Vietnam, the Rural Transport Project I has improved 5,000 kilometers of rural roads. The benefits have included a rise in the share of project communities participating in new markets, growth in the private businesses involved in services, and an increase in primary-school completion rates (Mu and van de Walle 2011). In Bangladesh, the Rural Development Program and the Rural Roads and Markets Improvement and Maintenance Program have boosted employment and wages in agricultural and nonagricultural activities and harvest output. Per capita annual household spending in program areas has risen by 10 percent (Khandker, Bakht, and Koolwal 2009). In Georgia, the share of project villages hosting small nonagricultural enterprises have risen; employment and wages among women in off-farm activities have increased; and waiting times for the arrival of ambulance services have been reduced.

Road investments lead to higher transport volumes and lower transport fees only if there is competition among providers. If competition does not exist or is not promoted, the poor are less likely to benefit because they cannot afford to change travel patterns or because service quality is not enhanced. Evidence in Asia confirms that the promotion of competition following the expansion of rural roads disproportionately benefits the poorest (Hettige 2006). A study in Indonesia, the Philippines, and Sri Lanka finds that villagers who benefited from the expansion or rehabilitation of rural roads and the promotion of competition in transportation traveled more frequently to buy provisions, for employment and business, and to obtain

documents, and travel times were reduced by about two-thirds (Hettige 2006).

Evidence from community-based projects in Georgia illustrates that the equalizing impacts of road investments in poor, isolated, and less densely populated rural settlements are multiplied if the investments are coupled with expansions in schools, medical facilities, banks, agricultural extension services, water and sanitation, and electrification. Rural road improvements that are accompanied by good maintenance plans help encourage poor households to invest in alternative livelihoods. Efforts to include girls in new schooling opportunities and to recognize equal property rights among women that promote increases in land prices need to be part of rural road rehabilitation and maintenance schemes. Maintenance is an important component of successful infrastructure projects. A study in Mexico found that assigning more resources to maintaining existing public infrastructure, versus investing in new infrastructure, leads to larger reductions in income inequality (Gibson and Rioja 2017).

Electrification

Several studies have found that access to electricity boosts household incomes by expanding labor supply and fostering a shift from farm labor to formal employment. Thus, electrification in rural communities in Guatemala and South Africa has led to a 9 percent rise in women's employment that cannot be attributed to greater demand because there has been no comparable increase in men's employment (Dinkelman 2011; Grogan and Sadanand 2013). In India, household electrification has raised labor supply by about 16 days a year among men and 6 days a year among women (van de Walle et al. 2013). There is heterogeneity, however. A study in Nigeria found that, a look at the labor supply decisions of spouses jointly reveals a different picture. Electrification seemed to increase working times among husbands at the expense of wives (Salmon and Tanguy 2016).

Electrification can generate additional household income by making home-based businesses viable or more productive. Evidence from rural Vietnam shows that households connected to the electricity grid are nine times more likely to be involved in home production than households without such connections (Khandker, Barnes, and Samad 2013). Incomes from nonfarm activities among the former rose an estimated 29 percent because of electrification.

The availability of electric lighting provides additional opportunities to study and is associated with greater school attendance and school completion rates, especially among girls. In Vietnam, school enrollment rates among children in households on the electricity grid were 9.0 percent higher among girls and 6.3 percent higher among boys (Khandker, Barnes, and Samad 2013). Electrification was associated with more average years of schooling, including an additional year among girls.

Street lighting improves security; clinics with access to electricity can stay open longer and provide cold chains for vaccines; and access to electricity helps reduce absenteeism among health workers and teachers. In Pakistan, absenteeism among teachers in public schools that have electricity is half the rate in other schools. This is relevant for the women teachers required for the education of girls (Ghuman and Lloyd 2007). Electrification can have health benefits by allowing kerosene and firewood to be replaced in lighting or cooking. Two years after the baseline in an electrification program in northern El Salvador, particle pollution concentration was 67 percent lower among households that had been randomly encouraged to electrify (Barron and Torero 2015).

