World Development Report 2019

THE CHANGING NATURE OF WORK

Working Draft

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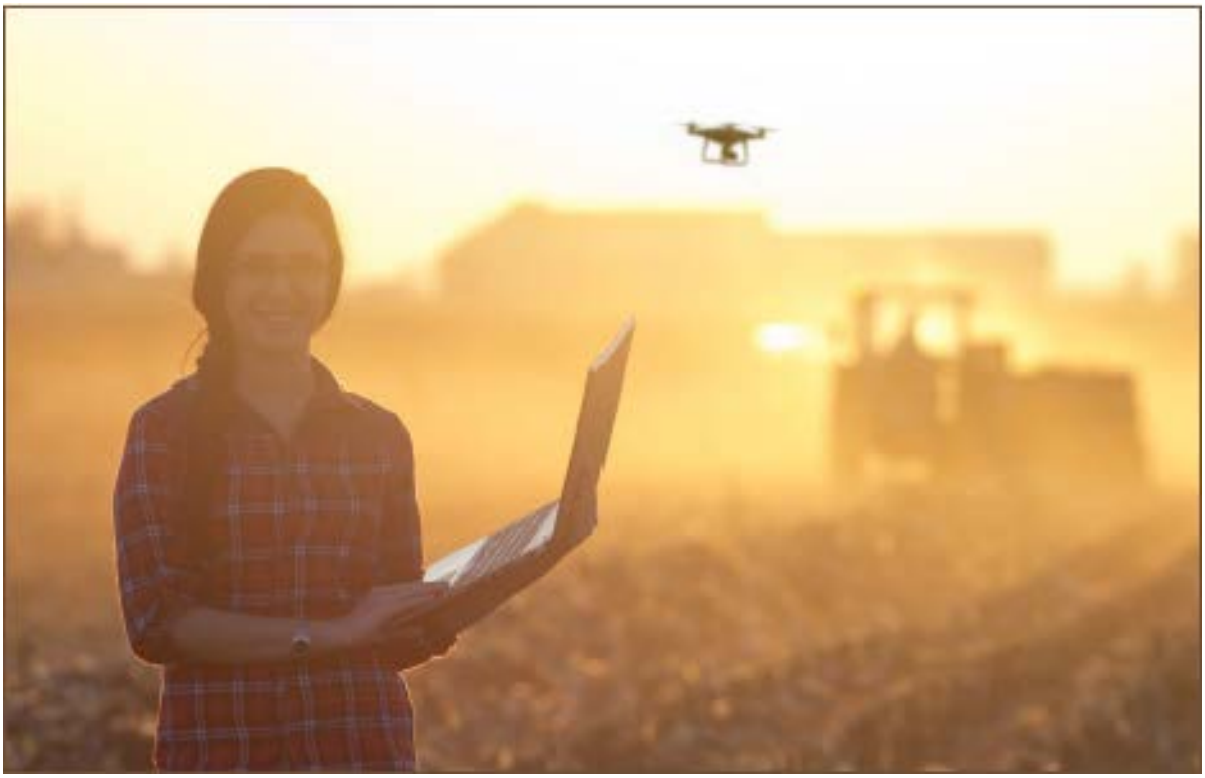

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Overview

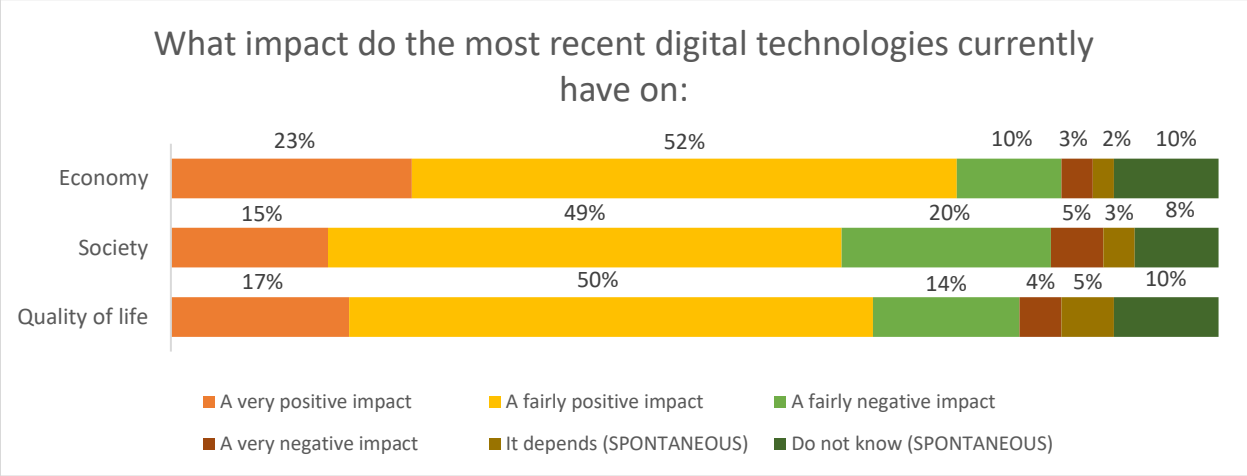
1. Concerns over technology-led disruption are far from new. Karl Marx worried that "machinery does not just act as a superior competitor to the worker, always on the point of making him superfluous. It is the most powerful weapon for suppressing strikes."[1] Economist John Maynard Keynes warned in 1931 of widespread unemployment due to technology.[2]

2. The balance of evidence in this study does not suggest the world is today, any more than it was in 1867 or 1931, on the cusp of an era of widespread, technology-induced unemployment. A more informed view predicts that some jobs will be lost due to automation. The adjustment to this loss will be especially challenging because many of the new jobs require significantly higher levels of human capital.[3] In the absence of countervailing policies, some workers are likely to be pushed into lower-wage jobs or temporary spells of unemployment.

3. The changing nature of work disrupts markets. Technology changes the boundary of the firm, obviating jobs in the process. At the same time, improved digital infrastructure extend the market for services—creating the gig economy. Reshoring (due to automation) along with the renegotiation of multilateral trade agreements create concerns about rising anti-globalization sentiment. However, emerging new leaders such as the BRIC countries (Brazil, Russian Federation, India, China) push integration forward.

4. Meanwhile, other trends such as demographic change, rapid urbanization and climate change, affect the composition as well as the location of jobs. In a March 2017 survey conducted in the European Union, 74 percent of the respondents envisioned technology beneficial to jobs, 64 percent thought technology would improve society, while 67 percent of Europeans thought the quality of life would rise (figure 0.1). Individuals, firms, governments and society can prepare for the adjustments ahead.

Figure 0.1. Impact of technology on the economy, society, and quality of life



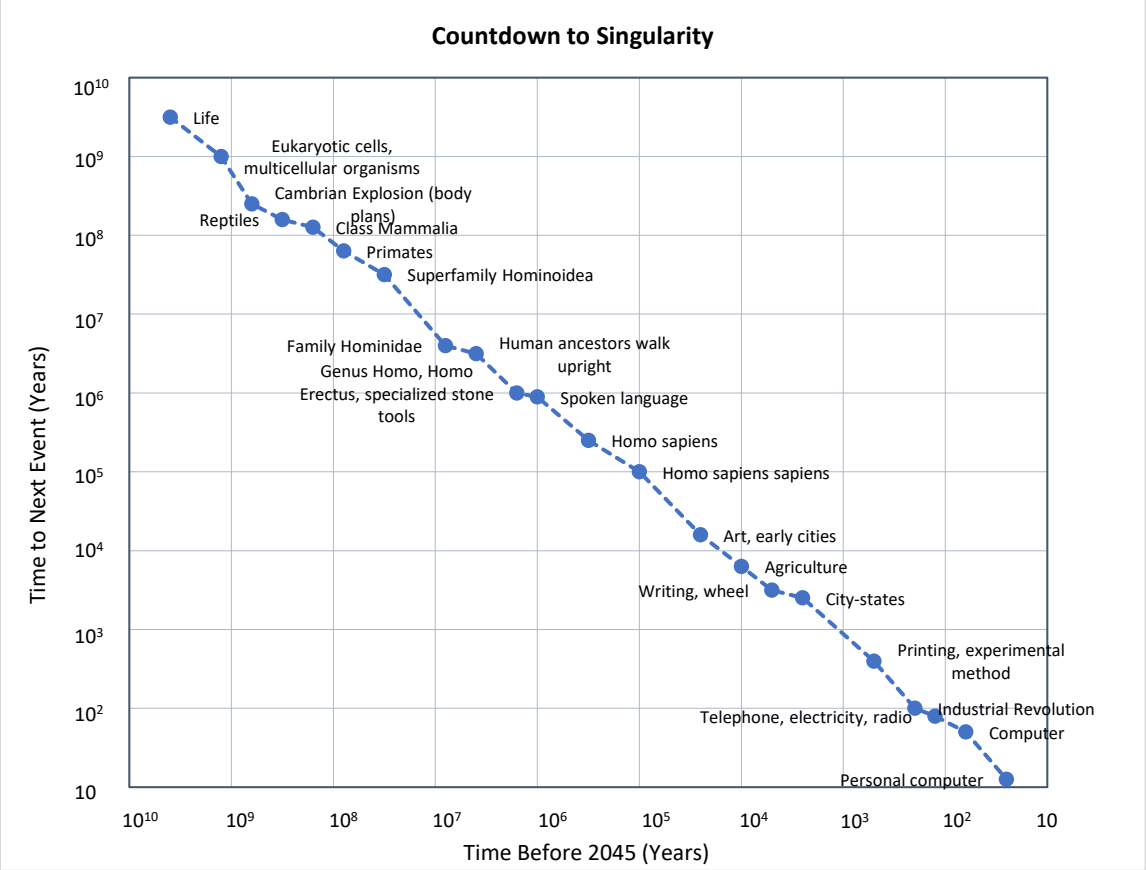
Source: European Commission 2017, Special Eurobarometer 460 "Attitudes towards the impact of digitisation and automation on daily life," Question 1.

5. In the changing nature of work, the forces of supply and demand collide. In some developing countries, particularly in Africa and South Asia, tens of millions of young people join the labor market looking for jobs. But those workers face uncertain demand. Large formal private firms are still too few. Their growth is often stunted due to trade barriers, domestic bias towards state-owned or politically connected firms, or stifling regulation.[4]

Running Order

6. The first chapter of this study focuses on the impact of technology on jobs, how the nature of work is changing and how it is not. The countdown to the time when artificial intelligence matches human intelligence is coming (figure 0.2). In some sectors robots are indeed replacing workers. But technology absorption rates in many parts of the world are slow. In many sectors, robots enhance worker productivity. Technology also creates new opportunities for work. But technology changes the relative demand for skills, placing greater emphasis on those that cannot be replaced by robots and that improve worker adaptability. Retooling workers for the future world of work is expensive. Meanwhile, continued tax avoidance by large firms squeezes public budgets. As a result, the concern is not mass employment, but potentially rising inequality.

Figure 0.2. Artificial Intelligence is Taking Over, Eventually



Source: Kurzweil, Ray. 1990. The Age of Intelligent Machines. Cambridge, MA: MIT Press.
Note: Kurzweil predicts a "translating telephone" by 2010.

7. Ongoing technological disruptions have increased the premia on human capital. At the economy-wide level, human capital is positively correlated with overall levels of research, innovation, and the adoption of advanced technologies. Firms with a higher share of educated workers do better at innovating and exploiting new technologies. Individuals with stronger human capital reap higher economic returns from new technologies. On the other hand, when technological disruptions are met with inadequately realized human capital, existing social order may be undermined. The second chapter addresses the link between human capital accumulation and the future of work, discussing why governments need to invest, why they often fail to, and how better measurement can address this problem.

8. Technology is reshaping not just work but the skills needed for work. Demand for cognitive skills, job-specific skills, and socio-emotional skills is undergoing significant disruptions. Part of the ongoing skills re-adjustment is happening outside compulsory education and formal jobs. Where? Chapter 3 answers this question by exploring three domains—early childhood, tertiary education, and adult learning outside jobs—that are increasingly central to the acquisition of specific skills that the changing nature of work demands.

9. Work is the next venue for human capital accumulation after school. Chapter 4 evaluates how successful economies are in generating human capital at work. Advanced economies have higher returns to work than emerging economies. Governments can raise the returns to work by Increasing formal jobs for the poor, enabling women's economic participation, and expanding agricultural productivity in rural areas. There is little scope for emerging countries to improve the returns to work by reallocating labor from villages to cities.

10. Chapter 5 explores how technological change affects the nature of the firm. Technological progress has made firm boundaries more permeable. New digital technologies accelerate the trend toward superstar firms. Superstar firms have a beneficial effect on labor demand by boosting production. These firms are also large integrators of young, innovative firms, often benefiting small businesses by connecting them with larger markets. But super large firms, particularly firms in the digital economy, also call for caution and pose policy challenges. Regulations often fail to address the negative externalities that can be created by new types of business in the digital economy. Tax systems are also in many ways no longer fit for purpose.

11. What are the implications for social assistance, social insurance and labor market institutions? As the nature of work becomes more fluid, traditional provisions of social protection through formal employers become increasingly obsolete. In developing countries, where informality is the norm, this model has been largely aspirational. The combination of old and new labor market challenges calls for adapting social protection and labor market institutions. These policies are discussed in chapter 6 of the Report.

12. Changes in the nature of work, compounded by rising aspirations, make it essential to rethink social contracts. New elements of the social contract need to respond to rising concerns around inequality and unfairness. Chapter 7 considers potential elements of the contract, how technology can be used in implementation, and how to finance them in the context of the changing nature of work.

Findings

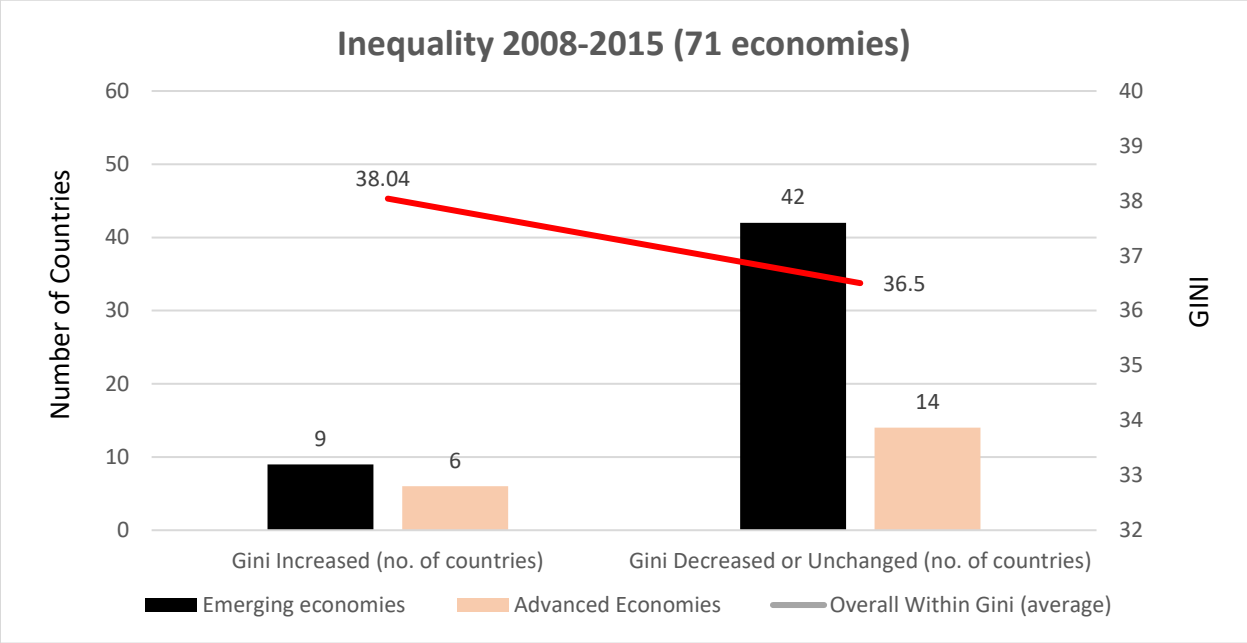
13. The study's first finding is that the threat to jobs from technology is exaggerated. History repeatedly teaches us this lesson. Doomsday scenarios on robots impoverishing workers continue to strike a societal nerve. The creators of such scenarios are so far sighted that few of their predictions have yet come true.

14. Four stylized facts have animated the discussion on the changing nature of work. This study shows that three of them are factually incorrect. First, some scholars bemoan the declining share of industry employment especially in manufacturing activities in emerging economies. Second, politicians in many countries fret about rising inequality. Third, labor activists worry about the spectacular rise of the gig economy, which provides opportunities for distant or flexible work, but strips workers of many social protections. Fourth, social movements like the Occupy Movement argue that global corporations are not paying their share of taxes, while collecting huge profits. Only the last claim is true.

15. The decline in manufacturing employment in many high-income economies over the past two decades is a well-known trend. Singapore, Germany, Spain, United Kingdom and Korea are among the countries where the share dropped more than 10 percentage points. This mainly reflects a shift in employment from manufacturing to services. In contrast, the share of industry employment, primarily manufacturing, has remained remarkably stable in the rest of the world (figure 1.2). In low income countries, between 1991 and 2017, the proportion of the total labor force working in industry has been consistently less than 10 percent. The situation was relatively constant in upper-middle income countries, too, at around 23 percent. Lower middle-income countries' experienced a slightly increase in the proportion of the labor force in industry over the same period, from 16.4 percent in 1991 to 18.8 percent in 2017. This may be due to the interplay between open trade and rising incomes – which generate more demand for goods and services – and technology – which in some industries reduces employment.

16. The notion that inequality is on the rise around the world is also incorrect. Recent estimates confirm the continuation of a trend observed of the 2000s – inequality in emerging economies has decreased or remained unchanged (figure 0.3).[5] Specifically, between 2008 and 2015, 56 of 71 economies studied experienced a decline or no change in inequality (as measured by the Gini coefficient).

Figure 0.3. Inequality has decreased or remained flat in emerging economies



Note: The figure presents the number of countries for which within country inequality increased and declined or unchanged. For example, 6 advanced economies experienced an increase in inequality between 2008 and 2015, while 42 advanced economies had declining or unchanged inequality. "Unchanged" inequality is defined as movements of the within-country Gini coefficient that are within one percentage point. The year of reference may not be exact – countries identified for the year 2008 include Gini estimates from 2006 to 2010. Estimates for the year 2015 include estimates between 2013 and 2016. The overall within Gini is the average of the all the unweighted within country Gini coefficients.

17. In Brazil, the Gini measure of inequality declined from 60.12 to 51 between 1993 and 2014. Over the same period, there was a decline in the top 10 percent share of the pre-tax income (from 56.2 percent to 54.9 percent). A higher stock of human capital, driven by the expansion of secondary and tertiary education, explains part of this downward trend. More formal jobs also contributed to decreasing inequality. Research shows that a reduction in the formal-informal wage gap between 1995 to 2012 was an important contributor.[6] Meanwhile, the expansion of social safety nets supported the poor.

18. The Russia Federation shows a similar story. Between 2007 and 2015, the Gini measure of inequality fell from 42.33 to 37.74. Again, over the same period there was a decline in the top 10 percent of pre-tax income, which dropped from 52.14 percent to 47.27 percent. The share of employment in small firms increased over that period, which improved those workers' wages relative to workers in large firms. Improvement in overall education levels of workers, mainly amongst female workers, combined with a reduction in the overall skill premium, also lessen inequality.[7]

19. In other economies, inequality has risen over the last decade. In Cameroon, between 2007 and 2014, the Gini measure of inequality rose from 42.82 to 46.54. Weak business environments, poor investment climate, low agricultural productivity, as well as an increased concentration of fossil fuel exports, contributed to widening inequality.

20. Even if inequality is decreasing, however, overall inequality levels remain high across the globe. The rallying cries of politicians demonstrate increased public awareness around the state of inequality today. Digital technologies expose society more profoundly to existing inequalities, which perhaps makes them care more. In Latin America, over 70 percent of people perceive income to be unfairly or very unfairly distributed. Hysteria around a robotized future make people fear job loss, declining incomes, and limited opportunity. Downward trends may decelerate as a result of technological upheaval or institutional change. The good news is that the fear of rising inequality is misplaced as of now. However, proactive initiatives are in need to further reduce the level of inequality and avoid any reversal of current trends.

21. Then again, many worry that the future will be made up of gigs, rather than more stable, traditional forms of employment. How many people currently work in the gig economy is difficult to estimate. Official data is lacking. Definitions of what constitutes freelance or gig work vary. Nevertheless, the numbers are very small overall. Worldwide, the total freelancer population is estimated at around 84 million—less than 3 percent of the global labor force (3.5 billion).[8] What's more, someone who is counted as a freelancer may also engage in traditional employment. This is the case in the United States, for instance, where more than two thirds of the 57.3 million freelancers are also in traditional employment, using freelancing to supplement their income.[9] One of the largest global online freelancing platforms, Freelancer of Australia, has around 15 million registered users. But only about 10 percent of registered workers are active.

22. The rise in gig work, albeit a small proportion of the overall workforce, does highlight larger problems. People have no better alternatives. Wages from traditional employment are not enough. Gig work often involves long hours for very little pay, and comes absent of social protections. But jobs in the gig economy are taken-up voluntarily, which is because they are better than the other options available—oftentimes, that means jobs in the informal sector. Informality is as high as 90 percent in some countries around the world especially in low and middle-income countries. Moreover, informality has remained remarkably stable notwithstanding the changing nature of work. Addressing informality and the absence of social protections for such vast numbers across the globe continues to be one of the most pressing concerns for emerging economies.

23. Finally, alongside the rise of technology, social backlash like the Occupy Movement have emerged to challenge the vast wealth accumulated by global corporations and the global elite. It is true that the share of the top 1 percent in total income has risen in some countries, such as Argentina, India, the Republic of Korea, and South Africa. This portion of the population benefits disproportionately from current system and will continue to do so unless the rules of the game change.

24. Global corporations have amassed such wealth for a number of reasons. Rising global incomes have expanded markets, as have digital platforms. But age-old tax avoidance schemes also play a significant part. On average, almost 60 percent of total income of multinationals is reported in countries where it pays an effective tax rate of less than 5 percent. The structure of the global tax system permits multinational corporations to engage in base erosion and profit shifting: firms allocate more profits to affiliates located in zero or low tax to countries, irrespective of how little business is actually conducted there. This option is not open to single, independent firms that have locations in only one country. Of the Fortune 500 companies, at least 366 companies operate

one or more subsidiaries in tax haven countries.[10] Apple and Microsoft in the United States each have 95 percent of their profits parked, untaxed, overseas in countries with low or zero corporate tax. The OECD estimates that governments worldwide miss out on between US$100 and $240 billion in annual lost revenues. Lower income economies are the hardest hit, given their relatively smaller source of personal income and consumption taxes.

25. The increasingly digital nature of business makes this situation worse. Corporate income tax rules, including in bilateral income tax treaties, are founded on the principle of physical presence. This means that digital platform companies located in one (low tax) country which supply services online to a consumer in another (higher tax) country have an unfair advantage over local companies or other foreign companies located in higher tax jurisdictions. Digital companies also generate revenue from new kinds of assets, such as user data and online advertisements, but it is not clear how or where value is created for tax purposes (even in those countries that have a right to tax in the first place). As a result, digital companies carry half of the tax burden of traditional brick and mortar companies.

26. This has to change. The only way to stop tax avoidance, in the words of the G20 Group, is "to put an end to the divorce between the location of profits and the location of real activities." Governments need to revisit their tax laws to attribute income for tax purposes to the location where business activities are performed. If that firm is digital, the location is most justifiably where goods or services are consumed. That means putting a stop to the IKEA Group's practice of syphoning revenues off to its affiliate in the Netherlands—ostensibly as payment for using the brand's intellectual property, which is registered in the Netherlands. Meanwhile, those royalties are not subject to taxation under Dutch law due to various tax incentives. While a global system of formulary apportionment may neither be administratively nor politically achievable at present, other options are available. Amending international tax rules, shutting down tax havens, and developing innovative way to tax the digital economy, should all be on the table.

Three Takeaways

27. This study provides a blueprint of how to think about a new social contract that addresses two issues: the failure to reduce informality in most developing economies; and the rising anxiety about the inequality of opportunity of the next generation of workers. The analysis suggests three takeaways:

- Individuals, firms and governments need larger investments in human capital. This investment is under-provided in many countries, especially in the early formative years of a child. Investing in human capital is the main mechanism to ensure that the next generation of workers is ready for the changing nature of work.

- The global corporate tax regime is in dire need of upgrading. Many global corporations, especially among the new platform companies, use tax avoidance techniques to increase their profits. Collecting the mandated tax rate in every country of operation can go a long way to finance a new social contract.

- Governments need to enhance social protection. A societal guaranteed minimum and strengthened social insurance, complemented by reforms in labor market institutions, could work towards achieving this goal. At present, a UBI is prohibitively expensive for all countries.

28. The most significant investment that people, firms and governments can do is in enhancing human capital. The jobs of the future require more socio-emotional skills. These skills are rarely taught at school. Their accumulation needs to start from birth and continue throughout life.

29. Accumulating human capital requires investment at all levels. Public investment alone is insufficient. Firms have to invest in their employees. Workers, in turn, need to invest in their continuous education. The World Bank's Human Capital Project aims to provide the impetus for enhancing investment in human capital.

30. The new social contract depends on efficient tax policy. The solutions are simple: impose or increase tobacco and carbon taxes, make platform and other global companies pay their equal share of corporate taxes in every country, eliminate VAT exemptions in some countries, eliminate energy subsidies in other countries.

31. The politics are simple too. Government have a choice between favoring a handful of tobacco, energy, or digital companies at the expense of their citizenry; or sharing the benefits of growth in a fair way.

32. Social contracts are about equality of opportunity. Investing in human capital increases the opportunities for workers to find better jobs. Such investment improves the job prospects for newborns or kids in school.

33. Social contracts are also about inclusion. For such inclusion to succeed, the rich have to pay their share of taxes. As simple as this proposition sounds, it is still not followed in many countries. Governments can do better.

34. Social protection for the poor remains a challenge. Wider coverage that prioritizes the poorest could better protect people in a changing world of work. All workers should be protected through social assistance and insurance systems that fit with the changing nature of work. Once fundamental protections are in place, labor markets can be made more flexible to facilitate work transitions.

Chapter 1: The Changing Nature of Work

35. From the beginning, robots were construed as worker-replacing machines. Karel Čapek, the Czech writer who invented the word robot in 1920, used the Slavic language for work "robota" to connote what these machines are used for. In the past century, machines have replaced workers in many tasks. Technology has brought higher labor productivity to many sectors by reducing the need for workers in routine tasks and allowing them to dedicate time to other tasks. It has opened new sectors, previously only imagined in the field of science fiction. On balance, technology has historically created more jobs than it has displaced.

36. Work is continuously reshaped by technological progress. Society evolves as technology advances, new ways of production are adopted, markets expand. Workers, firms and governments build new comparative advantages as conditions change. For example, learning foreign languages became necessary for many workers in Vietnam in response to the extension of global value chains to the country. Danish firms became the global exporters of hearing aid products in the 2000s by adopting 3D technology first.[11] The Indian government has built excellent technical universities as springboards into becoming leader in hi-tech sectors.

37. Other factors beyond technology influence the changing nature of work, too. Aging affects labor force participation, increasing pressure on active members of the population who remain in the workforce, and changing how firms organize production. Aging populations also increase the demand for healthcare and auxiliary services such as tourism, driving growth in these sectors. Climate-related disasters can disrupt global value chains. Urbanization poses its own challenges and opportunities.

38. Amidst all this change, there is no question that a technological revolution is underway. Between 1999 and 2017, mobile phone penetration (number of unique subscribers) in Sub-Saharan Africa increased from 10 to 66 percent.[12] Increasing access to digital infrastructure—via laptops, tablets, and smartphones—is providing an enabling environment for on-demand services to boom. Social media has flourished, overhauling the way information is disseminated in society. The role of robots is rising in production processes that involve well-defined routine tasks.

39. This technological revolution is expanding opportunities. Technology can enhance the productivity of workers, individuals can seek flexible job arrangements, social discrimination can be alleviated, and consumers enjoy more product choice at lower prices. In addition, firms can use new technologies to improve capital utilization, overcome information barriers, outsource, and innovate. Online trade platforms increase market size for firms, while some platform companies become markets themselves. The firms selling on eBay in Chile, Jordan, Peru and South Africa are younger and smaller than firms in the offline markets.[13] In the Alibaba platform, start-ups in China are disproportionally represented.[14] Even small firms can be global: hiring workers in one location to produce parts, in another location to assemble, and in a third location to sell. Societies benefit more broadly as technology expands options for service delivery and for citizens to exercise their voice to hold governments accountable.

40. Notwithstanding the opportunities created by technology, the displacement of workers generates anxiety, just as it did in the past. The invention of the printing press rendered religious scribes redundant. In 1589, Queen Elizabeth I was alarmed when clergyman William Lee applied for a royal patent for a knitting machine. "Consider thou what the invention would do to my poor subjects," she replied. "It would assuredly bring them to ruin by depriving them of employment."[15] The Qing dynasty fiercely opposed constructing railways in China during the 1880s arguing that the loss of luggage carrying jobs might lead to social turmoil.[16] With steam power and industrial machinery, the economic growth of industrializing nations accelerated rapidly, but not to everyone's immediate benefit. Luddites sabotaged machines to defend their jobs in the "Machine-breaking" movement in Britain during the early 19th century. Socialist and communist revolutions followed.

41. The industrial revolution, which mechanized agricultural production and automated manufacturing, led to mass migration of labor from farms to cities for factory jobs. Women entered the labor force in record numbers in the second half of the twentieth century as educational attainment improved and discrimination decreased. In the United States, the number of women in the labor force rose from 18 million in 1950 to 66 million in 2000. Since the early 1990s, the percentage of the labor force working in agriculture in East Asia (excluding high income countries) has decreased from 55 percent to 29 percent. Labor markets have welcomed these workers. Productivity has increased, economies have grown. There is no reason to think that this time is different. Fears about robot-induced, mass long-term unemployment are exaggerated.

42. In contrast, concerns about growing inequality, as well as the social and private costs from job transitions, are underestimated. The Occupy movement in the last decade, for example, has rallied against rising income inequality, claiming that the top one percent benefits disproportionately from technological progress. In fact, technology complements high-skilled workers by making them more productive. Gains seem to also be going disproportionally to capital owners instead of workers in many cases.

43. Many technologies replace workers in low or middle-skilled, routine jobs that can easily be automated. Middle-skilled, routine occupations have been losing ground in places such as Guatemala, South Africa or Turkey. In Mexico, clerking occupations decreased at an annual rate of 2.5 percent from 2000-2010.[17] The result is higher inequality. Service jobs may offer an alternative path for low- and middle-skilled workers, but these jobs are typically low paid with little upward mobility. For workers that are displaced by technology and for whom it is not that easy to be retrained and find new jobs, the transition is painful.

44. Regardless of how work may be changing, it is persistent informality that poses the greatest challenge for low and middle-income countries. Informal employment is more than 70 percent in Sub-Saharan Africa and South Asia, and more than 50 percent in Latin America. In India, the informal sector has remained around 90 percent notwithstanding rapid economic growth. Many informal workers face limited prospects. Both wages and productivity are significantly lower for informal workers. They exist day-to-day without health insurance or social protection.

45. The next sections examine the impact of technology on jobs, how the nature of work is changing and how it is not, and why policymakers everywhere should take note.

The Rise of the Robot?

46. "They're always polite, they always upsell, they never take a vacation, they never show up late, there's never a slip-and-fall, or an age, sex or race discrimination case," Andrew Puzder, chief executive of Hardee's restaurant chain with headquarters in Tennessee says of swapping employees for machines.[18] Such statements give workers reasons to worry.

47. People start to fear the advent of a "jobless economy" when tasks previously performed by humans are taken over by robots, especially those enabled with artificial intelligence. Data for the United States shows that one additional robot per thousand workers reduces the employment to population ratio by approximately 0.18-0.34 percentage points, and wages by 0.25-0.5 percentage points.[19] The number of robots operating worldwide is rising rapidly. By 2019, there will be 1.4 million new industrial robots in operation, taking the total to 2.6 million worldwide.[20] Robot density per worker in 2016 was highest in Republic of Korea, Singapore, Germany and Japan, respectively. Currently in 23rd place, China aims to be in the top 10 by 2020.

48. More than two thirds of robots are employed in the automotive, electrical/electronics and metal and machinery industry segments. Foxconn Technology Group, the world's largest electronics assembler based in Taiwan, China, cut its workforce by 30 percent when it adopted robots into the production process (from 1.3 million in 2012 to 873,467 by the end of 2016).[21] Ant Financial, a fintech firm in China, uses big data to assess loan agreements instead of hiring thousands of loan officers or lawyers.[22]

49. These robots continue to replace workers. Machines are mostly replacing workers in routine tasks that are "codifiable." The fastest replacement is taking place across a variety of sectors in advanced economies, including mining and quarrying, manufacturing, construction, and public utilities (electricity, gas, and water). In South Korea, jobs in these sectors declined overall from 36 percent to 25 percent between 1991 and 2017. In the UK, jobs in these sectors decreased from 31 percent to 18 percent. In UK manufacturing, there has been no absolute decrease in output.[23] Automation partly explains these trends.

50. Automation can lead to reshoring. Although there is no systematic evidence, there are some cases that highlight this possibility. In 2017, 3-D printing technologies enabled the German company Adidas to establish two "speed factories" for shoe production in Ansbach, Germany and Atlanta, United States, eliminating more than 1,000 jobs in Vietnam.[24] In United States, the share of parent companies' employment out of multinational companies' total employment has started to slowly increase since 2013, implying more jobs are being relocated back to home countries. The Dutch multinational technology company Philips Electronics shifted production from China back to the Netherlands.

51. Some service jobs may also be susceptible to automation. Israeli company Mobileye is developing driverless vehicle navigation units.[25] The Chinese technological giant, Baidu, is working with King Long Motor Group, China, to introduce autonomous buses in industrial parks. South Korea is opening a 360 thousand square meters facility known as k-city, to test driverless cars.[26] Financial analysts, who spend much of their time conducting formula-based research, are also experiencing job cuts—Sberbank, the largest bank in Russian Federation, already relies on

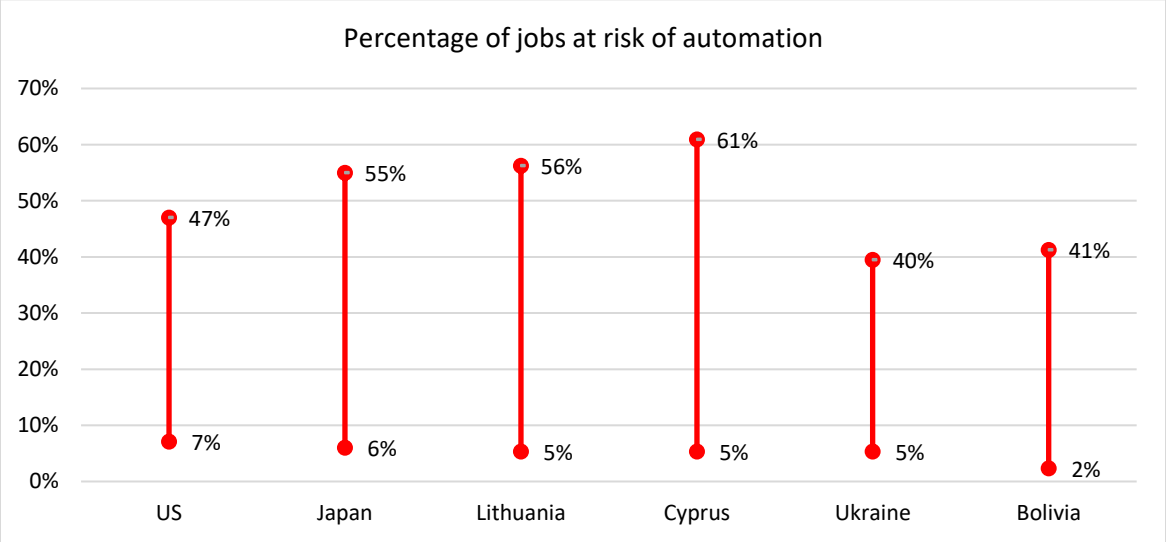
artificial intelligence to make loan decisions in 35 percent of cases, anticipating that this will increase to 70 percent in less than five years.[27] "Robot lawyers" have already substituted for 3,000 jobs in Sberbank's legal department. Such efforts reduce the number of back office employees overall to 1,000 by 2021, down from 59,000 in 2011.

52. Although a range of workers is being replaced by robots, the overall impact of technology on employment, especially in developing economies, is smaller and slower than many fear.

53. Economists are notoriously bad at predictions, even the best economists. In 1930, John Maynard Keynes predicted that technology would usher in an age of leisure and abundance within 100 years. "Everyone would need to do some work if he is to be contented," he wrote, "but three hours a day is quite enough."[28] This prediction about the future of jobs has not come true. Nor have many other predictions about huge job losses resulting from technology.

54. The great variation in estimates shows the high uncertainty involved in predicting how technology will affect jobs (figure 1.1). Wide differences stand out. For Bolivia, job automation estimates range from 2 percent to 41 percent. In other words, anything from 100,000 to 2 million Bolivian jobs in 2018 are likely to be automated. The range is even wider for advanced economies. In Lithuania, 5 to 56 percent of jobs are at risk of being automated. In Japan, 6 to 55 percent of jobs are at risk.

Figure 1.1. Wide variance in the perceived jobs at risk due to automation



Source: Authors' calculations based on World Bank (2016) and Arntz et al. (2017).
Note: The figures represent the highest and lowest estimate of the percent of jobs at risk of automation for economies that have more than one estimate in different studies. A job is at risk if its probability of being automated is greater than 0.7, following Frey and Osborne (2017).

55. The wide range of estimates drives attention to the methodologies underlying these calculations. Experts were asked to strictly categorize a sample of 70 occupations taken from official United States occupational categories as either strictly automatable or not (1-0). Using these probabilities, initial estimates placed 47 percent of U.S. occupations at risk of automation.[29]

Basing probabilities on the opinion of experts is instructive but not definitive. Moreover, using U.S. occupational categories to estimate possible job losses due to automation elsewhere is problematic.

56. Job loss estimates may not always account for industrial structure or comparative advantage of economies. British political economist David Ricardo taught us that economies specialize in sectors in which they produce goods and services more efficiently, as compared to other sectors. This basic economics principle, along with attention to countries' industrial structure, is often forgotten when predicting jobs losses due to technology. For instance, in one estimate by German economists, the risk of automation across the Spanish labor market is 12 percent; in the Slovak Republic it is 11 percent.[30] The Slovak Republic is a large exporter of vehicle parts – a sector highly vulnerable to automation. Spain too has a large automotive industry. Estimates do not account for the precise specialization of workers. They also do not account for the ability of other sectors to absorb displaced workers. Spain also has a large, vibrant tourism sector that looks to be immune to automation and is growing. If governments make the right investments in sectors that are less susceptible to automation they can reduce overall job losses despite the changing nature of work.

57. Job loss predictions have also struggled to incorporate technology absorption rates. One study, done by experts at the World Bank in 2015, adjusted the automation probabilities from Oxford University for differing technology absorption rates. It concluded that over 60 percent of jobs are susceptible to automation from a technological standpoint in Argentina, and over 50 percent in Angola.[31] Two years later, another World Bank study that implicitly incorporated technology absorption rates concluded that less than 10 percent of Argentine jobs are at risk.[32] The divergence in these results prompts skepticism.

58. Technology absorption can be painstakingly slow. Such absorption differs not only between countries but also across firms within countries—it therefore influences the potential for technology to destroy jobs. Mobile phones and the internet use spread amongst individuals very rapidly compared to earlier technologies. But this is not the case for firms, especially in the informal sector. Among these firms, internet use is very low, especially beyond basic email functions. The uptake of mechanization in agriculture paints a similar picture: persistent trade barriers, the relatively low cost of labor compared to agricultural machines and poor information all contribute to the low rates of mechanization in low and some middle-income countries. Even with the spinning jenny, the relatively low cost of labor in France and India delayed its introduction in those countries—in 1790, for example, there were only about 900 jennies in France compared to 20,000 in England.[33] Today, too, automation is used in some countries while others continue to rely extensively on workers.

59. Technology can raise productivity, raising the demand for labor. When robots take over routine jobs, productivity can increase and workers can focus on more creative tasks. Just as bank tellers in the past altered their task content towards more relationship-building in the dawn of ATMs, clerks can be retooled to include tasks that involve data analysis. The extent to which productivity gains result in more jobs depends on the responsiveness of demand to changing prices and incomes. Historically, household consumption has kept pace with household incomes. Today, consumers in advanced economies have responded to declining prices of goods and higher incomes

by spending more of their money on services, including education. In developing countries, incomes are still catching up with consumption needs. Recent evidence for European countries suggests that, in fact, while technology may be substituting workers in some jobs, overall, they are raising labor demand.[34] Part of this effect takes place because of spillovers to the non-tradable sector as, for example, more local services are demanded through raising incomes. Technological change that replaces routine work is estimated to have created more than 11 million jobs across Europe between 1999 and 2010, almost half of the total employment increase in the period.

60. New jobs can be created in this process. An example is the technology sector. Thailand's software industry has grown by 160 percent since 2013.[35] The enterprise application software industry in the Middle East and North Africa grew 7 percent in 2017 alone.[36] The internet of things means that people are relying on portable devices to work, organize their finances, and have fun. The sector is expected to grow to US$457 billion by 2020, at 28.5 percent per annum growth rate.[37] Humans are central to the creation of the online interfaces that will drive this growth. With consumer interests changing fast, there will only be more opportunities for individuals to pursue careers in mobile app development or virtual reality design. App Annie, based in the United States, reports that the mobile application ("app") industry generated a gross annual revenue of US$41 billion in 2015; this figure will more than double by 2020.[38]

61. Jobs are also being created through digital commerce, online work, or in the gig economy. Andela has built its business model on the digitization of Africa. It has trained 20,000 software programmers across Africa using free online learning and training tools. Once qualified, programmers work with Andela directly or join other Andela clients across the world. It aims to train 100,000 African software developers by 2024. Ninety percent of its workers are in Lagos, Nigeria, with other sites in Nairobi, Kenya, and Kampala, Uganda.[39]

62. Taken together, however, the jobs directly created by technology account for a relatively small percentage of total employment. More important is how new technologies have the potential to increase productivity in emerging economies and increase proximity to markets. For example, in Sub-Saharan Africa, the food industry is expanding to feed the growing middle class. Technology facilitates the creation of new, efficient value chains. Farmerline in Ghana is an online platform that communicates with a network of over 200,000 farmers in their native languages via mobile phone on the weather, market prices, while collecting data for buyers, governments, and development partners. The company is expanding to include credit services.