Electrification promotes gender equality by freeing women from household chores, such as the collection of firewood, and raising women's employment (Dinkelman 2011). Access to electricity may increase the income controlled by women through women's employment and the creation of woman-run enterprises. Made possible by electricity, television can improve health education and challenge entrenched perceptions of gender roles (Clarke 2008; Dinkelman 2011; Jensen and Oster 2009; La Ferrara, Chong, and Duryea 2012; Lipscomb, Mobarak, and Barham 2013; Moser and Holland 1997; World Bank 2011c). A study in Colombia also found that household electrification reduced fertility (Grogan 2016).

The International Energy Agency estimates that 1.2 billion people lacked access to electricity in 2013. Many more have access only to an insufficient or unreliable supply. Approximately 80 percent of people without electricity live in rural areas, and more than 95 percent live in Asia and Sub-Saharan Africa. However, efforts to expand electrification in rural areas often face a trade-off between keeping electrification financially viable by defraying costs and reaching people who are least able to pay. Households are often required to pay part of the connection cost. In Bangladesh and Brazil, lower prices are offered to households that consume only small amounts of electricity. South Africa provides poor households with 50 kilowatt hours of electricity per month at no cost. Even low-cost solar kits, which provide limited access to electricity, have been shown to have positive effects on health and productivity (Grimm et al. 2016).

Taxation

Taxes constitute an essential component of successful strategies to guarantee equal opportunity. Taxes raise the revenues needed to foster childhood development, improve education, ensure health care, and provide pensions or housing subsidies. Taxes can also introduce distortions, affecting the optimal decisions of individuals and firms on investments, savings, consumption, and labor supply. Furthermore, the choice of how to finance an investment can have stronger distributional effects than the targeted public investment itself (Adam, Bevan, and Gollin 2016). Exam-

ples of tax and benefit reforms aimed at sharing the gains of economic growth and enhancing equity are the 1990 tax reform in Chile and the 1994–99 tax reform in postapartheid South Africa. European Union countries embarked on fiscal consolidations based on equity considerations in response to the 2008–09 financial crisis (De Agostini, Paulus, and Tasseva 2015; Manuel 2002; Mideplan 1999; Vivian 2006).

Taxes redistribute income in two ways. They address the income inequality emerging from labor and capital markets by establishing tax rates to balance the relative contributions of individuals, households, and firms to revenue collection. This is done by imposing a tax rate that rises in line with earned incomes, offering tax credits based on age or household composition to individuals earning similar labor incomes, or exempting some consumption goods from the value added tax, while raising this tax on others to reflect differences in the consumers of basic goods and luxury goods.

Taxes also influence the labor, savings, and investment decisions of individuals and firms. Introducing high tax rates on labor and capital earnings may disincentive the supply of labor effort among individuals and the extent to which individuals and firms save and invest. High social insurance contributions and payroll taxes make formal work less attractive in highly informal economies with generous noncontributory pension benefits such as Colombia and Mexico. In the case of Mexico, the efficiency costs of taxation have been estimated at 0.9 percent to 1.4 percent of GDP owing to lower labor productivity and GDP growth deriving from the fragmented social security system (Cuesta and Oliveira 2014; Levy 2008). Redistribution can thus entail high efficiency costs.

The efficiency costs of taxes can be kept to a minimum with good administration practices. Taxes can be designed to encourage risk taking that may boost the returns to investment, or credit constraints can be relaxed so poor households can invest in health care and education. Likewise, effective redistribution can be achieved by broadening the tax base and lowering rates. Personal income tax deductions that benefit the more well off and do not generate significant revenue gains can be avoided. Earned income tax credits can be used instead of tax allowances to favor labor force participation and formal sector engagement. Other measures that increase the progressivity of taxes while raising revenues include property and inheritance taxes (Broadway, Chamberlain, and Emmerson 2010; de Ferranti et al. 2004; IMF 2014; Martinez-Vazquez 2008; World Bank 2005).