63. Non-tradeable goods and services sectors—usually intensive in non-routine manual skills—may offer a promising avenue for future work. Notwithstanding the rise of the robot, such sectors will rely on workers as the primary factor of production precisely due to the unique characteristics that humans offer. Artificial intelligence cannot yet think up new industries, lead teams, or develop policy. Nor can it engage in artistic expression. Automation's comparative advantage is its ability to optimize routine tasks. As such, creative disciplines, such as the arts, or sectors that rely heavily on innovation, will draw upon human labor for the foreseeable future. The same applies to jobs involving social interaction, such as teamwork, care, relationship management, leadership: all of which require people to interact based on tacit knowledge. In sectors that rely on these skills, sectoral growth leads to job growth.

64. The global market for creative goods and services grew by 81 percent between 2003 and 2012. Amongst developing economies alone, export earnings tripled during the same period, from US$87 billion to US$272 billion.[40] Governments can capitalize on increasing demand for tourism to generate jobs. Emerging economies increased their global market share from 30 percent in 1990 to 45 percent in 2016; it is expected to reach 57 percent by 2030, equivalent to over 1 billion international tourist arrivals. Arrivals in emerging destinations are increasing at twice the rate of those in advanced economies. In countries with high population growth, teachers become even more important. Estimates suggest that at least 69 million new teachers worldwide are needed if supply is to keep up with population growth. Africa has the world's largest teacher shortage—by 2030, 19.6 million primary and secondary teachers will be needed in Africa, 17 million of which will be in Sub-Saharan Africa.[41]

65. Given current demographic trends, jobs in healthcare may present one of the safest career choices in the future. By 2030 global aggregate demand for health workers will reach 80 million.[42] With a current stock of just 43 million health care workers worldwide, this forecast opens the possibility of 40 million new jobs. Aging populations only increases demand. In Asia, the number of older people is increasing faster than anywhere else in the world: by 2030, the over 60 population will increase from 57 percent in 2017 (549 million) to 60 percent (857 million) of the world's total. In Latin America, the number of people over 65 will quadruple between 2013 and 2050. A jobless future is, thus, unlikely.

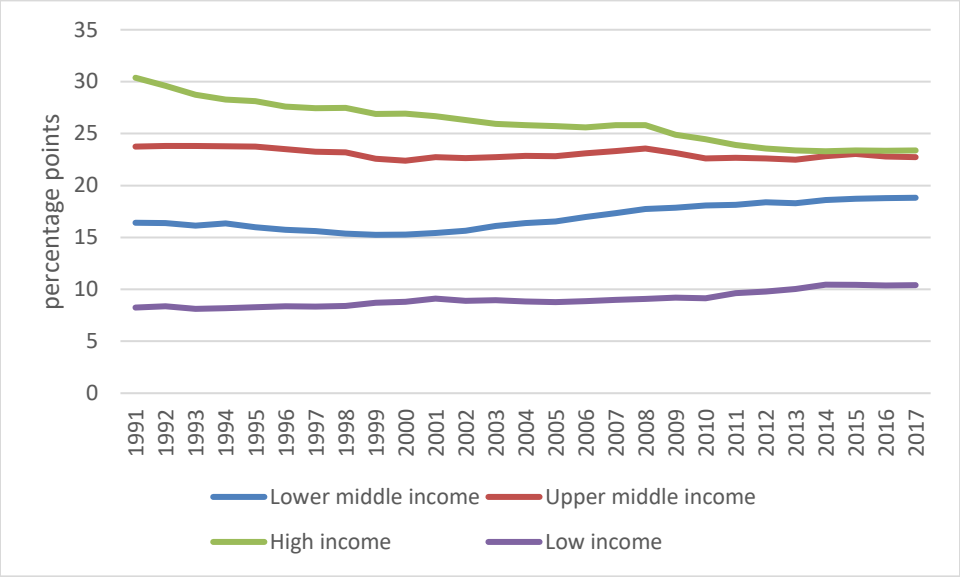
How the Nature of Jobs is Changing, and How it is Not

66. The decline in manufacturing employment in many high-income economies over the past two decades is a well-known trend. Singapore, Germany, Spain, United Kingdom and Korea are among the countries where the share dropped more than 10 percentage points. This mainly reflects a shift in employment from manufacturing to services. In contrast, the share of industry employment, primarily manufacturing, has remained remarkably stable in the rest of the world (figure 1.2). This may be due to the interplay between open trade and rising incomes – which generate more demand for goods and services – and technology – which in some industries reduces employment.

67. Meanwhile, informality in the developing world has barely moved. Even outside of agriculture, at least 8 out of 10 workers remain unregistered or in small-scale private unincorporated enterprises in countries such as Bolivia, India, Indonesia or Tanzania. In some respects, thus, the nature of jobs is remarkably stable, especially in low and middle-income countries.

68. In other respects, things are changing, rapidly in the case of advanced economies. Technology has given rise to the gig economy, although it is still small in terms of employment. Employers increasingly want workers with more advanced skills that complement technology. Permanent work contracts are becoming rarer in richer countries.

Figure 1.2. While the share of employment in industry has declined in high income countries, it has remained largely stable in the rest of the world



Source: World Development Indicators.
Note: The industry sector consists of mining and quarrying, manufacturing, construction, and public utilities (electricity, gas, and water).

69. Labor markets are being disrupted by technology, even if mass unemployment is not a major concern. First and foremost, technology is changing the skills that are being rewarded in the labor market. The premium for skills that cannot be replaced by robots and improve worker adaptability—namely general cognitive skills such as critical thinking, and socioemotional skills such as managing and recognizing emotions that enhance teamwork—is rising. Technology is also disrupting the production process, by challenging the traditional boundaries of firms and changing the geography of jobs. Technology facilitates the expansion of global value chains. It has also given rise to digital entrepreneurs and dominant digital platforms such as Alibaba, Amazon or Facebook. Finally, technology is changing where and how people work. It makes remote work possible, expanding significantly the range of flexible work arrangements or expanding markets through online work or online trade.

70. In other words, the nature of work is becoming more diverse and more demanding in terms of human capital. These changes, not surprisingly, are more noticeable in advanced economies where technology is more widespread and where labor markets start from higher levels of formalization and stability in employer-employee relationships. But the implications of these changes are also relevant for developing countries that have been grappling with many of the same issues for decades, even if not caused by technological change.

71. Technology is changing the skills required at work. Machines, including robots, replace workers when it comes to routine tasks that are "codifiable." Some of these tasks are cognitive, such as processing payrolls, bookkeeping, or doing arithmetic. Others are manual or physical, such as operating welding machines, assembling goods, operating forklifts. These tasks can be easily automated. At the same time, robots complement workers that engage in non-routine tasks that

require advanced analytical, interpersonal or manual skills that require significant dexterity. Designing, producing art, analysis and research, managing teams, nursing, cleaning have proven hard to automate. Robots have, for the most part, struggled to replicate these skills to compete with workers. So, a computer program can replace many of the repetitive, structured, legal research tasks carried out by a junior attorney in a law firm. But that program complements the tasks carried out by the law firm's partner who uses analytical skills to craft an argument.

72. These changes in skills demands are a major shift. Since 2000, the share of employment in occupations intensive in non-routine cognitive and socio-emotional skills has increased from 19 to 23 percent in developing countries, and from 33 to 41 percent in advanced economies. There has been an even larger decline in occupations intensive in routine skills from 50 to 44 percent in developing countries and from 42 to 32 percent in advanced economies. If current trends continue, future workers will be concentrated in occupations that involve non-routine tasks. For example, teamwork, relationship management, people management, care: these activities require people to react to one another based on tacit knowledge.

73. Several studies document the importance of these compositional changes in employment over negative overall impacts on employment levels. In Argentina, for example, the adoption of information and communications technology in manufacturing increased employment turnover through the replacement of workers, elimination of occupations, creation of new occupations, and a decrease in the share of unskilled workers. However, employment levels increased across all skill categories.[43] In Norway, broadband adoption in firms improved employment among skilled workers and worsened it among unskilled workers as it complemented skilled workers in executing nonroutine abstract tasks, and substituted for unskilled workers in performing routine tasks.[44]

74. The changing skills content of jobs has been documented extensively in advanced economies.[45] That is, employment has been growing most rapidly in high-skilled occupations that require advanced cognitive and interpersonal skills as well as in low-skilled occupations that require dexterity. In contrast, employment has shifted away from middle-skilled occupations, such as machine operators. This translates into an increase in the demand for high-skill and low-skill workers at the expense of middle-skill workers, which results in rising inequality in advanced economies. Both middle and low-skilled workers could see falling wages: the former, because of automation; the latter, because of increased competition.[46]

75. In middle and lower-income countries, skills needs are also changing. In middle-income countries in Europe, for example Bulgaria and Romania, while the demand for nonroutine cognitive and interpersonal work is rising, there is no increase in low-skilled nonroutine manual work.[47] Routine cognitive work has increased in countries like Botswana, Ethiopia, Mongolia, the Philippines, and Vietnam.[48] More common than polarization, is the observation that, in most cases, the demand for nonroutine cognitive and interpersonal skills is rising much more than for any other skills. High-skilled workers are gaining with technological change while low-skilled workers—especially those in manual jobs— seem to be losing.[49]

76. Even within a given occupation, the nature of the skills needed to perform a job is changing. The job of a personal assistant today is very different from what it was 15 years ago. Travel agents, whose job for a while seem to have been automated away by online travel websites, are seeing a

resurgence, albeit these are very different travel agents than before. Data indicates a renewed interest amongst travelers, particularly younger travelers, to work with human travel agents to plan the details of their vacations, recognizing the benefits of tailored suggestions that leverage specialized local knowledge and sensitivity to individual preferences.

77. Sometimes these changes are not in the direction one may expect at first glance. In Chile, the adoption of complex software used for client, production, and business management between 2007 and 2013 reallocated employment from skilled workers to administrative and unskilled production workers. This shift led to an increase in the use of routine and manual tasks and a reduction in the use of abstract tasks within firms.[50]

78. Because of these trends, demand for three types of skills is being disrupted. First, returns to general cognitive and socio-emotional skills appear to be rising.[51] In Vietnam, within a given industry, workers performing nonroutine analytical tasks earn 23 percent more; those on interpersonal tasks 13 percent more. In Georgia and Armenia, the earnings premium for problem solving and learning new things at work is close to 20 percent.[52] Second, returns to job-specific skills that are routine are declining. Third, pay-offs to the combination of different skill-types appear to be increasing.

79. Not surprisingly in a world of work that is rapidly evolving, the skills that are increasingly in demand are skills that can easily be transferred from one job to another, thus making workers more adaptable. Across countries, higher-order cognitive skills and socioemotional skills are consistently ranked among the skills most valued by employers. This is the case even in lower income countries. Employers in Benin, Liberia, Malawi and Zambia rank teamwork and communication, and problem-solving skills, for example, as the second and third most important set of skills. These are considered at least as important as technical skills.[53] Hence, while there are many unknowns about the future of work, there is a better idea of which underlying skills are most likely to be in demand.

80. Beyond the skills content of jobs, technology is reshaping the geography of jobs. Other waves of technological change have also redefined the geography of jobs. The industrial revolution, which mechanized agricultural production and automated manufacturing, led to mass migration of labor from farms to cities. The advent of commercial passenger planes expanded tourism from a clientele previously limited to aristocrats and other elites. Thousands of new jobs were created in new industries, in new locations.

81. Improvements in transcontinental communication technologies and the fall in transportation costs have allowed the dramatic expansion of global value chains. This has supported the outsourcing of jobs to the developing world. Robots and automation offer now the possibility of "reverse offshoring", where automation in advanced countries, replaces workers in jobs that would otherwise been outsourced. Beyond technology, of course, many other factors matter for outsourcing. The Philippines overtook India in 2017 in terms of market share in the call center business, at least partly due to lower labor costs and taxes.

82. Online trade is another example of how technology is changing the geography of jobs. Technology can enable clusters of business to form in under-developed, rural areas. In China, rural

micro e-tailers began to emerge in 2009 on Taobao.com Marketplace, one of the largest online retail platforms in China owned by Alibaba. These clusters—now referred to as "Taobao Villages"—spread rapidly, from just 3 in 2009 to 2118 across 28 provinces in 2017. In 2017, there were 490,000 online shops.[54] While sales have been strongest in traditional goods such as apparel, furniture, shoes, luggage and leather goods, and auto accessories, sellers are now diversifying their offerings to include high-tech goods such as drones and robots.[55]

83. Online work platforms, which eliminate many of the barriers related to geography for a number of tasks, are also part of the changing geography of jobs. UpWork, a U.S. based freelancing website, notes that nearly two thirds of United States companies have remote workers today, primarily to ensure they can attract top talent but in a flexible manner that accords with their needs.[56] Bangladesh, for example, contributes about 16.8 percent to the global labor pool online with around 650,000 freelance workers.[57] Indiez, founded in 2016 in India, takes a team-based approach to online freelancing. The platform provides a remotely distributed community of talent—mainly from India, Southeast Asia, and Eastern Europe—that works together on tech projects for clients anywhere in the world. Clients include the pizza restaurant, Dominos India, as well as the Indian multinational conglomerate, Aditya Birla Group. Wonderlabs in Indonesia follows a similar model. ASUQU in Nigeria connects creatives and other experts with businesses across Africa. CrewPencil works in the South African movie industry. Tutorama, based in Egypt, connects students with local private tutors.

84. Remote work can also make work more flexible in traditional sectors. Digital technologies, for example, allow people to work on different schedules or from different locations. Email and video conferences make it easier to do work away from an office. In the European Union, on average, 17 percent of employees are engaged in different forms of telework at least occasionally.[58] Women carry out more regular home-based telework than men. This may present opportunities for women in places where family responsibilities or social norms make it difficult for women to engage in work outside the home.

85. Digital platforms, and technology more generally, are rapidly transforming the "standard" model of work. This is a model of work common in advanced economies based on a contractual, often stable, relationship between an employer and an employee. These are often called "gigs" as, for example, short-term jobs carried out in online work platforms. Another clear example of how technology is disrupting the standard employer-employee relationship is the on-demand economy. Technology makes certain types of work accessible to every individual on a more flexible basis. Examples range from grocery delivery to sophisticated tasks like accounting. Increased access to digital infrastructure—via laptops, tablets, and smartphones—provides an enabling environment for on-demand services to boom. For example, a student can become a Yandex driver in Moscow, Russian Federation, whenever they want. She can identify peak hours in different locations where she can achieve the highest level of passenger turnover.

86. While these jobs provide new earning opportunities and a flexibility that is welcomed in many cases, they are in a grey regulatory area and lack access to benefits. Platform workers are emerging as a separate labor category. But most current labor laws are very unclear on roles and responsibilities in such situations. In these gigs—contrary to the case of formal jobs, but just as in other informal ones in the traditional economy—there is no pension, no health or unemployment

insurance, no minimum wage, or other workers' protections. This shifts the standard pattern (in advanced economies) of demanding workers' benefits from employers to directly demanding welfare benefits from the state, forcing a debate on the need for a new social contract.

87. All in all, labor markets are becoming more fluid in advanced economies. Job tenures are becoming noticeably shorter in some cases. Younger workers are most at risk in European countries, mainly due to the rise in temporary contracts. Among workers aged 25-29, for example, the share of workers with job tenures less than 12 months, increased from 16 to 24 percent in Austria between 2003 and 2015. In the same period, job tenures among this age group increased from 19 to 28 percent in Ireland; and from 19 to 24 percent in Italy.[59] Part-time employment is also on the rise in many places: since 2000, part-time employment went from 5 to 17 percent of total employment in Chile, and from 17 to 22 percent in Germany. A similar trend can be observed in temporary employment. In Poland, for example, temporary employment increased from 46 to 68 percent of total employment in the past 15 years. These trends are likely the result of not only technological change, but also other changes such as demographic change or open trade.

88. Many of these changes amount to a convergence in the nature of work between advanced and developing economies. This type of convergence is not what would have been expected for the past century, however. Then, economic development was almost synonymous with formalization and the development of the manufacturing sector. This is reflected in the design of social protection systems and labor regulations, for example. To this day, a formal wage employment contract is the most common basis for the protections afforded by social insurance programs and by regulations such as minimum wages and severance pay.

89. Yet, this transformation has hardly taken place in developing countries. With some notable exceptions in East Asia, informality has been hard to tackle. Self-employment, informal wage work with no written contracts and protections, and low-productivity jobs more generally, are the norm in most of the developing world. Most workers in developing countries are either self-employed (65 percent) or on informal wage employment (20 percent). They are often farmers or own accounts workers in informal, low productivity activities. Only 15 percent of the labor force in middle and low-income countries is in formal wage employment. This was the case before this wave of technological change, and it seems that it will continue to be the case. In fact, recent technological developments accentuate the divide between formal and informal work in many cases. Managing this old and new informality is a crucial challenge for policymakers.

The Concern of Rising Inequality

90. "Concerns about inequality trump all other dangers, and the gap between the rich and the poor is increasingly considered the world's top problem". This was the finding by the Pew Research Center when asking respondents in advanced economies about the "greatest danger in the world".[60] In Latin America, public opinion polls show that over 70 percent of people perceive income distribution to be unfair or very unfair.[61] Field experiments with over 50,000 respondents in 11 high-income and developing countries reveal high levels of concern about inequality.[62]

91. Technology brightens the prospects for upward mobility. However, the process can be bumpy or disruptive. Economic prosperity is the result of economic dynamism: research shows

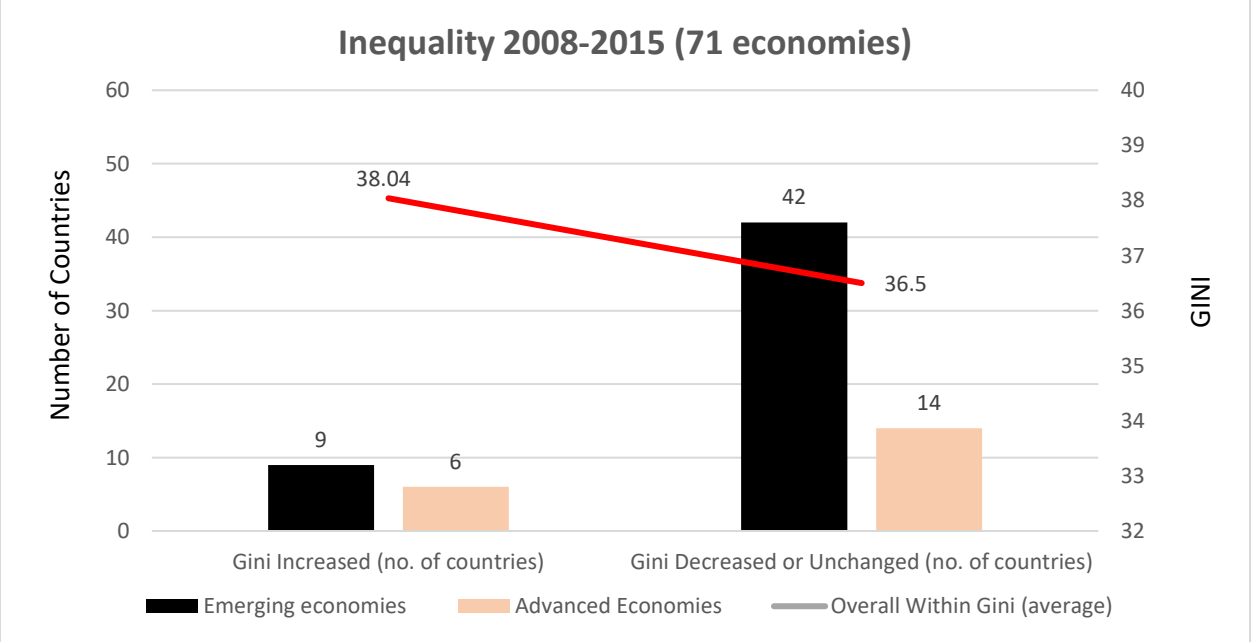
that firm death rates are higher in richer developing countries than poorer ones.[63] The process of job creation and destruction works society-wide – and not just for the few – when rules of the game are fair and equal opportunity is provided to all. While the extent to which technology affects inequality is an empirical question,[64] there is some cause for concern.

92. Though inequality remains high in many countries, the perception of its rise over recent years is overblown. Between 2008 and 2015, 56 of 71 economies studied experienced a decline or no change in inequality (as measured by the Gini coefficient) (figure 1.3).

93. In Cambodia, for example, against the backdrop of fast economic growth at an average rate of 7.8 percent between 2004 and 2014, the livelihoods of the poor improved. The poorer population took advantage of opportunities by participating in higher-return, commercial agricultural activities, as well as reaping the employment opportunities in the expanding sectors such as garment and tourism. As a result, inequality declined (the Gini dropped from 35.1 in 2008 to 30.8 in 2013). Similarly, in Tanzania, the increase in manufacturing and retail trade since 2007 has created more opportunities for lower-skilled workers, which contributed to its falling inequality.[65]

94. In contrast, in South Africa inequality remains stable at elevated levels (a Gini of 63 between 2009 and 2015). Part of this is explained by labor market that can split into two parts – highly paid formal sector jobs and informal low paying jobs. High paying jobs are likely to be nearly five times the average low-paying jobs. The difference in skill premiums between high and low-skilled workers are reflected in high wage inequality. Education, gender, and race are important drives of inequality in South Africa.[66]

Figure 1.3 Inequality has declined or remained stable for most economies since 2008



Note: The figure presents the number of countries for which within country inequality increased and declined or unchanged. For example, 6 advanced economies experienced an increase in inequality between 2008 and 2015, while 42 advanced economies had declining or unchanged inequality. "Unchanged" inequality is defined as movements of the within-country Gini coefficient that are within one percentage point. The year of reference may not be exact – countries identified for the year 2008 include Gini

estimates from 2006 to 2010. Estimates for the year 2015 include estimates between 2013 and 2016. The overall within Gini is the average of the all the unweighted within country Gini coefficients.

95. Technology shifts skills demand in favor of high-skilled workers, while reducing the need for low-skilled, and often even middle-skilled workers. Technology is augmenting the productivity of many high-skilled workers, as reflected in rising returns to advanced cognitive and socioemotional skills. Globally, private returns to education, at about 10 percent per year, remain high despite the significant expansion in supply. Returns to tertiary education are the highest at almost 15 percent per year.[67] Individuals with more advanced skills can take better advantage of new technologies and adapt to the changing nature of work. In fact, the more volatile the state of technology, the more productive education could be.[68] For example, returns to primary schooling in India increased during the Green Revolution, with the more educated farmers adopting new technologies.[69]

96. In many countries, low and middle skilled workers are concentrated in occupations that have a high content of routine tasks. These are the occupations that are most susceptible to automation and offshoring. Displaced workers are likely to compete with (other) low-skilled workers for jobs with low (and possibly decreasing) wages. Even when new jobs arise, retooling is costly, and in many cases, not possible. This is concerning because a core reason why people are monetarily poor is their low-paying jobs: for example, between 54 and 63 percent of workers in Africa and Asia live on less than US$2/day.[70] Cross-country evidence shows that jobs reduce poverty: in 10 out of 18 Latin American countries, more than half of poverty reduction came through jobs.[71] Finally, a job is more than earnings: having a job can shape psychological wellbeing, identity-shaping, civic engagement, and social cohesion.

97. Finally, many global corporations, including many in the platform economy, are getting ever more profitable but, often, not contributing a fair share of taxes. Evidence on tax-avoidance by platform companies has brought into question their "don't be evil" social imprint. Corporations such as the Alibaba Group in China or oil and gas service company Willbros (Offshore) Nigeria Limited shift profits to places where corporate taxes are low. Again, this phenomenon is centuries old. "The bourgeoisie are today evading taxes by bribery and through their connections; we must close all loopholes," Lenin stated in 1918.[72]

98. According to the latest figures, almost 60 percent of total income of multinationals is reported in low-tax jurisdictions like Bermuda, Luxembourg or Ireland. Corporation shareholders benefit while all others lose. An estimated US$8.7 trillion, 11.5 percent of the entire world's GDP, is held offshore by companies and wealthy households (who in turn benefited from investments in companies) in a handful of tax shelters. The collection of taxes on this income should be a priority for governments and international institutions. These additional revenues can go a long way towards funding a new social contract.

99. A new social contract is required to address anxiety about lack of equal opportunity for the next generation of workers. Technology is not destiny. Governments can play a significant role in ensuring that the benefits from technological progress are widespread. The rest of the report discusses how.

Chapter 2: Building Human Capital

100. Technology is transforming lives, economies, and societies.[73] While these transformations bring opportunity, they also unleash anxiety and dislocation. In one recent survey, nearly 79 percent of respondents agreed that technology has led to healthier, easier lives.[74] In another survey, nearly 50 percent felt that technology displaces jobs, increases income inequality, and disrupts social order.[75] Society can maximize the gains inherent in rapid technological change, while staving off its risks, by investing in people.

101. The world is healthier and more educated than it has ever been. Schooling has expanded tremendously, even in the poorest countries. Between 1970 and 2010, the gross primary enrollment rate in South Asia increased from 47 to 100 percent.[76] Life expectancy in Sub-Saharan Africa increased from 52 years in 1980 to 62 years in 2015.[77] And by 2030, a girl born in South Korea is expected to live to 91 years.[78]

102. However, a large unfinished agenda remains. Nearly a quarter of children under 5 are malnourished.[79] In many contexts, poor children start to lag behind in terms of working memory and executive functions (such as sustained attention) as early as 6 months of age.[80] Globally, more than 260 million children and youth are not in school. Nearly 60 percent of primary school children in developing countries fail to achieve minimum proficiency in learning.[81]

103. Health and education have tremendous intrinsic value. They are also good investments. This was true in the 1700s when Adam Smith said, "The acquisition of…talents during…education, study or apprenticeship, costs a real expense, which [is] capital in [a] person. Those talents [are] part of his fortune [and] likewise that of society."[82] This is still true now.

104. On average, one additional year of schooling generates 9 percent more in earnings. These returns are especially large in low- and middle-income countries. They are also higher for females relative to males.[83] But human capital is not just about how long children stay in school. What matters more is how much they actually learn. For example, in the U.S., replacing a low-quality teacher with an average one can add US$250,000 to a child's lifetime income.[84] Other dimensions of human capital also count. There is well-established evidence that when people are healthier, they tend to be more productive.[85] In Nigeria, a program providing malaria testing and treatment increased worker earnings approximately 10 percent in just a few weeks.[86] A study measuring the impact of interventions in Kenya showed that deworming in childhood reduced school absences, and raised wages in adulthood by as much as 20 percent, all of this from a pill that costs no more than 25 cents.[87]

105. The different dimensions of human capital complement each other, starting at an early age. For instance, healthier children learn more. Proper nutrition, in-utero and in early-childhood, has been shown to improve people's physical and mental well-being. Evidence in the United Kingdom shows that providing a healthier diet for school children significantly increased their achievements in English and Science.[88] In a multi-country study, both underweight and obese children had lower IQ scores than healthy weight children.[89] Gaps in cognitive and socioemotional skills that open-up at an early age—disproportionally falling on the poor—can be closed later. But as children turn

into teenagers, these interventions become more expensive.[90] It is no surprise then that investing in human capital during the "first 1,000 days" of a child's life is both the most cost effective and equitable investment governments can make.

106. Human capital benefits transcend private returns.[91] Deworming one child also decreases the chances of other children becoming infected with worms, which in turn sets those children up for better learning and higher wages.[92] Some of the benefits from improved human capital also go beyond the generation that makes those investments. Maternal education, through increased prenatal care, improves infant health.[93] In Pakistan, children whose mothers have even a single year of education spend an extra hour a day studying at home.[94]

107. For all these reasons, human capital feeds—both directly and indirectly—into economic growth. Between 10 and 30 percent of per capita income differences can be attributed to cross-country differences in human capital.[95] This fraction could be even higher if we take into account the quality of education and the interactions between workers with different skills.[96]

108. The positive effects of human capital on income and economic activity also persist over time, economy-wide. For example, in the mid-19th century, the state of Sao Paulo, Brazil, encouraged the immigration of educated Europeans to specific settlements. More than 100 years later, those very settlements continue to have higher school attainment, a progressive shift of employment from agriculture to manufacturing, and higher per capita income.[97]

109. Increased human capital plays an important role in decreasing poverty.[98] Ghana's success story is testament to this relationship: throughout the 1990s and early 2000s the country doubled its education expenditure, drastically improved its primary enrollment rates, and increased literacy by an astonishing 64 percentage points by 2012.[99] This led to an increase in the salaries this newly-educated labor force took home and a substantial reduction in poverty.[100]

110. Returns to human capital may be even higher during periods of high uncertainty, as in the current era of rapid technological change. For instance, despite higher supply of schooling, there has been an increase in the returns to schooling since 2000.[101] Those with higher human capital can better complement new technologies, an ability that is rewarded in labor markets. Future success depends on working with machines, instead of fearing them. In 1997, one of the greatest chess players in history, Garry Kasparov, lost a chess match to a supercomputer called Deep Blue, developed by IBM. Some years later Kasparov developed "advanced chess," where a human and a computer team up to play against another human and computer. This collaboration is mutually beneficial: the computer's ability to calculate moves combined with human intuition creates a much stronger whole. This idea is being applied to many forms of human endeavor. Automation and artificial intelligence are tools to augment human abilities. But to master them, higher levels of human capital are required.

111. Individuals with higher human capital are better able to adapt to changing work. During the Green Revolution in India in the 1970s-80s, it was the more educated farmers who could adopt new technologies.[102] In Mexico, the benefits of increased labor productivity resulting from the North American Free Trade Agreement were concentrated among more skilled workers.[103] Not surprisingly therefore, ongoing technological disruptions have increased the premia on human

capital. Firms with a higher share of educated workers do better at innovating and exploiting new technologies.[104] At the economy level, human capital is positively correlated with overall levels of research, innovation, and the adoption of advanced technologies.[105] A recent cross-country study suggests that a one standard deviation increase in the density of engineers in 1900 is associated with a 16 percent increase in income and 10 percent increase in patenting capacity today.[106]

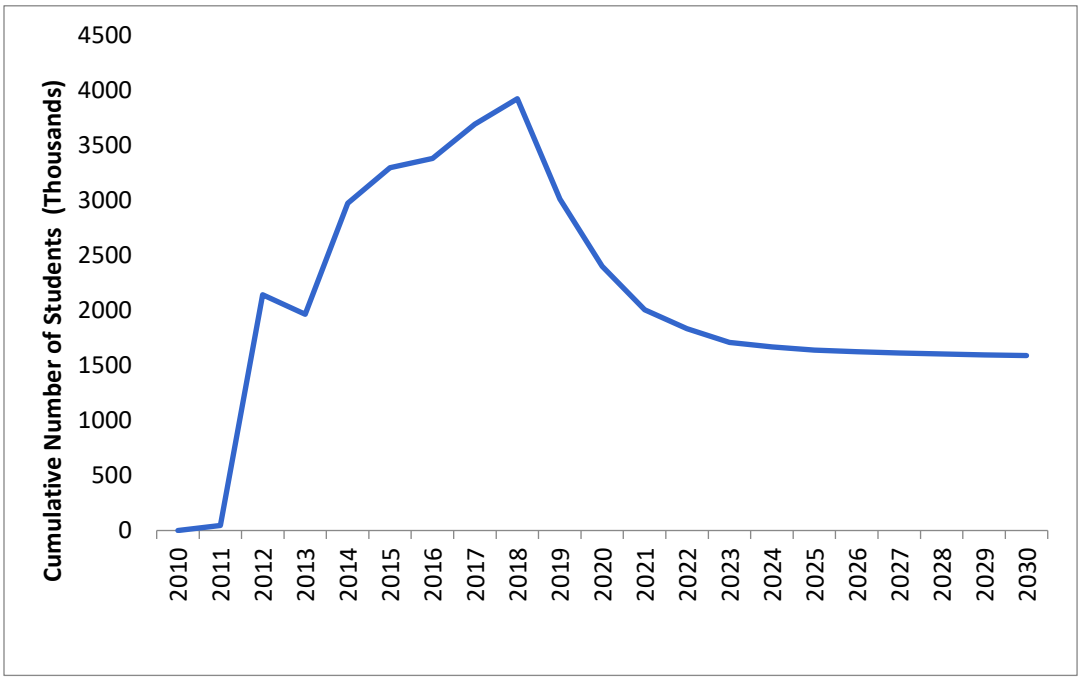
112. The understanding of human capital has expanded to include not just cognitive skills, but also socioemotional skills. The ability for teamwork, empathy, conflict resolution, and relationship management are now recognized as skills that can be developed as a part of human capital. The labor market returns to these skills have increased.[107] This is because increasingly globalized and automated economies put a higher premium on human capabilities that cannot be fully mimicked by machines. Abilities such as grit have economic returns that are often as large as those associated with cognitive ones.[108] Cognitive and socio-emotional skills reinforce each other. Providing mathematics-based games to preschoolers in India generated enduring improvements in students' intuitive abilities.[109]

113. Human Capital matters for societies. For example, in the mid-1970s, Nigeria introduced universal primary education, sending a large cohort of people through primary school who otherwise would not have gone. Years later, those same people were found to be more engaged in political life. They paid closer attention to the news, spoke to their peers about politics, attended community meetings, and voted more often.[110] Human capital can also play an important role in building "social capital" by making people more trustworthy. Social capital in turn is associated with a number of positive societal and economic features, including higher economic growth.[111] Surveys typically find that more educated people are more trusting of others. Research also suggests that the large wave of compulsory school reforms that took place across Europe in the mid-20th century made people more tolerant of immigrants than they were before.[112]

114. Increased human capital also reduces crime.[113] In Mexico, high school dropouts are significantly more likely to be caught up in the violence of the war on drugs.[114] In Liberia men at risk of committing violence when enrolled into a cognitive behavioral therapy program intended to stimulate skills such as recognizing emotions, improved their self-control, and ability to navigate difficult emotional situations. When combined with a small cash transfer, the program significantly reduced the chance that these men would fall back into a life of crime.[115]

115. Human capital is also one of the first things to suffer when societies fracture. Wars can prevent whole generations from realizing their potential. World Bank estimates for Syria show that between 2011 and 2017 almost four million children left school because of the civil war, and many of them are likely never to make-up for these lost years of school (figure 2.1).[116]

Figure 2.1. Children Not in School Due to War in Syria



Source: World Bank 2017a.

116. When rising aspirations associated with expansions in human capital are left unmet, they can spill over into political violence[117]—an effect highlighted recently in the Arab Spring.[118] As access to internet has expanded, and so has the likelihood that people compare themselves not only to success stories in their own community/country but also to those in other countries.[119] This risk looms large in countries that are experiencing a youth bulge, especially at a time when social media has reduced the costs of political activism. Recent research suggests that people who are educated but underemployed are more likely to support violent extremism.[120]

117. While this gap in opportunity leads to an erosion of social capital, policies to bolster human capital accumulation counteract this trend. Cash transfers conditional on human capital investments led to increased social capital and trust in local government.[121] Social insurance programs such as India's *National Rural Employment Guarantee Scheme* have been linked to decreased violence by offering up alternative sources of income to those who might be tempted to join local insurgencies.[122] Preliminary evidence from the National Volunteer Service Program in Lebanon, an inter-community soft-skills training program supported by the World Bank, shows that young participants displayed higher levels of overall tolerance.[123]

Why Governments Need to Invest

118. Polish-French scientist Marie Curie said, "You cannot hope to build a better world without improving the individuals." Governments need to support invest in human capital when individuals and families underinvest. This is because these investments produce significant social returns but individuals do not always count social returns when making investment decisions. For instance, in

deciding whether to deworm their children, parents consider the perceived private return—the health of their children. But they do not always think about the social return, i.e., the fact that other children are less likely to be infected. Some of these benefits are hard for parents to quantify, let alone internalize. For instance, early childhood development programs have wider societal benefits such as lower crime and incarceration rates. A 2010 study of Perry Preschool, a high-quality program for 3- to 5-year-olds developed in Michigan, United States, in the 1960s, estimated a return to society of between about US$7 and US$12 for each dollar invested.[124] Without government intervention or incentive, families might not choose to invest enough in these types of programs.

119. But social benefits are not the only reason governments need to intervene. Some parents may underinvest in their children because of social norms. While the preference for sons has been documented both in developed and developing countries, the extent of the discrimination is dramatic in certain areas. Indian newspapers recently featured findings from the Economic Survey in 2017-2018 estimating that India could have as many as 21 million "unwanted girls," daughters whose parents wanted sons instead.[125] There is evidence that these girls receive much less parental investment both in terms of health and education.

120. There are also cases in which families would like to invest in the human capital of their children, but cannot afford it. As of 2013, 10.7 percent of the global population live below the poverty line of US$1.90 a day.[126] For these families, even when education is free, large direct costs on transportation and materials, as well as opportunity costs such as the fact that children in school cannot work to earn extra income can be prohibitive. Many poor rural families cannot afford the time it takes to travel to the nearest school or medical facility. For instance, in Niger, only 24 percent of population lives within a 1-hour walk of the nearest medical facility during the wet season.[127]

121. In such cases, government interventions can make a big difference. Cash transfer programs have improved the health and education of millions of children in low- and middle-income countries. For instance, *Shombhob*, a conditional cash transfer piloted in Bangladesh, has been found to reduce wasting among children between 10 and 22 months of age and improve mothers' knowledge about the benefits of breastfeeding.[128] The effects of these programs last over time. For example, a two-year conditional cash transfer program in Malawi targeting adolescent girls and young women produced a large increase in educational attainment and a sustained reduction in the total number of births in girls who were out of school at the start of the program, which persisted after the end of the program.[129]

122. People may also underinvest in human capital because they do not always do what is in their long-term interest. Young people might not want to stay in school or take care of their health because they lack self-control or information on the benefits, or they do not feel that the decision is particularly salient. There is evidence that providing information about the returns on investments in human capital or mechanisms of self-control can have large effects on learning. For example, in the Philippines, young people were offered a voluntary non-smoking commitment program in which their savings were returned only if the person passed a smoking cessation test. The program changed behaviors, leading to a significant reduction in smoking.[130]

123. Too often, however, governments do not step in to the level they need to. In 2014, governments of low-income countries on average spent 4.0 percent of GDP on education, and 5.7 percent on health, while corresponding expenditures in high-income countries are 5.2 percent and 12.3 percent.[131] This underinvestment is starkly visible in the extent to which human capital outcomes for the poor are much worse than those for the rich. Governments might also spend much more on the politically visible aspects of human capital like school and hospital buildings; but much less on the less visible aspects—such as teacher and health worker effort and competence. Election campaigns often promise a new school or hospital; but rarely discuss actual learning levels or stunting rates.

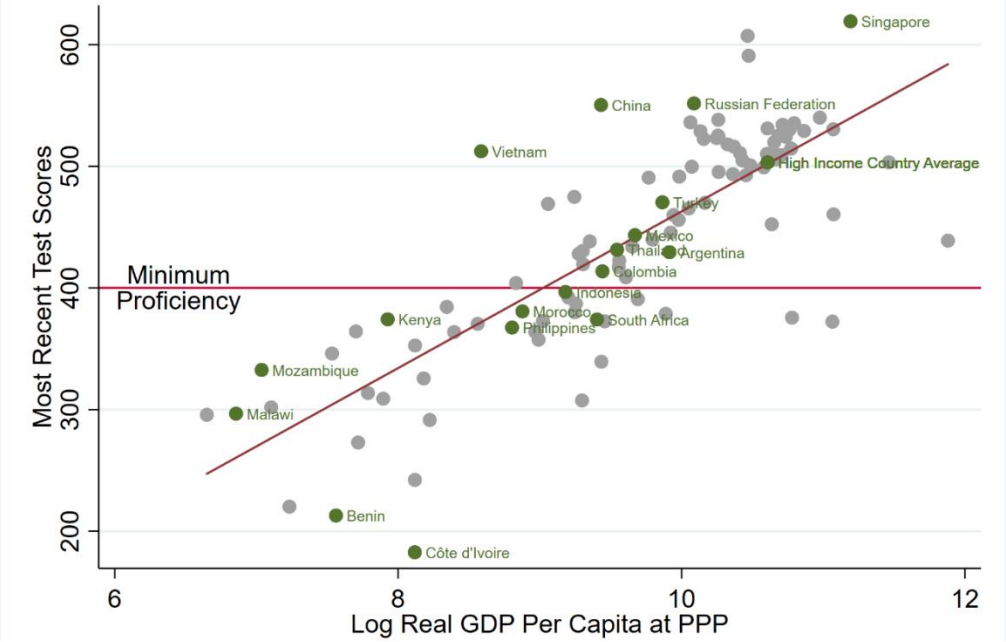
124. Even when countries invest significant share of their budgets, often public services fail to be of sufficient quality to actually generate human capital. Sometimes, they fail only the poor. Sometimes they fail everyone—and the rich simply opt out of the public system.

125. Human capital investments often do not reach the poorest. In many countries, the richest 20 percent of the population benefit 5-10 times more from public education resources than the poorest quintile.[132] Gaps in spending for the poor show up as gaps in outcomes for the poor. In Lao PDR, 75 percent of children from the wealthiest quintile complete lower secondary education, while this share is only 3 percent among the poorest quintile.[133] In India, infant mortality rate among the poorest versus richest wealth quintiles is 82 and 34 per 1000 births, respectively.[134]

126. In many contexts, school quality is systematically worse in poor neighborhoods. This reinforces—or even exacerbates—existing inequalities. Individuals who live in high-poverty areas fare worse than those who live in lower-poverty neighborhoods on a range of educational outcomes.[135] In fact, the fraction of childhood spent in a high-poverty area is negatively correlated with outcomes such as high-school completion,[136] and every year spent in a better area during childhood increases college attendance rates and earnings in adulthood.[137]

127. Because of individual and government failures, children (especially in the most disadvantaged countries) are failing to achieve the level of competencies that are needed to project them into more competitive labor markets. On the widely implemented PISA, a score of roughly 400 corresponds to minimum proficiency: less than half of students in developing countries meet this standard, while 86 percent do so in advanced economies (figure 2.2). In Singapore, 98 percent of students reached the international benchmark for basic proficiency in secondary school; in South Africa, only 26 percent of students met that standard. This means that all of Singapore's secondary school students have sufficient cognitive skills for the world of work, while almost three-quarters of South Africa's youth are, effectively, functionally illiterate.