The impact of taxes on inequality depends on tax progressivity and composition (Lustig 2015). Direct taxes cause the more well off to bear the brunt, while indirect taxes cause the poor to bear a larger relative share of the burden given that the poor spend a greater share of their incomes on consumption. However, in eight Sub-Saharan African countries, the distribution of the value added tax across households is reportedly less unequally distributed than the distribution of origi-

nal market incomes. This is partly explained by exemptions and reduced rates on goods and services disproportionately consumed by the poor (Bird and Zolt 2003; Sahn and Younger 2000).

Taxes can redress market income inequalities dramatically. For example, together, taxes and transfers redistribute important shares of market incomes in the European Union (Avram, Levy, and Sunderland 2014; De Agostini, Palaus, and Tasseva 2015). However, the redistributive role of taxes is often limited (Martorano 2016). A study comparing the tax and benefit systems of 150 countries concludes that tax systems have had a limited, but inequality-increasing impact since 1990 (Martinez-Vazquez, Vulovic, and Moreno-Dodson 2014). There are multiple reasons for this. Administrative systems, especially in low-income countries, are often inadequately funded and staffed and lack the autonomy, transparency, accountability, and technology to face challenges. This weak capacity prevents authorities from raising significant revenue, launching progressive schedules, avoiding evasion, and ensuring compliance (Bird and Zolt 2003, 2008). A recent study in Colombia suggests that decentralizing taxation and strengthening subnational revenue systems can reduce multidimensional poverty (Ramírez, Díaz, and Bedoya (2017).

Even if poor countries were politically and administratively able to shift large shares of income from the rich to the poor, they would need prohibitive marginal income tax rates to end poverty and substantially narrow inequality.¹⁰ However, a study has found that most countries would experience welfare gains with additional redistribution (Eden 2017). Indeed, much of global poverty could be eliminated in developing countries by reallocating regressive fossil fuel energy subsidies and excessive military spending to cash transfers (Hoy and Sumner 2016).

There are large differences in redistribution across countries at similar levels of inequality (Ostry, Berg, and Tsangarides 2014). Chile and Colombia share similarly high levels of market inequality, but Chile redistributes income significantly more. The tax and transfer system in Chile as a whole is both equalizing and poverty reducing (Martínez-Aguilar et al. 2017). Mexico and Peru have similar levels of inequality, but only Mexico redistributes income substantially, that is, uses its fiscal policies to narrow inequality in a significant way. Indonesia and the Russian Federation show comparable, though much lower levels of inequality, but only Russia appears to redistribute substantially (Inchauste and Lustig 2017; Lustig 2015). Redistribution is also limited in Ethiopia and Sri Lanka; in South Africa, it is more appreciable (Inchauste and Lustig 2017; Lustig 2015; Younger, Osei-Assibey, and Oppong 2015). The norm is that the size of the tax benefit system is closely correlated with the redistributive effect. This is important because countries with large tax systems tend to provide large benefit transfers, which ultimately show more redistributive impacts (IMF 2014). Regardless of the inherent ability of taxes to reduce inequality, choices about progressivity, composition, and size largely determine the equity effects (Inchauste and Lustig 2017).

Concluding remarks

The evidence reviewed in this paper shows that interventions aimed at equalizing opportunities and incomes are not a luxury reserved for high-income countries, nor an option available only in prosperous places. Numerous examples of successfully implemented interventions in ECD, universal health care, teaching, CCTs, rural infrastructure investment, and redistributive tax schemes across low-income countries should dispel the notion that such countries cannot afford effective pro-equality policies. For example, one of the most well documented and most successful ECD programs was implemented in Jamaica. It allowed beneficiary (stunted) children to catch up in physical development with nonstunted children within 18 months of the program. These beneficial impacts lasted well beyond the program's duration: 25 years after the program, there was no earnings gap between stunted and nonstunted children.