Figure 2.2. Harmonized test scores

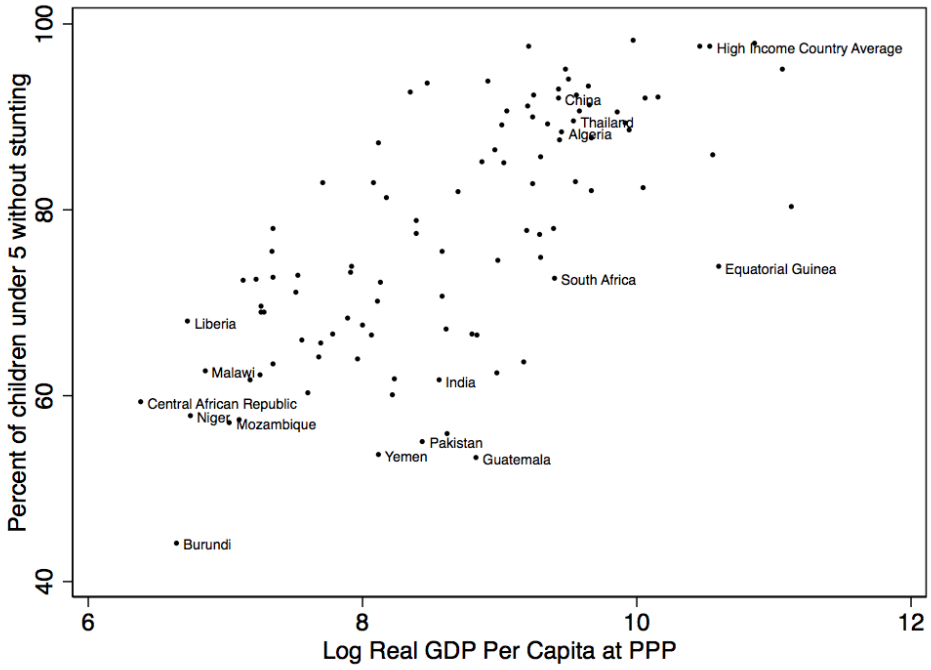


Source: Altinok, Angrist and Patrinos 2018. Data for China refer to PISA tests administered to students in Beijing, Shanghai, Guangdong and Jiangsu.

128. To benchmark the learning of children from rich and poor countries, the World Bank Group and partners are developing a comprehensive new database of international student achievement test scores, harmonizing results from international, regional, and national testing programs covering over 160 countries so they are comparable to an international assessment scoring standard.[138]

129. Learning outcomes measured by standardized assessments are the result of a cumulative process, where health, cognitive and socioemotional skills start evolving during early childhood, complement and reinforce each other over the life cycle.[139] There is well established evidence that health in early life has long term impact on individual well-being.[140] Nevertheless, stunting rates—one of the key markers of child development—remain extremely high in some parts of the world (figure 2.3). Over one-third of children under age 5 in South Asia have low height for age,[141] which reflects chronic malnutrition and severely limits the ability to learn. In countries such as Benin, Burkina Faso and Côte d'Ivoire, 10 percent of children born today never see their fifth birthday. Rates of anemia caused by iron deficiency—the leading cause of morbidity in children and adolescents age 0 to 19—are particularly high in Afghanistan (41 percent) and Yemen (40 percent).[142]

Figure 2.3. Percentage of children under 5 without stunting



Source: UNICEF, WHO, and World Bank 2017a.

Why Governments Often Fail

130. Despite the important role for public action, governments often fail to deliver because politicians do not have sufficient incentives to pursue technically sound policies; or because bureaucracies do not have the capacity to deliver. The degree to which governments invest in human capital does not just depend on available budgets.

131. Politicians may lack the incentives to invest because, for example, public health is not sufficiently politically relevant until there is a health crisis. Even when there is consensus among politicians and voters on the importance of an issue, there may be disagreement on the optimal solution. Politicians who rely on popular support may find themselves particularly constrained when they must fund health programs by diverting resources from more noticeable services such as infrastructure or public subsidies, or by raising taxes. The government of Nigeria, for example, ran into significant resistance when it tried to repeal fuel subsidies to spend more on maternal and child health services. In some countries, this resistance is partly explained by a weak social contract: citizens do not expect—or do not trust—governments to perform, so they are hesitant to make sacrifices or provide taxes that they worry will be misspent.

132. Another reason for lack of political incentives is that human capital investments might not produce economic returns until years later. While those with basic education earn more than those with no education,[143] labor market returns for basic education might not manifest until 10-15 years after these investments are made. This is even more the case for investments in early childhood

education. For instance, the provision of psychosocial stimulation to toddlers increased earnings by 25 percent in Jamaica, but such returns only materialized 20 years later.[144]

133. Implementation problems are equally daunting. Delivering health and education services involves a massive coordinated effort, especially in more populous countries. This effort often falls prey to capacity constraints and bureaucratic inefficiencies. In contexts where such services are expanding rapidly to the poorest and most vulnerable populations, there is the added challenge of input shortages and fiscal constraints.[145] For example, the roll-out of Ghana's national health insurance scheme, in 2003, suffered from insufficient management capacity and the poor distribution of health facilities and workers. These led to significant delays in provider reimbursement and the provision of membership cards.[146] In Tanzania, less than 8 percent of health providers received direct financial support from the central or local government.[147]

134. World Bank's Service Delivery Indicators surveys, recently fielded in seven Sub-Saharan African countries that together represent close to 40 percent of the continent's population, found that, on average, only 66 percent of fourth-grade teachers had mastered the language curriculum they were supposed to be teaching, and only 68 percent had the minimum knowledge needed to teach math.[148] Similar surveys conducted in healthcare facilities paint an equally mixed picture: while about 80 percent of Kenyan doctors could correctly diagnose a basic condition such as neonatal asphyxia, fewer than 50 percent of Nigerian doctors were able to do so.[149]

135. Misaligned incentives and lack of capacity might be behind insufficient progress in human capital outcomes. In the seven countries that were surveyed, on average, teachers taught for only half of the time they were supposed to spend teaching. In Senegal, nearly 69 percent of teachers claimed it was acceptable to be absent from class as long as students were left with work to do.[150] For teachers and doctors working in politicized bureaucracies—where promotions are based on political connections, not performance—lack of motivation may not be surprising. In these contexts, reform is not simply a question of identifying the problem and finding the solution, but also of understanding the incentives of bureaucrats and aligning them with program objectives.

136. But there are success stories where change has happened. When the incentives between central and local government are aligned on one side and those between local governments and service providers are aligned on the other, countries can make significant improvements in human capital outcomes. That is the case of *Plan Nacer* in Argentina that provides insurance for maternal and child health care to uninsured families. The program, which was supported by lending from the World Bank, used indicators measuring health outcomes and the use and quality of maternal and child health care services to allocate funding. Recipient provinces then used these resources to pay health facilities to provide maternal and child health care services to beneficiaries. An impact evaluation shows that *Plan Nacer* reduced the probability of low birth-weight by 19 percent among beneficiaries.[151]

The Human Capital Project—How Better Measurement Helps

137. Human capital matters—a lot—for people, for economies, for societies, and for global stability. And it matters over generations. When countries fail to invest productively in human capital, the costs are enormous, especially for the most disadvantaged. These costs put new

generations at a severe disadvantage. With technological progress placing a premium on higher-order skills, failing to lay the groundwork for productive lives not only carries high costs, but is likely to generate more inequality. It puts security at risk, as unmet aspirations lead to unrest.

138. Yet, policymakers often do not prioritize investments in human capital sufficiently. Lack of political incentives and technical solutions get in the way. Better measurement addresses both issues. To this end, the World Bank has launched a "human capital project" (HCP). HCP is a program of measurement and analytical work designed to galvanize global momentum around human capital. It would provide data for setting goals, designing solutions, and tracking progress on human capital investments.

139. Better measurement and access to information are the first step that can improve what citizens demand from their leaders and service providers. For example, in Uganda, releasing report cards on the performance of local health facilities galvanized communities to press for service delivery reforms. This in turn led to sustained improvements in health outcomes, including a reduction in mortality for children under 5.[152] In 2000, when Germany was subject to its first assessment under the Program for International Student Assessment (PISA), disappointing scores—known as the "PISA shock"—dominated public discussions and led to significant reforms that improved learning.

140. Better measurement also creates a shared understanding of reality and momentum for action. In Tanzania, the NGO Twaweza, supported by the World Bank, launched a nationally-representative survey to assess children's basic literacy and numeracy. The dismal results—released in 2011—showed that only three out of every ten third-grade students had mastered second-grade numeracy, and even fewer could read a second-grade story in English.[153] The World Bank's own Service Delivery Indicators, released around the same time, shined a spotlight on the low levels of teacher competence and high levels of absenteeism. Together, these results led to substantial public outcry and the introduction of Tanzania's "Big Results Now" initiative, a government effort to track and address low levels of learning. The World Bank has been supporting these reforms through a program linked specifically to learning outcomes, which is already leading to tangible results.

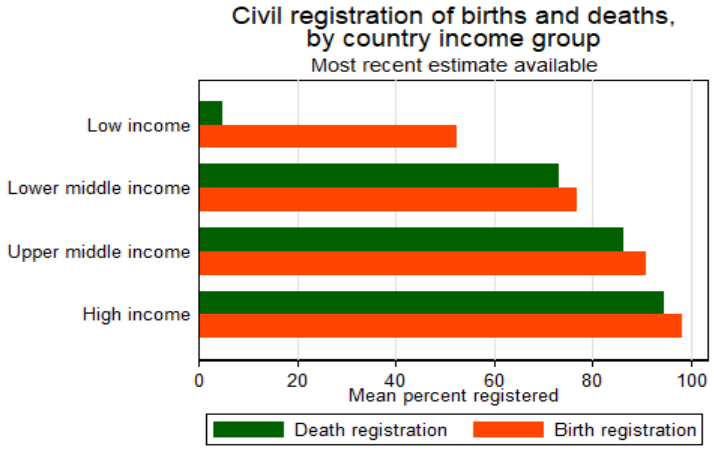
141. Better information can also provide technical guidance for policy reforms. A review of community accountability interventions in public sector primary schools in low- and middle-income countries identified 11 mechanisms through which these operate to improve school performance.[154] These types of interventions, which include community scorecards and citizen report cards, can improve local representatives' understanding of local needs and their confidence in advocating for them. These can also identify discrepancies between entitlements and the provision of services, prompting local citizens to demand actions for improvement. As part of the World Bank-funded READ PNG program, an early grade reading assessment revealed that Papua New Guinea's elementary students had difficulty with basic reading skills. In response, the Papua New Guinea government piloted a reading program, including teacher training. An evaluation of the program found that it improved students' reading comprehension. These results went on to inform the government's standards-based curriculum.[155]

142. In a resource-constrained world, it is also important to understand who to target first and carefully evaluated pilots improve the planning of a targeted scale-up. For example, in Indonesia, the World Bank has partnered with the government to understand issues affecting the human capital development of the youngest children. This project included a rigorous impact evaluation of the country's Early Childhood Education and Development project, which ran from 2009-2013 and provided 3,000 villages in 50 districts across the country a package of interventions to improve children's school readiness. The project established 6,000 child centers and trained 12,000 teachers. Children in villages that benefited from the project displayed better outcomes. After three years, students from more disadvantaged families in these villages had higher degrees of social competence, emotional maturity, and cognitive development than children in villages without the project.[156]

143. However, information on human capital outcomes is scarce. In education, only 1 in 6 governments publish annual education monitoring reports.[157] Many countries, especially the poorest, do not regularly participate in internationally comparable assessments of student learning. Across 121 countries, nearly a third lack any data on reading and mathematics proficiency for children at the end of primary school.

144. Monitoring of even the most basic health information—births and deaths—is inadequate in low- and middle-income countries (figure 2.4) and the pace of improvement in these systems has been slow. Between 2000 and 2012, worldwide, the percent of deaths registered changed little from 36 percent to 38 percent and the percentage of children under 5 whose births were registered only increased from 58 percent to 65 percent.[158] This prevents governments from accurately understanding the health needs of their populations and complicates proper planning for the allocation of public services.

Figure 2.4. Low- and middle-income countries have inadequate civil registration systems for recording births and deaths



Source: Authors' calculations based on data from Global Health Observatory.
Note: Estimates for birth and death registration coverage based on available data for 180 and 120 countries, respectively. Birth registration based on United Nations demographic yearbook. For countries with incomplete civil registration systems, birth registration is estimated from mothers' self-report of their children's birth registration status, as collected in household surveys. Death registration data based on WHO estimates.

145. Increasing the number of countries where the learning achievements of children are measured—both those in and out of school—would allow much better tracking of how countries are performing in terms of both school access and learning. The Annual Status of Education Report (ASER) survey, a rare example, provides an annual assessment of learning levels of children in rural households in India, capturing both youth in and out of school.[159]

146. One way to increase data on learning outcomes relatively cheaply is by adding learning modules to household surveys that are undertaken routinely in most countries. This would have the added advantage of also covering children who are out of school. In addition, it would allow learning data to be linked to household characteristics, including poverty. Another way is to bring together stakeholders to agree on a common core of questions to include in the existing learning assessments, to allow results to be harmonized across different tests.

147. Similar efforts are underway in health. To harmonize health measurement, the Health Data Collaborative was launched in 2015 by a large group of international agencies, bilateral and multilateral donors, foundations, and governments, with the objective of improving the coordination of health data collection.[160] New technologies such as tablets, global positioning system (GPS), and the diffusion of mobile phones are driving down costs and increase the scope of data collection.

148. It is also important to look not just at outcomes, but also pathways of change. There is a need to improve our understanding of how doctors' and teachers' knowledge and effort influence children's health and learning, to inform more targeted efforts to invest in human capital. Exploring these determinants elucidates, for example, the discrepancy between relatively high average years of schooling yet relatively low student achievement in Latin America.[161] A recent assessment in Madhya Pradesh, India found that people from poor households in poor villages were more likely to visit health care providers with low levels of knowledge and that, on average, 49 percent of accessible providers had no formal medical training.[162] An emerging body of research shows provider effort and competence as two critical factors driving poor quality in health.[163] Similarly, unqualified and unmotivated teachers are detrimental to student learning.[164]

149. Measurement enables policymakers to design more effective, context-specific solutions. Early research on determinants of student performance concluded that school and teacher quality matter even more for primary school achievement in low- and middle-income countries than in high-income countries.[165] A recent meta-analysis of school-based learning interventions in low- and middle-income countries found the largest impacts for: interventions using computers or instructional Computer Assisted Learning, teacher training, smaller class sizes, and grouping students by ability level.[166] A large body of literature on social determinants of health shows the many factors that affect health and development—including appropriate nutrition, clean water, safe roads, adequate housing, safe working conditions, and social support, among many other factors.[167] These health determinants must be tackled through effective policies in a wide range of sectors and cannot be sufficiently addressed through health policies alone.

150. Generating new information on the economic benefits of human capital is key to making the case to governments that these interventions are worthy of investment, particularly to Ministries of Finance that typically spend more time worrying about stocks of debt than stocks of

human capital. The 2018 "Changing Wealth of Nations" study has produced estimates of the monetary value of human capital, based on a comprehensive analysis of how earnings respond to education for individuals.[168] Demonstrating the beneficial effects of investing in human capital on economic growth can get policymakers to worry as much about what is happening in their schools as what is happening in their current account.

151. Stepping up measurement and analysis in these different areas is core to the Human Capital Project. The first step of this process is developing an international metric that captures key elements of human capital and can underscore its saliency in the political debate. The new Human Capital Index (HCI) measures *the amount of human capital that a child born today can expect to attain by the end of secondary school, given the risks of poor health and poor education that prevail in the country where she was born.* The HCI is designed to highlight how investments that improve health and education outcomes today affect the productivity of the next generation of workers. It measures current education and health outcomes since they are salient to policymakers and can be influenced by current interventions to improve the quantity and quality of education and health.

152. The design of HCI is intuitive. Imagine the trajectory from birth to adulthood of a child born today. In the poorest countries in the world, there is a significant risk that the child does not even survive to her fifth birthday. Even if she does reach school age, there is a further risk that she does not start school, let alone complete the full cycle of education through Grade 12 that is the norm in rich countries. The time she does spend in school may translate unevenly into learning, depending on the quality of teachers and schools she experiences or the support she has from her family. When she reaches age 18, she carries with her lasting effects of poor health and nutrition in childhood that limit her physical and cognitive abilities as an adult.

153. The goal of the HCI is to quantify the key stages in this trajectory and their consequences for the productivity of the next generation of workers. Accordingly, it has three components: (i) survival, as measured by under-5 mortality rates; (ii) *Expected Years of Quality-Adjusted School* which combines information on the *quantity* and *quality* of education; and (iii) health.

154. The quantity of education is measured as the expected number of years of school that a child can expect to obtain by age 18 given the prevailing pattern of enrolment rates across grades. The *quality* of education measure in the HCI reflects new work at the World Bank and with partners to harmonize test scores from major international student achievement testing programs.[169]

155. For health, there is no single broadly-accepted, directly-measured, and widely-available metric that is analogous to years of school as a metric of educational attainment. In the absence of such a measure, two proxies for the overall health environment are used to populate this component of the index: (i) adult survival rates and (ii) the rate of stunting for children under age 5. In addition to the fatal outcomes directly captured by this measure, adult survival rates can also be interpreted as a proxy for the range of non-fatal health outcomes that a child born today would experience as an adult if current conditions prevail into the future. Stunting is broadly accepted as a proxy for the pre-natal, infant and early childhood health environment, and so summarizes the

risks to good health that children born today are likely to experience in their early years—with important consequences for health and well-being in adulthood.

156. The health and education components of human capital described above all have intrinsic value that is undeniably important but difficult to quantify. This in turn makes it challenging to combine the different components into a single HCI. One solution that permits aggregation is to interpret each component in terms of its contribution to worker productivity, relative to a benchmark corresponding to full health and complete education. This aggregation strategy builds on the large literature of development accounting.[170] Conversely, the contributions of health and education to worker productivity are anchored in the large micro-econometric literature on estimating returns to education and health.

157. The HCI is measured in terms of the productivity of next generation of workers, relative to the benchmark of complete education and full health. This gives the units of the index a natural interpretation: a value of x for a particular country means that the productivity as a future worker of a child born today in that country is only a fraction x of what it could be under the benchmark of complete education and full health (table 2.1). This can be decomposed into the contributions of the three components of the HCI, each of which is also expressed in terms of productivity relative to the benchmark, and are multiplied together to arrive at the overall HCI.

Table 2.1. Human Capital Index—the productivity as a future worker of a child born today

(Maximum productivity = 1)

		A country in the		
		25th Percentile	50th Percentile	75th Percentile
		for component _, has a value of …		
	Component 1: Survival			
1	Probability of Survival to Age 5	0.95	0.98	0.99
A	*Contribution to Productivity*	0.95	0.98	0.99
	Component 2: School			
	Expected Years of School	10.3	12.4	13.5
	Test Scores *(out of approx. 600)*	354	421	510
2	Quality-Adjusted Years of School	6.0	8.6	11.3
B	*Contribution to Productivity*	0.53	0.65	0.81
	Component 3: Health			
3	Fraction of Kids Not Stunted	0.67	0.75	0.89
4	Adult Survival Rate	0.78	0.85	0.91
C	*Contribution to Productivity*[*]	0.88	0.91	0.95
	Overall Human Capital Index[**]	**0.44**	**0.58**	**0.76**

Source: Authors' calculations.

Note: Contribution to productivity measures how much each component of the HCI, as well as the overall HCI, contributes to the expected future productivity of a worker of a child born today, relative to the benchmark of complete education and full health. A value of x means that productivity is only a fraction x of what it would be under the benchmark of complete education and full health. Estimates of productivity contributes are anchored in microeconometric evidence on the returns to education and health. Quality-adjusted years of school is product of test score relative to global best times expected years of school.

*: C is calculated as the geometric average of 3 and 4's contributions to productivity.
**: A x B x C

158. The units of the HCI make it straightforward to connect the index to scenarios for future per capita income and growth. Imagine a "status quo" scenario in which the expected years of quality-adjusted school and health as measured in the HCI today persist into the future. Over time, new entrants to the workforce with "status quo" health and education replace current members of the workforce, until eventually the entire workforce of the future has the expected years of quality-adjusted school and level of health captured in the current human capital index. This scenario can then be compared with one in which the entire future workforce benefits from complete education and enjoys full health. Per capita GDP in this scenario is higher than in the "status quo" scenario, through two channels: (i) direct effects of higher worker productivity, and (ii) indirect effects reflecting greater investments in capital induced by having more productive workers.

159. Benchmarking countries against their growth potential—and against each other—is only the first step in the HCP. The overall goal is much wider. It includes understanding the contributing factors that affect human capital accumulation and their levels within the population. It also includes linking human capital more rigorously with economic growth.

Chapter 3: Lifelong Learning

160. The first president of post-apartheid South Africa, Nelson Mandela said this on learning: "Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that the son of a mine worker can become the head of the mine, that the child of farm worker can become the president of a great nation. It is what we make out of what we have, not what we are given, that separates one person from another."

161. Automation, platforms, and social media are reshaping not just work but the skills needed for work. Part of the ongoing skills re-adjustment is happening outside compulsory education[171] or formal jobs. Three domains—early childhood, tertiary education, and adult learning outside jobs—are increasingly central to the acquisition of specific skills demanded by future labor markets. Taken together, these domains crystalize the idea of lifelong learning: in a rapidly changing world, people need several opportunities to re-skill or up-skill throughout their lifetimes. Not only does this approach align with the changing nature of work; it also aligns with the changing nature of populations, whether it be rapidly aging populations on the one hand or youth bulges on the other.

162. In terms of skills for the future, two concerns have heightened. First is inequality. Within advanced countries, job polarization—the expansion of high- and low-skill jobs coupled with the decline of middle-skill jobs—is well documented.[172] Yet whether these changes will unfold in low- and middle-income countries in the same way remains to be seen. Except for Indonesia, Mexico, and Brazil, job polarization has not been observed so far.[173] Second, linked to job polarization, is the trade-off between skills adjustments in the current labor market vs. skills adjustments among those who enter the labor market in the next decade.

163. Against this backdrop, demand for three types of skills—acquired throughout one's lifetime—is undergoing significant disruptions. These are general cognitive skills, job-specific skills, and socio-emotional skills. General cognitive skills determine how well individuals understand the world around them and act based on this understanding. These skills are transferable across jobs and include critical thinking, problem solving, reasoning, to name a few. Job-specific skills refer to the knowledge related to a particular field. Socio-emotional skills include the ability to recognize and manage emotions, develop caring for others, and establish positive relationships.

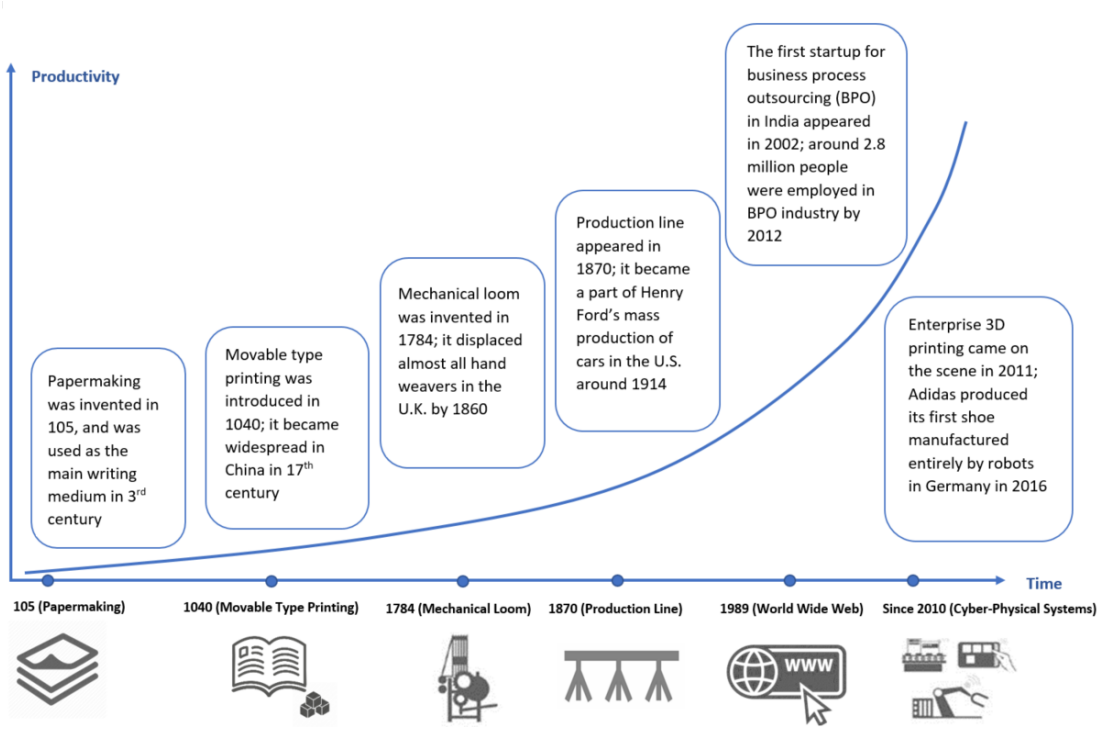
164. The demand for these three skill-types changing. First, labor market returns to general cognitive and socio-emotional skills appear to be rising. Second, returns to job-specific skills are increasingly uncertain—with returns increasing for some jobs and declining (often dramatically) for others. For example, the demand for home electronics repairing skills is decreasing because technology drives down equipment prices and improves reliability. On the other hand, the rising renewable energy sector is increasing its demand for the very specific skill of building and operating power-generation installations. Third, pay-offs to the combination of different skill-types appear to be increasing.

165. Given these changes, three types of skills investments can have big pay-offs: early childhood investments, tertiary education, and adult learning outside jobs. This is in addition to skill acquisition in primary and secondary schools and jobs. Skill acquisition during basic schooling remains very important, as discussed in World Development Report 2018.

166. The increase in returns to transferable cognitive skills is due to rising job uncertainty. A large share of children entering primary school today will work in occupations that do not yet exist. Even in low- and middle-income countries, many young people are employed in jobs that did not exist three decades ago. India has nearly 4 million app developers; Uganda has over 400,000 internationally certified organic farmers; China has 100,000 genetic counselors. In such a rapidly transforming context, it makes sense to invest in skills that can easily be transferred from one type of job to another.

167. Higher-order cognitive skills that are transferable across jobs appear to have the strongest premia. This is because of the specific demands of an increasingly technological world—that keeps changing. In the past, shifts in skill demands prompted by technological advancements took centuries to manifest (figure 3.1). Today technology demands new skills seemingly overnight. Consequently, demand for transferable higher-order cognitive skills like mathematics, logic, critical thinking, complex problem solving, and reasoning is rising. In fact, it is expected that nearly all jobs of the future will be more intensive in higher-order cognition.[174] Irrespective of the region of the world, higher-order cognitive skills are consistently ranked among the skills most valued by employers.[175]

Figure 3.1. Time needed for technological diffusion keeps getting shorter



Source: Authors' calculations.

168. Socio-emotional skills often cover human capabilities that machines are unable (for now) to replicate. Creativity, innovation, and social interaction are some examples of the skills that will remain high in demand. A finer-grained list could include elements like curiosity, emotional intelligence, empathy, leadership, teamwork, conflict resolution, and relationship management. For example, even when medical diagnostics have been taken over by computers, doctors and nurses will still play a vital role given the need to offer empathy, manage information, and negotiate difficult situations humanely. In Latin America and the Caribbean, adoption of digital technology has not only placed more importance on general cognitive skills, but also increased demand for workers with interpersonal skills.[176] Labor market returns to socio-emotional skills are much higher today than they were in the mid-1980s.[177] These returns will continue to grow.

169. A new trend is the increasing importance of skill combinations. Technological change seems to be less about completely replacing old skills with new skills—and more about combining skills in new ways. For instance, a marketing professional might well be called upon to write algorithms. A physics graduate may land a job as quantitative trader in the finance industry. Demand for professionals such as digital-mechanical engineers, who can combine emerging digital skills with traditional subject expertise is also likely to grow. The sought-after trait is adaptability—the ability to respond to unexpected circumstances, and to un-learn and re-learn quickly. Developing this ability takes a combination of general cognitive, socio-emotional, and even job-specific skills.

170. This chapter discusses how skill acquisition outside compulsory schooling and jobs can be effective for equipping workers with general cognitive skills, socio-emotional skills, and the ability to combine skills in new ways. This is through three avenues: early childhood investments, tertiary education, and adult learning outside jobs. Their increasing importance signals that skills for the future are truly a matter of lifelong learning.

Learning in Early Childhood

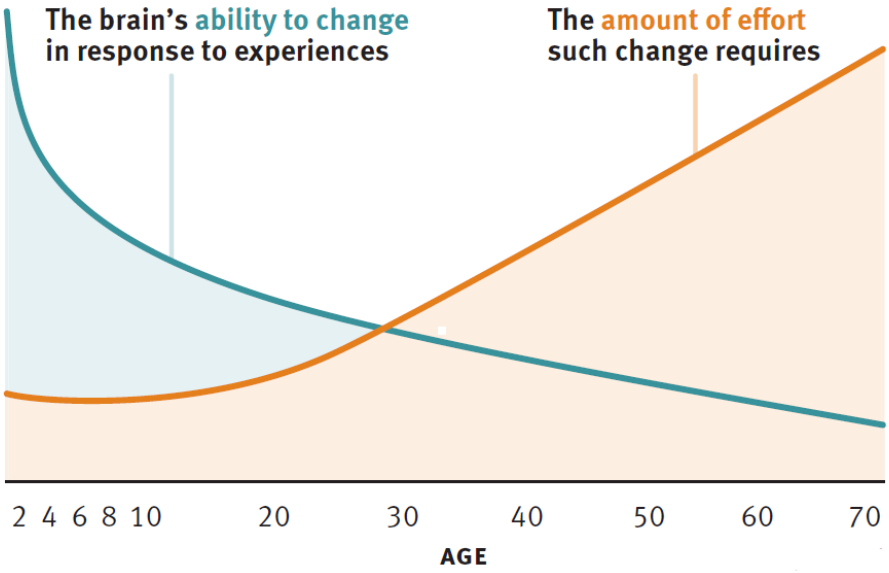
171. In France, the mandatory school starting age is soon to be reduced from six to three years. According to French President Emmanuel Macron, this reform is intended to boost equality, improving the ability of children from disadvantaged backgrounds to remain competitive in the education system.[178]

172. The most effective way to acquire the skills demanded by the changing nature of work is to start early. Early investments in nutrition, health, protection, and education lay strong foundations for future acquisition of cognitive and socio-emotional skills. They also make future skill acquisition more resilient to uncertainty. Early childhood investments are an important channel improve equality of opportunity. Currently, these investments are underprovided, especially for poor and disadvantaged children who can benefit the most from them. Prioritizing these investments can have big pay-offs for economies, as long as both access and quality are emphasized.

173. The foundations of brain architecture are set in from prenatal period to age 5—making it an important stage to develop cognitive and socio-emotional skills.[179] During this period the brain's ability to learn from experience—its "plasticity"—is the highest. This ability decreases

with age (figure 3.2). This means two things. First, by impacting brain architecture—early childhood investments can influence the very ability to acquire skills. As a result, experiences and learning during this period directly impact achievement in adulthood. Second, if this window is missed, skill-building becomes harder. Building more advanced skills on weak foundations is more difficult than getting the foundations right.

Figure 3.2. Brain's ability to learn from experience decreases with age



Source: Center on the Developing Child at Harvard University 2016.

174. Quality early childhood development programs enable children to "learn to learn." Investments in nutrition, health, and stimulation in the first 1,000 days of life builds stronger brains. Engaged parents and caregivers during this phase better develop children's language skills, motor, and self-regulation skills, as well as various social behaviors. In Colombia, for example, exposure to psychological stimulations through home visits with play demonstrations significantly improved cognitive development of children aged 12-24 months.[180] In Pakistan, *Lady Health Workers* program, which provided health services in rural areas led to a decline in infant mortality from 250 to 79 per 100,000 live births.[181] When the program provided nutrition supplementation, and encouraged mothers to engage in responsive play with children aged 0-2 years, it generated sustained positive effects on children's cognitive abilities and pro-social behaviors.[182]

175. As children age, around age 3, socialization and more formal early learning become important to prepare children to succeed in primary school. Quality preschool at this stage further strengthens children's executive functions (e.g., working memory, flexible thinking, and self-control), launching them on higher learning trajectories.[183] In Bangladesh, rural children who attended preschool performed better in first- and second-grade speaking, writing and mathematics, compared to those who did not.[184] Besides improvement in cognitive and motor skills, a preschool reform in rural Mozambique had positive effects on socio-emotional development—participating children were better at interacting with others, following directions, as well as regulating their emotions under stress.[185] But for these results, the quality of pre-schools needs to meet certain

thresholds. There is evidence that low quality preschool can be worse for child development than no preschool at all.[186]

176. Early childhood investments produce future-relevant skills efficiently. This is because learning is cumulative—skills beget skills. Skills acquired at an earlier stage facilitate skill formation in subsequent stages.[187] Hence, the returns for early investments are the highest and the advantages conferred by these investments grow overtime.[188] It is estimated that an additional dollar invested in quality early childhood programs can yield a return of 6 to 17 dollars.[189]

177. In addition to having long-lasting benefits on children, early childhood development programs improve labor force participation of parents. Many women do not work due to time-consuming childrearing responsibilities. In the United Kingdom, half of the stay-at-home mothers would prefer going back to work if they could get high-quality, affordable childcare services.[190] Early childhood development investments can alleviate this constraint. In Argentina, a large-scale construction program of pre-primary school facilities in the 1990s positively impacted maternal employment.[191] During the same period, in Spain, offering full-time public care for three-year-old children increased maternal employment by 9.6 percent.[192]

178. Early childhood investments are also effective in increasing equity. They close developmental gaps between children from different socioeconomic backgrounds. For children exposed to poverty and other adverse conditions, quality early childhood programs increase adult competence, reduce violence, depressive symptoms and social inhibition, as well as foster growth in the subsequent generation.[193] For example, in rural Guatemala, an early childhood development nutrition program for poor families significantly increased wages for these children in adulthood.[194] In Jamaica, early stimulation for infants and toddlers increased their future earnings by 25 percent—equivalent to adults who grew up in wealthier households.[195]

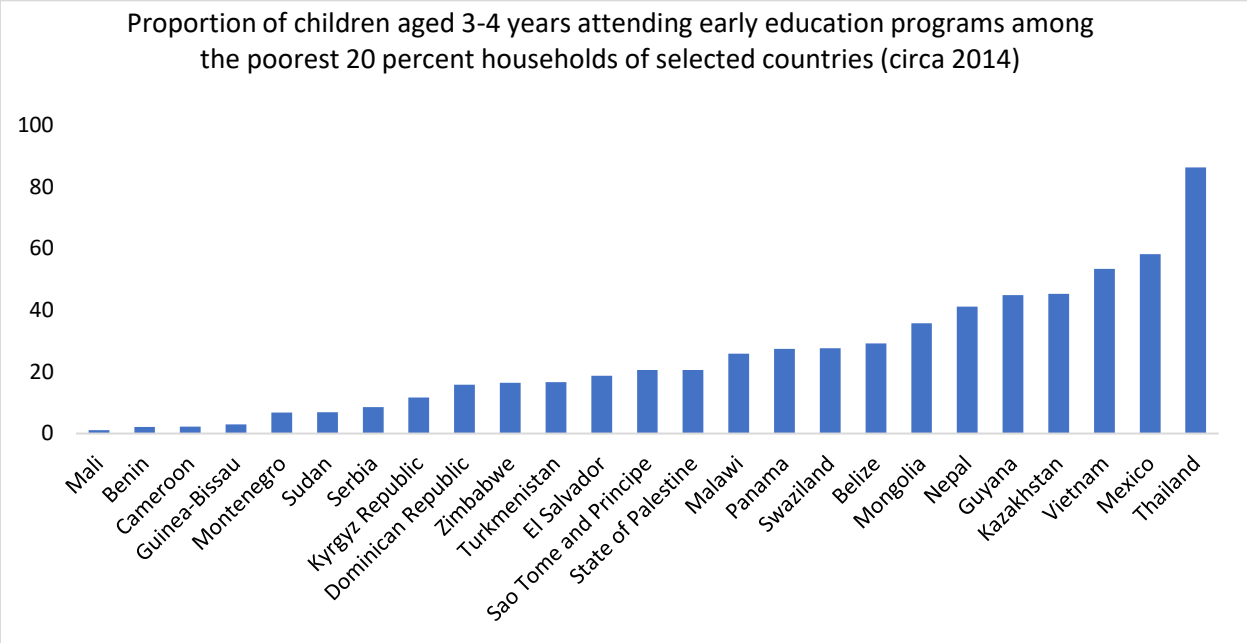
179. Despite their strong efficiency in producing important skills, early childhood investments are underprovided. Around 250 million children under age five are at risk of not reaching their developmental potential in low and middle-income countries because of stunting or extreme poverty.[196] Worldwide, more than 87 million children under age seven have spent their entire lives in conflict-affected areas.[197] They suffer from extreme trauma and toxic stress, which impair their brain development and skill enhancement. On the other hand, only half of all three- to six-year-olds have access to pre-primary education globally—in low income countries this share is one in five.[198] In 2012, North America and Western Europe spent 8.8 percent of their education budgets on pre-primary education; in Sub-Saharan Africa the share allocated was a paltry 0.3 percent.[199]

180. Children from poor families are the least likely to attend early childhood development programs (figure 3.3). They are also the ones who can benefit the most from such programs. In low- and middle-income countries, approximately 47 percent of wealthiest families have access to early education programs, but for the poorest families, this number is 20 percent.[200] Rural families are especially disadvantaged. Across a sample of 15 countries, rural dwellers consistently have worse access to early childhood development programs compared to those living in urban areas.[201]

181. Even for those who have access to care services or early learning, quality is often a concern. Poor-quality early childhood development programs can lead to disappointing results in children's

language development, cognitive skills, and sociability.[202] A study of preschools in a slum of Nairobi, Kenya shows that despite high participation rates, the curricula and pedagogical approach were not age-appropriate. In the program, 3- to 6-year-olds had to follow academic-oriented instruction and even sit for exams.[203] In Peru, while the national *Wawa Wasi* program has provided safe community-based daycare and nutritious diet for children aged 6 to 48 months in impoverished areas, it failed to improve children's language or motor development skills due to insufficiently trained care-givers.[204]

Figure 3.3. In many countries, children from disadvantaged background are least likely to attend early childhood education programs



Source: Authors' calculations based on data obtained from UNICEF Multiple Indicator Cluster Survey.

182. Effective solutions for early childhood development are available. In some contexts, community-based playgroups have generated sustained outcomes at a low cost. In Indonesia, one such program positively affected children's language, socioemotional and cognitive skills; those from disadvantaged backgrounds benefited more in both short and long term.[205] In Tonga, organizing playgroups for children aged 0-5 significantly improved their early grade reading skills.[206] The Montessori model, characterized by multi-age classrooms, student-chosen learning activities, and minimal instruction, have been shown to be more effective than conventional education in improving children's executive functions.[207] With successful local adaptations, Montessori and other child-centered approaches—including Steiner, Reggio Emilia, and Tools of the Mind—can now be found in diverse settings from Kenya to Haiti.

183. Research has uncovered several concrete ways to increase take-up of early childhood development investments. For example, cash transfers can support early childhood development for the poorest children. Such programs have reduced stunting in the Philippines and Senegal, foster language development in Ecuador and Mexico, and improve children's socioemotional skills

in Niger.[208] Integrated approaches that combine health, nutrition, and stimulation investments can be highly effective as well. For instance, Chile's *Crece Contigo* (ChCC) program integrates the services provided by the health, education, welfare, and protection services—so that a child's first contact with the system occurs in utero, during her mother's first prenatal control.

184. However, the need for local adaptation of global evidence remains strong. A highly successful child nutrition program from Southern India failed to have any impacts in Bangladesh. Why? Partly because the program targeted mothers. Decisions about the feeding of young children in Bangladesh were often being made by mothers-in-law, not mothers. Local context matters for effective early childhood development.[209]

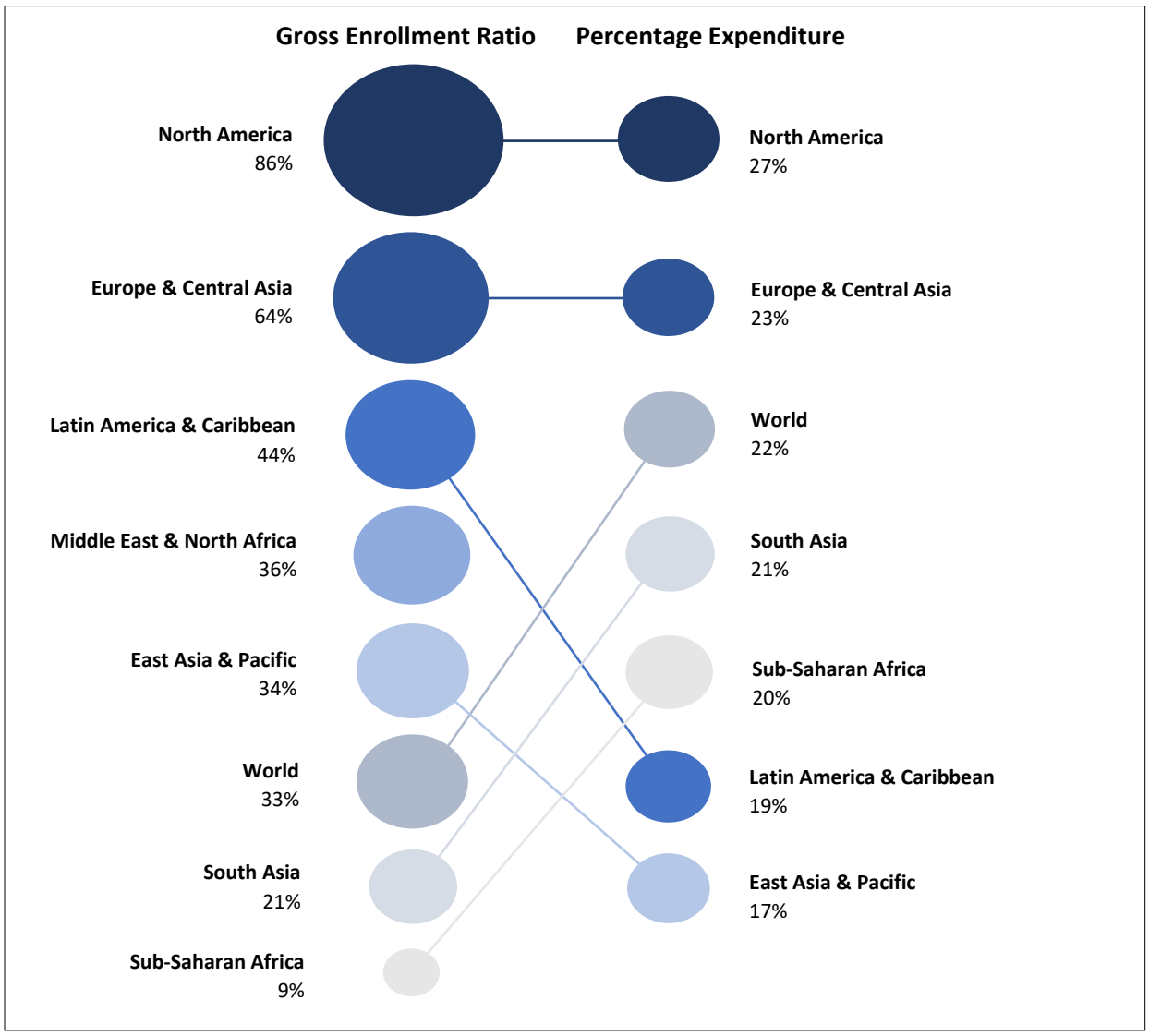
185. Ultimately, concrete measurement is necessary to understand where investments are needed, find effective solutions, and adapt them locally. The World Bank-supported *Measuring Early Learning Quality and Outcomes* (MELQO) consortium is an effort in this direction. It is developing measurement modules that can be implemented at scale. Such information improves the quality of early childhood development, target those most in need, as well as establish quality assurance systems. So far, eleven low- and middle-income countries have participated in MELQO pilot. In Mongolia, the government used MELQO to assess early childhood development outcomes by socioeconomic status. The findings were used to inform policies that address quality of pre-primary education and cross-region differences.[210] The Nicaraguan government incorporated MELQO results into the design and planning of the country's preschool measurement system.

Tertiary Education

186. Tertiary education is a worthwhile investment only if it is configured to meet the specific demands of the future. It can provide the complex skills demanded by the changing nature of work. But to do this, three specific system-level adaptations are called for: more flexible choices within tertiary systems; more focus on skills that are transferable across jobs; and more support for innovation.

187. More integrated and technology-driven economies appear to reward tertiary education. The global average private return to tertiary education is 15.8 percent.[211] But these returns are not high for everyone. They depend on a range of factors including the quality of the provider, student composition, the availability of jobs. Controlling for other factors, students attending a top university in Colombia earn 20 percent more than those who just failed to meet the cut-off.[212] Returns also vary dramatically based on the field of specialization. In Chile, for example, the return to tertiary education ranges from 4.1 percent for humanities to 125.8 percent for engineering and technology.[213] Tertiary enrollment and expenditure also vary considerably by region (figure 3.4).

Figure 3.4. Gross tertiary enrollment ratio and percentage expenditure on tertiary education by region, 2013



Source: World Development Indicators sourced from UNESCO Institute for Statistics.
Note: Expenditure on tertiary education data is unavailable for Middle East & North Africa region. Gross Tertiary Enrollment Ratio: The ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to tertiary education. Percentage Expenditure on Tertiary Education: Expenditure on tertiary education expressed as a percentage of total general government expenditure on education.

188. The changing nature of work makes tertiary education more attractive in three ways. First, technology and integration have increased the demand for higher-order general cognitive skills—like complex problem solving, critical thinking, and advanced communication that are transferable across jobs but cannot be acquired through schooling alone. Rising demand for these skills has enhanced the wage premia of tertiary graduates, while reducing the demand for less educated workers.[214] Second, by increasing the demand for lifelong learning. Workers are now expected to have multiple careers; not just multiple jobs over their life-time. Tertiary education—with a wide-array of course offerings and flexible delivery models like online learning and open universities—

meets this growing demand. Third, tertiary education, especially universities, become more attractive in the changing world of work by serving as platforms for innovation. As "knowledge hubs," universities can be engines for developing new capabilities, innovation, and high-tech entrepreneurship.

189. The relevance of tertiary education systems for the future of work depends on how well they deliver on these three fronts. Increasingly, skills acquisition is a continuum, not a finite decision-tree. To better serve this model, tertiary systems would need to become more flexible, more effective at producing transferrable higher-order skills, and more actively facilitate innovation.

190. Flexibility is increased by ensuring that when students open the door to one pathway, the door to other pathways does not close irrevocably. For instance, at the start of tertiary education most students must choose between general education or vocational training. General education such as programs on engineering or economics prepare students in transferable higher-order skills that determine their overall learning-readiness or trainability. On the other hand, vocational training, such as programs on nursing or airport operations, is directly related to specific occupations. Students need to choose one or the other and once this choice is made—especially if it is for vocational training—it can be difficult and expensive to reverse. This rigidity in tertiary systems is inefficient and inequitable given the future of work.

191. The trade-offs between general and vocational education are changing in unpredictable ways, and most economies continue to need both. Technological progress tends to lower the demand for certain occupation-specific skills, making certain vocational degrees obsolete. It also leads to a higher depreciation of narrow job-specific skills compared to general skills. At the same time, vocational training continues to be pursued by many. In 2012, 63 percent of Dutch higher education students were attending vocational training.[215] This share was more than 50 percent in Malaysia, and 31 percent in Kenya in 2013.[216] Vocational training meets immediate demand for technical skills, enables faster education-to-work transitions for some, and alleviates pressures on the university system.

192. Against this backdrop, three factors make flexibility between general and technical tracks imperative for the changing nature of work. First, the combination of general and technical skills is becoming highly valued. Second, even technical jobs seem to be getting more intensive in higher-order general skills, implying that this type of skills acquisition needs to be accessible before and during work-life. Third, those trained in narrow vocational skills need viable options for an unpredictable future. A straightforward way to do this is by introducing "bridging" arrangements allowing vocational students to continue their studies at universities. For instance, Congo, Dem. Rep. offers "bridging" arrangements for vocational graduates to continue to university.

193. Close collaboration between industry and vocational education can also play a role. For example, in China, Lenovo is working with tertiary institutes to train vocational students in high-tech areas such as cloud computing, which features practice-based curricula, practitioner-led instruction, and professional certification. In addition, filling in information gaps enables students to make choices between and within different paths. Chile, for instance, is establishing online

platforms where students can access information on employability of various degrees, wage profiles, courses to take for certain occupation, and so on.[217]

194. Greater flexibility is also needed within course formats. Demand for lifelong learning implies that the working population needs to top up existing skills with just-in-time qualifications. This demand calls for flexible delivery models that allow individuals to access tertiary education while working. Also, for sharper, self-directed, and practical training—a greater mix of degrees and shorter courses. It is possible to imagine future tertiary education systems that provide "stackable credentials" in which qualifications can be fitted together in flexible and customizable ways.

195. It is not as if tertiary systems have remained static or impervious to these changing demands. They have responded. General and vocational tracks often intersect. There are now a wide range of programs offered by universities which have a vocational dimension or orientation—including many in the sciences, engineering and technology. In addition, technology-enabled platforms are making tertiary education more agile and responsive, especially to those with historically low access. This is seen in the increase in distance learning (or online learning) and open universities (i.e. universities with minimal or no entry requirements). In the mid-1990s, the five largest distance-learning programs were based in lower or middle-income countries. India is now the second largest consumer of Massive Open Online Courses (MOOCs).[218] XuetangX, the major MOOCs and blended learning portal from China, crossed 2.7 million students in May 2016.[219] However, some caution is warranted. A recent study shows that the return on investment of online courses for post-secondary education is lower than that of brick and mortar education when labor market returns and opportunity cost are considered.[220]

196. Tertiary education systems need to guarantee a minimum threshold of transferable cognitive skills—which are the best inoculation against job uncertainty. But many tertiary education systems are not effective at producing these skills. For example, in Colombia, there is significant variation across universities in their ability to impart foundational higher order skills such as critical thinking, problem-solving and communications.[221] A study among Chinese undergraduates in engineering and computer science suggests that their cognitive skills did not improve much during the first two years of college.[222]

197. Incorporating more general education in tertiary programs is one way to increase acquisition of transferable higher-order cognitive skills. In 2012, an additional year of general education was added to undergraduate programs in af SAR, China—focusing on problem solving, critical thinking, communication, leadership, and lifelong learning skills.[223] A large majority of students perceive this change as being effective in promoting desirable graduate attributes. Another way is through innovative pedagogy. The faculty of Architecture and Environmental Design at College of Science and Technology-University of Rwanda promoted learning strategies that include open-ended assessment, feedback opportunities, and a progressive curriculum that balances academic challenge with student support. These approaches improved the critical thinking skills of students.[224] Another channel is through better metrics that reliably assess student gains in complex cognitive skills at the higher education level.[225]

198. Tertiary education may also build transferable socio-emotional skills—such as teamwork, resilience, self-confidence, negotiation and self-expression. In a survey of employers of engineers in India, socio-emotional skills were ranked at or above technical qualifications and credentials in terms of their significance for the employability of recent graduates.[226] Employer surveys in Bulgaria, Georgia, Kazakhstan, Poland, Macedonia FYR, Russian Federation, and Ukraine indicate that employers see the lack of socioemotional skills at least as binding as technical skills.[227]

199. Socio-emotional skills can be acquired in adulthood. Forward-looking universities are finding ways to do this. In the United States, the University of California, San Diego developed an interactive course on "Learning How to Learn," which is offered at the Coursera platform. Dutch Vocational Colleges provide entrepreneurial courses with the objective to improve non-cognitive skills such as teamwork and self-confidence.[228] In Tunisia, introducing an entrepreneurship track that combines business training with personal coaching reshaped behavioral skills of university students.[229] In Spain, cooperative learning strategies (learning in small teams with peers of different ability levels) improved empathy, assertiveness, cohesion and the ability to accept different views and reach agreements among university students.[230] In China, a combination of cooperative learning and role play enhanced self-educational abilities and communications skills among undergraduate students in pharmacology classes.[231] However, to better teach socio-emotional skills, more efforts are necessary to design appropriate curriculum and accurate measurement, especially in the contexts of low income countries or rural areas.[232]

200. Tertiary education systems often serve as epi-centers of innovation—this role will be increasingly valued in future economies. In industries such as pharmaceuticals and electronics, more than 10 percent of the new products and processes have been commercialized thanks to academic research.[233] One study suggests that universities and research institutes, rather than firms, have driven scientific advances in sectors like biotechnology.[234] In Sub-Saharan Africa, nearly 45 percent of the university research output focused on health sciences, grappling with the most pressing issues of the region.[235] Further, knowledge spillovers from university activities remain strong. In the United States, a 1 percent increase in university expenditure leads to a 0.08 percent increase in local labor income of other sectors. In Sweden, the presence of university research contributes to 0.5 percent more patents awarded in labor markets each year.[236] In Chile and Colombia, firms are more likely to introduce new products and patent them if they collaborate with universities.[237]

201. To prepare students for the changing labor market, more and more tertiary institutes are offering entrepreneurship trainings, creating business incubators, or hosting venture capitalists. Stellenbosch University in South Africa has generated 24 spin-out companies, and filed 290 patents from 2000 to 2018.[238] Since its establishment in 2000, *SIDBI Innovation and Incubation Center* at Indian Institute of Technology (IIT) Kanpur has incubated 53 start-ups, and disbursed seed funds of 50 Crores.[239] Egypt, Arab Rep. launched its first university incubator, *Venture Lab*, in 2014.[240]

202. For some countries, a regional-cooperation approach has proved more optimal. Regional "centers of excellence" can be a great way to build regional specialization, concentrate limited top-level faculty, generate knowledge spillovers, and meet private sector demand for skills. This has

been successful in Sub-Saharan Africa under the Africa Centers of Excellence project supported by the World Bank. Under the project the West Africa Center for Infectious Bio Pathogens at the University of Ghana obtained international accreditation; as did at least 12 other programs in Development Impact Systems and Power Engineering. Through its "matching grant" approach, at least five centers have won research grants in crop science, genomics of infectious diseases, oil and gas. The project has supported at least 1,000 PhDs and 5,000 master students. Similar regional collaborations exist in the European Union, ranging from building pan-European research infrastructure to forming research partnerships to address common challenges such as Alzheimer.

203. There are well-known examples of successful university innovation clusters in the developed world—innovation clusters around Stanford University (Silicon Valley) and Harvard-MIT (Boston's Route 128) in the United States, Cambridge-Oxford ("Golden Triangle") in the United Kingdom, to name a few. Such clusters are also emerging in middle income countries. In Malaysia, the University of Malaya has established eight interdisciplinary research clusters during the past decade, covering sustainability science and biotechnology. In China, Peking University is building *Clinical Medicine Plus X*, a research cluster for precision medicine, health big data, and intelligence medicine. As part of the *Startup India* initiative, seven new research parks located in different IIT campuses will be established to promote innovation through incubation and collaboration between universities and private sector firms.[241] In Mexico, the Research and Technology Innovation Park currently houses more than 30 research centers covering R&D in biotechnology, nanotechnology, robotics; seven of them are led by universities.

204. But building university-based innovation hubs is not easy. There seems to be standard ingredients to create an innovation center: a "hot" industry, a research university, a technology park, subsidies and incentives for companies to relocate, and a pool of venture capital. However, simply applying this formula does not always work. Beyond the hard infrastructure, many other "soft" elements are important but difficult to create. Such elements include strong human capital supply, close ties between university research and private sector innovation, sufficiently developed capital market, and even innovation-friendly cultural norms (such as de-stigmatization of failure). In short, successful university-based innovation cluster is a rare breed.

205. Two main factors matter for a healthy innovation ecosystem. First, prioritize the right university for the right sector. Establishing university-based innovation clusters is a complex process, costing sizeable financial resources, requiring highly-skilled employees, and often taking a long time.[242] An appropriate mix of research quality, budget, culture, as well as institutional arrangements is essential for a good university candidate.[243] The agglomeration effects of universities vary by sector. For example, university R&D has been shown to be irrelevant for sectors such as furniture.[244] Finally, the concept of physical innovation clusters might become obsolete. Today, university spillovers tend to be mostly spatially bounded,[245] but digital platforms make the physical institutional structures of innovation clusters irrelevant.

206. Second, create an enabling environment. Just because successful innovation clusters exist, does not mean that government can create them. However, they "set the table"—providing necessary local infrastructure, increasing expenditure on R&D, facilitating universities to attract high-quality researchers and connect with private sector innovation, easing rigid labor market regulations, to name a few.[246]

Adult Learning Outside Jobs

207. As the nature of work changes, some workers are caught in the cross-hairs of the ongoing skills disruptions. As economies adjust skills provision for the human capital of the next generation, the current working-age population becomes anxious over job prospects.

208. One step towards lessening this anxiety is adult learning for reskilling and upskilling those who are not in school and not in jobs. This approach has shown more promise in theory than in practice. Too often bad design gets in the way. There are three ways to improve adult learning—more systematic diagnoses of the specific constraints that adults are facing, pedagogies that are customized to the adult brain, and flexible delivery models that fit well with adult lifestyles. Adult learning is an important channel for skills readjustments in the future of work, but it needs a serious design re-think.

209. Adult learning programs come in many different forms. This section mainly focuses on three types that are particularly relevant in preparing adults for the changing labor markets. These are programs on adult literacy, skills training for wage employment, and entrepreneurship programs.

210. Worldwide more than 2.1 billion working-age adults (aged 15-64) have low reading proficiency.[247] In Sub-Saharan Africa, nearly 61 percent of workers are not fully reading proficient; in Latin America and Caribbean this proportion is 44 percent. Even in middle income countries like India only 24 percent of 18- to 37-year-olds who dropped out of school before completing primary could read.[248] This is a problem. Given the future of work, functional literacy is a survival skill. The economic and social cost of adult illiteracy to developing countries is estimated at more than US$5 billion a year.[249]

211. Even with basic literacy skills, many people leave school too early to thrive in work or life. This could be because of economic or cultural constraints or low quality of basic education[250] or both. In 2015, the drop-out rate from lower secondary general education is higher than 30 percent in countries such as Cambodia, Costa Rica and Madagascar.[251] Lacking in formal certification and trainings of other necessary skills, it is difficult for early school leavers to find jobs or pursue further education later in life. Similar constraints are also faced by many adults who stayed in school but were failed by poor quality of basic education.

212. Concerns about unemployment and underemployment also continue to be pressing. Globally, around 260 million youth aged 15 to 24 are out of school and out of work.[252] A pool of unemployed adults is not only an economic concern, but also a political risk. It can lead to large emigration, social unrest, and political upheaval. Insufficient economic opportunities for an increasingly educated population was seen to be a major catalyst for the Arab Spring.[253] Changing demographics add additional pressures to the labor market. With population ageing, many rich countries are trying to equip a smaller, older workforce with skills to sustain economic growth. Other countries with big youth cohorts struggle with a low-skilled labor force trapped in low-productivity jobs.

213. Adult learning programs upskill, retool and improve the adaptability of older workers. India's *Saakshar Bharat* initiative from 2009 aimed to provide adult literacy to 70 million adults. In Ghana, adult literacy programs yielded labor market returns of more than 66 percent.[254] To give out-of-school individuals a second chance, the Mexican National Institute for Adult Education has developed flexible modules to deliver education programs that are equivalent of primary or secondary education. Under the World Bank's Nepal *Adolescent Girls Initiative*, vocational training for women increased their non-farm employment by 174 percent.[255] The Argentinean *Entra21* program provided adult skills training and internships, leading to 40 percent higher earnings among participants.[256] Kenya's *Ninaweza* program offered skills training to young women living in informal settlements in Nairobi—leading to a 14 percent increase in the likelihood of obtaining a job, increased earnings, and improved self-confidence for participants.[257]

214. But many adult learning programs fall short of impact. Adult literacy programs often improve word recognition but fail to improve actual reading comprehension. In Niger, although an adult education program increased the number of words that participants can read, it did not improve their reading speed to one word per 1.5 second—the speed needed for comprehension.[258] Entrepreneurship programs often improve business knowledge but not income or employment.[259] In Peru, training improved business practices among the targeted female entrepreneurs, but did not generate significant impacts on employment.[260] In France, a program comprising of collective business training, individual coaching as well as financial support had no impact on business creation or employment.[261] Vocational training for the unemployed often improves short-run earnings but not always increases long-run employment. The Dominican Republic's *Juventud y Empleo* program improved non-cognitive skills and job formality, but did not increase employment.[262] Turkey's vocational training had no significant impacts on overall employment, while the positive effects on employment quality faded in the long term.[263]

215. Even among the successful adult learning programs, costs are high. In Liberia, even though young women with access to job skills training enjoy higher monthly earnings—US$11 more than the comparison group—the program cost is US$1650 per person.[264] It would take 12 years of stable effects for the training program to recoup its costs. For some programs in Latin America it takes a long time to attain positive net present values if the program benefits sustain: 7 years for *ProJoven* of Peru and 12 years for *Proyecto Joven* of Argentina.[265] Adult learning is frequently one part of a comprehensive package, which makes it difficult to understand the cost-effectiveness of that—frequently more expensive—component. The Chilean Micro Entrepreneurship Support Program (MESP), boosted self-employment by 15 percentage points in the short run.[266] However, it is not clear how much of this can be attributed to the 60-hour business training, as opposed to the US$600 capital injection.

216. There are two main reasons for high costs: suboptimal design and incorrect diagnoses. Adult brains learn differently—this is not always factored in program design. The brain's ability to learn decreases with age.[267] Therefore, adult learning programs face a built-in challenge—acquiring knowledge when the brain is less efficient at learning. Advances in neuroscience suggest how to tackle this. Adult brain's ability to learn is significantly dependent upon how much it is used. Practice is central to adult learning. Consequently, adult learning programs have a greater chance of success if lessons can be integrated into everyday life. For instance, Nigerians who were

taught basic operations on their mobile phones as part of an adult education program had reading and math scores that were significantly higher than those who were not.[268]

217. Adults face significant stress which compromises their mental capacity—this is not always factored in program design. For adults, emotions are constantly mediated by demands of family, child care, and work. These demands compete for cognitive capacity required for learning. Sugar farmers in India, for example, were found to have markedly diminished cognitive capacity when poorer (during pre-harvest) than when richer (during post-harvest).[269] Creating emotional cues linked to learning content—such as goal-setting—can be an effective strategy to increase adult learning.[270] Such behavioral tools are only rarely integrated in adult learning programs.

218. Adults face specific socio-economic constraints—these are not always factored in program design. Adult learners have high opportunity cost—in terms of lost income, lost time with children. However, programs often have inflexible and intensive schedules. In Malawi, participation in training resulted in a decline in personal savings for women at a rate nearly double that of men.[271] Distance to training locations and lack of child care were significant barriers to vocational training program completion for women in India.[272] Dropout rates are often high for adult literacy programs, ranging from 17 percent in Niger to 58 percent in India.[273]

219. One sign that adult learning programs are not always the answer is the low participation in these programs. In Pakistan's *Skills for Employability* program, even among poor households who expressed interest in vocational skills, more than 95 percent did not enroll when given a voucher. Even when government increased daily stipends, moved the training centers to the village, and actively mobilized the population, enrollment did not cross 25 percent.[274] In Ghana, demand for training by informal businesses is low as most managers do not see skills as a constraint.[275]

220. In some cases, the binding constraint might be lack of information—not lack of skills. Information is an important constraint, especially for young adults, whose decisions about which skills to acquire may be based on outdated stereotypes or misguided perceptions. Qualitative work from Uganda shows women in female-dominated trades were frequently mistaken regarding the earnings of women in male-dominated trades.[276] In Sub-Saharan Africa, youth entrepreneurs in the informal economy have limited information about relevant training programs.[277] Further, lack of information about labor market needs may also constrain youth from making informed choices. In India, a program that raised rural women's awareness of and access to jobs in the business process outsourcing sector, led to significant increase in young women's employment in this sector. These women went on to invest more in relevant skills training.[278]

221. In some cases, the binding issue might be lack of credit—not lack of skills. When compared to adult training programs, cash (or capital) transfers have a stronger impact on self-employment and long term earning potential in some contexts.[279] In Sri Lanka, among a group of businesswomen, the training-only approach did not influence business profits, sales or capital stock. However, the grant-plus-training approach enhanced business profitability.[280] In Liberia, *Action on Armed Violence* program provided 3-4 months of agricultural training plus US$125 worth of tools and materials to high-risk ex-fighters. While both farm employment and profits increased for participants who received the whole package, men who only attended trainings but received no capital did not increase their farming.[281]

222. There are three promising routes to more effective adult learning programs: better diagnosis and evaluation, better design, and better delivery.

223. Systematic data collection before program design identifies the most important constraints for the target population. Such information can be used to customize skills training as well. For example, through its Skills Towards Employability and Productivity Skills Measurement Surveys, the World Bank has facilitated collection of skills-related data from employers and working-age populations in 17 developing countries; these datasets enable policymakers to identify the extent and main features of any skills mismatch. In addition, the World Bank supported jobs diagnostics in Bangladesh, Congo, Dem. Rep., Tajikistan and Zambia to assess what skills investments make the most sense in each context. Systematic data collection during implementation can generate cost-effectiveness estimates for these programs. It may also provide insights on how to improve design and delivery. Administrative data under India's massive *National Rural Employment Guarantee Act* program has offered powerful insights about local labor markets.

224. Another useful approach is small-scale piloting combined with rigorous evaluation before scale-up. This was undertaken by the World Bank-supported *Youth Opportunities Project* in Uganda. In evaluating early pilots, it is important to test the relative impact of different training components separately. Policymakers can then determine the most cost-effective bundle of inputs. Evaluations also need to have sufficiently large sample sizes and sufficiently long-time frames. Larger study samples are needed if we want to look at how training impacts different recipients differently. For instance, to test if a training impacts men and women differently, a study needs 4 times the sample size than if it simply wants to test how training impacts the overall population.[282]

225. For greater effectiveness, adult learning programs need to be explicitly tailored to adult brains and lifestyles. There is tremendous scope to improve adult learning programs through insights from neuroscience and behavioral economics. Because adult brains learn through practice, it needs to be a core part of such programs. Both practical exercises and visual aids can be effective in adult learning since they assist memory. Explicitly including motivational tools such as a financial reward, work experience, or frequent feedback have all been shown to boost adult learning. An experiment among young adults shows that offering rewards not only improves short-term memory, but also increases post-training long-term performance gains.[283] In fact, insights from behavioral science suggest that even small modifications to the way choices are presented can have large impacts on participation in adult learning programs. A business training program in Kenya found that demand for training was low partly because the language used in the invitation to the training may have been too complicated for poor, uneducated women.[284]

226. Adult learning programs need to be flexible—so that adults can learn at their convenience. In a voucher program for vocational training in Kenya, nearly 50 percent of women cited proximity to a training center as a determining factor for choosing the preferred training center and course.[285] Given competing demands on adults' time, training programs with short-modules delivered through mobile applications are particularly promising. In the United States, *Cell-Ed*, a mobile-based adult literacy program, provides 400 micro training modules, and allows participants to learn through phone calls, text messages as well as interactive quiz. Adults made significant progress in their reading skills—in four months, they reached a level that would normally take school children two years to achieve. The program also positively impacted participants' self-esteem. [286]

Delivering training programs via mobile phones can also shield adult learners from potential stigma.

227. Adult learning programs are more successful when they are explicitly linked to employment opportunities. One popular way to do this is through apprenticeships and internships. They link training to day-to-day experience and provide motivation through the promise of future economic returns. Evidence suggests that skills training programs are more successful when the private sector is involved in developing the curriculum or training methods or in providing on-the-job training via internships or apprenticeships. For instance, Colombia's *Jóvenes en Acción* program combined classroom instruction with on-the-job training at private companies. The probability of formal employment and earnings rose in the short term, and sustained in the long run.[287] The program has also demonstrated strong education effects—participants were more likely to complete secondary school and to pursue higher education eight years after the training. The likelihood of their family members enrolling in tertiary education also increased.[288]

228. Success might also depend on addressing multiple constraints at the same time. In some cases, combining training with cash or capital can be a direct way to boost effectiveness. For instance, in Cameroon, 54,000 people who participated in a program that coupled training with financial assistance found employment.[289] Combining skills training with skills certificates, referral letters, and better information about job opportunities may enhance effectiveness—especially for women. For example, in Uganda, workers with more certifiable and transferrable skills have higher employment rates, more earnings, as well as greater labor market mobility.[290] A World Bank supported program in South Africa is attempting to increase support job search through peer support, SMS reminders, and action planning.

229. Incorporating soft-skills or socio-emotional skills in training design has shown a lot of promise. In Togo, teaching informal business owners "personal initiative"—a mindset of self-starting behavior, innovation, goal-setting—boosted firm profits by 30 percent two years after the program. This approach was much more effective than traditional business trainings.[291] For factory workers in India, acquiring soft skills such as time management, effective communication as well as financial management increased their productivity.[292]

230. The need for better targeting comes out clearly in the highly variable returns to training. For instance, a study from Germany shows the important role played by personality traits such as locus of control in influencing adults' investments in training.[293] Similarly, the World Bank's Kenya *Youth Employment and Opportunities* project is tailoring the design of a youth-friendly entrepreneurship aptitude test. Finally, governments might be more effective as facilitators—but not actual deliverers of training. For instance, India's *Vikalp Voucher* program incentivizes students to choose between multiple private training providers and courses—paid for using a voucher.

Chapter 4: Returns to Work

231. Zhou Qunfei was born in 1970 in Xiangxiang, China, the youngest of three children. Ms. Zhou grew up in poverty. She was the only one of her siblings to attend secondary school. Despite excelling as a student, she dropped out of school at the age of 16 due to economic necessity. Zhou worked in a glass factory for watch lenses while taking part-time courses at the university. At the age of 20, she was promoted and continued to move up the ranks in the years that followed. By 1993, Ms. Zhou started her own glass workshop overseeing every aspect of the business. In 2003, she expanded from watch lenses to mobile phone lenses. In 2018, Ms. Zhou, the owner of Lens Technology, is one of the world's richest self-made women.[294]

232. There are many examples of self-taught entrepreneurs. With just a high school education, Yoshiko Shinohara started the temp-staffing agency Temp Holdings in her one-bedroom apartment in Tokyo, Japan, ultimately turning it into a billion-dollar company. Sir Li Ka-shing was forced to leave school at the age of 15 to work in a plastics trading company. In 2018, as the wealthiest entrepreneur in Hong Kong SAR, China, he retired from active business with a net worth of US$37 billion.

233. However, these are the exceptions. Successful entrepreneurs with advanced degrees far outnumber those without. Luciano Nitrini Guidolin, CEO of Odebrecht, Brazil holds a B.S. in Production Engineering from the Polytechnic School of the University of São Paulo (USP) and an MBA from Harvard University. Liu Qing, president of Didi Chuxing in China, has a bachelor in computer science from Peking University and a master's degree in computer science from Harvard University. Dr. Victoria Kisyombe, founder of SELFINA, acquired a bachelor's degree from Dar es Salaam, Tanzania, and a master's degree in Veterinary Science from Edinburgh University in Scotland. Nguyễn Thị Phương Thảo, CEO of VietJet Air in Vietnam, holds a doctoral degree in economic management at the Mendeleev University of Chemical Technology in Russian Federation.

234. The experience of entrepreneurs illustrates two points. First, learning in school goes hand in hand with learning in work. School enhances what can be learned at work. Second, work continues to build human capital after school—*work is school*. Skills built through work advance a person's capacity to work successfully in the future. Just as different subjects in school dispense different knowledge, different jobs lead to the acquisition of different skills. Such skills are not simply confined to cognitive skills. Engaging co-workers, working in teams, managing employees—all build essential socio-emotional skills not easily acquired at school.

235. But opportunities to learn at work may not always materialize. Where you are, what you do, and what you know, influence your payoffs at work. If Zhou Qunfei had not been able to move from her village near Changsha to Guangdong, she may not have afforded the same opportunities. If the only type of work available is subsistence farming, then the scope of learning is limited. If society does not promote gender equality, many women would not be able to work.

236. To quantify the payoffs to work and school, one must turn to one of the fathers of labor economics—Jacob Mincer. Born in 1922 in Poland, he was ready for school at the age of 5. The

director of the school, impressed by his reading, agreed to admit him to school if the birth certificate indicated that he was born in 1920. This "white lie" would turn out to be significant, as Jacob's early entrance into school allowed him to begin university early, thus avoiding the fate of his family under the Nazis. In 1957, Mincer obtained a PhD in economics from Columbia University titled "A Study on Personal Income Distribution."

237. Before Mincer's work, the common belief among his contemporaries was that luck determined one's ability, which in turn determined one's payoffs. Mincer confronted this viewpoint by showing that earnings differentials are determined by deliberate investments in human capital. Human capital grows over the life cycle by means of investments, initially in school, later at work. One can measure the payoff of such investments—an additional year spent in school or work in terms of increased earnings or "returns."[295] For example, a 10.7 percent returns to education, as found by Mincer for white males in non-farm wage jobs in the United States, means that an additional year of education increases earnings by 10.7 percent.

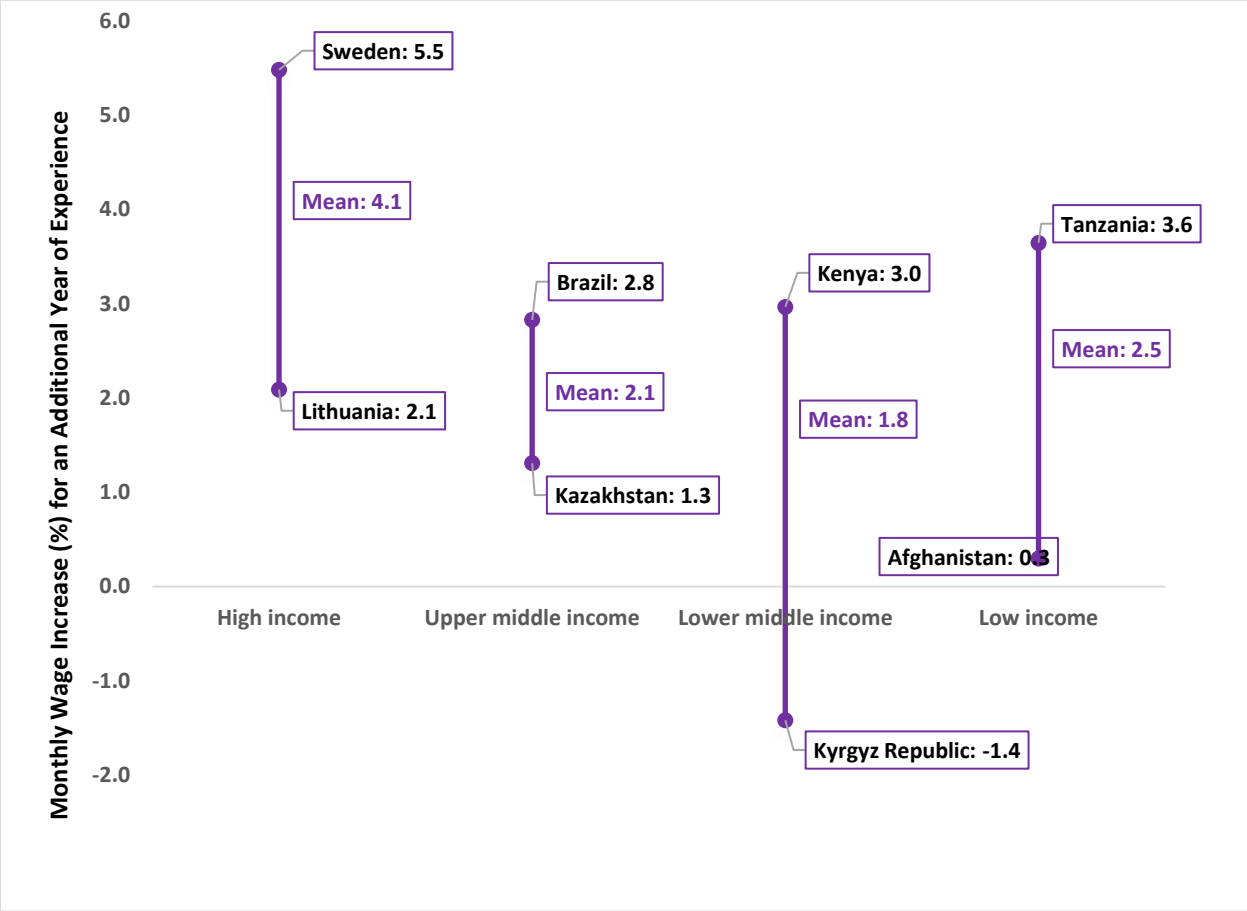
238. This chapter compares at the global level the payoffs of time spent in school and work. For instance, does schooling affect how much one's earnings grow at work? Do payoffs from work differ by the level development of the economy? What are the roles of informality, gender, and the agriculture sector on the careers of workers as they face diverging payoffs from work?

239. The estimates of returns to work are based on observations of over 22 million individuals across a thousand surveys in 144 economies. The data source for the analysis is the World Bank International Income Distribution Database. The surveys include nationally representative household surveys, labor force surveys and budget surveys.

240. Workers in emerging economies face lower payoffs to work experience than workers in advanced economies (figure 4.1). In the Netherlands and Sweden, one additional year of work raises wages by 5.5 percent. In Afghanistan the corresponding figure is 0.3. This result is surprising but has an explanation. Compared to advanced economies, emerging economies have a poorly educated workforce with a larger proportion of workers engaged in manual jobs in the informal sector. Advanced economies, meanwhile, are often at the cutting edge of technology. Their workers tend to be highly educated, formally employed, and have access to a wide range of jobs intensive in non-routine, cognitive tasks.

241. A worker in an emerging economy is more likely to find herself in a manual occupation that is intensive in physical tasks than a worker in an advanced economy. This may explain the higher returns to work in advanced economies than emerging economies. There is also less scope of learning, as well as risk of automation, in such jobs. Comparing returns to work between manual and cognitive occupations shows that an additional year of work in cognitive professions increases wages by 2.9 percent, while for manual occupations the figure is 1.9 percent. Elementary occupations and skilled agriculture have the lowest returns. Professionals, managers and technicians have the highest returns.

Figure 4.1. Returns to experience by income group



Source: Authors' calculations using household survey data.
Note: The figure provides estimates of the percentage increase in wages from an additional year of potential experience across 133 economies by income level. The first bar presents the estimates for high income economies. The middle figure presents the mean (4.1 percent). On average an additional year of experience increases monthly wages by 4.1 percent in high income economies. The top figure is the highest estimate for the high income group (Sweden – 5.5 percent). Therefore, an additional year of experience raises monthly wages by 5.5 percent in the Sweden. The bottom figure displays the lowest estimate for the high income group (Lithuania – 2.1 percent). The same information is repeated for other income groups, as represented by each bar. The top and bottom economies for each region are provided. The methodology follows Lagakos and authors[296] where years of experience is categorized into bins. The wage growth is estimated for each bin relative to the no-experience bin. The returns to experience is then calculated as an average of these seven bins, using a geometric mean. The top and bottom economy listed for each income group are ranked after the estimates account for income and life expectancy of the economy.

242. Although work provides a venue for a prolonged acquisition of skills after school, it is a complement to schooling, not a substitute. Globally, differences in school education explain much of the observed variation in earnings. One additional year spent in school produces, on average, the same increase in wages as does spending 4 years at work. A worker would need to spend 3 years on the job in Germany, 5 years in Malawi, and 8 years in Guatemala to match the benefit of one extra year of schooling on wages.

243. Also, educated workers have a greater scope of learning at work than uneducated workers. For each additional year of work experience, poorly educated workers have an annual wage growth of 1.97 percent. Workers with high levels of education, on the other hand, have annual returns to work experience of 2.43 percent.

244. The complementarity between education and learning at work imply that economies with poor schools face a double jeopardy. First, young adults graduating from high school are not equipped with the skills to find work. Second, even if they find work, they learn less than the more educated individuals.

245. Consider Jordan, a country with low returns both on education (5.85 percent) and experience (1.24 percent), and with below average PISA (Programme for International Student Assessment) scores in math, science and reading. A worker who completes secondary education in Jordan and one year at work would earn less than half of the equivalent person in Germany. What is more, by the time she accumulates 30 years of experience, the German worker's wage would already be at least 5 times higher than for the worker in Jordan.

Informality

246. Over a thousand stalls litter the open-air space. Juma works in one of them, repairing bicycles. He works in the *Jua Kali* sector. In Swahili, "*Jua"* means *sun*. *"kali"* means "hot or fierce" a term coined to reflect that the work is done in open spaces under the hot Nairobi sun. Juma's business is one of the 5.8 million unlicensed businesses that make up the informal sector in Kenya.[297] By some estimates, employment in the informal sector in Kenya stands at a staggering 77.9 percent of total employment. Three out of four workers are informal, one of the highest rates of informal employment in the continent.[298] Juma represents the average Kenyan.

247. Informal work is a means of survival. Maria, one of the 4.5 million people working in the informal sector in Guatemala, dropped out of school as her family could not afford the fees. Forced to provide income for her family, and unable to find formal work, she took up selling trinkets on the street. She earns about US$2.5 a day – barely enough to afford her meals.[299] She worries about inclement weather destroying her wares, as well as having to deal with the insecurity of working on the streets. Such informal entrepreneurs face limited prospects for growth. They exist day-to-day without health insurance, social security or any other form of protection.

248. From the rickshaw pullers in the buzzing streets of Dhaka, Bangladesh, to the mobile fruit vendors of Nairobi, Kenya, the informal economy is omnipresent. Informal employment is more than 70 percent in Sub-Saharan Africa and South Asia, and more than 50 percent in Latin America. Although informal workers outnumber formal ones, their productivity is significantly lower for the typical developing economy. Informal workers are only 15 percent as productive as formal ones.

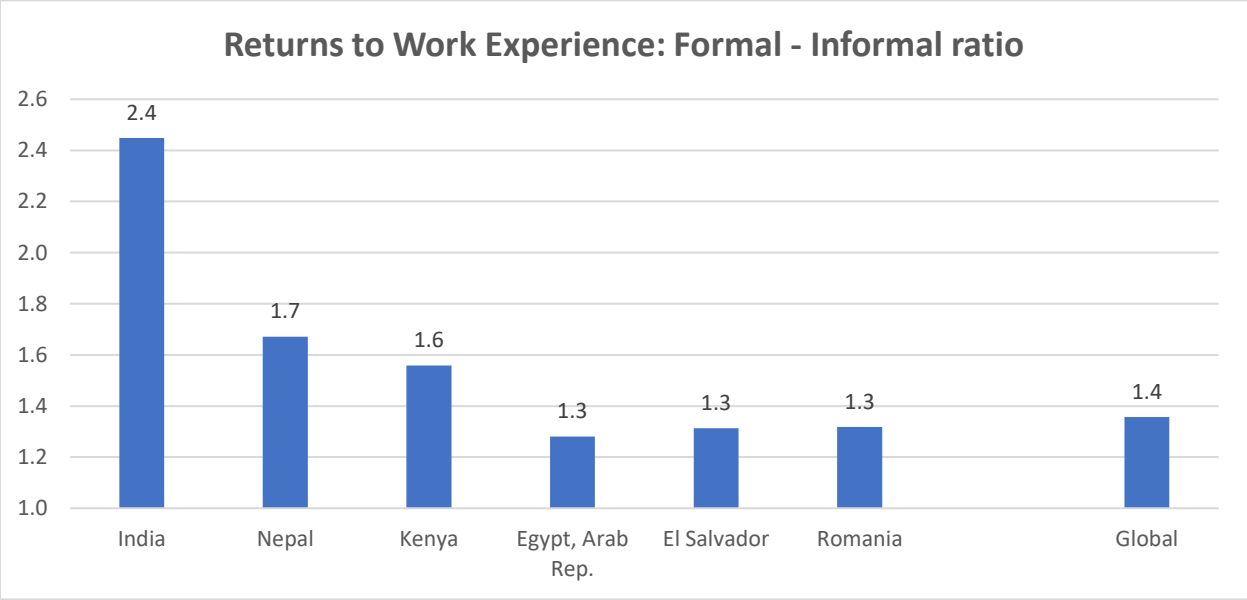
249. The informal sector is slow to change. Since 1999, India has seen its IT sector boom, become a nuclear power, broken the world record of number of satellites launched in a single rocket and achieved an annual growth rate of 5.6 percent. Yet, the size of its informal sector has remained around 91 percent. These patterns are not idiosyncratic to India. Informal sectors in

emerging economies are a fixture. In Madagascar, the percent of non-agricultural informal employment workers increased from 74 percent in 2005 to 89 percent in 2012. In Nicaragua the size of informality rose from 72.4 percent in 2005 to 75 percent in 2010.