Nonetheless, weak capacity, lack of political will, restricted fiscal space, vulnerability to external crises or climate change, internal conflict, and challenging geography are among the obstacles to the reduction of inequality that clearly affect the efficacy of interventions and the range of interventions at the disposal of policy makers at any given time. These obstacles are more frequently present in developing countries, which also typically evidence the deepest and greatest inequalities. In many low- and middle-income countries, preschool enrollment rates among the poorest quintile are less than a third the rates among the richest quintile. Mothers in the bottom 40 percent of the distribution across developing countries are 50 percent less likely to receive antenatal care. The poorest children are four times less likely to be enrolled in primary education. And only one-quarter of children in the poorest quintile in the developing world are covered by safety nets. But the evidence shows that these are not insurmountable disadvantages and that these disparities can be addressed and reduced through well-designed and well-implemented interventions.

The reduction of inequality does not take place in a single, unique way. Income equalization may take place through deliberate redistributive policies. For example, taxes have been shown to lower the Gini index of market incomes in some European Union economies by up to 20 percentage points. Investments in rural roads and electrification may influence income generation opportunities, employment, and perceptions of gender roles. Expanding ECD, health care, and education can reduce cognitive, nutritional, and health gaps, thereby narrowing inequalities of outcomes in the short term, but also intergenerational disparities. By smoothing consumption among the most deprived, cash transfers can help prevent widening inequalities at times of shocks. In response to the use of such programs, substantive reductions in the incidence of wasting, infant mortality, and primary and secondary enrollment gaps have been documented in places as diverse as Bangladesh, Burkina Faso, and Mexico.

Evidence from successful interventions also dispels the misperception that competition and economic efficiency are not compatible with reducing inequality. Investments in roads help expand transport volume and lower fares only if there is competition among transport providers. CCTs can offset economic inefficiencies that may impede the acquisition of productive assets among poor farmers and hamper investments in education and health care. Successful efforts to achieve universal health care include initiatives that incentivize health providers to offer competitive services to people who are excluded. Furthermore, investments in ECD, universal health care, and education have equity and efficiency benefits. Connecting poor farmers to urban markets can affect the incomes of farm households and the income gaps among a population. In the effort to reduce inequality, policy choices are less often restricted by an imbalance in the equity-efficiency trade-off than by an imbalance in the trade-off between expanding coverage and increasing the benefits of interventions. Economic growth and good macroeconomic management contribute to circumventing such implementation policy trade-offs by providing resources, stability, and opportunities to adopt appropriate policies.

This review has also shown that some initiatives are more likely than others to generate inequality reductions and improvements in the well-being of the poorest. Evidence from developing countries shows that well-integrated, simple, and flexible interventions are more likely to succeed than isolated interventions, but composition influences the degree of success. If CCTs are combined with other safety net interventions, they may generate more wide-ranging benefits. Thus, the ability of safety nets in Ethiopia and the Philippines to reach thousands of new beneficiaries after catastrophic events indicates that the coordination of cash transfers, emergency response, and postdisaster reconstruction is possible and effective in protecting the poor from natural disasters. Evidence from ECD programs, initiatives to promote universal health care, and efforts to foster good-quality teaching shows that underprivileged children often benefit the most. Many rural electrification initiatives are associated with high connection costs to keep electrification campaigns financially feasible, but this often means the poorest households must opt out. Policy design needs to take such outcomes into account.

Yet, inequality reduction is not insensitive to context and choice. This review confirms that universally valid prescriptions are not replicable everywhere. In effect, design and implementation choices matter in ensuring that interventions are equalizing without compromising efficiency. Different choices among tax reforms with the same objectives can lead to different impacts. For example, similar fiscal reforms in Chile and Mexico resulted in similar amounts of revenue collection, but had different distributional impacts because one was designed to affect the ultra-rich, while the other was aimed at the upper-middle class. In many environments, incentivizing higher quality in teaching, while making social transfers conditional on school completion may have a greater impact than simply constructing a new

school. Indeed, only one-third of the reviewed primary-school interventions associated with physical infrastructure had a significant impact on test scores in developing countries. Defining the package of services that are provided, the level of user contributions in the financing of interventions, and the composition of the target population are critical to successful reforms aimed at achieving universal health care. A successful case is Thailand's Universal Coverage Scheme, which has brought a large uninsured population under the umbrella of a national program, thereby greatly reducing catastrophic health payments among the poor and improving access to essential health services.