250. Turning back to Juma, a year spent in the informal sector raises his income by only 2.65 percent per year. In contrast, a worker in the formal sector in Kenya raises his income 4.13 percent every year, which is 1.6 times higher than the informal sector. The difference is potent.

251. The disparity in the payoffs to work between formal and informal jobs is a global phenomenon (figure 4.2). In Nepal, returns to experience is 1.7 times higher for formal wage workers than informal wage workers. In India, returns to experience the formal sector is over twice as high as the informal sector. Globally, on average, the earnings increase for an additional year of work for informal wage workers is 1.4 percent. The figure is 1.9 percent for formal wage workers.

Figure 4.2. Informal work provides lower payoffs than formal work



Source: Authors' calculations using household survey data.
Note: The figure provides estimates of the ratio of an increase in wages from an additional year of potential experience for formal versus informal wage workers. For example, in Egypt the returns to potential experience for a formal wage worker is 1.3 times more than an informal wage worker.

252. Informal workers show resourcefulness to handle the harsh constraints they face. Consider the trash collector in Guntur, Andhra Pradesh.[300] Businesses bought trash from her, sorted it, and sold it to recyclers. To make extra money, she cut the middleman – she sorted the trash herself. She took out loans from microfinance institutions to buy a cart to collect more trash. She got her husband to join in. Soon she was buying trash from others. Eventually she was organizing a large network of trash collectors. Take another example. In the 1970s, near the Mumbai Stock Exchange, a group of women would lay out wet sea sand in the road. The wheels from the cars would dry out

the sand. After occasionally scraping the top, the women would sell the dried sand to slums where it would be used to scrub dishes. These women generated income out of nothing.

253. These millions of informal businesses run the by poor are unlikely to make their owners rich. Typically, they have no paid staff, tend to be barely profitable. In Dakar, Senegal, 87 percent of firms with labor productivity below US$10,000 per worker are in the informal sector.[301] Informal firms are run by uneducated owners, serve low-income consumers, and use little capital—informal firms add only 15 percent of the value per employee of formal firms.[302] They also rarely transition to the formal sector.

254. The poor manage to make a lot out of little, but the businesses they run are too small to raise the livelihoods of their owners. The Mumbai sand driers, although creative, have a business that is too small in scale to elevate them out of poverty. Furthermore, these enterprises do not provide a stable stream of income, leaving the poor vulnerable to unexpected events. The question then is why the poor run these enterprises in the first place. The answer is that it is the only option they have. The enterprises of the poor are a way to have work when formal employment is unavailable.

255. Governments can encourage stable formal private jobs for the poor. Stable jobs are desirable as they allow poor workers to make commitments to expenditures. Consider the zinc factory that enabled a village to prosper in Udaipur District, India.[303] At least one member of every family in the village worked in the factory. The presence of the zinc factory not only provided opportunities for employment, but provided a career – workers could climb up the ladder from the factory floor to foreman. Research has found rigorous evidence of how factory jobs improved the lives of the poor.[304]

256. Improvements in infrastructure in towns and villages could encourage formal firms to establish themselves near poor workers. While small-scale informal enterprises are unlikely to formalize and grow, the owners of informal firms can obtain formal jobs.

257. Countries with heavier regulations have larger unofficial economies. Such countries also display higher levels of perceived corruption.[305] Complex and costly procedures to start a business discourage entrepreneurs. Firms do not grow. Steady jobs are not created. Reducing the regulatory burden may encourage formal firms to grow, thus creating steady jobs that could be accessed by certain segments of the poor. Removing burdensome regulations may provide incentives for certain firms to formalize, although there is limited evidence of this.

258. Mexico provides a good illustration.[306] Starting in May 2002 Mexico implemented the Rapid Business Opening System. The program simplified local business registration procedures. It reduced the average number of days 30.1 to 1.4. Number of procedures were reduced from 7.9 to 2.7 on average. Number of office visits required to register a business fell from 4.2 to 1, respectively. The Federal Commission for Improving Regulation (COFEMER), organized the reform. COFEMER coordinated with municipal governments since many business registration procedures are set locally in Mexico. Business reforms led informal owners that were similar in profile to formal wage workers to be 22.3 percent more likely to become wage workers. The

evidence suggests that easing regulations encourages the transition from informal firm ownership to formal wage jobs.

259. Between 2001 – 2004, Russian Federation implemented reforms of business regulations. Three consecutive national laws focused on liberalization of entry and operation of existing businesses in the areas of inspections, licenses, and registration. Agencies (e.g., fire, sanitary, labor, or certification) were limited to no more than one inspection of any firm every two years. Over one hundred business activities were exempt from licenses. The procedures for startups were shortened. As a result, in regions with fewer burdens on entrepreneurs, reform had a substantial positive effect on the performance of small firms as well as the formation of new formal small businesses.[307]

Working Women

260. Some societies exclude women from work. Across the world, 49 percent of women above the age of 15 are employed. For men, it is 75 percent. Gender imbalances persist in positions of power. Less than a fifth of firms have a woman as the top manager.[308] These numbers mask wide differences among countries. In Sweden, 61 percent of women are formally employed. In Italy, the figure is 40 percent. In India and Pakistan, only 25 to 27 percent of women are in the labor force. Generally, women work in less economically productive sectors, in occupations with potentially lower on-the-job learning opportunities. In 2017, only 6.4 percent of the Fortune 500 companies had women CEOs.[309]

261. The inclusion of women in formal economic activity depends on equal property rights. In ancient Greece, women could not inherit property rights, while in ancient Rome, they had no political rights. In 1804 the Napoleonic Code stated that wives were under the purview of their fathers and husbands. Before 1870, married women in England had no right to claim property, full ownership rights belonged to the husband. Though gender parity has improved around the world, major differences persist.

262. Several gender restrictions were transferred from colonial powers to colonies. While colonial powers overturned many of these restrictions at home, the old legal codes were retained in many former colonies. For example, while Spain in 1975 allowed married women to contract in her own name, the 1960 Spanish Civil Code is still maintained in Equatorial Guinea. The United Kingdom's Mines and Collieries Act of 1842 imposed restrictions on women's work in mining that are still retained in many commonwealth economies. Remnants of an old 1932 Soviet Law that restricted women from certain jobs is still prevalent in most post-communist countries. In the early 2000s, Portugal repealed several decrees introduced in the 1890s that restricting women's work. Several of these restrictions are still found in Lusophone Africa and Brazil.

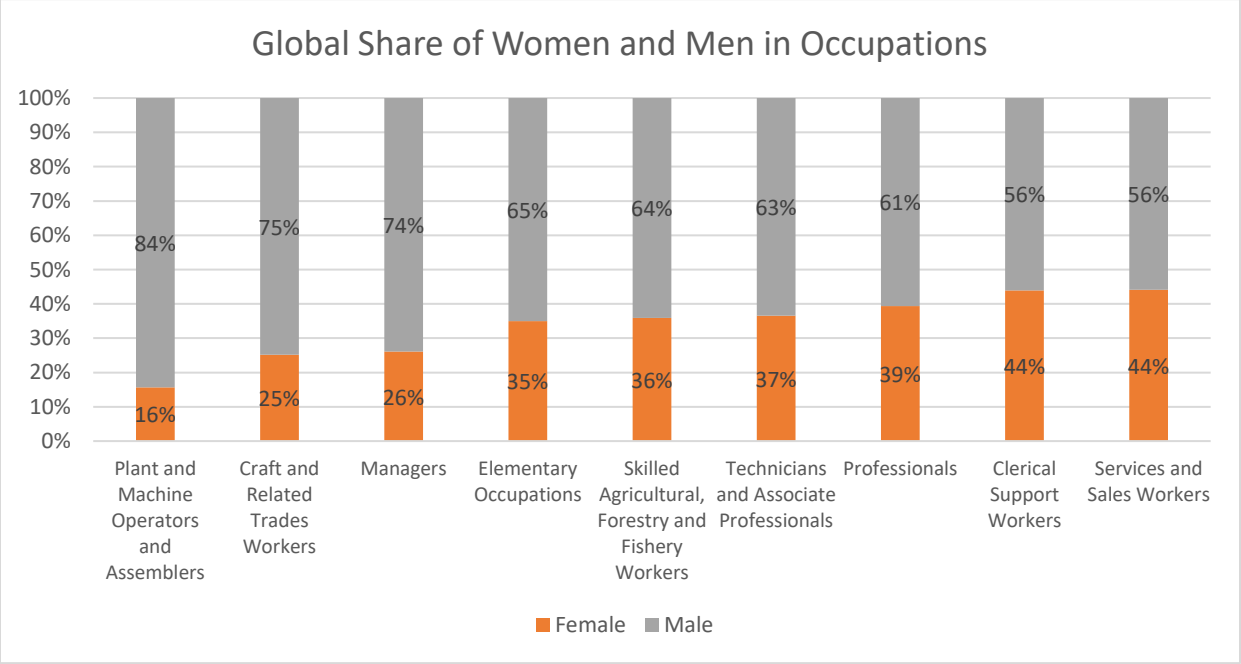
263. Dalia and Zaid, two siblings of similar age in Yemen, Rep., live different lives. Dalia faces several restrictions; her brother does not. She may not be able to work at night for certain jobs. The law does not protect her from any form of discrimination in hiring. Zaid's testimony in court carries more weight than hers. Zaid will inherit more than her from their parents. Once she gets married, the limits to her freedom multiply. She is required to obey her husband. She cannot travel

outside the home the same way as Zaid. Dalia is one of 2.7 billion women globally who are legally restricted from having the same choice of jobs as men.

264. Women face legal restrictions in obtaining jobs across many countries. The restrictions are sector-specific. 65 economies around the world restrict women from mining jobs. Women in 47 economies face restrictions in manufacturing while 37 economies restriction women in construction jobs. Furthermore, in 29 out of 189 economies explored, women cannot work the same hours as men.

265. Men outnumber women in every occupation (figure 4.3). Only a quarter of managers are women. About 39 percent of professionals are women. Across the occupations, women have a relatively higher presence in clerical support worker occupations (44 percent) and services and sales workers (44 percent). The lowest is in plant and machinery operators and assemblers - women constitute only 16 percent. Most female managers of formal firms in emerging economies are found to be in the retail sector.[310]

Figure 4.3. Men outnumber women across all broadly-defined occupations



Source: Authors' calculations using household survey data.

266. Women face lower payoffs from work than men in many countries. The returns to work experience for men is 3.1 percent, for women it is 1.9 percent. In Venezuela, RB, men's wages increase by 2.2 percent, while women's do so by only 1.5 percent for each additional year of work. The difference is even larger for countries like Mali, where returns for men are 3.1 percent, while for women are only 1.6 percent. To put this in context, a woman in Mali would need to accumulate almost 2 years more experience for every year her male coworker accumulates to earn the same wage increase. In Denmark, on the other hand, this figure is 5 percent for men, and 4.98 percent for women.

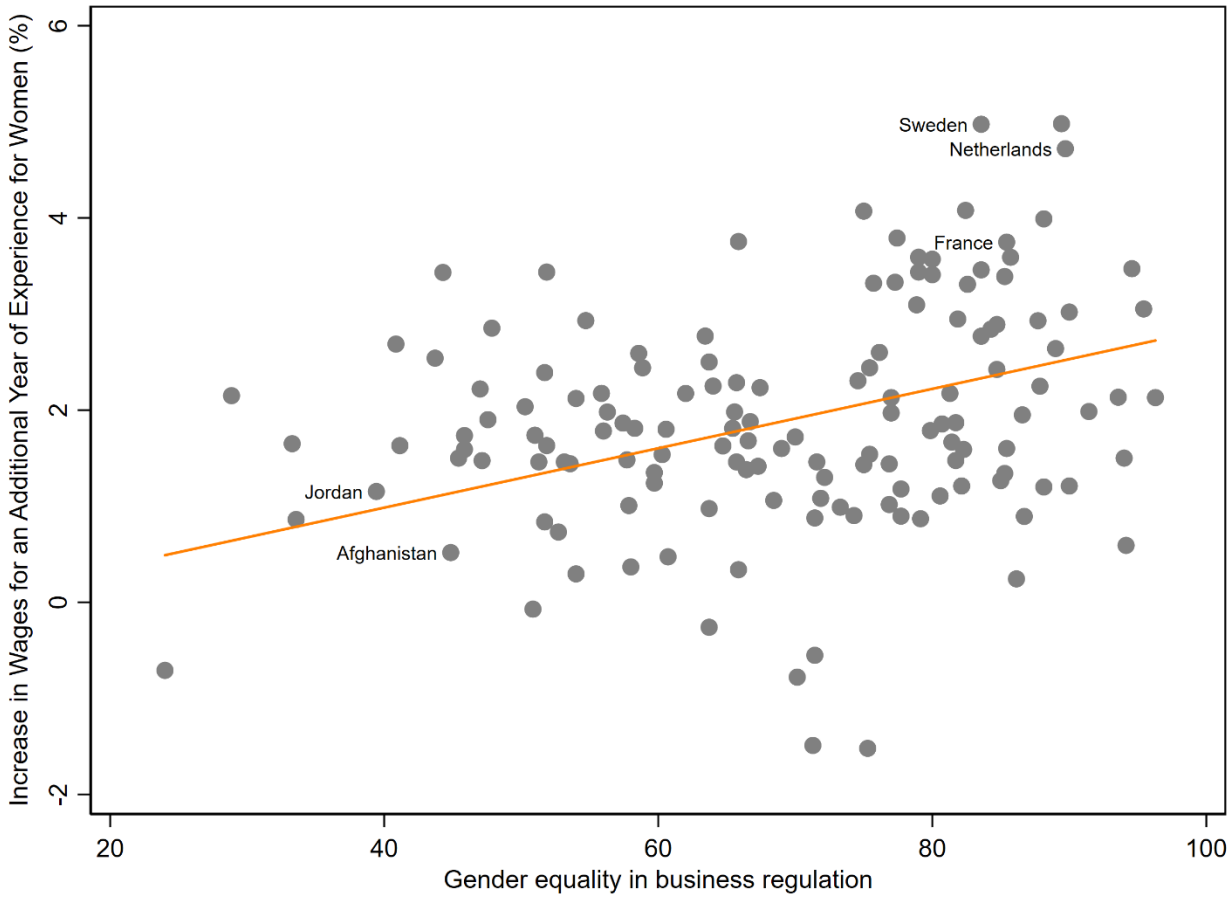
267. The reasons for such different payoffs between men and women are multiple. Consider a working couple from Bangladesh. They are contemplating the decision of conceiving their first baby. However, Bangladesh's laws do not prescribe paid or unpaid parental leave. As such, an equivalent job position is not guaranteed for the mother after giving birth, nursing mothers are not entitled to nursing breaks, and the law does not allow flexible/part-time schedules. Bangladesh's returns to work experience for women is 0.84 percent—almost half of the returns for men. In contrast, in Spain, Sweden and Portugal—all countries with paid leave for both men and women—the returns on experience are similar across genders.

268. However, some care should be taken in reading these numbers at face value. The nature of the underlying data means that the exact years of experience cannot be calculated. Women may exhibit lower returns to work experience as they drop out of the labor market quite frequently due to childbearing and childrearing responsibilities. Furthermore, the estimates of work experience payoffs are based only on women who are employed. The inclusion of women who are unemployed may lower the estimated returns even further.

269. Better information can encourage change. As a response, the World Bank began the Women, Business and the Law project in 2008 to document gender legal disparities for 189 economies. Removing legal restrictions for women can be powerful. Just mandating a non-discrimination clause in hiring in terms of gender can increase women's employment in formal firms by 8.6 percentage points.[311] Similarly, mandating paternity leave to encourage a more equitable distribution of childrearing activities between men and women can raise the proportion of women employed in formal firms by 6.8 percentage points.[312]

270. The larger the number of legal restrictions women face, the lower the payoff from working (figure 4.4). At one end of the spectrum, France, Sweden and the Netherlands have fewer legal gender restrictions and higher returns to work for women. In Afghanistan and Jordan, where women and men are treated differently by law, the payoff from work for women is among the lowest. Increasing legal gender-specific restrictions have been found to discourage women from both owning and managing firms.

Figure 4.4. Lower payoffs to work experience correspond with more legal restrictions on women at work



Source: Author's calculations based on World Bank (2018).
Note: The World Bank's Women, Business and the Law measure of gender legal equality scores economies based on whether they treat men and women differently. The higher the score, the greater the gender legal equality.

271. Countries are reforming. Take the case of Madame Ngetsi. Following reforms in the family code in Congo, Dem. Rep. in 2016, she can formalize her small business, open a bank account, get a loan, sign a contract, register her business and register land without her husband's permission. Zambia's Gender Equity and Equality Act of 2015 prohibits gender discrimination in employment. Iraq now guarantees workers a similar position with the same wage after maternity leave. China increased paid paternity leave. Afghanistan now forbids sexual harassment in employment and education. In total, 65 economies reformed towards gender equality from 2015 to 2017.

272. Empowering women by reforming discriminatory laws is just one way to improve their well-being. Programs that empower women by giving them access to training and assets are seeing success. In rural Bangladesh, poor women work as maids or agricultural workers. Wealthy women rear livestock. A nationwide program empowered poor women by providing them livestock in combination with skills and training on their legal, social and political rights. The program changed lives. Poor women started rearing livestock, spending less time as agricultural workers or maids.

As a result, for many of the women, their earnings rose, the value of their livestock increased, they accumulated business assets, they were more likely to own land, and they lifted themselves out of poverty. These improvements lasted seven years after the program.[313] A similar program in Uganda empowered adolescent girls by providing them vocational training and information on sex, reproduction, and marriage to counter rampant youth unemployment and early childbearing. Four years after the program, women were more likely to engage in income-generating activities.[314]

273. Policies can reduce restrictions that shackle women from entering labor markets or transitioning towards productive work. For instance, the Economic Empowerment of Adolescent Girls and Young Woman (EPAG) project launched by the Liberian government in 2009 seeks to provide young girls with both in-classroom training—focused on life and technical skills highly demanded in the market—and follow-up job placement support (to either enter a paying job or start a new business). The program had significant impacts on different aspects of participants' lives: employment and earnings increased in 47 and 80 percent respectively; participating women increased their savings in US$35; improvement in several subjective outcomes such as self-confidence, life satisfaction, social abilities, among others. Moreover, households with participating women improved their food security by increasing the consumption of high-value proteins and decreases the likelihood of food shortages.[315]

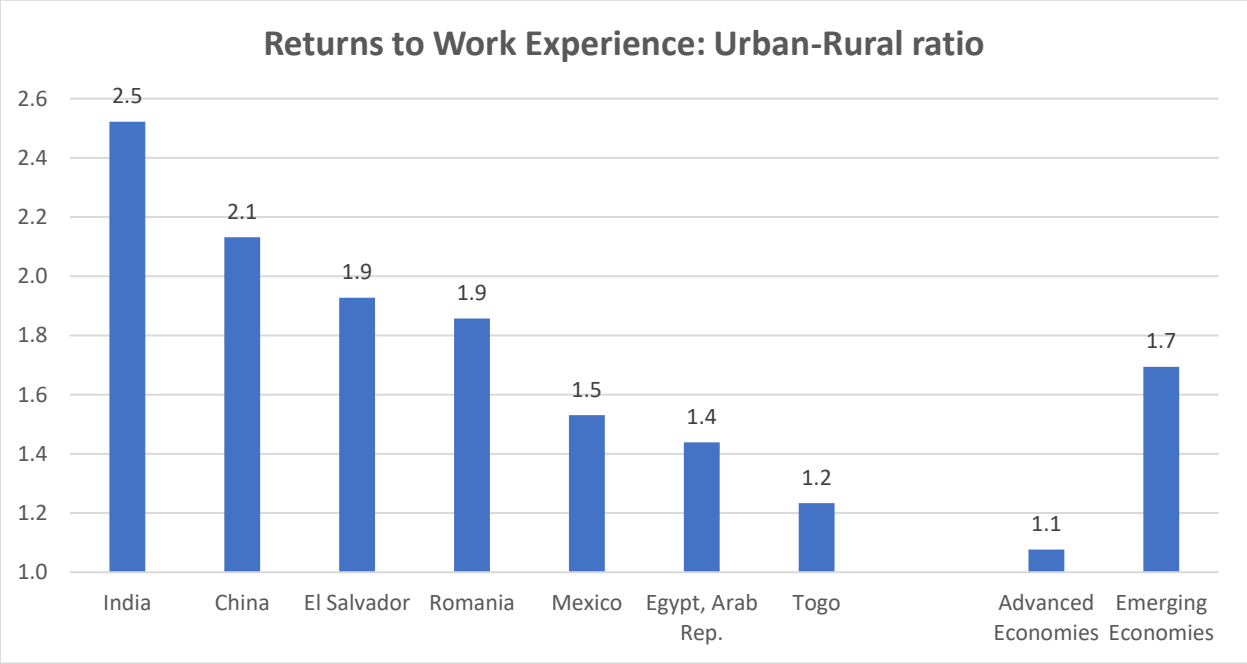
Working in Agriculture

274. Bella works in the rice fields in the rural area 90 kilometers north of the Togolese capital city of Lomé. She is one of several rural smallholder farmers in the area. Her crops suffer from erratic rainfall. Insurance is unavailable. She doesn't have access to finance to buy tools or fertilizer. Poor roads deter her from accessing markets. Her story is not unusual. More than half of Togo's population is in agriculture. Around 60 percent of the population lives in rural areas, and 65 percent of these households are in poverty.[316]

275. Although agricultural employment tends to decline as countries develop, it remains the main economic sector in low income economies. In 2017, agriculture accounted for 68 percent of employment in low income economies. Because the livelihoods of the majority depend on the agriculture sector, improving agricultural incomes is an effective way of reducing poverty. Agriculture has a strong record as an instrument for poverty reduction. Growth from agriculture has a larger effect on reducing poverty than growth from other sectors. [317]

276. Bella's life could be different if she moved to the city where she may have more career opportunities. Her earnings could be higher – her returns for an additional year of work experience in the city would be 2.7 percent. If she remained in the village in Togo, her returns to experience would be 2.2 percent. The returns to work in the city is 1.2 times more than the village. This is reflective of a global pattern (figure 4.5). In emerging economies, the payoffs to work in urban areas are 1.7 more than rural areas. For India and China, payoffs to work in urban areas are double that of rural areas.

Figure 4.5. Rural areas provide lower payoffs than work in urban areas



Source: Authors' calculations using household survey data.
Note: The figure provides estimates of the ratio of an increase in wages from an additional year of potential experience for urban versus rural workers. For example, in Romania the returns to potential experience for an urban worker is twice more than a rural wage worker.

277. However, the opportunities in the city can be harnessed by Bella only under certain circumstances. She would need to have a certain level of education to access most of the better jobs in the cities. Goods and services – from food to transport – are far more expensive in the city than the country side. To afford the high cost of city living, Bella would need to have a minimum amount of financing. Furthermore, her established network of family and friends in the countryside that support her during tough times would be inaccessible in the city. There is a risk that Bella would end up in an occupation with far lower payoffs that the average job in the city.

278. The constraints faced by the poor in moving to the city have been well illustrated. In India, for instance, workers in Orissa provided several reasons for not staying in the city. [318] First, there is no housing—the extreme poor squeeze themselves often in swamps or slums right next to garbage dumps. In contrast, the villages offer more open greener and quieter spaces. If one moved the whole family to the city, there are considerable risks. What happens in the children get sick – sure, healthcare is better but will anyone lend you money if it is needed? The connections developed in villages serve as crude safety nets for the vulnerable lives of the poor.

279. Overall, workers in emerging economies experience half of the payoffs to work (1.96 percent) than workers in advanced economies (4.09 percent). Governments may be tempted to move poor workers from villages to cities to raise the overall payoffs in the economy, thereby reducing poverty. However, this movement is unlikely to considerably narrow the payoff gap between emerging and advanced economies. The following two scenarios illustrate this result.

Imagine all the workers in Togo moved around until the share of workers in urban areas matched that of an advanced economy such as Spain. Also assume nothing else changed in Togo – the rural and urban areas had the same returns as before. This movement would narrow the Togo-Spain gap in aggregate payoffs by 22 percent. Now consider an alternate scenario. No workers moved in Togo, but both the urban and rural areas raised their payoffs to match Spain. In this scenario the Togo-Spain gap in aggregate pay offs would fall by 77.4 percent.

280. A similar hypothetical story plays out for Bangladesh. Adopting Spain's employment pattern would just narrow the payoffs gap between Bangladesh and Spain by 7.2 percent. In contrast, achieving Spain's payoffs to work in urban and rural areas would narrow the gap by 91.5 percent. The implication is that improvements in rural areas are necessary to narrow the payoffs gap between emerging and advanced economies. This is what has also been found by studies in Kenya and Indonesia.[319]

281. Between the bustling cities and the subsistence-oriented villages lie secondary towns. They serve a special role in facilitating the transition of rural workers to off-farm employment, much of it related to agriculture. Secondary towns inhabit an important space between villages and cities, enabling movement up and down the value chain.[320] Life histories of migrants from Tanzania confirm these insights, further highlighting the role that secondary towns can play, in facilitating the transition out of agriculture.[321] In early stages of development, growth of secondary towns may do more for rural poverty alleviating than big cities, although in later stages of development, big cities take over.[322]

282. There is wide acceptance that as economies go down the development path, agricultural productivity rises, unlike the informal sector. There are many steps governments can take to ensure agricultural jobs in rural areas provide sufficient income for the poor in parallel to increasing productivity. The challenges facing farmers in emerging economies are numerous - they lack access to essential inputs and services that increase their productivity. Smallholders are not integrated with value chains. Entrepreneurs face numerous obstacles to their operations. Inclusive value chain development allows farmers to capture the urban demand for higher value agricultural products such as dairy, meat and fruits and vegetables. Poverty reduction is faster when agriculture transforms from staple to non-staple crops. This requires raising staple crop productivity well beyond the levels currently achieved in Sub-Saharan Africa. This section explores three areas that are of enormous importance where policymakers have made strides: programs that transfer knowledge, initiatives that exploit digital technologies to increase access to input, output and capital markets, and improvement in regulatory systems.

283. Training farmers on the best farming techniques can raise productivity. This training is typically done through agricultural extension work. Several projects expand training programs or collaborations to improve the exchange of information. Sometimes this has been combined with increasing access to finance or provisions of agricultural inputs as an impetus for improving agricultural productivity. Providing resources to cooperatives can connect them to agribusinesses along the value chain. There are many examples of such efforts with qualitative evidence of the impact on the livelihoods of many farmers.

284. For instance, a few years back, Safiata faced several challenges in her cocoa processing business located in the Sambirano region, Madagascar. She faced difficulties finding buyers for her cocoa beans. She had to accept unfair prices that led to operating losses. These days, Safiata fares better thanks to the Integrated Growth Poles Project run by the local government. The project, supported by the World Bank, offered her training in improved cocoa processing practices coupled with business management skills. Safiata can upgrade to premium quality cocoa that conferred several benefits. Exporters seek her cocoa, paying prices that are 50 percent higher than her previous cocoa. Premium cocoa can also be stored longer, allowing Safiata to wait for better offers for her cocoa without worrying about it deteriorating. She developed new contacts through the project that allowed her to diversify her activities. Two of her children are now in university, choosing their own paths. To date, beneficiaries of the Integrated Growth Poles Project, like Safiata, have seen an average increase in net revenues of 47 percent.

285. A little bit of knowledge can go a long way. When Jan Agha's animals suffered a bad cut, he would put chewing tobacco, petrol or mud to stop the wound. He laughs thinking about how his poor animals must have suffered. He knows better now - he uses iodine instead. Jan Agha is one of many livestock farmers in Merak Bela village, Nangarhar province in Afghanistan who benefited from Farmer Field Schools. The classes are twice a month and are an important part of the National Horticulture and Livestock Project, a government initiative supported by the World Bank. Agha, a father of 11 children, says his income has tripled since the project – his cows can produce almost 10.5 liters a day, while before they produced just 3.5 liters a day. Farmer Field schools have also found success in East Africa.[323]

286. A year ago, Marie Behane produced only 8 bags of sorghum in the Far North region of Cameroon. Today, she produces 22 bags of sorghum. Much of this can be credited to the support from the Agriculture Investment and Market Development Project. To aid farmers such as Marie, the government established partnerships between producer organizations, agribusiness purchasers, and financial institutions to improve the sorghum sector activity to meet agribusiness needs. Marie's membership of the Regional Council of Farmers' Organizations in Northern Cameroon cooperative conferred to her many of the project's benefits. Her increased earnings allowed her to send her kids to school. She can afford to get them treatment when they fall sick.

287. The effectiveness of agricultural training can be improved. One way is by activating social ties in villages to encourage peer leaning. A recent study ran a series of training experiments with rural female farmers in Uganda that lead to the conclusion that encouraging competition among women farmers resulted in greater learning in training sessions.[324] Digital Green amplifies agricultural extension services by leveraging knowledge and participation of local communities to produce low cost videos to spread information that is within the local context. Pursuing innovative methods to improve learning in training raises the returns of the training budgets.

288. Mechanization has in the past failed to take a foothold in Sub-Saharan Africa. This failure has warranted some skepticism on ambitious predictions of technological transformations in agriculture. However, there are now signs that mechanization is taking hold, facilitated by information and communication technologies. Real time measurements allow farmers to make better real-time decisions. Aerial images from satellites, drones, and soil sensors improve

measurements and allow for the monitoring of crops in real time.[325] Detailed and precise information inform farmer decisions on how much fertilizer and irrigation is needed for their crops.

289. Many farmers in emerging economies do not know if they are getting the best price for their crops. However, buyers typically have a better idea of prices. In economics this is known as information asymmetry. TruTrade in Uganda is an example of digital technology can bridge the technology gap. TruTrade uses online applications to allow price setting, track the movements of produce, and payments. TruTrade connects smallholders to buyers while enforcing quality and transparency. This creates an atmosphere of trust. Farmers receive good prices and reliable access to markets. Traders can build relationships as a trusted provider, thereby growing their business.

290. Mobile technology in Kenya has also been used to reduce administrative and assessment costs of insurance scheme. A good illustration is the app Kilimo Salama (Swahili for "Safe Farming"). When insurance products are sold, the seller activates the insurance policy using the Kilimo Salama application on by scanning a product-specific bar code with the camera phone, entering the farmer's mobile number, and connecting the farmer to the local weather station. Thirty solar-powered weather stations automatically monitor the weather. An SMS is received to confirm the insurance policy. The indemnity payments are made through the M-PESA platform. The Kilimo Salama project has now evolved into ACRE Africa. By 2017, over a million farmers in Kenya, Tanzania, and Rwanda have been insured.[326]

291. Orchards in the Kastamonu Province in Turkey face two main challenges – pests and harmful frost weather. National weather broadcasts are not useful. For one, they happen in the evening – too late for producers to react. Second, the weather forecasts were at an aggregated level, and thus not reflective of local conditions that tended to vary by farm. Furthermore, weather forecasts cater towards urban areas, therefore do not account for the cooler weather in rural areas. The Government of Turkey in collaboration with international donors established five mini-meteorological stations in rural areas throughout the province as well as 14 reference farms to measure rain, temperature, as well as pest cycles. Producers were informed regularly though SMS. They were thus able to react to prevailing local conditions. Costs fell dramatically for producers in the first 2 years. Pesticide applications dropped by 50 percent.[327]

292. Regulations play a role in shaping the business environment for players in the agricultural sector through their impacts on costs, risk, and competition. High transaction costs can reduce trade volumes, restrict access to finance, and lower productivity. Faced with such challenges, firms are liable to slip into the informal economy.[328] The right institutional and regulatory framework can enable agricultural entrepreneurs to integrate into formal markets.

293. Kenya used to be the world's leading producer of pyrethrin, an organic insecticide made from the pyrethrum flower. However, the stated-owned Pyrethrum Board of Kenya had exclusive rights to purchase and process pyrethrum flowers. After foreign competition caused Kenya's global market share to drop from 82 percent in 1980 to 4 percent in 2010, new legislation was passed, working with the World Bank, to eliminate a ban on private investment in the sector. By April 2018, three firms had obtained pyrethrum processing licenses; two other investors are awaiting licenses. The move benefits 43,000 farmers who can sell pyrethrum in a more competitive market.

294. Fertilizer use in emerging economies is often constrained by high prices and scarcity due to inadequate administrative procedures and infrastructure. Lengthy and expensive procedures to register fertilizer may limit their availability, thereby reducing yields. In Malawi, it takes 913 days to register fertilizer, costing about thirty times the income per capital to register. In Nepal, it takes 1,125 days, costing more than 6 times the per capita income to register. When new rules for fertilizer registration were introduced in Honduras as part of a World Bank project, three hundred new products were registered in 2013 compared to only 68 in 2011.

295. Finance is another important component of a commercialized agriculture sector. Working capital, long-term credit, access to savings accounts, and payment services can be used to expand operations. Financial regulations that support innovative ways of delivering financial services, can increase access to finance in rural areas. In Mozambique, following an amendment to the law to allow for agent banking activities in 2015, Moza Banco now serves the unbanked population in the country, often located in rural areas, through retail stores or postal offices. Ghana adopted a new law the same year to allow both banks and non-bank institutions to issue e-money. Thirteen percent of adult population in Ghana now has access to a mobile banking account, which is higher than Africa's average.

Chapter 5: The Changing Nature of Firms

296. Technological progress is changing the boundary of the firm.[329] This change, in turn, is having consequences for workers.

297. Historically, firms have operated within certain boundaries. In 1937, British economist Ronald Coase explained this phenomenon in *The Nature of the Firm*.[330] Studying firms in Detroit, the United States, Coase observed that firms grow so long as it is cheaper for them to take on additional transactions than it is to complete those transactions on the open market. Firms also facilitate the keeping of commercial secrets.

298. Firms today operate within wider boundaries. Informational costs related to price search are practically non-existent. Free trade agreements and improved infrastructure have reduced the cost of cross-border trade, allowing transactions to take place wherever costs are minimized.[331] New technology also allows management from a distance. Some platform companies create new micro-markets, such as JD.com in China, with 300 million users and Alilbaba's Taobao Villages.

299. The expanded boundaries of the firm today evolved gradually. Compare the Ford Motors of the 1930s with the IKEA of the 1990s with the Apple Inc. of today. Henry Ford owned the farms that raised the sheep that provided the wool for automobile seat covers. He also owned the iron ore and coal freighters that fed Ford's sprawling River Rouge manufacturing complex. Ford kept most of the transactions needed to manufacture a car in-house because the transaction costs of finding a supplier able to customize Ford's auto parts where very high.

300. With trade liberalization and rising integration of world markets in the late 1980s and 1990s, the concept of vertical integration began to disintegrate. Large corporations with complementary, interconnected but separate establishments started to emerge across the world. This structure allowed firms to expand their market reach, keeping most of their operations in-house but located in lowest cost locations. The international expansion of IKEA, founded in Sweden in 1946, began with establishment of small start-up stores in Norway in 1963, then in Denmark in 1969. The company expanded rapidly with the liberalization of the global trading system in the 1990s. The reduction in tariff and non-tariff barriers allowed IKEA to set up complex global value chains in low cost markets that allowed them to compete aggressively on price.

301. Now consider Apple, Inc., the world's largest information technology company by revenue worldwide. Rather than establish its own production sites, it sources components from over 200 suppliers across the globe.[332] For the iPhone, displays come from Samsung in South Korea, communication chips for ApplePay come from NXP Semiconductors N.V in Taiwan, China, flash storage technology comes from Toshiba Corp. in Japan, audio components are produced by Cirrus Logic in Texas, the United States. All parts are then assembled by Foxconn in China before the device is shipped to one of Apple's 500 stores worldwide, or any number of other mobile phone suppliers in the world. The iPhone integrates a variety of other Apple products, including iTunes, Apple Music, ApplePay, as well as the AppStore, where Apple charges other firms an annual fee to publish their app in the online platform. Freer trade, better logistics, and now technology, all make the integration of different product lines and services possible. The entire market appears

almost within reach for some companies today. Meanwhile, those companies amass vast wealth in their efforts to get there.

302. The rise of these superstar firms like Apple would have made Joseph Schumpeter proud. "Capitalism requires the perennial gale of Creative Destruction," Schumpeter opined.[333] He did not worry about any jobs that might be lost in the process. Politicians do. Politicians blame technology as the main reason behind the decline in labor share in some countries. Superstar firms at the technological frontier take the brunt of rebuke.

303. Around the world, workers have been losing out, as the labor share of national income has declined significantly since the early 1980s. The decline has happened across a large majority of industries and countries when looking to the corporate sector. A recent study that focuses on the corporate labor share shows that there was a decline in corporate labor share between 1975 and 2012 in 75 percent of advanced countries and 58.8 percent of emerging economies included in the sample.[334] Recent World Bank evidence based on the use of total labor shares from Penn World Tables, which includes the self-employed and government sectors, shows a decline in 64.5 percent of the 76 developing countries included in the sample.

304. Despite consensus around the overall decline, various inconsistencies between countries and across different periods makes it difficult to build a strong understanding of the reasons behind that decline. First, labor shares and the degree of the decline vary greatly between countries, even for those at similar levels of development. Second, the declines in corporate labor shares are larger in absolute value than declines in total labor shares, showing that overall decline is being driven by the corporate sector. Third, if you look at the last 10 years rather than the last 20 years, labor shares in some countries switch from being negative to positive. For example, considering only the period 2005 to 2014, only 23.3 percent of economies experience declining total labor shares (as compared to 64.5 percent). Fourth, several large economies experienced an increase in labor shares, such as Brazil, Nigeria, and the United Kingdom.

305. Governments struggle to craft a coherent response to the decline in labor shares. In an attempt to create jobs, politicians often finance programs for the development of small and medium enterprises (SMEs). Such programs are rarely cost efficient. More importantly, they are based on the false premise that SMEs create sustainable jobs. Yet the evidence shows that economies where labor shares are rising rely mainly on large firms to create jobs. Singapore is one example. China is another. Ukraine is yet another.

306. A better solution is to ease the entry of new firms. Most firms do not grow significantly. Those who do may become the superstars of the future. They require a business-friendly environment, one that is not tilted towards state-owned enterprises or firms run by politicians and their families. Basic technologies and logistics infrastructure needs to be in place. Programs that train entrepreneurs and prepare them for investment are important, filling important educational gaps.

307. Consider an example from Togo. Akouélé Ekoué Hettah originally ran a wedding dress rental boutique in Togo. After completing a World Bank-sponsored entrepreneurship training, she developed a plan to expand her business. In addition to renting out wedding dresses, she sells

dresses, jackets, shirts, gowns, and evening outfits. Her formal wear and accessory company, Ameyayra, has shops in both Togo and Benin, with another planned to open in Ghana in 2018. In this period, Akouélé has created 165 jobs. If enough start-ups are established and grow in employment, the destruction of old firms or sectors would be less troubling.

308. A second solution is to allow the rise of local superstar firms.[335] Technological change favors the most productive firms in each industry, incentivizing the reallocation of resources towards them. Superstar firms have a beneficial effect on labor demand by boosting production. Superstar firms are also large integrators of young, innovative firms, often benefiting small businesses by connecting them with larger markets. Superstar firms create the majority of jobs. Digital technologies expand the market reach of superstars, allowing them to integrate parallel goods and services operations, to achieve large economies of scale.

309. But super large firms, particularly firms in the digital economy, also call for caution. Regulations often fail to address the negative externalities that can be created by new types of businesses in the digital economy. One of the many mandates of governments in a capitalist economy is to ensure that markets are competitive. Too much integration eliminates competition. The acquisition of one behemoth by another even across sectors gives societies reason for pause. As it should for regulators, too. Antitrust rules need to be revisited. Governments also need to act to make firms pay their fair share of taxes. The largest firms engage in creative income allocation across countries to minimize their tax burden. Foreign suppliers of digital services can escape corporate tax in the country of service delivery, making it difficult for resident suppliers to compete. The generation of profits from intangible assets also evades most tax rules. Renewed cooperation at the international level may be needed.

Start-ups

310. For firms in France, 49 is a magic number. There are sharply fewer employers (by more than a factor of two) with exactly 50 employees than with exactly 49 employees. The reason is burdensome business regulation. French companies employing 50 or more workers are, among other things, obligated "to establish a committee on health, safety and working conditions and train its members," whereas companies with 49 employees are not.[336] France also has various regulations that become binding at employment levels of 10 and 20.[337]

311. Identifying firms that create jobs preoccupies politicians worldwide. Development banks participate in this exercise too. Tens of billions of taxpayers' or foreign donors' money are spent each year on initiatives that seek to increase employment through small and medium enterprises (SMEs). Rarely do such initiatives succeed in identifying or promoting start-ups that will turn into high-growth, successful firms in the future.

312. Relying on subjective analysis to select start-ups with high potential excludes too many from opportunity. Instead, by creating a better business environment for all firms, the more successful firms naturally rise to the top. The World Bank's Doing Business project lays out the basic regulatory requirements for private initiatives to grow.[338] These data have been used by researchers to study the deleterious effects of burdensome regulation. Poverty is lower in countries with business-friendly regulations and institutions in place.

313. Countries with significant start-up activity display several characteristics: they typically operate in business-friendly environments, they are run by well-educated entrepreneurs, they hire workers with high human capital, they innovate (bringing new products or service solutions to the market), and they export (directly or as subcontractors of superstar firms).[339]

314. Examples abound. EuroPATC, a Serbian start-up established in 2015, invented a wearable tracking device for children with autism, to improve child safety. The company exports its products to 60 countries. Exporting is easy for Serbian companies: the country ranks in the top-25 in trading on time.[340] SailRouter, a Croatia-born desktop-cloud application, reduces fuel consumption during shipping by adjusting engine speed in response to wave power and currents. The company also collects data on ship performance that can be analyzed by artificial intelligence to improve routing.

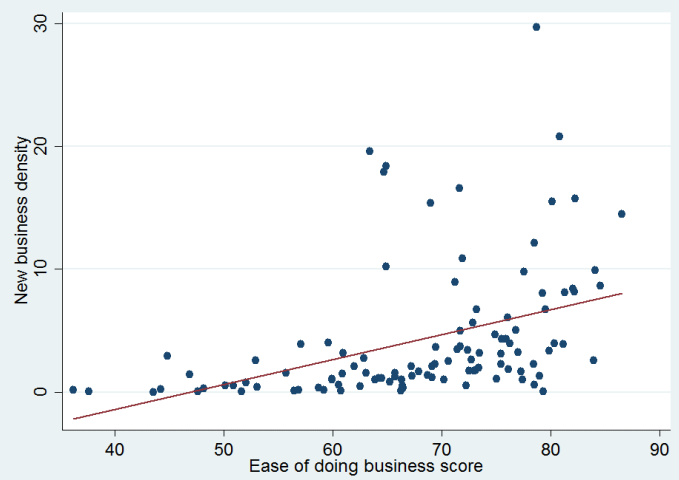
315. Not all successful start-up firms today are high tech. Akouélé's wedding dress boutique in Togo succeeded by introducing new clothing products for unexploited market niches.

316. These three start-ups have benefitted from improvements in government policy towards businesses: for example, no legal requirement to put money upfront in starting the company.[341] Serbia and Ghana have eliminated the minimum capital requirement altogether. SailRouter established its headquarters in Amsterdam, the Netherlands, rather than in Zagreb. Croatia, alongside 30 other economies, still imposes significant costs on start-ups.

317. The most efficient way to encourage the emergence of high-growth firms is to have more start-ups in the first place. The more start-ups there are, the more innovation and competition.[342] Resources are allocated toward their most productive uses. Under conditions that facilitate business, it is more likely that one of these start-ups transforms into a high-growth company that creates jobs. Faced with new competition, less productive firms—so long as they are not state-owned or politically connected—exit the market. World Bank research finds that in Ben Ali's Tunisia new firms were simply prevented from competing with companies connected to the President's family.[343]

318. Numerous studies show that increased start-up activity is associated with ease of doing business in a country (figure 5.1). Where formal entrepreneurship is higher, job creation and economic growth also tend to be higher.[344] One study estimates that the failure of small firms to grow into large firms lowers productivity growth in manufacturing by 25 percent in Mexico and India as compared with the United States.[345]

Figure 5.1. The easier it is to do business in a country, the greater the number of start-ups



Source: The World Bank's Doing Business and Entrepreneurship database, accessed April 2018.
Note: The ease of doing business score reflects the regulatory environment for starting and operating a local small and medium sized enterprise. The higher the score, the more conducive the regulatory environment is. The correlation between new business density and the ease of doing business score is 0.41, significant at 5 percent level after controlling for GDP per capita. The new business entry density is defined as the number of newly registered corporations per 1,000 working-age people (those ages 15–64).

319. Technology is another important prerequisite for many firms to grow, particularly those in the digital economy. High level of mobile phone ownership in Kenya, currently around 90 percent, was vital to the success of M-PESA, a mobile payment and microfinance platform. Many attribute Kenya's start-up boom to the presence of M-PESA, which provides credit to entrepreneurs. Technology can also increase firm competitiveness by increasing their operational efficiency. Digital technologies enable the establishment of firms such as Teleroute in Belgium, a platform that matches freight forwarders and carriers in Europe. Teleroute claims its online services reduce empty runs by up to 25 percent. Improved connectivity also enables start-ups to source essential technical expertise through online freelancing platforms as and when needed. As of 2015, U.S.-based Upwork already connected 5 million client businesses with more than 12 million freelancers and sourced its fourth largest community of task providers from Ukraine. Start-ups used to need data centers, IT systems, custom software and a user support infrastructure to take on large conglomerates. Now, entrepreneurs worldwide can source these from Zendesk, Python and others.

320. Logistics infrastructure is also important for firm growth. To facilitate rural e-commerce, the Chinese government invested US$300 million in 200 counties to establish local logistics centers. In 2018, the World Bank partnered with GSMA to unite nearly 800 operators with more than 300 handset and device makers, software companies, equipment providers and internet companies, to intensify connectivity in developing countries.

321. Notwithstanding the importance of the overall business environment, politicians continue to assist specific firms. In most cases, SME-focused initiatives have positive effects by making firms earn more for the families involved. But rarely do they lead to new jobs.[346] Moreover, government programs to support SMEs are often open to manipulation. Men might register businesses in the names of their wives to gain access to preferential financing set aside for female

entrepreneurs. Applicants might apply from their ancestral communities in order to benefit from regional preferences. The growth aspirations of entrepreneurs are easily overstated. In most cases, support to specific groups of SMEs, either by sector or location, is inferior to overall improvements in the regulatory environment.

322. Some initiatives are more useful than others. Business plan competitions, programs that train entrepreneurs and prepare them for investment, as well as programs that increase export competitiveness, have the potential to increase the prospects of start-ups.

323. In Nigeria, young firms that won a US$50,000 grant in a business plan competition created more jobs in three years than those that did not win. The cost per job was also lower than the costs of vocational training, wage subsidy, management training, and small grants taken together.[347] Competitions have had similar positive impact in assisting start-ups in Ethiopia, Tanzania, and Zambia.[348] However, choosing winners in a competition for start-ups does not equate to identifying superstar firms of the future. A creative study in Nigeria finds that the scores start-ups receive in business plan competitions are poorly associated with the subsequent employment growth of these firms.[349] Using machine learning methods does not improve forecasting either. The predictive power of both approaches is low, highlighting the fundamental difficulties involved in picking future winners from a pool of start-ups.

324. Programs that prepare young firms to adopt new technologies and receive outside investment are another tool. Start-ups in emerging countries often have good business ideas, but they are not prepared to attract outside funding. They may also not have the managerial and organizational practices necessary to take an idea to market. This is the case in the Western Balkans, for example, where entrepreneurs are reluctant to surrender partial control of their business in exchange for equity financing. The World Bank's program *Pioneers of the Balkans* provides business support services to high potential start-up firms, including on how to leverage the knowledge that equity partners bring.[350] A study on Start-Up Chile, the largest ecosystem accelerator in South America, shows that schooling of entrepreneurs bundled with the provision of basic business services significantly increases start-ups' performance.[351] In Argentina, there is the Buenos Aires Emprende, which facilitates investment opportunities for innovative startups.

325. Investment readiness programs are emerging in developing countries. In Kenya, Swahilibox in Mombasa, LakeHub in Kisume, along with other business incubators provide access to training, mentoring, and networking opportunities with potential equity investors. Investments usually follow. In 2017, startup funding in Africa increased by 51 percent as compared to 2016, with a record number of 159 startups raising US$195 million.[352]

326. One may question the wisdom of preparing start-ups for equity investments if the history of government programs picking winners is so dire. However, there is a difference between choosing a high potential start-up firm as an equity investor or as a government. Equity investors want to identify which firms have the greatest potential to grow the fastest. Governments, on the other hand, care more about the marginal effects of the government assistance provided, which is much more difficult to assess. Even if a government could identify in advance which firms are likely to grow fastest, this does not necessary mean they are the ones that need government support.

As an example, male-owned firms tend to be larger and more profitable, but the added effect of government support might be higher for women, since assistance might close the gender gap.

327. Governments can also help start-ups to grow by facilitating exports. Export promotion agencies focus on access by domestic firms to foreign markets. In Egypt, Arab Rep., a group of academics partnered with an Egyptian rug supplier to secure export orders from foreign buyers through trade fairs and direct marketing channels.[353] Trade fairs broker linkages between local firms and multinational companies. National branding initiatives or geographical indications, such as "Made in Morocco" or "Lübecker Marzipan" also differentiate products, potentially improving marketability abroad.

328. Export competitiveness is best enhanced by linking smaller firms to large exporters. In Ethiopia, PVH Corporation, one of the largest global apparel companies and owner of brands such as Calvin Klein and Tommy Hilfiger, is an anchor investor in a new industrial zone generating 60,000 jobs and US$1 billion in export revenues. The presence of PVH attracts domestic firms to join the industrial park, offering sub-contracting services.

329. One under-researched policy area to ease doing business is by opening public procurement to small firms. In Brazil, an online competitive bidding system for government contracts increased employment by 2.2 percentage points amongst winning companies.[354] Notably, 93 percent of the new jobs created were for people that were either unemployed, in the informal sector or out of the labor force. The employment effects persist beyond the initial contract period.

Superstar Firms

330. Thomas Jefferson raised concerns around the "aristocracy of corporations" when he announced in 1816 that "I hope we shall crush…in its birth the aristocracy of our moneyed corporations, which dare already to challenge our government…". A century later, in a speech in 1910, Theodore Roosevelt warned corporate giants dominated the American economy. A further century has passed, and those words are still applicable. The names of these superstar firms have changed tremendously, however.

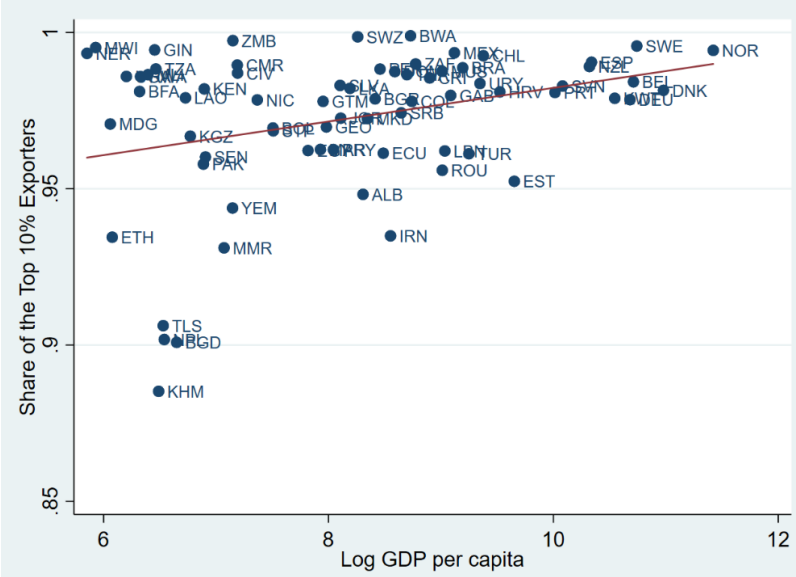
331. Natura Cosmetics S.A., the largest cosmetics maker in Latin America, was founded in 1969 as a door-to-door business in Brazil. Natura distinguishes itself via its direct sales model, as well as its environmentally-sustainable business practices. It now sells personal care products in more than 3200 stores in 70 countries across the world, with RUS$9.85 billion (US$3 billion) in net revenue last year. It employs 7,000 staff and operates a network of 1.4 million sales consultants globally.

332. Tata Group began life in the resource-related or non-tradable sector, establishing India's first steel plant and hydro-electric plant. In the second half of the 20th century it expanded its business into tradable products such as tea, watches and automobiles. Today the Tata Group operates in high-tech sectors. Tata spent US$2.8 billion on research and development (R&D) in 2016, 2.8 percent of its annual turnover.

333. These are just two examples of superstar firms: large, productive, innovative firms. These firms dominate the global economy: 10% of the world's public companies generate 80% of all profits.[355] Superstar alone can transform a country's industrial structure, shift comparative advantages, and shape a country's exports. A study on exports superstars in 32 developing countries shows that the five largest exporters in a country account for one third of exports, 47 percent of export growth, and a third of the growth due to export diversification.[356]

334. The superstars' dominance has been driven by open trade. Richer countries have larger sized exporters, as well as higher concentration in the top 10 percent of firms (figure 5.2). Superstar growth is particularly strong in markets undergoing rapid technological advances.[357] Low or absent informational costs related to price search, free trade agreements, and improved infrastructure have reduced the cost of cross-border trade, allowing transactions to take place wherever costs are minimized. New technologies allow management from a distance. Against this backdrop, the share of sales by superstar companies is expected to grow. A 2018 World Bank study on China, Chile, Colombia, and Mexico confirms that economic activity reallocates towards the most productive firms.[358]

Figure 5.2. Richer countries have greater density of export superstar firms



Source: Authors' calculations based on Exporter Dynamics Database version 2.0 described Fernandes, Freund and Pierola (2016).
Note: Oil exports (hydrocarbons such as oil, petroleum, natural gas, coal etc.) are excluded from the calculation.

335. There are plenty of reasons to argue that superstar firms have a beneficial effect on economic growth. Superstar firms have accelerated growth in developing economies by pulling resources out of subsistence agriculture.[359] They increase aggregate productivity by upgrading their internal capabilities to become more efficient, while promoting the exit of unproductive firms. They often pay higher wages, although in some advanced economies, evidence indicates that the large-firm wage premium is shrinking.

336. Superstar firms are at the forefront of adopting new technologies. Kuka Systems Group, founded in 1898 in Germany, is a major supplier of engineering services and robotics to the automotive sector. An early adopter of Internet of Things (IoT) technologies itself, it now sells IoT and smart robotics to auto manufacturers, allowing them to stream operating data for automated processing and human viewing. The data collected through sensors and actuators can be used to optimize operations and maintenance. In disrupting many industries, tech giants are changing them for the better. Didi Chuxing, the leading ride-hailing company in China offers app-based mobility options for more than 450 million users. The service is superior to that of established taxi companies, and is forcing them to improve.

337. Superstar firms create the majority of jobs. Between 1995 and 2015, the percentage of the U.S. workforce employed by Fortune 500 companies increased from 15 to 17 percent. In Serbia, workers of top 1 percent manufacturing superstar firms hold a quarter of total employment; the top 5 percent absorb almost half of the total labor force. Romania shows similar picture. Superstar firms are also responding to new way of employment. Many superstar firms are increasingly employing large share of workers under temporary work arrangements. For example, Samsung of South Korea sources 65 percent of its data science work, 17 percent of software development work as well as 10 percent of marketing automation work, through freelancing platforms.[360] As a share of employment, however, it is small firms that rely more on part-time or freelance work.

338. Superstar firms are large integrators of young, innovative, dynamic firms. Digital giants can benefit small businesses by connecting them with larger markets to source inputs, offers convenient payment solutions, and reach targeted customers. In India, numerous technological startups act as digital partners for global technological companies, providing payment solutions or app development services at a lower cost compared with large firms' in-house capacity. These startups are the largest employers of India's contract workforce.

339. Superstar firms can provide important financing for small business. Large buyers of agricultural produce satisfy 40 percent of the credit needs of commercial farmers or farmers organizations.[361] For instance, as the leading agricultural manufacturer and service supplier in Vietnam, Loc Troi Group provides working capital for agricultural cooperatives to purchase inputs, which contributes to increased agricultural productivity as well as household income.

340. New digital technologies accelerate the trend toward superstar firms. The list of the world's most valuable firms by market capitalization in 2017 reveals an important feature of the changing economy— firms are leveraging online platforms to reach customers. Seven of the top-ten non-financial firms on the list fit this category. Digital giants, such as the Alibaba Group in China, entered the Global Fortune 500 within less than two decades. Much of Alibaba's growth was driven by its e-commerce platform—Taobao.

341. While global players such as Amazon still dominate this list, platform-based businesses are on the rise in every country. Consider VIPKID, a leading Chinese online education firm that matches children in China with North American teachers for real-time, one-to-one English learning classes. Founded in 2013, it now links 200,000 students with 30,000 teachers in the United States and Canada. Or consider Jumia, an e-commerce company in Nigeria, which spearheaded the e-commerce trend in Africa in 2012. It is already present across 23 African countries, bringing

electronics, groceries, and fashion to customers. Flipkart in India facilitates sales of consumer electronics between suppliers and customers. Today it is more than a firm, Flipkart operates like a market, defying firm boundaries as originally described by Coase.

342. Digital platforms allow for rapid scaling. There are many examples of billion-dollar startups built around digital platforms. JD.com, China's second-largest e-commerce company, started as a retail business in a tiny booth in Zhongguancun Electronic Shopping Market, Beijing. As of April 2018, the JD platform has 300 million active users. Ant Financial, part of the Alibaba group, is the most valuable fintech firm in the world. It took off within just a few years due to advances in artificial intelligence. It uses big data—including data collected through Alibaba's Taobao marketplace—to disburse loans in less than 1 second from the moment of application. Its famous "3-1-0" online lending model involves a 3-minute application process, 1-second processing time, with zero manual intervention. In the past five years, over 4 million small Chinese businesses received loans.

343. Platforms, such as Wechat Pay in China or M-Pesa in Kenya, enable firms to do payments electronically, making goods and services trade more efficient. The digital services trade often reaches beyond traditional markets. For example, VulaMobile, a South African service platform, links tens of thousands of individuals in rural areas to specialized medical services in fields as diverse as ophthalmology, dermatology, HIV treatment, cardiology, and oncology. Hello Tractor, a Nigerian asset-service sharing platform, has established a network of tractor owners, offering equipment as well as maintenance to those who can't afford to buy machines for farming activities.

344. Digital platforms can create jobs beyond their own corporate structure. For example, since 2009 many clusters of rural e-tailers have opened shops on Alibaba's Taobao.com Marketplace, fostering "Taobao Villages" in China. Taobao Village merchants produces consumer goods, agricultural products and handicrafts based on their niche competencies. Taobao Villages have created more than 1.3 million jobs, drawing youth who migrated to cities back to hometowns to start up enterprises. Strong internet connectivity and mobile phone penetration must exist for this kind of e-commerce to grow.

345. Digital platforms often disrupt markets, which can challenge incumbents. For example, e-money platforms have achieved coverage where the traditional banking model failed. In Kenya, M-Pesa reached 9.5 million customers within three years in operation, in a country with only 8.4 million bank accounts. In 2017, ride-haling apps surpassed traditional taxis in New York City with over 12 million monthly taxi pickups. Taxi service providers that used to be protected by fixed caps on licenses are now exposed to competition. Electronic freight exchanges such as uShip and Mober that match carriers with cargo holders forced global logistics providers such as Schenker and DHL to develop their own digital exchanges.

346. In addition, digital platforms expand the market reach of firms through mechanisms that build trust (e.g., brand certification, digitalized social capital, third party validations). This trust enables them to expand rapidly into other business lines. For example, Grab, a Singapore-based ride-hailing platform, grew to hold 95 percent of the Southeast Asian ride-hailing market, before expanding to offer additional services ranging from ordering food to payment systems at the touch of the app. GrabPay addresses a critical gap in this region where an estimated two-thirds of people

are unbanked. Grab's rival, Indonesia-based Go-Jek, processes over 100 million digital-wallet transactions per month. Platforms also expand through commercial partnerships or mergers. For example, Grab started providing microloans in a partnership with Japan's Credit Saison while Go-Jek acquired three companies to become a dominant player in payment systems in Indonesia.

Regulations and taxes in a changing landscape

347. There is much to celebrate when it comes to superstars and the rise of platform firms. But there is much to caution, too. Superstars pose policy challenges today as much as they did during Jefferson's time. Governments are called upon to address market concentration and taxation concerns without imposing obstacles for firms to grow. When Sherwin Rosen introduced the concept of superstar firms in 1981, he predicted that technology would allow firms to expand markets and crowd out the competition more easily. In many markets, this is true. Technology has allowed some companies to rise to the top—and stay there. Tax systems and other laws are, in many ways, no longer fit for purpose.

348. Platform firms often operate in a regulatory grey area, skirting existing regulation. For example, Airbnb premises are often not subject to zoning or licensing requirements, unlike other commercial accommodation. However, Airbnb guests affect neighbors who do not share the benefit of rental income. M-Pesa can take deposits and facilitate payment between users despite not having the usual financial institution license.

349. The intense competition created via some platforms prompts a race to bottom in price. Without minimum labor standards or tariffs, workers suffer. Drivers with Go-Jek and Grab in Indonesia held large demonstrations in early 2018 demanding an increase in their tariffs. In response, the government began the process of amending its laws to require such firms to register as transport companies, comply with safety requirements, and impose a minimum floor price. Users of platform firms also worry about the misuse of their personal data, but most privacy laws are insufficient to address the data collection practices of firms in the digital economy.

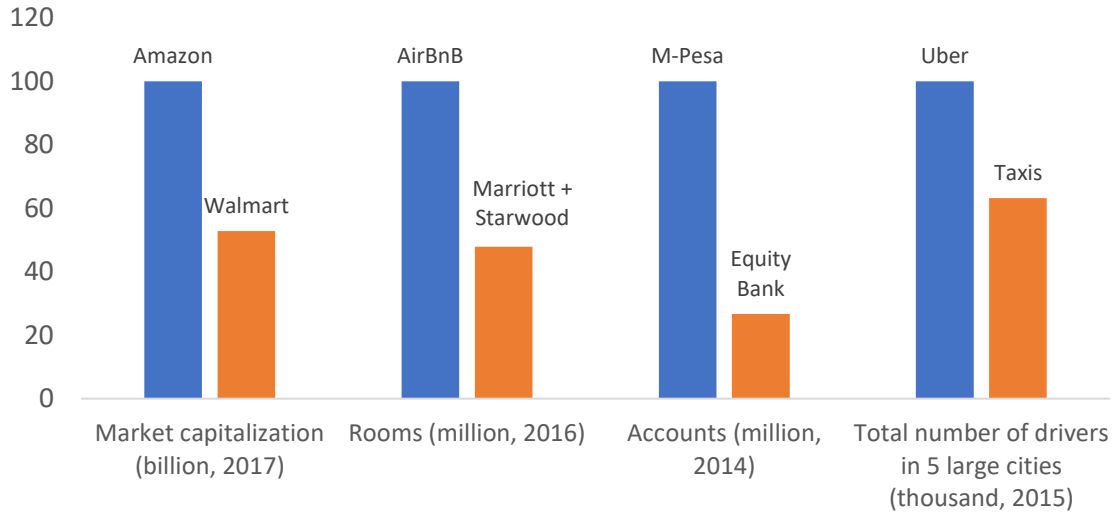
350. In some countries, particularly in Europe, platforms are disrupting existing systems so much that governments are called upon to ban them altogether. Outright bans are, however, inefficient – they simply deprive countries of the good, too. In early 2018, courts of Egypt, Arab Rep. suspended the licenses of ride-hailing companies Uber and Careem, in response to a challenge by taxi drivers. Bulgaria's Supreme Court ordered Uber to stop operating in 2016. The same year, the Hungarian government amended its regulations to make it effectively impossible for Uber to operate. Uber left the market. Many other cities or countries have banned ride hailing apps, including parts of Australia, Hong Kong SAR, China, and Spain.

351. Some regulators, on the other hand, have resisted pressures to create barriers for platforms. Competition authorities across developed and developing countries have successfully advocated against disproportionate restrictions for platforms in transport and accommodation. For example, the United Kingdom withdrew a proposal that would have obliged private-hire vehicles to offer pre-booking seven days in advance. Spain's Supreme Court ruled against a regulation that required a minimum number of nights for any accommodation (such as Airbnb) other than hotels. In Italy, a ban on Uber was overturned just one month after it was imposed.

352. In most cases, however, regulators need to adjust laws to new business models to ensure minimum standards of quality, prudence, and safety, among other policy goals. In the case of e-money, Peru's financial regulators has set up a special license that imposes a lighter regulatory burden. Mexico City created a new regulatory category (network transportation service) for ride-sharing apps. The municipal government of Milan, Italy, reached a data sharing agreement with Airbnb. This agreement limits tax evasion on platform transactions. In some cases, formal standard-setting can be partially replaced by tracking technologies or user feedback on observable features such as quality of service, cleanliness, reliability, and customer support. For example, the application "Safemotos" in Rwanda allows users to find motorbike taxi drivers whose driving quality has been monitored by reviews.

353. Although platforms may disrupt incumbents to increase competition, new problems may arise over time as they become entrenched themselves (figure 5.3). As with any market, the ascent of platform firms relative to the nearest competitors raises issues related to market power. Users tend to converge around one or few platforms. For example, the top three payment card networks account for 80 percent of all payment cards worldwide. Beyond China, where UnionPay holds a monopoly, roughly every second payment is made with a Visa-branded card.

Figure 5.3. Platforms and their offline competitors



Source: Author's calculation, based on data from Yahoo! Finance, Business Insider, CGAP, Visual Capitalist.

354. Platforms can obstruct the growth of competing offers, for example by charging high fees for other networks to interconnect: high fees for terminating phone calls or accepting wire transfers make it difficult for smaller platforms to attract users. In 2013, sending e-money from M-Pesa to its rival Airtel Money was over four times more expensive than sending it within the network. Amazon in the United States accounts for 10 percent of United Parcel Service's (UPS) returns and is able to negotiate discounts of up to 70 percent. UPS makes up the difference by charging higher prices to other customers.

355. Business practices that exclude competitors warrants attention from regulators. Governments can require competitive coexistence of platforms, where businesses and individuals

can use several competing platforms at once and switch easily between them. When Zimbabwe mandated interoperability and infrastructure sharing among e-money operators, it raised the total number of subscribers by 15 percent. With World Bank support, Kenya ruled that Safaricom could not contract small stores on an exclusive basis. After the decree was implemented, small agents in rural areas raised their income by 49 percent. Brazil forced card payment acquirers to accept more than one card network to ensure that customers could pay with several cards at points of sale. Israel and Mexico passed laws to ensure merchants can charge differently for different cards, to signal to card holders which ones provide better terms.

356. Mergers and acquisitions should also be monitored. Firms expand by buying rival firms, ultimately until they dominate the entire market. Anti-trust laws exist to patrol such activity, to ensure markets remain competitive. DB Schenker USA, a global logistics company first entered an exclusivity agreement with uShip, an online marketplace for shipping services, in 2016. Later, DB Schenker USA acquired a minority stake and a seat on uShip's board.

357. Acquisitions by global superstar companies of smaller companies in emerging markets frequently makes headlines today – this eliminates international competition before it ever becomes a real threat. In 2017, Amazon acquired Souq, the "Amazon" of the Arab World, with no opposition from authorities. In 2018, Amazon announced a partnership with the Vietnam E-Commerce Association, the largest consortium of local online sellers in the country. Local mobile payment service providers such as Ascend Money in Thailand and Paytm in India are part of the Chinese fin-tech giant, Ant Financial. Uber, the U.S. ride-hailing company, sold its operations in China, Russian Federation and Japan to its large competitors in the local market in exchange for equity stakes or joint-ventures.

358. Superstars and digital platform companies also leverage their power in adjacent markets by bundling or at least connecting different types of services. Most anti-trust rules are not yet built for these challenges. Starting with the Taobao.com marketplace, the Alibaba Group now dominates the mobile payment market with Alipay, and enjoys a significant share in the online entertainment sector through Youku.com in China. Through numerous acquisitions, Google and Facebook, now account for an estimated 80 percent of the global advertising business. In addition to online retail, Amazon controls one-third of the cloud business, 44 percent of e-commerce and a 70 percent of voice in the United States. Amazon also publishes books, manufactures hardware, and has even entered the grocery-store business with its recent WholeFoods purchase. The U.S. antitrust agency approved the deal on the basis that the business of Amazon and Wholefoods are sufficiently different as to eliminate the risk of consumer harm.

359. In Europe, the fact that markets are adjacent is not failsafe. In 2017, Google received a US$2.7 billion fine from the European Commission for promoting its own shopping services in its search results, at the expense of competitors.[362] Anti-competitive practices by conglomerates with multiple platforms, networks and services have been caught by regulators elsewhere. In Peru, the telecom regulator forced the largest communication networks to offer messaging services to banks that were expanding into e-money.

360. Digital firms are also giving rise to new sources of market power—user data. Algorithms improve the more data they are fed. Large platforms can use this data to provide customized

services and products to users. For instance, the Taobao.com marketplace, China's largest e-commerce platform, tailors recommended products to clients based on their shopping history. Although the cost for consumers to switch to substitute platforms is low, they tend to stick to old platforms who "understand" them better.

361. Given the potential utility of user data, it has become a tradable good itself. And when data becomes indispensable to compete, governments need to regulate to provide access. Malawi advocated the national banking association to provide their data to all credit referencing bureaus. Mexico's competition authority mandated the terms and fees that banks may charge FinTech companies for sharing transaction data of individual customers. Governments can also publish the data they collect to create opportunities for smaller firms or support "data co-operatives". In Switzerland, a project called Midata collects health data from patients, who can then decide whether they want them to be included in research projects.

362. New ways of generating revenue in the gig economy, through intangible assets such as user data, should also be subjected to tax. Most tax systems around the world are built for brick and mortar institutions, with taxation based on physical presence. But some of the biggest firms today provide goods and services from abroad, without physical presence in countries where consumers are located. Moreover, foreign firms often generate profit out of intangible assets, for example, through user data or advertising. The result is that digital companies pay less tax. The European Commission estimates that digital businesses face an effective tax rate of only 9.5 percent, compared to 23.2 percent for traditional business models. This is not fair. Digital companies benefit from the good health and education levels of citizens, as well as political stability, functional infrastructure, and economic prosperity in a country, just as traditional domestic companies do. Governments are deprived of tax revenues. Meanwhile, the profits of digital firms continue to rise faster than any other segment of the economy.

363. Digital firms also engage in "base erosion and profit shifting"—tax avoidance—just as other global companies do. Multinational firms have long shifted their profits around the world to "paradis fiscales", which are or countries with low tax rates and often high levels of secrecy. In so doing, they avoid paying their fair share of taxes.[363] This phenomenon is not new, nor is it illegal, but it becomes easier as more firms "go global" via the digital economy. It is estimated that nearly 60 percent of total income of multinationals is reported in countries where they pay an effective tax rate of less than 5 percent. Fortune 500 companies are reportedly holding more than US$2.6 trillion in accumulated profits offshore for tax purposes.[364] The five most popular destinations for U.S. multinationals are: Bermuda, Luxembourg, the Netherlands, Switzerland and Ireland (table 5.1).

Table 5.1. Some of most popular tax haven countries

Country	***Tax Incentive***
Bahamas	0% corporate tax, 0% withholding tax, highly secretive.
Bermuda	0% corporate income tax, 0% withholding taxes, highly secretive
British Virgin Islands	0% corporate income tax
Cayman Islands	0% corporate income tax, 0% withholding taxes, highly secretive
The Channel Islands	Jersey has no inheritance tax, capital gains tax or standard corporate tax.

Hong Kong	Tax breaks, 0% withholding taxes.
Ireland	12% corporate income tax, tax breaks.
Isle of Man	0% corporate income tax, tax breaks such as 100% VAT refunds if planes are part of "leasing" businesses (even if the purchaser is ultimately leasing to himself)
Luxembourg	Tax breaks for international corporations, 0% withholding taxes
Malta	Tax breaks (effective corporate tax rate for multinational corporations is as low as 5%. Local businesses pay 35% corporate taxes).
Netherlands	Tax breaks (e.g., limited partnerships can potentially avoid paying Dutch taxes, if certain conditions are met), 0% withholding taxes.
Singapore	Flat corporate tax rate of 17 %, exemptions for international corporations
Switzerland	Tax incentives, 0% withholding taxes, highly secretive.

364. The vast majority of global companies are engaged in tax avoidance schemes. At least 366 of the Fortune 500 companies operate one or more subsidiaries in tax haven countries. High-wealth individuals do the same. The Paradise Papers, leaked in 2017, disclosed the most egregious examples. Other sources confirm these findings. Morgan Stanley alone has 251 tax haven subsidiaries in the Cayman Islands.[365] Dow Chemical has 45 subsidiaries in the Netherlands, 17 in Singapore, and 13 in Switzerland, among others. Apple and Microsoft of the United States each have around 95 percent of their profits parked, untaxed, overseas in countries with low corporate tax.[366]

365. Corporate groups can get away with tax avoidance without infringing the law. Numerous law and accounting firms specialize in navigating the regulations in question. The current international tax system is stacked in favor of multinationals. A company can create foreign affiliates, segment their activities between those affiliates, then report the majority of profits in countries with the lowest tax rates. The process of allocating profits in this way is called transfer pricing. All the company needs to do is ensure that the income transferred accords—based on the firm's own judgement—with the "arm's length principle". That principle requires that the transfer price between affiliates within a corporate group for a given asset is the same or similar to that which would be the case between independent companies operating at arm's length.

366. Transfer pricing rules in their current form suffers from several weaknesses that are exploited by multinationals. First, should a tax audit ever occur, it can be difficult to identify another transaction that is at arm's length for purposes of comparison. Identifying a true arm's length transaction between independent companies may be impossible in certain markets due to economies of scope and scale, network effects, or risk assignments. If that is the case, relying on a transaction between other affiliates may also be unhelpful—the prevalence of aggressive transfer pricing within corporate groups means that other international market transactions that could potentially be useful may also be distorted. Second, accounting rules that implement transfer pricing can obscure what is actually going on. Firms have significant flexibility to establish contracts for goods, services, or intellectual property rights, or set up lending agreements between affiliates, all of which can be used to justify the transfer of income. Small subsidiaries may also be set up to bear the risk for the entire global conglomerate, in exchange for (significant) payment. If there is no comparable transaction in the market against which to assess that contract or agreement, firms have vast discretion to set "prices" as they please.

367. For example, Nike, Inc., headquartered in the United States shifted large sums of money to Bermuda between 2005 and 2014 by opening a subsidiary called there called Nike International Ltd. Although the subsidiary did not have local employees, it "charged" large fees for the use of the Nike trademark by Nike's European affiliates. That way, Nike, Europe could deduct that expense from its taxable income in Europe. In 2017, Amazon relied heavily on a single tax break in the United States system—writing off the value of executive stock options for tax purposes — to zero out its tax liability in 2017.[367] While multilaterals wheel and deal to reduce their corporate tax obligations, small and medium enterprises that do not have the possibility to transfer profits to foreign locations pay the full rate.

368. As in the Nike example, intellectual property is oft-used to justify income transfer between affiliates. Corporate tax rates influence where firms register their intellectual property rights.[368] For one, foreign affiliates in higher tax countries can pay royalties to the IP-owning affiliates in low tax locations.[369] Google's search and advertising technology is held by a subsidiary in Bermuda, where the corporate tax rate is 0 percent. Evidence shows that pharmaceuticals use IP royalty payments to report dead-weight losses, set high prices, or even withdraw drugs from the market entirely.[370] To combat such practices, the United States government was reportedly considering in 2017 a new, 12.5 percent tax on foreign income U.S. companies generate from intellectual property, no matter where it is registered.

369. This does not mean that all IP rights are registered in paradis fiscales, however. Another way multinationals get out of paying tax is through contract research and development (R&D). The pharmaceutical sector has this down to a fine art. When a subsidiary located in a low tax country finances R&D in a higher tax country, it sets a price (usually the cost of the R&D plus an arm's length mark-up). If the contract stipulates that the financing subsidiary also bears the risk of that R&D, additional returns from any subsequent patent that comes of out that R&D will accrue to the subsidiary (in the low tax location). To compound these windfalls, well-advised companies carry out their R&D in countries with R&D tax incentives. Thus, firms conducting R&D can deduct those expenses from taxable income, receive tax credits, and then allocate R&D revenues to foreign affiliates (because they bore the risk). On top of that, some countries charge lower corporate taxes for any revenues generated using patents. When one considers the sheer length of some patents, not to mention their vulnerability to abuse, it is clear that amending intellectual property rules must be part of global efforts to combat tax avoidance.

370. Citizens are demanding change. There is no justification for the tax break currently granted to digital companies over traditional. Moreover, closing the loopholes that allow multinationals to avoid tax is long overdue.

371. An overarching challenge is the fact that current tax regimes are founded on the principle of permanent establishment. Current rules require that businesses pay tax on profits generated where they have physical presence. This means that when foreign digital companies provide online services to consumers abroad or generate revenue from user data, governments have no legal hook to collect taxes those profits. Transfer pricing rules also allow for profit shifting between physical establishments, irrespective of where the bulk of activity is carried out.

372. Advanced countries, through multilateral efforts at the OECD, regional, and unilateral actions, are taking steps to tax the digital economy.[371] So far, indirect taxes have been the easiest to implement. As of 2015, EU and non-EU firms are obliged to charge VAT on all digital services based on the location of the consumer. The tax removes the competitive of advantage held by digital companies located in countries with low VAT rates. In 2017, Australia passed a similar tax on digital products and other services imported by consumers. In both cases, foreign digital businesses are required to register with the authorities in the country of consumption, file and settle taxes directly. Other advanced economies with indirect taxes on the digital economy already in place include Japan, Korea, New Zealand, Norway, the Russian Federation and South Africa. In the United States, the U.S. Supreme Court is currently considering a case that would grant States the right to levy taxes on online sales in their territories, from companies that do not have a physical presence.

373. Less is being done in emerging economies, where additional tax revenues are needed most. Most emerging economies have a limited tax base, due to high levels of informality and poverty, as well as collection challenges. Meanwhile, the digital economy, particularly in e-services, is increasing rapidly in emerging markets. In Sub-Saharan Africa, the mobile ecosystem is expected to rise from US$102 billion in 2015 to US$142 billion by 2020.[372] Digital transactions are potentially more accessible than informal markets when it comes to tax collection. In 2017, Serbia and Taiwan, China adopted models similar to the EU and Australia, extending their VAT regimes to cover digital suppliers. India adopted an "equalization levy", which is a 6 percent witholding tax applied to the gross consideration paid by Indian companies to non-resident businesses without a permanent establishment for online advertisement services. China, Malaysia, and Thailand are also reviewing their tax frameworks.

374. The problem with indirect goods and services taxes is that they have a more discernible impact on consumers prices. Direct taxes do a better job of targeting firm profits directly (even accounting for some transfer of this cost to consumers through price). But direct taxation of digital business is amorphous, even putting tax avoidance schemes to one side. The virtual nature of digital value chains makes it difficult to identify how and where value is created. Electronic service supply chains can be complex and may cross multiple international borders. In most cases, only the final consumer and perhaps the digital intermediary (often involved in payment) are both apparent and tractable entities. What's more, to impose a direct tax, countries have to renegotiate their double taxation treaties. Doing so will not be easy. The direct tax proposed under the EU's 2018 Digital Tax Package would apply to digital firms with "significant digital presence", which means firms over a certain size in terms of revenues, users, or business contracts in each Member State in a given year. But it cannot enter into force until EU Members (which retain sovereignty over taxes) successfully renegotiate their tax treaties with third countries. Indirect taxes would apply in the interim. In parallel, Spain is also pursuing its own direct tax on digital companies, to be in place by 2019 to finance the increase in pensions.

375. Discussion around digital taxation has revived the debate around formulary apportionment, an allocation formula that aggregates and then divides a firm's worldwide income across countries in which firms are active. Formulary apportionment would remove existing incentives for multinational corporations to shift reported income to low-tax locations. There would be no need for transfer pricing rules. The formula to allocate profits between countries would be based on

"allocation keys" comprising volume of sales to third parties, assets, payroll, and/or headcount of staff in each jurisdiction. But introduction of formulary apportionment faces significant hurdles, not least an agreement among major economies on the rules used to allocate corporate income. The divergent interests of countries would make such an agreement difficult to achieve. Any unilateral moves to formulary apportionment risk double taxation of some income and non-taxation of other income.

376. Nevertheless, the current system cannot be tolerated. Steps towards formulary apportionment could be taken within existing multilateral frameworks. Transfer pricing rules could be changed and controlled foreign company regulations tightened to limit related-party interest deductions.

377. Governments can also take steps to shut down tax havens. Economic sanctions are one option, facilitated by a list of the most egregious offenders as recently released by the European Union. Governments can also take steps to make it harder for firms to shift their profits there undisclosed. The United Kingdom passed a law in early 2018 that compels British Overseas Territories like Bermuda, the British Virgin Islands and the Cayman Islands to disclose real owners of shell companies. By 2020, those governments have to create public databases setting out the real owners of all companies registered there. Crown Dependencies, Jersey, Guernsey (The Channel Islands) and the Isle of Man are not covered by the legislation. Related to this, governments could pass legislation requiring all multinationals to publish detailed reports on the countries in which they operate and have holdings, including their turnover, intra-firm sales, employees, assets, profits, taxes, etc. Not only would this reveal the scale of the problem, but it could contribute to public "name and shame" campaigns that prompt change.

378. The changing nature of the firm requires action from governments. Expanding firm boundaries present opportunity for societies, but they also bring risk. Appropriate business regulation and access to technology all increase firm establishment and enable them to grow in a digital age. Antitrust laws need to adapt to patrol anticompetitive practices in the digital economy. The implications of superstar dominance across multiple adjacent markets have to be scrutinized. Firms should also pay their fair share of corporate taxes. Anything else raises serious questions around the bounds of corporate power.

Chapter 6: Adapting Social Protection and Labor Market Institutions

379. Otto von Bismarck, Germany's Chancellor in the late 19th Century, is widely accredited for having invented social insurance as we know it: one where benefits to formal workers are financed by dedicated taxes on wages. What is less known, however, is that this model was Bismarck's plan B. The Chancellor's original intention was to create a system of pensions financed via taxes on tobacco. As his plan failed, Bismarck eventually resorted to wage-based, contributory financing. The contributory model is still largely in place today in most countries.

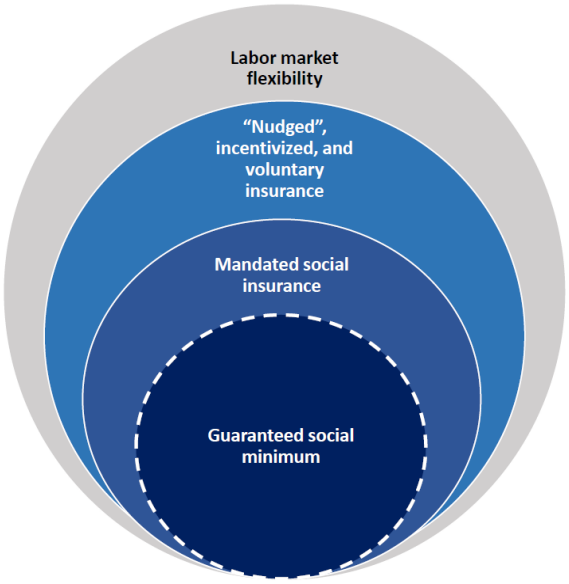
380. Social insurance and labor institutions conceived around long-term employer-employee relationships are increasingly challenged by changes in the world of work. Labor markets are becoming more fluid, including workers pursuing a portfolio of activities like self-employment or multiparty employment arrangements. Changing skill demands also raise the concern of higher inequality, and broader segments of the population becoming vulnerable.

381. While the Bismarckian arrangements have served many advanced countries well, in developing countries the model remained mostly aspirational due to informality. Many lack formal protection. Earning from jobs alone may not lift people out of poverty: in Africa and Asia, over half of workers live on less than US$2/day.[373] In low-income countries, social assistance and insurance only cover 18 and 2 percent of people in the poorest quintile, respectively. The corresponding rates increase to 77 and 28 percent in upper-middle income settings.

382. More uncertain, complex labor markets demand effective social protection while ensuring that firms and workers can respond to changes in technology and product markets. These developments are stimulating a reconsideration of how social protection, including labor market institutions, can reduce poverty, smooth consumption, and redistribute wealth. Their relevance is reflected in legislations, national strategies and budgets. Any discussion on the future of social protection is not a matter of 'whether' it is needed, but of 'how' it is best adapted to the changing nature of work.