Much more is still needed to close the remaining knowledge gaps on successful equalizing interventions. First, more and better data are required. Improving the evidence base on initiatives that narrow inequality requires more investment in filling data gaps and enhancing the understanding of the specific pathways through which programs affect inequality. Evaluations have been critical in fine-tuning the design of CCTs and advocacy for the desirability of CCTs. Monitoring has made the quantification of the long-term effects of ECD programs possible. Especially important is the generation of more microeconomic household data, more compelling evidence on the benefits of the integration of multiple interventions, and more information on the potential distributional effects of policy interventions aimed at addressing long-term challenges such as climate change.

There are also important knowledge gaps that remain unaddressed, such as on the circumstances and contexts in which conditional transfers are more effective than unconditional transfers in reducing inequalities. Another understudied area is the link between the quality of human capital accumulation and distributional outcomes. Because of the utmost urgency in the delivery of effective interventions in humanitarian disasters, which disproportionately affect fragile, low-income countries, rigorous studies of the distributional impacts of humanitarian interventions are rare.¹¹

Improving the evidence base on interventions that successfully reduce inequality requires extending our analysis to areas and policies other than those covered by this review, most notably, land reform, labor market interventions, crop insurance, and access to financial services and instruments.

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Notes

¹Inequality in this article refers to consumption or income inequality, not wealth inequality, unless otherwise indicated.

²Disparities in education, health, and nutrition, among others, are much wider in developing countries, though this should not be taken to suggest that equality of incomes and outcomes has been achieved in high-income countries, especially if one considers dimensions such as ethnicity, gender, or race.

³For example, the large difference in the inequality of incomes observed between Latin America and high-income countries is not caused by a difference in the functioning of markets, but rather by the role given in

rich countries to (higher) social spending and (higher) fiscal revenues in reducing inequality as part of the social contracts. See Breceda, Rigolini, and Saavedra (2008); Goñi, Lopez, and Serven (2008); IMF (2014); Lustig (2015).

⁴Policy interventions in land redistribution, financial inclusion, adaptation to climate change, or technology and innovation are not covered because the evidence on the equalizing effects is less complete or less compelling.

⁵Teacher behavior is measured by Classroom Assessment Scoring System scores, which measure in three domains: emotional support, classroom organization, and instruction support. See Araujo et al. (2016).

⁶See PISA (Programme for International Student Assessment) (database), Organisation for Economic Co-operation and Development, Paris, <http://www.oecd.org/pisa/pisaproducts/>; TIMSS (Trends in International Mathematics and Science Study) (database), International Association for the Evaluation of Educational Achievement, Amsterdam, <http://www.iea.nl/timss>.

⁷See Global Education Monitoring Report (database), United Nations Educational, Scientific, and Cultural Organization, Paris, <http://en.unesco.org/gem-report/>; SABER (Systems Approach for Better Education Results) (database), World Bank, Washington, DC, <http://saber.worldbank.org/index.cfm>; WIDE (World Inequality Database on Education), United Nations Educational, Scientific, and Cultural Organization, Paris, <http://www.education-inequalities.org/>.

⁸This represents the unweighted average of 17 countries on which incidence analysis is available and in which the CCTs are not delivered through pilot programs. Bolivia and Uruguay, where CCTs cover about two-thirds of the poorest quintile, are exceptions (World Bank 2015b).

⁹These benefits are not automatic. See Asher and Novosad (2016); Banerjee, Duflo, and Qian (2012); Bryan, Chowdhury, and Mobarak (2014).

¹⁰The more well off developing countries would require little additional taxation on the rich to eliminate extreme poverty. See Ravallion (2009).

¹¹Doocy and Tappis (2016) conclude that only 5 out of 113 published studies analyzing the effects of cash-based interventions in humanitarian contexts were sufficiently rigorous to provide conclusive lessons of assistance in such context.