383. The chapter outlines how a package of three inter-dependent components of social protection systems – a guaranteed social minimum against poverty (with assistance at its core), social insurance, and labor market institutions – can manage these labor market challenges in developed and developing countries (figure 6.1). The provisions of social assistance, social insurance and labor market institutions must be coordinated to jointly provide protection and promote employment. Changes in the shape of one may affect what is needed in the others.

Figure 6.1. Social protection and labor system for the changing world of work



Source: Adapted from World Bank (2018)

384. The envisioned package reinforces the role for social assistance. Already spurred by equity concerns, the development of adequate social assistance is underscored by greater risk in labor markets and the need to ensure adequate support irrespective of form of labor contract. The proposed package moves some of the burden of protections from social insurance and labor market protections to social assistance.

385. "Progressive universalism" embeds the objective of expanding of social assistance prioritizing the poorest, while navigating the fiscal, practical and political trade-offs that incremental levels of coverage entail. As a result, countries have an array of options to walk the path, including extending individual programs or combining multiple ones. Among the options, there is growing discussion around Universal Basic Income (UBI). This program is a variant of a familiar instrument – unconditional cash transfers. Since UBI is often featured in the debate on the future of work, this chapter devotes particular attention to it.

386. A guaranteed societal minimum income should be complemented with adequate insurance that does not fully depend on having stable wage employment. Such arrangements would, first, provide basic universal coverage, subsidizing premia for at least the poor. This would top-up social assistance. In addition, mandatory earnings-based contributions would be necessary. At least initially, this mandate would apply only to formal workers. A lighter mandate could attract greater compliance. Finally, additional insurance could be achieved through voluntary saving schemes "nudged" by the state. Disentangling redistribution from savings and moving the redistributive function to the guaranteed societal minimum would increase transparency and reduce labor costs. This may reduce incentives to replace labor with technology.

387. As all workers become better protected through enhanced social assistance and insurance systems, labor markets can be made more flexible to facilitate work transitions. Current labor

regulations are often used as a substitute to provide the protections that social assistance and insurance systems could instead provide. For example, when aiming to provide a livable income, countries could choose to use more social assistance to supplement earnings and relax pressure on setting the minimum wage to levels that would exceed the labor productivity. Similarly, income support to the unemployed may be provided by unemployment benefits rather than via severance pay.

388. Moving protections to the social assistance and insurance sectors can reduce the burden of risk management on labor regulation. In doing so, it may protect informal workers. Lower labor costs can improve the adaptability of firms in the changing world of work and allow for more formal employment, especially of new labor market entrants and low skilled workers. Complementary support for reskilling and job search, as well as new arrangements for expanding workers' voice, become even more important.

Social Assistance

389. "All poor people should have the alternative… of being starved by a gradual process in the home, or by a quick one out of it". The words of Charles Dickens' *Oliver Twist* provide a vivid illustration of social assistance practices in 19th Century Britain.[374] The approach, codified in the Poor Laws of 1601 and 1834, established harsh criteria for accessing social assistance. The Laws also influenced thinking about social assistance in other contexts for centuries. It was only 70 years ago that the "Beveridge Report", with its recommendations embedded into the National Assistance Act of 1948, marked the end of the era evoked by Dickens.

390. In subsequent decades, social assistance began to spread in developing countries.[375] Trends in social assistance attest to significant progress. Out of 142 countries, 70 percent have now unconditional cash transfers in place, 43 percent introduced conditional cash transfers (CCTs), and 101 countries have old-age social pensions.[376]

391. Developing countries are expanding flagship social assistance programs: between 2013 and 2016, the coverage of the national CCT scheme in Tanzania increased twentyfold from 0.4 percent to 10 percent of the population. An equal level of coverage is achieved by the Productive Safety Net Program in Ethiopia. About 20 percent of the population is served by the *Pantawid* program in the Philippines and the Child Support Grant in South Africa.

392. These expansions are often accompanied by administrative innovations. Social registries connect potentially eligible beneficiaries to different programs. This improves coordination programs and attain efficiency gains. When linked to a unique ID number, such platforms can reduce costs due to inclusion errors. In Pakistan, the social registry, which includes 85 percent of the population and serves 70 different programs, contributed to savings of US$248 million. In South Africa, and Guinea, a similar process saved US$157 million, and US$13 million, respectively.

393. Countries are using various outreach strategies to raise awareness of available interventions. For example, in Brazil the *Busca Activa* strategy resulted in including over one million additional poor families in the *Cadúnico* social registry.[377] Payment technologies are also

making a difference. In the Labor Intensive Public Works scheme in Ghana, the digitalization of paper-based transactions and a wider use of biometric machines reduced overall wage payment time from 4 months to one week. In the Indian state of Chhattisgarh, electronic devices for the Public Distribution System of food assistance contributed to a reduction in 'leakages', from 52 percent in 2005 to 9 percent in 2012.

394. Rigorous empirical studies demonstrate the substantial multidimensional impacts of social assistance. Evidence shows that transfers increase not only household income, but also the human capital of current and future generations. For example, a systematic review of 56 cash transfer programs found significant impacts on school enrolment, test scores, cognitive development, food security, and usage of health facilities.[378]

395. Despite progress made, there is more to do. The evolution of social assistance is unfolding as the changing nature of work combines with structural challenges. More people, and not only the poor, are becoming vulnerable as skills demands change. At the same time, high levels of informality have prevented firm-based, "Bismarckian" social insurance from taking hold in most developing countries.

396. Where deprivation is widespread, households across income distribution may face similar, although still varying, levels of need.[379] Such continuity may contrast with sharp, somewhat arbitrary measures of poverty or eligibility criteria. Even where poverty is less prevalent, there can be a concentration of similarly-vulnerable people around poverty lines. For instance, in some middle-income countries those living on US$6/day, or just above the poverty line, face a 40 percent probability of falling back into poverty.[380] In fact, poverty is often dynamic: in Africa, one-third of the population is persistently poor, while another third moves in and out of poverty.[381] These issues suggest the need for broader coverage than most of current programs.

397. When countries achieve high levels of coverage, many policymakers weigh the possibility of targeting by "excluding the rich", instead of selecting beneficiaries from the bottom. This approach is often considered in the context of subsidy reforms and entails new technical challenges. While it does not eliminate exclusion errors, these tend to occur higher up the income distribution. As such, "targeting from the top" may have less problematic social consequences.[382] The political viability of such a proposition may then depend on how the middle-class and various interest groups are set to benefit (and in part pay for) the program as part of a wider social contract.[383]

398. In advanced economies, social assistance faces the bottleneck of low 'take-up', or the extent to which eligible beneficiaries participate in a program. For example, it is estimated that in the European Union only about 60 percent of social benefits are claimed.[384] This challenge stems from lack of awareness of benefits, misunderstanding of eligibility rules, perceived stigma associated with assistance, bureaucratic obstacles, and opportunity costs to access benefits. In low-income countries, only 18 percent of the poorest quintile receives some form of transfer, albeit coverage rises to 77 percent for upper middle-income countries. Low coverage can be the result of fiscal, administrative and informational constraints. Out of the benefits provided in developing countries, about one-third accrues to the poorest quintile, while two-thirds are spread across the income distribution.[385]

399. These challenges are complex. Decisions about the shape of a 'guaranteed societal minimum' carry different technical, fiscal, and political challenges. Packages with more universal elements reduce or eliminate challenges around determining eligibility, but require significantly more resources. The choice of larger or smaller tax-transfer policies have different roots of political support.

400. The principle of 'progressive universalism' could be applied to the idea of a guaranteed societal minimum. Originally introduced in the context of universal health coverage,[386] such principle could provide a direction of travel to build an inclusive societal minimum, as well as set out basic parameters to gauge trade-offs.

401. Progressive universalism is anchored in four core considerations. First, it recognizes that while a significant expansion of social assistance is needed, its extent depends on country-specific factors (e.g., preferences toward redistribution, fiscal space, political economy, and implementation capacity). Second, the pace of scale-up matters: gradual, sequential expansions might be more realistic, especially for contexts with limited capacities. Third, as countries expand social assistance, those at the bottom of the distribution – who are intrinsically more difficult to reach – should benefit before or at least at the same time as others in society. Fourth, those at the bottom need to be supported adequately, meaning that they are likely to need more support than others. For example, average benefits represent between 13 and 18 percent of the poor's income or consumption in most developing countries. These amounts tend to be too modest to make a dent on poverty.

402. These basic considerations have important implications. For instance, they place a higher societal weight on minimizing exclusion errors among the poor rather than on reducing errors of inclusion of the better-off. Success does not necessarily entail that everyone in a country receives transfers – rather, it requires that the poorest and vulnerable do so. Therefore, progressive universalism demands information systems to prioritize those most in need.

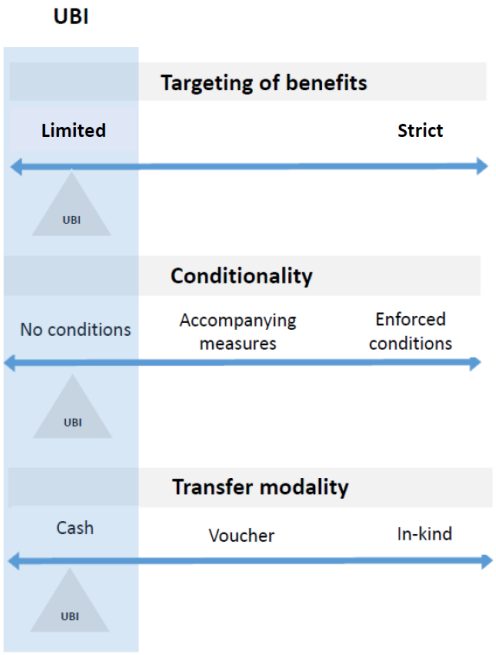
403. The idea of a Universal Basic Income (UBI) is a hotly-debated topic in thinking about how countries can build their guaranteed social minimum and overcome the challenges in current social assistance provision. For example, India's Chief Economic Adviser, Arvind Subramanian, predicted enthusiastically that "… I can bet, within the next two years, at least one or two [Indian] states will implement universal basic income".[387]

404. Part of the literature discusses the potential for UBI to provide emancipatory economic freedom in a world where automation ultimately leads to mass unemployment. UBI has also been explored as a vehicle to enhancing accountability and improving efficiency in governments' natural resource revenues. Another branch of literature examines how UBI fulfills the rights agenda. Arguably, most of the literature presents UBI as a platform for "welfare reform". Importantly, these distinct narratives imply different objectives for a UBI. To gauge the appropriateness of the program, it is important to clarify which goals it intends to pursue.

405. A UBI is the result of three radical design choices. First, the program is meant for every person independent of income or employment status. Second, it is provided in the form of cash, as opposed to in-kind transfers and services. Third, there are no conditions attached or reciprocal

responsibilities to be fulfilled by participants (figure 6.2). In addition, a UBI is intended for individuals, and not households, and it not supposed to be provided permanently.

Figure 6.2. Design features of a UBI



406. Other parameters can be set in varied ways. For example, a UBI can envisage limited transfers to supplement household income, to lift people out of poverty, or to meet additional needs. When transfers are modest in size, a UBI is more likely to be complementary to work. This is the version discussed in this essay. Instead, a more radical and contested option envisages UBI as a deliberate substitute for work. In addition to the size of transfers, other parameters of UBI design matter. For instance, a UBI can be provided as substitution for or in addition to existing welfare schemes; eligibility criteria can envisage a minimum (e.g., 18 years); and citizenship or residency requirements may also apply.

407. Theoretically, a UBI may be designed in a way that provides the same level of transfers to the entire population, and then recoups part of it through taxes. A similar approach is to directly provide more benefits to the poor and less to the rich. In other words, benefits would decline as incomes rise. This "tapering" can be achieved through a Negative Income Tax (NIT).[388]

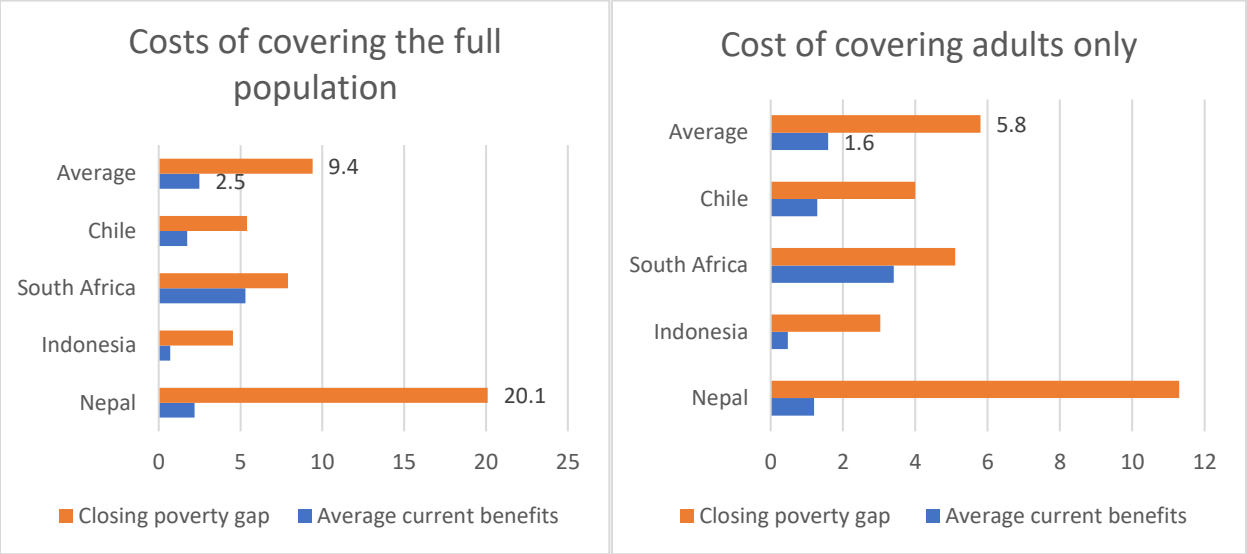
408. What do we know about how UBI works in practice? For the moment, a true UBI is largely a theoretical proposition. Only one country, Mongolia, had a short-lived UBI covering the entire population. The program lasted 2 years (2010-2012) before being downsized due to fiscal constraints. When mineral prices collapsed, so did the scheme.[389] Iran also had a program resembling a UBI for one year: in 2011, energy subsidies were replaced by cash transfers to 96 percent of the population.

409. Variants of a UBI are in place in a range of resource-dividend schemes.[390] The Alaska Permanent Fund, for example, is designed to redistribute oil revenues to all residents. In 2016, the Fund distributed about US$2,000 to 660,000 individuals. There are several small-scale schemes and experiments ongoing in Canada, China, Kenya, the Netherlands, and the United States.[391] These are labelled as UBI, but they are often variants of targeted programs.

410. While practical "proof of concept" is lacking, fiscal implications of a UBI could be significant. Recent analysis estimated the costs of providing a UBI in four European countries. UBI transfers were set equal to those of existing cash transfer programs.[392] Results show that the additional cost of a UBI varies significantly, i.e., 13.8 percent of GDP in Finland, 10.1 percent in France, 8.9 percent in the UK, and 3.3 percent in Italy. To cover the additional costs, two funding sources were identified: taxing UBI transfers alongside other incomes and abolishing existing tax allowances. In Finland and Italy, these measures were more than adequate to cover the extra costs of a UBI. In France, those revenues almost offset the cost of a UBI. In the United Kingdom, taxing cash benefits and eliminating tax allowances is not enough to cover for the UBI.

411. Simulations from developing countries also point to significant additional spending for a UBI. For example, in a handful of emerging economies a UBI set at 25 percent of median income would cost about 3.75 percent of GDP.[393] In comparison, today's low and middle-income countries spend on average 1.5 percent of GDP in social assistance. In India, the government's estimates show that a quasi-UBI excluding the top 25 percent could be largely paid by replacing existing schemes.[394] While the latter account for about 5 percent of GDP, results have been contested.[395] Other simulations are providing further evidence. For instance, the cost of a UBI for adults set at the average poverty gap level ranges from 11.3 percent of GDP in a low-income country like Nepal to 3 percent of GDP in Indonesia.[396] If transfer amounts are lower – for example set a at the average level of current benefits – costs would shrink considerably (but would have less impact). When also covering children, in Nepal the cost of eliminating poverty via a UBI would double (figure 6.3).

Figure 6.3. Simulated cost of UBI for different amounts in select countries (percentage of GDP)



Source: Preliminary results (Gentilini et al. 2018)

412. A UBI would generate winners and losers among the population. Effects depend on how the program is financed; if and which programs would be replaced; the performance of existing schemes; current tax structures; the size of UBI transfers; and the profile of beneficiaries.

413. At the margin, many winners from a UBI could be non-poor. For example, in Finland, France and the United Kingdom, lower-income households already receive income support under existing policies. Therefore, they would be less likely to gain if the UBI is set at similar levels. A UBI would instead tend to benefit those not qualifying for (or not taking-up) current social assistance benefits. In contrast, low social assistance coverage in Italy means that most individuals across income groups would receive higher transfers through a UBI. The individualized nature of UBI would also have distributional impacts. For example, many couples without children would gain from a UBI. By contrast, single parents at lower income levels may be worse-off. A UBI, which is often conceived for adults, may not provide additional support for children. It is important to note that these simulations do not consider the distributional effects from higher taxation nor potential work incentive effects.

414. Estimates for select developing countries that simulate replacing some existing schemes with a UBI also found significant distributional effects.[397] In Nepal, for instance, most individuals would experience gains from a UBI. In Indonesia, while a UBI providing the same average amount of benefits of current programs would make most of the population better-off, about 40 percent of the poor would get less benefits. Under the same scenario, simulations suggest that a UBI in South Africa make most of the elderly and the poor worse-off. A similar negative effect on about 40 percent of senior citizens would be observed in Chile.

415. A recurrent concern around UBI is the risk of work disincentives. In theory, a UBI only has an income effect: the fact that the program benefits are delinked from earnings or other income may suggest there is no substitution effect.[398] Available evidence confirms limited impact on work incentives. This holds for both UBI and other forms of social assistance.[399] A study on the Alaskan dividend program in the United States shows no impact on employment. Instead, it finds increases in part-time employment of 1.8 percentage points (or a 17 percent increase).[400] Yet, the size of the average transfers under the scheme is arguably too small to affect labor supply. Similarly, a study of the Iranian quasi-UBI program found that it did not affect overall labor supply.[401] There was a negative effect among youth, however. It has been argued that a UBI may empower individuals, both within households (e.g., 'making unpaid work pay') and in the labor market (e.g., the power to 'say no').[402] These emancipatory effects would likely require more generous benefit levels.

416. An important debate is whether a jobs-guarantee program would offer a better alternative to UBI. For example, India's National Rural Employment Guarantee Act offers 100 days of work per year at the minimum wage. UBI proponents contest public works on the basis that a 'right to income' should precede that of work.[403] Conversely, it is contended that the right to work rests on the premise that anyone who wants work could be offered one, but it does not impose a duty to work.[404] Those favoring jobs schemes also point to the range of productive and socially valuable activities implementable beyond labor-intensive tasks (e.g., social care services). A UBI may be an alternative to public works when their overwhelming function is mere income support. However, when works envision more meaningful activities, public works emerge as a complementary instrument for those with work capacity. The concept of 'participation income' is a hybrid between a UBI and public works. It envisions the provision of universal cash transfers tied to some form of civil engagement.[405]

417. As with other forms of social assistance, a UBI requires solid delivery systems. One requirement is a credible personal identification system. In Sub-Saharan Africa, the share of the population with national IDs ranges from nearly 90 percent in Rwanda to less than 10 percent in Nigeria. A UBI necessitates robust payment mechanisms and markets capable to meet additional demand from cash transfers. A UBI program would also call for carefully monitoring inflation, which was a major issue in the case of Iran. It would still need core delivery building blocks for social assistance, like outreach, registration, information systems, recertification, oversight, monitoring and evaluation, grievances and redressal mechanisms.

418. Would a UBI reduce errors of exclusion among the poor? If those errors are the result of errors in eligibility determination, a UBI may offer potential to overcome them. However, universal design does not ameliorate the barriers of information often faced by the poor; nor the constraints of not having IDs, accounts into which to receive payments, or being challenged by barriers of remoteness, literacy or language to get effectively enrolled. If the main constraint is fiscal cost, a UBI may amplify that bottleneck.

419. Could a UBI generate efficiency gains by reducing program fragmentation? Most countries layer together social assistance programs in a complex mosaic. For example, Bangladesh has over one-hundred programs. India has nearly 950 centrally-sponsored schemes, with many more provided at the state level. This plethora of programs usually has more historical or institutional roots than solid technical justification. Some degree of consolidation may be appropriate, but the

optimal number of programs is certainly more than one. The program composition of social assistance should allow for differentiated support to different vulnerabilities; as illustrated, a UBI offers flat benefits.

420. Many programs pursue multiple objectives beyond income support that could hardly be replaced by cash alone. For example, large scale food assistance interventions (e.g., school feeding) support low-income households, may encourage local production, enhance school attendance, and shield beneficiaries against inflation. Similarly, a UBI must not replace services in training, job search, social care, disability, health, education and other critical provisions; also, cash as a modality may not always be the more effective transfer modality in contexts of weak markets.[406]

421. In sum, which problems in building a social minimum would a UBI solve or exacerbate? By simplifying eligibility, UBI can expand coverage of the poor as well as of those vulnerable to labor market changes. However, some people at the bottom of the distribution may not be better-off with a UBI instead of current programs; also, UBI demands identification, payment mechanisms, and grievance redress for many more people than other options. Broader coverage and additional efforts would require a much-larger fiscal envelop. The wide reach of UBI programs is often posited to strengthen social contracts. As such, UBI can build support for the reforms or additional taxation that would be necessary for financing. But the political economy of UBI is vastly underexplored. Design choices should not be straitjacketed: whether and how to configure co-responsibilities, as well as what transfer modality to provide, should be based on societal preferences, evidence, and local conditions.

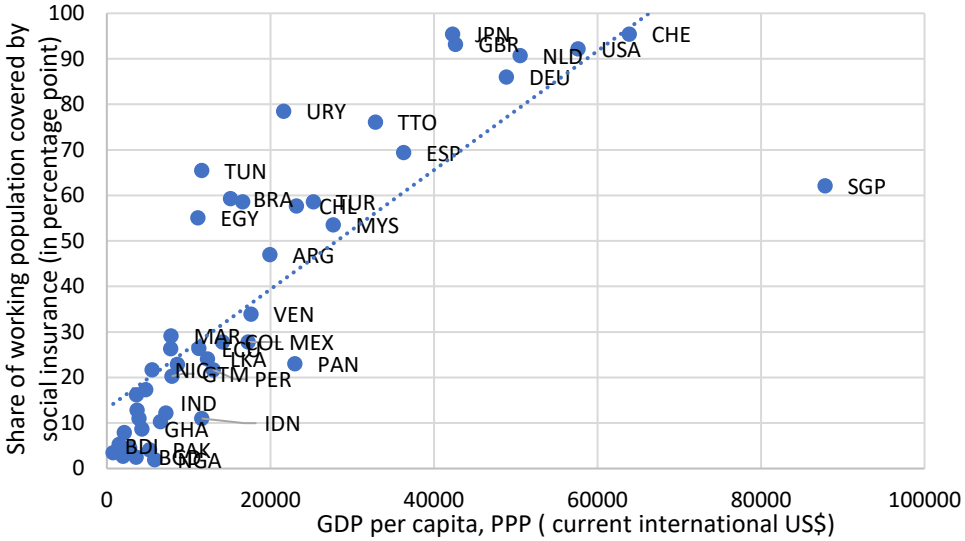
Social Insurance

422. After six years of double-digit growth, in June 2011 Ethiopia introduced a landmark social insurance law. For the first time, the mandate to provide pension and disability benefits was extended to private-sector firms. Firms operating beyond the reach of enforcement, where able to evade and keep their workers uncovered. The policy aimed to expand social protection and reduce poverty. However, the consequent rise in labor costs, together with other factors, induced firms to adopt more technology. As a result, employment among lower-skilled workers dropped, exacerbating the formal-informal divide in the labor market.[407]

423. Today's "Bismarckian" social insurance model – the one pursued by Ethiopia –is premised on steady wage employment, clear definitions of employers and employees, and a fixed point of retirement. It relies on levying a dedicated tax on wages. In rich countries, this scheme was effective in increasing coverage as workers were steadily absorbed into factories, then onto jobs in formal services firms. This contributory approach is ill-fitting for developing countries where formal, stable, and subordinate employment is not common. Indeed, because eligibility to coverage is based on making mandatory contributions, this form of social insurance excludes informal workers, who account for as much as two-thirds of workers in these countries. In India and in many countries in Sub-Saharan Africa, coverage barely reaches ten percent of the working population (figure 6.4). This model is also increasingly unsuitable for a changing world of work where the stability of long-term employer-employee relationships is no longer the norm, and where there are more risks and greater uncertainty. The traditional model of social insurance can also make

employing workers more expensive, as illustrated by the Ethiopia case. Thus, rethinking this model is a priority.

Figure 6.4. Coverage of social insurance in developing countries is low and stagnant



Source: Authors' calculations based on World Bank pension database and World Development Indicators.

424. A reformed system needs to ensure that low-income workers have access to effective risk management tools. The right combination of instruments, subsidized for the poorest, is required to cover losses from livelihood disruptions, longevity, sickness, disability and untimely death. Instruments that support stable consumption patterns, or consumption smoothing, are also important. A comprehensive package of protection can meet these goals. This package would contain, first, a guaranteed minimum insurance with subsidized coverage against impoverishing losses. This instrument would complement social assistance by providing coverage against losses that would be too large to cover through transfers. Second, a mandated savings and insurance plan can smooth consumption. Finally, market-based nudged or purely voluntary savings would allow people to make additional savings, if desired. Elements of this model already exist in many countries.

425. Attaining a universally accessible, comprehensive package of protection requires continued government-mandated participation for most and subsidized coverage for the poor. The mandate to participate ensures the most efficient risk pool. The redistributive and poverty preventing elements of this system could be separated from the rest. The former could then be financed through a broader tax than employment-based contributions. This would allow for this basic insurance to be extended to all people.

426. This approach can, along with a guaranteed minimum income, reduce the size and pure-tax element of mandated contributions. To varying extents, current social insurance models mingle redistribution with risk-sharing functions, and thus require higher contributions which are perceived by many mainly as taxes on work. The extent of redistribution built into current social

insurance schemes is low in countries like Indonesia or Vietnam, but is substantial in countries like China or the Philippines. Simulations suggest that a shift like the one proposed here could reduce the payroll tax rate in a country like the Philippines from 18 to 14 percent.[408]

427. Some countries are already moving in the direction proposed. The significant extension of the rural pension scheme in China is a case in point. Currently, around 360 million rural and urban informal workers are contributing to the scheme and around 150 million older people are receiving payments.[409] Similarly, Costa Rica's government covers part of the pension contribution for the self-employed. Subsidies could be for everyone, just for the poor, or be gradually reduced as income grows. The latter is the case in Turkey's health insurance system. In addition to an almost universal old age pension, Thailand pays part of the social insurance premium for working age people in the informal sector. The cost of the subsidy depends, of course, on the subsidy level as well as the population to be subsidized.

428. In richer countries and countries with mature social insurance systems, reducing the reliance on payroll taxes is difficult. Social insurance in rich countries is financed through payroll taxes. These systems – found also in Eastern Europe and the Southern Cone of Latin America - are mature and the size of their pension and health liabilities are formidable obstacles to change. In Romania, for example, the implicit pension debt is about 175 percent of GDP. As a result, other taxes would have to be increased dramatically to make up the financing gap that would arise with lower labor taxes. Most of these countries already have high rates of value added tax.[410] Therefore, while they have largely halted pension increases, most of the advanced economies are counting, at least partly, on future benefit cuts to deal with their aging populations. In some countries, like Brazil, pension deficits are already financed from general revenues.

429. In many emerging economies, social insurance liabilities are more limited since coverage is low. In countries like Bangladesh, Namibia, Lao PDR, Nepal, Somalia, and South Africa, pensions are not financed through labor taxes but from general revenues. In these cases, decoupling from payroll taxes may be feasible. A significant portion could be replaced with other taxes while broadening the coverage beyond those in contracted and regulated, standard employment relationships.

430. Yet, despite clear advantages, efforts to move away from a payroll tax-based model are often resisted. There are various arguments against a shift to general tax financing. Chiefly, a payroll tax is earmarked for social insurance; it also confers beneficiaries a sense of entitlement and, thus, ownership. It is argued that this feature better protects social insurance from political interference compared to financing through general revenues. That said, alternative sources of revenue can also be earmarked.

431. In sum, in richer countries it is difficult to move completely away from the contributory model based on dedicated payroll taxes. However, they seem to have prevented further liability increases through budget cuts and occasionally through earmarking other taxes.[411] Middle income countries may have more scope to replace part of their financing. Finally, the best chance for viable alternatives to payroll tax lies in low-income countries that have either not introduced it or where there is no significant liability. Here, relying on general taxation could lead to higher coverage rates for basic insurance with fewer labor market distortions. These are also the countries which

could use technology to leapfrog institutional developments through, for example, the use of mobile transactions as a base for consumption taxation.

432. Beyond the basic insurance level, additional policy support likely to be required to achieve adequate protection. Additional mandated contributions would allow consumption smoothing, for which instruments are often missing in countries with underdeveloped capital and insurance markets. This layer would cover formal workers, but setting the level of insurance is not trivial since a higher mandate leads to higher labor taxes. In some countries, these taxes are already high, which can affect formal employment. The average payroll tax rate used to finance contributions is almost 23 percent in advanced economies.[412] It is also more than 20 percent in countries like China, Egypt or Peru. The mandate could be relaxed by reducing the tax rate or lowering the ceiling on earnings subject to mandatory savings.

433. Once universally accessible coverage against impoverishing losses is in place, and a modest mandated plan ensures adequate consumption smoothing, governments are advised to proceed with a light touch. They can put in place incentives to increase private savings. They could also design savings programs in ways that make it more likely for people to participate in them.

434. For example, as an alternative to a mandate, policy makers have tried making participation in savings or insurance schemes the lowest-effort, default option. Some measures include adding an "opt-in" default on business registration and income tax returns. These measures can lower transaction costs.[413] Other approaches that rely on behavioural insights can be instructive. In Kenya, giving people a golden colored coin with numbers for each week to keep track of their weekly deposits doubled their savings rate.[414] Another form of nudging may include 'commitment devices' in which, for example, people agree to incur a loss if they do not reach a savings goal. Evidence from the Philippines shows that the strategy increased savings by 81 percentage points.[415] Technology vastly increases possible nudges. For example, it facilitates the defaulting of rounding from mobile money or credit card transactions into savings.

435. There are also larger, national efforts to nudge people – regardless of the way they work – to augment savings and insurance efforts. The "KiwiSaver" program in New Zealand, for instance, relies on automatic enrolment and offers a limited set of investment choices.[416] The United Kingdom's National Employment Savings Trust operates similarly.[417] In both programs, although people can withdraw, incentives dissuade people from doing so.

436. In countries that have mandatory savings, the mandate can be softened by allowing people to access a portion of their savings for fundamental life events.[418] Participants can be allowed to "borrow" from their individual account. Interest can be set at higher-than-market rates to encourage quicker "repayment". Singapore grants workers access to their mandatory savings for specific aspirational investments, such as housing and education. In the United States, individuals can draw on their individual savings accounts, although taxes dissuade many from doing so. The dilemma for policy makers is to balance individuals' liquidity preference with their long-term consumption smoothing objective.

Labor institutions

437. In many countries, labor regulations were adopted at the time of colonialism. Through Napoleonic conquest, French civil law was transplanted throughout Western Europe and the colonies in North and West Africa, Latin America, and parts of Asia. Repercussions are still felt today: French (and socialist) legal origin countries have significantly more stringent labor regulations than do common law countries.[419] These regulations are ill-fitting to many countries' labor markets. Designed with industrial economies in mind and at a time of weak social protection systems, they fail to protect most workers when informality is the norm. This is the case because most governments are unable to observe and regulate a substantial part of the economy. Within formal work, regulations favor full-time wage and salary employment. In many developing countries, these types of jobs are an exception, mostly found in the public sector or among high-skilled workers.

438. Reforms need to address three main challenges around labor regulations. First, they cover few, only formal workers whose labor is observed, regulated and taxed by the state. Yet, more than half of the global labor force is informal, and even in non-agricultural activities, close to seven in ten workers are informal or work on the informal sector in countries like Guatemala, India, Liberia and Pakistan.[420] Second, labor regulations try to do too much and act as a social protection system, including ensuring a minimum income or substituting for unemployment benefits. Third, and as argued in the World Development Report 2013, while they can address labor market imperfections, they can also act as a barrier to formal work and hinder dynamism. This happens especially when they are too strict as they can impose a high cost on firms as well as on society by excluding many, especially youth and the low-skilled.[421]

439. The social cost of protecting jobs is increasing with the changing nature of work: rapid changes put a premium on flexibility for firms to adjust their workforce, but also for those workers who benefit from more dynamic labor markets. Labor regulations set necessary rules —including core labor standards —and can encourage firms to invest in training or can increase workers' commitment to their jobs. However, they impose costs on firms that can hamper productivity.[422] In a sample of 60 countries, moving from the 20th to the 80th percentile in job security, in countries with strong rule of law, cuts the speed of adjustment to shocks in terms of employment by a third and reduces annual productivity growth by one percentage point.[423]

440. Technology adoption is negatively associated with the strictness of labor regulations, specifically with burdensome dismissal procedures.[424] Technology-intensive sectors are smaller in countries with stricter labor regulations.[425] More stringent regulations are also associated with lower entry and exit of firms—especially small ones—in industries with higher worker reallocation.[426] Within countries, similar evidence is also emerging.[427] The evidence on labor regulations shows limited impacts on overall employment, except in cases of very stringent laws. However, they can constraint formal employment and have important distributional effects. Importantly, at this time of change, stringent regulations make it costlier for firms to adjust the composition of their workforce, an important condition for adopting new technologies and increasing productivity.[428] Hiring and dismissal costs, in addition, are associated with longer unemployment spells and fewer moves between different types of work.[429]

441. The challenge is to establish the right balance between workers' protection—including protections for those without a labor contract— and firms' flexibility in the management of their human resources. The tensions are clear in efforts to introduce more flexible contracts, such as "mini-jobs" contracts in Germany, or zero-hours contracts in the United Kingdom.

442. To address these problems, policymakers need to rethink labor regulations. The flexicurity objective remains vital. Although many governments have made their labor markets more flexible, only a few are making corresponding investments in worker protections that facilitate the reintegration of workers back into work. Reforms can provide firms more flexibility while strengthening social protection, labor market programs and arrangements for expanding workers' voice. Beyond basic regulations, protections would be provided independently of work contracts as part of a comprehensive approach to social protection and labor institutions. This approach adds protection to the many workers—often the most vulnerable— who today are effectively excluded. Thus, this would be a shift from protecting some jobs to protecting all people.

443. One of the policies that needs careful attention is the minimum wage. The original objective of a legislated minimum wage was to ensure a fair remuneration to workers that protects them against abuse from employers when they have higher bargaining power due to limited competition. In this case, the minimum wage can even increase employment. However, in part due to weaknesses in the social protection system, the minimum wage has become a blunt instrument to ensure a minimum level of income. Yet, only a minority of workers across countries benefit from the minimum wage; informal workers do not. Even in correcting imbalances in market power, a legislated minimum wage is similarly blunt. It assumes that these imbalances are the same across the board and it is not responsive to changes in market power.

444. In most cases, the minimum wage applies uniformly to firms with very different levels of productivity, across regions and sectors, and can affect, depending on the level, (formal) job creation. As a result, many firms—65 percent of formal firms and 82 percent of informal ones in Paraguay, for example— have labor productivity levels that are below the minimum wage.[430] The minimum wage can also have important distributional impacts, adversely impacting youth, for example. This is an important issue as several countries set minimum wages at high levels: in low-income countries, minimum wages are, on average, 85 percent of the value added per worker; in middle-income and high-income countries, they are around 53 and 30 percent of the value added per worker, respectively.[431]

445. When thinking about alternatives or complements to minimum wages, a first step would be to align firms' and workers' incentives by tightening the link between labor productivity and wages. If the original objective of protecting workers against market power is prioritized, reforms can increase potential benefits of minimum wages. Governments can adopt formulas to guide adjustments to the minimum wage that give more weight to changes in productivity. Regulations can be kept simple and transparent; discretion can be reduced by having an independent body that periodically assesses the level of the minimum wage and its impacts.[432] In addition, governments can consider lower minimum wages for the kind of workers where it is more likely to have negative effects, such as young, first time job seekers.

446. The bargaining power of workers also needs to be strengthened. Labor unions—with a broader constituency and membership—play an important role. So does collective bargaining. Technology, including social media, can make this task for workers associations more effective. For larger firms, for whom there is evidence in advanced economies of increased labor market power, increased scrutiny could be applied to assess the potential adverse labor market effects of mergers.[433]

447. A more ambitious set of instruments would target, explicitly, the distribution of value added within the firm. Many workers—as sole traders, self-employed or workers in family businesses — are sharing in the profits of firms. Profit sharing—monitored by social partners and firm-level collective bargaining arrangements— can be an attractive alternative to the minimum wage for large firms, which employ most workers and for which the minimum wage is more likely to bind (because they are more likely to be formal). The proceeds from the profit sharing could be deposited into an individual savings account.

448. When rules on firms' hiring and dismissal decisions are too onerous, they can also create structural rigidities that carry higher social costs in the face of disruption. Bolivia, Oman and Venezuela, for example, do not allow contract termination for economic reasons, limiting grounds for dismissal to disciplinary and personal reasons. In 32 countries, the employer needs approval of a third party even in case of individual redundancies. In Indonesia, an approval from the Industrial Relations Dispute Settlement Board is required; in Mexico, the employer obtains approval from the Conciliation and Arbitration Labor Board; in Sri Lanka, the employer must obtain consent of the employee or approval of the Commissioner of Labor.

449. Firms could be accorded more flexibility in managing their human resources contingent on the law mandating proper advance notice and the presence of an adequate system of income protection as well as efficient mechanisms to sanction discrimination. More flexible dismissal procedures when current regulations are very stringent ought to be balanced with increased protections outside of the work contract and active policy measures to meet the needs of people who lose their jobs. Otherwise, reducing restrictions on hiring and dismissal decisions would shift an unmanageable risk-burden onto workers. The current approach, however, places too much of this burden on firms and not enough on the State directly. To prevent abuse, ministries of labor can implement audits based on the risk of violating the law and apply penalties on employers found at fault.

450. The provision of financial protection to workers in the case of livelihood disruptions can also be reformed. Severance pay is the most prevalent form of this protection in most low and middle-income economies that have not implemented unemployment benefit schemes. Some countries have, on paper, extremely generous severance pay. For example, after ten years of continuous employment, the statutory severance pay equals 132 weeks of salary in Sierra Leone; 130 weeks of salary in Mauritius, and 120 weeks of salary in Bahrain.

451. Yet, severance pay is an ineffective instrument for income protection since it pools risk at the firm or industry level where shocks can be correlated.[434] In addition, employees face a high risk of not receiving payments if their employers have liquidity constraints or go out of business. Placing greater reliance on unemployment benefits organized nationally would give workers more

reliable options, and would open this form of protection to all no matter where or how they work. To ensure sufficient protection while preserving work incentives, unemployment benefit systems would rely both on individual savings and redistribution.[435]

452. Savings could be drawn upon in case of unemployment or for retraining. If people do not draw on all their savings, the remainder would be available upon retirement. Workers without enough savings would be able to rely on the minimum income guarantee financed through general revenues. Chile and Jordan, for example, have individual savings accounts for unemployment. Singapore has individual accounts that can be used for unemployment, housing or education.

453. There is a wide variety of employment contracts. In addition to permanent and temporary employment contracts, there are part-time and on-call contracts, contracts for workers hired through temporary employment agencies. In addition, other forms of work, such as employee sharing, job sharing, and online work, are becoming more common. These contracts differ significantly in the degree of employment security, associated working conditions, and the types of benefits provided to workers. Hence, they distort firms and workers decisions.

454. As labor markets become more complex with new forms of work, the design of contracts can become simpler as to accommodate growing diversity. That is, rather than aiming to define in advance as many contracts as working forms emerge, policymakers can aim to define a single core contract resting on a set of uniform basic protections. These protections would include the areas discussed above, as well as core labor standards and protections in terms of work safety. Recent reforms in Italy and Slovenia are an example.[436] But uniform protections ought to be basic to foster job creation and support the economy in adjusting to the changing nature of work. Workers and employers, supported by strengthened collective bargaining structures, would then negotiate bilaterally benefits above those specified in the base contract.

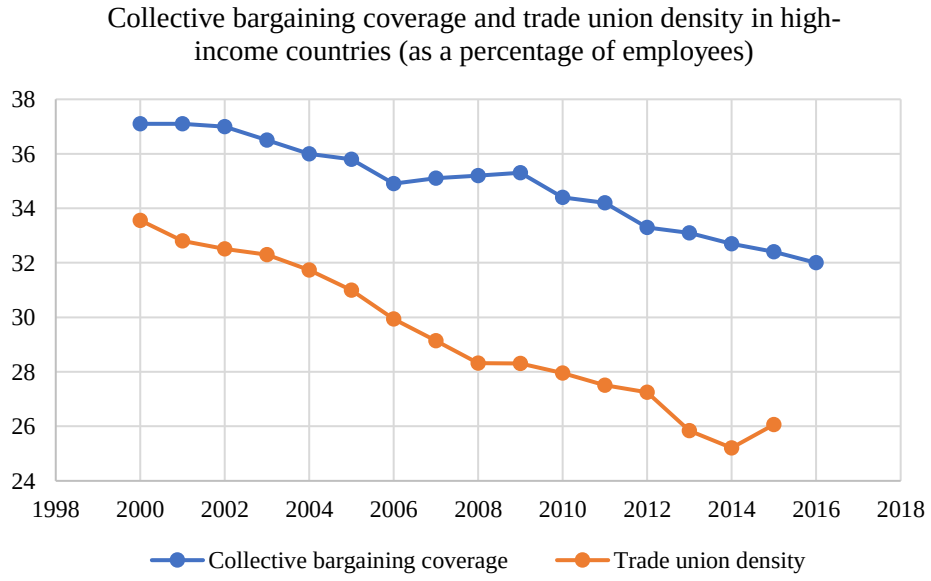
455. As a transition to a uniform core contract, governments would need to ensure that worker protections in the labor code are neutral with respect to working forms. Brazil's 2017 labor code reform moved in this direction. Any benefits that are part of the base contract would also be pro-rated depending on hours worked. A starting point is to do away with regulations that severely constrain flexible work arrangements. In Montenegro, for example, contracts for part-time employment cannot be less than 10 hours per week. In Serbia, the "reference" wage (determining a minimum social contribution) is not adjusted for hours worked.[437] Reforms are also necessary in terms of working time arrangements. The traditional 5-day, 8 hours per day work week is no longer desirable for some workers.

456. As the industrial-era employment protections are scrutinized, so too need to be rigid, possibly outdated laws regarding work arrangements. Some new forms of work blur the distinction between being an employee and being a "dependent" self-employed: is a Yandex driver a Yandex employee? Labor codes need to define more clearly what it means to be an employee in current labor markets to ensure the basic set of protections discussed above. This definition would be based, for example, on the extent to which the worker determined her working conditions (e.g. when to work). Generally, it is important to ensure convergence in the types of benefits and protections that workers receive, regardless of the length of time they spend with a given employer.

457. Some countries are reforming labor regulations in ways that support firms and workers in adapting to the changing world of work. Italy's recent reforms, for example, have been associated with the creation of more permanent jobs.[438] But many are not. Between 2007 and 2017, 99 countries initiated reforms in labor regulations. Approximately 48 percent of the reforms made labor legislation more flexible, and 52 percent enforced more job protections.[439] Notably, 21 countries made the use of fixed-term contracts more restrictive and 17 made severance pay costlier.

458. Finally, there is also a need to strengthen the enforcement of labor laws and mechanisms to expand workers' voice.[440] Unions and collective bargaining institutions remain important, especially at the level of the firm and given potential unequal changes in information and power. Moving to a simpler, core contract would also require strengthened collective bargaining structures as fewer protections are pre-specified in the law. But their significance is declining: On average across high-income countries, the share of workers covered by a collective agreement has shrunk from 37 percent in 2000 to 32 percent in 2015; 24 percent of employees are members of trade unions, down from 30 percent in 1985 (figure 6.5). In developing countries, given high informality, unions and collective bargaining tend to play a more limited role. Unionization rates vary from between 15 and 20 percent of workers in Brazil, Moldova, Senegal, or Tunisia to less than 10 percent of workers in countries like Ethiopia, Guatemala, Indonesia or Turkey. Countries like South Africa, where almost 30 percent of workers are estimated to be unionized and a similar share is covered by collective bargaining agreements, are an exception.

Figure 6.5. Coverage of collective bargaining and unions is declining in high income countries



Source: Authors' calculations, based on OECD Employment and Labor Statistics. Note: Figure covers OECD countries. Collective bargaining coverage is calculated among workers that have collective bargaining rights.

459. These institutions need to be updated to remain relevant, reflecting the diversity of working forms and giving much needed voice to old and new actors in the world of work. Including self-

employed and informal firms in the social dialogue, for example, would more accurately reflect the range of actors relevant for the future (and present) world of work. In short, countries need to build more representative structures to expand representation at the dialogue table beyond the traditional 'tri-partite' model. This model works well within the context of a firm, but less so at the national level where other groups with divergent interests exist. In some developing countries, such as Kenya and Uganda, the informal sector is organized and represented in many national discussions. India's Self-Employed Women's Association (SEWA) represents self-employed workers.

460. The most effective arrangements for achieving voice, may not necessarily be linked to the labor market. In the new "Duty of Vigilance" law in France, although not a prerequisite, any concerned party can request that a judge compels a company subject to the law to establish, implement, or publish a vigilance plan that establishes mechanisms to prevent human rights violations and environmental impacts throughout their production chain. Broader means for representation can address some of the political constraints that make labor reforms difficult.

461. Technology can strengthen voice. Digital technologies can improve today's systems which over-rely on labor inspectors. Digital technologies can bring down enforcement costs by more cheaply monitoring compliance with laws. In Brazil, the Annual Social Information report is used to monitor compliance with the Apprentice Law.[441] Oman has a Worker Protection Scheme that allows for monitoring wage payments.[442] Social media can play a role in voicing complaints about employers and working conditions, putting pressure on authorities but also on employers due to reputational risks. In addition, governments could, through results-based contracts, outsource to third-parties the development of online platforms for submitting, managing and resolving labor complaints.

462. Given the changing nature of work, as well as the need to improve workers' productivity, especially among the poor and informal workers, active labor market programs become even more central to policymakers' toolkit. Governments need to ensure that first time job-seekers, workers who lose their jobs, or those who are working on low productivity jobs have access to proper counseling, training, information about new job opportunities, job search assistance, and migration support. However, most low and middle-income countries spend little on active labor measures: about 0.5 percent of GDP. Only a fraction of the unemployed and inactive population has access to these services, particularly in rural areas.

463. Beyond the expansion of these support programs, it is important to get these interventions right. Many programs have a poor track record. For instance, among 90 youth employment programs that were rigorously evaluated only 30 percent had a positive impact on employment rates or earnings and the effect was small. [443] While impacts tend to be small in the short-run, these often increase with time as workers raise productivity or are absorbed in the labor market. A recent analysis of these programs also found that programs that emphasize human capital accumulation are particularly promising. So are also programs that focus on women or participants that come from long-term unemployment. [444] In judging their effectiveness, however, it is important to keep in mind what these programs can be reasonably expected to achieve, especially as they often target low-skilled workers in environments of limited labor demand.

464. Hence, there are two challenges that governments face regarding active labor market programs: increasing scale and improving the approach. There are emerging lessons from a range of successful programs that address these challenges. First, the importance of tailoring programs to the specific needs of individuals, recognizing that typical target groups of such interventions—such as youths or women—are far from homogenous. Second, countries need to consider moving from ad-hoc, self-standing, interventions, to an integrated package of services that can be adapted to needs. For example, the evidence suggests that in-classroom technical training for youths is more effective if combined with work experience in the form of internships or apprenticeships.[445] The Jovenes programs in Latin America and similar initiatives in Sub-Saharan Africa follow this model. Similarly, the combination of technical training with socio-emotional skills seems to also payoff, including among entrepreneurs. Given the changing skills demands in the labor market, these programs are likely to become increasingly relevant. Third, there is also a growing role for private non- and for-profit organizations in providing active labor services, depending on an assessment of needs. Private providers, paid for employment results, can provide the required support.

Chapter 7: Ideas for a New Social Contract

465. "I am the State" is how Louis XIV expressed his view of the social contract. At the other extreme, Lenin argued that "socialism can only take shape and be consolidated when the working class has learned how to run the economy and when the authority of the working people has been firmly established."[446] Not long after the revolution of 1917, ownership of all assets was transferred to workers and peasants.

466. The French Revolution and socialist movements, among others, have all been about a quest for a new social contract. The English *Magna Carta Libertatum* ("the Great Charter of Liberties") was an earlier attempt to protect individual freedoms against the King. Introduced in 1215, the document influenced the formulation of, among others, the Constitution of the United States. These documents, too, defined a social contract.

467. A social contract envisions the state's obligations to citizens and what the state expects in return. This basic conception has evolved over time. For much of history, social contracts have been imposed by force or threat of it. Rulers governed by the so-called 'divine law', wherein protection was provided in return for obedience. This idea was challenged in the 1600s by Thomas Hobbes and John Locke who embedded the relationship between state and citizens in rational thought rather than religion. A social contract imposes an obligation on citizens to respect and obey the state, in exchange for security.

468. In most societies, the obligation of the state extends beyond simply providing safety. It includes broad provisions around services, jobs, and public goods. More generally, expectations behind a social contract revolve around the notion of a fair society with protections for everyone's basic living standards. Governments set the parameters for a fair society where citizens can thrive.

469. Formal elements of social contracts are embodied in legislation debated in parliaments. In democratic societies, prior to such debates a wide consultative period engages academics, civil society organizations, political parties. If adopted, the implementation of legislation is financed by public budgets. The budget process involves another set of analyses, this time on the costs and benefits of proposed changes.

470. Recent examples of substantially new social contracts, or their elements, include Roosevelt's New Deal in the United States in 1933-35, the adoption of a new constitution in China in 1978, the Balcerowicz Plan in Poland in 1989, as well as the Hartz reforms in Germany in 2003. Cracks on current social contracts are already evident in, for example, the Arab Spring and the backlash against globalization reflected in rising protectionism. The changing nature of work makes it even more urgent to upgrade the social contract.

471. This chapter addresses two questions related to the changing nature of work: If the government is given a mandate to prepare a social contract, what could its basic ingredients be? Related, how could the state finance the package of proposed reforms so that these can be adopted? This exercise sets out a scenario that politicians could consider as part of legislative processes and national consultations involving multiple stakeholders. The package described here is not meant

to be exhaustive. Instead, the discussion lays out an illustrative menu of policies that could ignite a renewed societal dialogue.

472. The rationale for the social contract is fairness. As Jawaharlal Nehru, the first Prime Minister of India, warned, "... the forces in a capitalist society, if left unchecked, tend to make the rich richer and the poor poorer". Fears of losing jobs, climbing inequality in some economies, and failure to deal with informality in developing countries are straining the relationship between citizens, firms, and governments. At the same time, social media are rising aspirations, especially among youth. When met, aspirations can foster opportunity and prosperity. But when unfulfilled, they could lead individuals and countries down a track of frustration.

473. "The social contract is broken... there is a culture of not participating, of not caring, of silence", was one of the voices from areas affected by rampant insecurity in Mexico.[447] In many developing countries, a dysfunctional social contract may lead to exerting less demand on the state to improve public service provision. As a result, evidence from developing countries suggest that the middle class may sometimes "… send their children to private schools, use private healthcare, dig their own boreholes for water, and buy their own generators".[448] Ineffective public services impact the poor disproportionately: a cross-country review shows that in poor urban slums, average water prices charged by private vendors were 4.5 times higher than those by the public network elsewhere.[449]

474. The middle-class is key for ensuring better and more coverage of services, as both a tax-payer and benefit-receiver. Such involvement of the middle-class may reactivate demand for accountability and better service provision for the broader population, including the poorest.[450] Lack of trust in governments, however, can preempt those virtuous dynamics. For example, evidence from India has shown that farmers who trust the government are more willing to replace energy subsidies (which they benefit from) with reliable electricity provision (which they would pay for). In other words, even those with vested interests may be willing to support better policies when they trust government's provisions.[451]

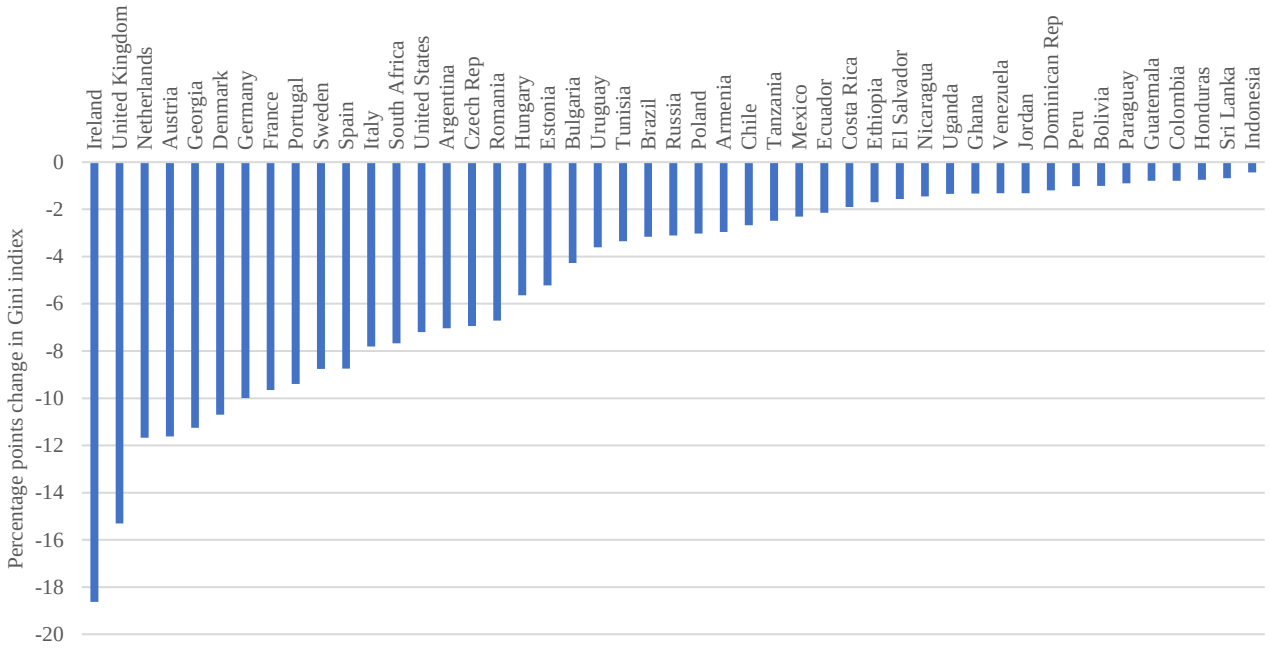
475. Ensuring equal opportunity is central to fairness, but mechanisms to achieve fairness often fall short – especially in developing countries. For example, countries are under-investing in early years, particularly among disadvantaged groups, and an unequal education system perpetuates inequality. In Latin America per capita government spending on children under 5 is one-third that for children 6 to 11. In Sub-Saharan Africa, only 2 percent of the education budget goes to pre-primary education.[452] Similarly, tax and social protection systems in developing countries redistribute income to a limited extent. This is because both revenue collection and social protection spending are low.

476. High levels of informality stymie social contracts. Informal employment is more than 70 percent in sub-Saharan Africa and South Asia, and more than 50 percent in Latin America. Informal workers are beyond the reach of the state with respect to provision, protection, and redistribution. However, they also miss the obligations to the state, for example in paying taxes. Informality can reflect a lack of trust in the state.[453] Evidence from Latin America shows that inequitable social spending, regressive social protection coverage, and inefficient tax regimes can break social contracts. When social contracts are found to be unfair or exclusive, informality can

become the opt-out option. In other words, high levels of informality can be the symptom as well as the cause of an unfulfilled social contract.

477. Redistribution of wealth is a mechanism through which social contracts can achieve equality of opportunity. The redistributive potential of a country depends on the size and composition of taxes and government spending, as well as their progressivity. For instance, in a sample of 30 developing countries, direct taxes and social transfers reduce income inequality by 3 Gini percentage points, while they reduce income inequality by 7 percentage points in the U.S., and 9 percentage points in the European Union (figure 7.1).[454]

Figure 7.1. Tax and transfer systems in developing countries have limited impact on inequality



Source: Euromod and Commitment to Equity database, and references therein.
Note: Difference in market income plus pensions and disposable income. Gini index ranges from 0 (perfect equality) to 1 (highest inequality).

478. Despite the recent positive trends, inequality remains high in many economies. New elements can be embedded into the social contract to promote equality of opportunity for people and firms. For people, this inclusion entails fostering job creation, as well as making early childhood investments. One estimate suggests that expansion of early childhood development in the United States could reduce inequality by 7 percent and increase intergenerational mobility of income by 30 percent.[455] Impacts are likely to be even higher in more unequal societies. In addition, it means providing a minimum guaranteed income as well as basic protection from rising risks.

479. Beyond some core elements which are needed by all, aspects of a social contract would need to be tailored to country needs. One clear area of customization relates to demographic trends. By 2050, more than half of global population growth is projected to occur in Sub-Saharan Africa. There, annual growth rates of working age population are projected to be over 2.7%.[456] In contrast, the populations of East Asia and the Pacific are rapidly-aging: more than 211 million people ages 65 and over live in this region, accounting for 36 percent of the global population in that age group. By 2040, the working-age population will shrink by 10-15 percent in Korea, China, and Thailand.[457] The social contract in Sub-Saharan Africa and South Asia would need to be particularly responsive to the needs of large youth cohorts entering the labor market. In Eastern Europe, social contracts emphasize relatively more care services; in East Asia - securing productivity.

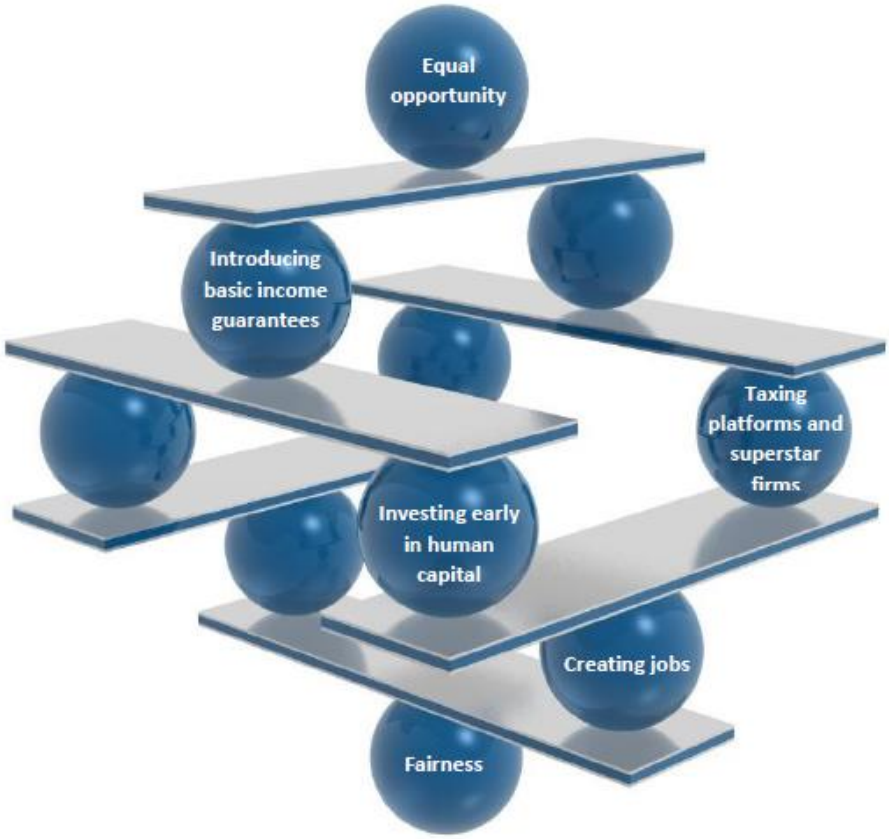
480. For firms, technological change—combined with globalization and other mega-trends—is exposing weaknesses in taxation and regulation systems. Digital platforms have emerged as a global economic force, but they do not pay taxes accordingly. A new social contract calls for a reflection on the international tax architecture to ensure that global firms pay their fair share of corporate taxes in every country they operate. The resulting additional revenues can also finance new elements of the social contract while improving redistribution.

481. A new social contract would also ensure open social dialogue with diverse actors: from small informal enterprises to superstar firms – and from informal self-employed workers to wage employers – different voices are emerging in the world of work. The social dialogue promotes this diversity. Social media tools open the door for engagement.

Possible Elements of a New Social Contract

482. Social contracts are wide-ranging. So are policies that could feed into them. This section discusses a set of elements that countries could consider when designing their social contract. The objective is to position options discussed in previous chapters within a broader societal framework. This scenario offers further insights on these elements should countries pursue them based on their preferences. Possible elements of a social contract could include: (i) creating jobs; (ii) investing early in human capital; (iii) taxing platforms and superstar firms; and (iv) expanding social protection to provide a socially acceptable minimum income and insurance (figure 7.2). The overall goal of these elements is to achieve equality of opportunity.

Figure 7.2. Elements of a social contract



Source: The authors' calculations.

483. Governments have an important role to play in promoting job creation. Most countries want a mix of policies to support enterprises, and large firms. However, a job creation strategy rests on two policies. First, support to large, highly-productive, and export-oriented companies. These firms are most likely to create the largest number of jobs. Since there are only a few of them in a country, it is easier to predict which ones are the most important engines of job creation. Possible policies include improving the general business environment, promotion of foreign direct investment, and infrastructure policies. More targeted industrial policies need to be undertaken with caution given concerns about political capture and fairness.

484. Second, governments can promote employment growth by supporting entrepreneurship. Young, start-up firms are important for innovation and job creation. The first step towards ensuring the existence of successful firms is to have start-ups. Easing business regulations is associated with start-up activity. For targeted policies, business plan competitions, preparation for equity investors, and export competitiveness projects are promising instruments to do this. Such instrument could be particularly useful in screening out the subsistence firms that have little chance of success.

485. Part of the jobs creation agenda includes reducing the cost of hiring workers. As a first step, countries can relax some of the most stringent labor regulations, especially those negatively

affecting low-productivity workers. This change could level the playfield between workers and capitalists while protecting all workers – not only the few in formal jobs. In many cases, labor regulations—centered around legislated minimum wages, constraints on hiring and dismissal decisions, severance pay and a limited set of contracts— make it expensive for firms to hire workers. For example, in Pakistan the maximum length of a temporary contract, including renewals, is 9 months. The minimum wage is twice the value added per worker (a rough proxy for average labor productivity) in Liberia or Zimbabwe. Third-party approval is needed in the case of the dismissal of even one worker in countries like Angola, Egypt, Honduras or Indonesia. These costs can be detrimental for many workers. Linking protections to how and where people work provides a false sense of security, including leaving unprotected most informal workers. Instead, more flexible labor regulations would come in tandem with enhanced social protection provided independently of the work contract.

486. In most countries, existing social contracts guarantee access to basic education. However, the changing nature of work necessitates a reexamination of this basic contract. On one hand, there is a clear decline in returns to low-skilled jobs. On the other hand, returns to higher order skills are increasing. This means that unless everyone has a fair shot at acquiring higher order skills, inequality will increase. In fact, given the changing nature of work, education is likely to be one of the strongest mechanisms for transmitting inequalities from one generation to the next.[458] A new social contract would level the playing field for skills acquisition. The most direct way to provide fairness is to support early childhood development. Guaranteeing that every child has access to adequate nutrition, health, education, and protection in early years ensures that they have the required foundations for developing skills in the future. As skills acquisition is cumulative, returns to early investments is the highest.

487. The changing nature of work makes basic literacy and numeracy essential. These skills are increasingly required for simply navigating life – for buying medication, for applying to jobs, for interpreting campaign promises. The ability to read and manipulate numbers lays the foundation for all future skills acquisition. Consequently, guaranteeing access to basic education is not enough - social contracts need to guarantee actual learning. For too many schooling does not translate into learning. Millions of children in low- and middle-income countries attend school for 4-5 years without acquiring basic literacy and numeracy. A new social contract needs to ensure that schooling leads to literacy and numeracy for all.

488. A social contract on early childhood development could comprise of two elements: (i) support the first 1,000 days of a child's life in terms of nutrition, health, and stimulation and possibly income support; and (ii) at least 1 year of quality pre-school for every child. Part (i) includes cash transfers for supporting deworming, immunizations, micronutrient supplementation and fortification; and community outreach for monitoring child outcomes, parental education, and support. For Part (ii) quality is as important as access because low quality pre-schools can cause harm. Quality pre-schools are those that emphasize age-appropriate curriculum and well-trained teachers and caregivers. These elements present an integrated package to ensure children receive basic standards of nutrition, health, stimulation, and protection in the early years. The package outlined above only includes basic ingredients towards this end. An enhanced package would add items such as pregnancy and birth assistance, child protection services, and investments in water and sanitation.

489. Some countries are already trying to deliver on this type of social contract. In Cuba's early childhood development program, children's growth and development are regularly monitored. At the beginning of each school year the education sector identifies families who need specific attention, to monitor and prevent any negative impact on child development. Similarly, Chile's *Crece Contigo* includes a *programa de acompañamiento familiar* that works with families, pregnant women and children under grade 4 who are in situations of health and social risk. France recently passed a law to ensure that all children have access to pre-school.

490. A social contract on literacy and numeracy would ensure that students master these skills by grade 3 (approximately age 10). Schools around the world expect students to acquire these skills by grade 3 because by this stage students need to read to access the rest of the curriculum. Children who cannot read by grade 3 struggle to catch up — eventually falling so far behind that no learning takes place whatsoever. The core ingredients of this element would include: (i) learning assessments at end of grade 3 to shine a light on those who are at risk; and (ii) early grade reading and math assistance for students in grades 1-3 who need additional support.

491. There are good models for supporting literacy and numeracy by grade 3. Research has shown that Early Grade Reading and Teaching at the Right Level interventions are cost-effective and scalable, even in resource-constrained contexts. In Liberia and Malawi, training teachers to better evaluate their students combined with additional materials significantly improved learning in early grades. In Singapore, students take simple screening tests at the beginning of grade 1, and those who are behind in reading receive additional support daily. These approaches are scripted and straightforward. They train teachers to assess their students through ongoing, simple measurement of their ability to read, write, comprehend and do basic arithmetic. Those who need additional support are provided this support through targeted activities and materials. Such models have been tested with success in contexts as varied as India, Ghana, Kenya, or Jordan, and form a basis of precise design and costing.

492. A social contract also requires all actors to contribute their due share in taxes across countries. This is not the case today. Many large digital platforms—for example, Taobao.com marketplace in China, and Jumia in Nigeria—are a case in point. It is estimated that in the European Union traditional companies have paid an effective tax rate of 23.2 percent, while digital companies pay on average only 9.5 percent in taxes.[459]

493. The platform economy makes taxation of these global firms difficult. Large digital businesses rely heavily on intangible assets (e.g. algorithms that facilitate personalized advertisement). They have few tangible assets (e.g. the largest "hotel", U.S. company Airbnb has no hotel rooms; Careem, the leading ride-hailing firm in the Middle East and North Africa region owns no cars). Also, they have sales that bare little relationship to where the company has a physical presence, and a significant part of their value is user-generated (e.g. social media).

494. These features may be particularly salient in digital platforms, but they are not unique to these firms. For example, pharmaceutical companies also have many intangible assets, and traditional exporters sale with no physical presence at destination. Estimates suggest that the level of assets sheltered in tax heavens is around 8 percent of global GDP.[460] This is estimated to cost around US$200 billion. The share of financial wealth held abroad ranges from more than 50

percent in Russian Federation and the Gulf countries, 30 percent in Africa and 22 percent in Latin America, to 4 percent in the United States or Asia. More recent estimates suggest that 45 percent of multinationals' profits are shifted to tax havens, causing a loss of 12 percent of global corporate tax revenues.[461]

495. International corporate taxation needs to be updated to keep up with the times. Corporate tax rules are more than a century old. They were devised for the pre-internet era, where physical presence in a country made sense as a base for taxation. In fact, corporate taxation laws were designed for a pre-globalization era where firms could not easily shift income around the world to minimize tax liabilities.

496. Given the preeminence of some of the large global digital platforms, it is not surprising that countries have started to put in place measures to more effectively tax them. The European Commission has recently released a proposal to tax the profits of the digital economy that are generated in member countries, even if a company does not have a physical presence there. The proposal focuses on taxing advertising from U.S. companies such as Google, the fees raised from users and subscribers to services such as Apple or Spotify, and the income made from selling personal data to third parties. An estimated 5 billion euros in revenues a year could be generated for member countries if a 3 percent tax rate is applied.

497. A global agreement on how to tax digital platforms and the strengthening of global rules around reporting are a way to ensure that all firms contribute their fair share. The implementation of the automatic exchange of financial information is an important step. In addition, all multinational companies could be required to publicly disclose, for each country where they operate, basic financial information, such as their sales, profit, taxes paid, and number of employees. These rules could be combined with national measures that strengthen local corporate tax laws and reduce the number of loopholes that allow firms to reduce their tax bill.

498. The new social contract would also include elements of social protection. Increased risks in the world of work make it imperative to adapt how societies protect workers. A new social contract could consider providing an inclusive minimum income, combined with basic universal social insurance, that is decoupled from how or where people work. Such minimum could take many forms. For example, it could be achieved through a multiplicity of programs or by expanding individual interventions. A Universal Basic Income (UBI) is one option that, while untested, could extend, with some modifications, familiar unconditional cash transfer schemes. Each of these modalities present different comparative advantages, fiscal, political, and administrative implications.

499. Low and middle-income countries have made significant headways in social assistance. For example, in Tanzania spending on conditional cash transfers increased tenfold between 2013 and 2016. The program currently reaches 16 percent of the population and claims 0.3 percent of GDP. Similarly, spending on conditional cash transfers in the Philippines grew five-fold over 2009-2015: the *Pantawid* program covers 20 percent of the population at a cost of 0.5 percent of GDP. These trends mirror the growth in categorical or age-based programs like the Child Support Grant in South Africa. Between 2001 and 2014, the scheme's coverage increased from 1 to 11 million beneficiaries, and absorbed from 0.2 to 1.2 percent of GDP, respectively.

500. Several challenges remain. For example, in high-income countries about 40 percent of benefits remain unclaimed, while in low-income countries over 80 percent of households in the bottom quintile are not covered by social assistance. More and better coverage of social assistance is needed so to provide an inclusive, guaranteed societal minimum. Current experiences offer a wide gamut of tested programs to be considered for scale-up. Other new interventions could also be part of the menu of options, such as a UBI or NIT. Whether existing or new, programs should share the notion of 'progressive universalism'. This principle deliberately aims at higher levels of coverage while ensuring that the poor would benefit more and before others in the scale up process. Where exactly in the income distribution one becomes a net beneficiary instead of a net payer is a choice that societies can make based on their preferences and capabilities.

501. In addition, social insurance systems that cover, for example, old age and disability pensions, are based on a standard employer-employee relationship with limited suitability for developing countries. New forms of work increasingly challenge this model also in advanced economies. As a result, informal workers can lack access to that kind of support. Also, the system is financed by labor taxes that raise the costs of hiring workers. As social contracts are reimagined, subsidizing a basic level of social insurance—especially for the poor— can be considered. Such reform could also reduce labor costs as the financing of the system is at least partly shifted away from labor taxes towards general taxation.

Delivering the New Social Contract

502. Technology leapfrogs a range of implementation challenges inimical to earlier attempts at equality of opportunity. In doing this, it expands the frontier of what is possible in policy. This has brightened the prospects for countries to implement the new social contract. These benefits, however, need to be interpreted in tandem with possible risks, especially in terms of privacy.

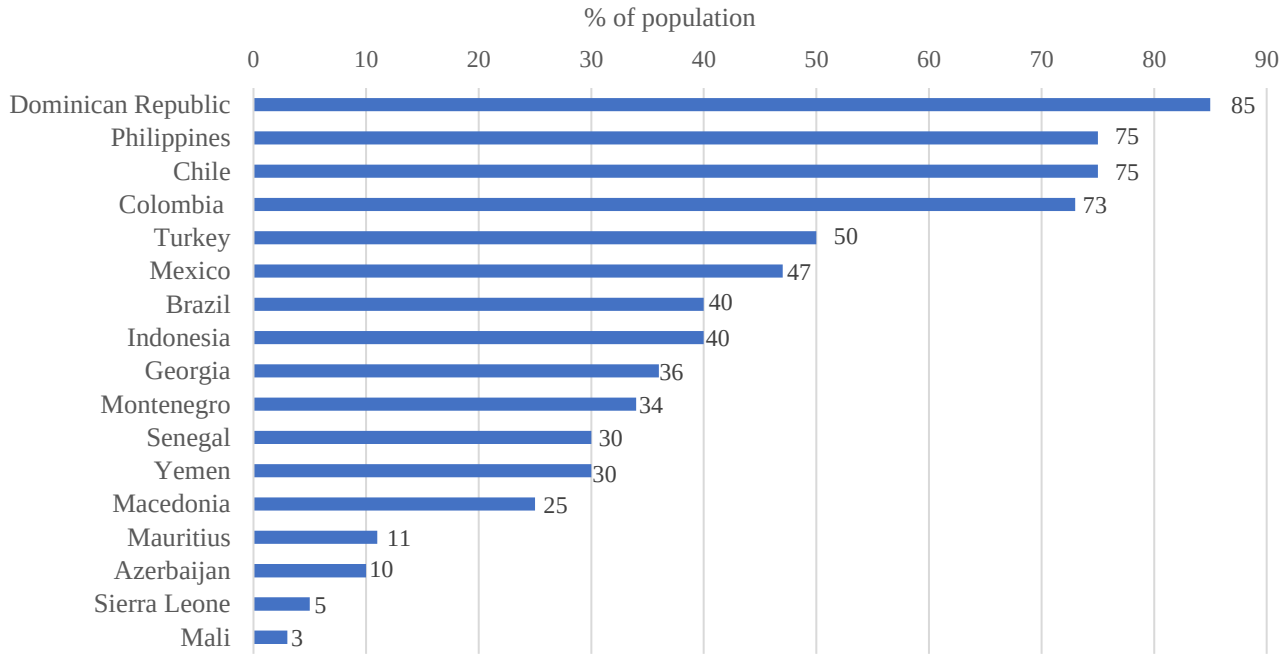
503. Technology broadens the reach and inclusiveness of social programs. In Mexico, geospatial mapping tools are used to identify the most vulnerable areas in cities, including at block-level. Mobile phone data was leveraged to construct poverty maps in Côte d'Ivoire. In Benin, GPS-based data collection located households living in urban settlements with no addresses. In France, a digital solution for a social pension program simplified application processes, with take up rates increasing between 22 and 50 percent. Technology can enable students to learn at their own pace. Sophisticated algorithms underpinning programs like Geekie in Brazil and Mindspark in India customize instruction to the level of the student.

504. Digital devices have also delivered assistance in fragile settings. In Lebanon, electronic smartcards provide food vouchers to nearly 800,000 Syrian refugees. In Jordan, the Read to Kids initiative provides refugees with free access to high-quality Arabic reading materials through a mobile application. When schools were closed during the 2014-15 Ebola epidemic, an emergency radio education program was launched in Sierra Leone providing academic broadcasting five days a week.

505. Costs can be reduced by technology. In Argentina, linking 34 social program databases with the unique ID number revealed inclusion errors in eligibility of various social programs. This led to US$143 million in savings over an 8-year period. In 2016, Thailand eliminated 660,000

applicants out of 8.4 million based on cross-checking databases using the unique national ID number. In Turkey, the Integrated Social Assistance System includes an automatic collection of data on applicants from 21 different databases (including civil registry, employment, vehicle, property, business registry), facilitation of data collection during obligatory home visits to all applicants, and preparation of case documents for the almost 1,000 local social assistance offices across the country. Similar impacts are observed in a range of other countries which have established social registries. However, the share of the population included in these databases varies by country, including from single digits to over four-fifths of citizens (figure 7.3).

Figure 7.3. Share of Population Included in Social Registries, Select Countries



Source: Leite et al. (2017).

506. Technology enhances accountability. In Romania, modeling techniques are used to profile social assistance beneficiary households and their likelihood to commit fraud or display erroneous data. This approach optimizes limited resources for spot-checks and investigations. Similarly, the Dominican Republic embeds machine learning algorithms in its socioeconomic data collection system to flag irregularities. Biometric verification systems to record attendance of teachers in Sindh, Pakistan, have uncovered large numbers of 'ghost' teachers. In Yemen, social media are used to solicit feedback on the emergency cash transfer program.

507. The sizable benefits of technology should be carefully weighed against its risks. For example, Equifax, a global information solutions company, lately faced a major cybersecurity incident affecting 145 million consumers in the Unites States. The event revealed the names, Social Security numbers, birth dates and addresses of almost half of the U.S. population.[462] India's flagship Adhaar system, which stores the biometric information of nearly every citizen, was

recently breached by unauthorised personnel: access to names, email addresses, phone numbers and postal codes was made available after paying for bribes.[463]

508. The scale of innovations makes it even more important to have legislation in place for personal data protection. Proper laws are often absent in low income countries. Rules for collecting and sharing personal data should be spelled out clearly. Such principles apply to existing schemes, and the stakes are even higher for programs with universal coverage. Thus, countries need to build capacity for enforcing data security.

509. The sophistication of technology should not exceed local capacities to properly manage it. This benchmark puts a premium on gradually testing and introducing solutions, maintain open communication channels with users, deploying context-appropriate technologies (e.g., higher-tech in cities versus lower-tech in remote rural areas with limited connectivity), establishing solid operational processes, and ensuring robust and scalable infrastructure. Such an approach can improve the ability of society to fully reap the benefits of technology while minimizing the risks.

Financing the New Social Contract

510. Simulations suggest that the component of the new social contract focused on foundational human capital, including investments in early childhood and support for literacy and numeracy by grade 3, would cost around 2.5 percent of GDP in low income countries and 0.8 percent of GDP in middle income countries. These are estimates based on unit costs of fully-costed models in low- and middle-income countries combined with data-driven assumptions on demographic structures and prevailing proficiency rates. These costs may vary across countries depending on programs already in place, demographic structures, input prices, and salary levels of program staff.

511. The lower cost for middle-income countries relative to low-income countries are driven by two factors. First, low-income countries are early in their demographic transitions, so they tend to have on average more children in ages 0 to 10 per capita than middle-income countries. Second, low-income countries tend of have lower proficiency rates in literacy and numeracy by grade 3 on average, leading to greater costs of remedial education. These cost advantages are mitigated to a small extent by higher unit costs (driven by higher salaries) in middle-income countries.

512. Nearly 93 percent of the total costs of the human capital component in low income countries comes from the early childhood investments. This is because these investments include a range of inputs considered crucial for providing integrated support in early years (immunization, deworming, micronutrient supplementation, community outreach for monitoring, education, and support, and pre-school). These investments need to be cover multiple dimensions - health, nutrition, and stimulation. Literacy and numeracy support is cheaper in comparison. It includes sample-based learning assessments for grade 3 literacy and numeracy, teacher training, and remedial education for students who are lagging (based on available data on proficiency rates).

513. The costing exercise for the human capital package of the new social contract involves three steps: (i) identifying the unit cost of each proposed element (e.g., cost of immunizations per live birth); (ii) identifying the number of beneficiaries for each element (e.g., number of children aged 0-1 that would receive immunizations); and (iii) calculating the total cost of each element

and the overall human capital component. Given that costs are likely to differ by country; estimates are provided for two scenarios, one low-income country (Mali) and one middle-income country (Colombia). Element-specific unit costs, are derived from rigorous studies of relevant in-country programs (e.g., unit cost of micronutrient supplementation documented by scientific trials in Mali and Colombia) if available. Alternatively, the most recent cost estimates that are appropriate for the country's income level (e.g., cost of deworming for developing countries globally) are considered. In addition, population data are sourced from United Nations World Population Prospects and GDP data from World Development Indicators.

514. The cost of enhancing social assistance to provide a guaranteed minimum would also vary considerably by context and design choices made (table 7.1). Simulations of a UBI serve the function of providing an upper-bound estimate. Currently transfers as a share of the poor's income or consumption are low, i.e., 13 percent and 18 percent in low and lower-middle income countries, respectively. Preliminary estimates for a handful of low and middle-income countries show that a UBI set at such a level would cost nearly 2.5 percent of GDP. However, the average level of current transfers does not lift most poor out of poverty. A UBI with a larger transfer to close the poverty gap, would cost almost 6 percent of GDP in middle income countries; in the poorest countries, the cost of a UBI that eliminates poverty would be double-digit.[464]

Table 7.1. Estimated Costs of Possible Elements of a Renewed Social Contract (% of GDP)

	Human Capital Package		**Social Assistance Package**	
Income Group	***Basic***	***More Comprehensive***	***Basic***	***More Comprehensive***
Low Income Countries	2.5		11.3	20.1
Lower Middle-Income Countries	1.1		3.0	4.5
Upper Middle-Income Countries	0.8		5.1	7.9
High Income Countries	0.3		4.0	5.4

Source: Authors, based on preliminary results (Gentilini et al. forthcoming; Zheng and Sabarwal 2018).
Note: The basic human capital package includes (1) supporting the first 1,000 days of a child's life in terms of nutrition, health, and stimulation and possibly income support; (2) at least 1 year of quality pre-school for every child; (3) learning assessments at end of grade 3 to shine a light on those who are at risk; and (4) early grade reading and math assistance for students in grades 1-3 who need additional support. The basic social assistance package includes UBI for adults set at the average poverty gap level. The more comprehensive social assistance package includes UBI for the full population set at the average poverty gap level. Estimates are based on a specific country for each country grouping. As such, results are meant to be indicative.

515. Embarking on such level of spending in low-income countries would be difficult. In those contexts, governments could expand coverage in line with their fiscal capabilities, continue to invest in enhancing delivery platforms and information systems, and do so within a strategy of progressive universalism. This would include measures that ensure that the poor are not excluded from interventions – for example, starting with more modest 'tapered' options that can increase coverage as capacities grow.

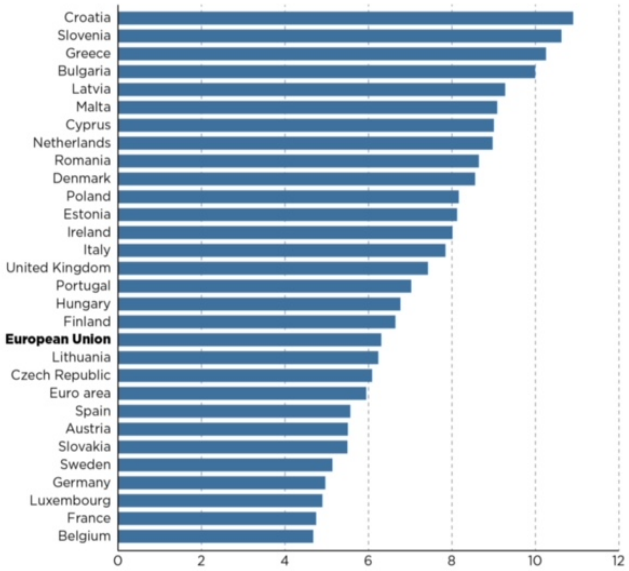
516. Other countries would be better positioned to consider more significant scaling-up options. However, the complexities around political economy of reform are likely to be particularly compelling in higher-income countries, as well as in middle-income countries with vast constellations of interventions like India. These efforts would need to be closely synchronized with social insurance.

517. Given the needs, a new social contract would require additional government revenues. A first potential source of revenue are excise taxes. For example, the average revenue from excise taxes on alcohol and tobacco in the European Union is 0.3 percent of GDP. However, several countries have larger dependence on such taxes: Estonia at 4.8 percent in 2016; Luxembourg at 2.5 percent; the Czech Republic, Ireland, and the Netherlands at about 1.5 percent. Saudi Arabia adopted excise tax regulations in 2017: 50 percent on soft drinks, and 100 percent on energy drinks, tobacco, and tobacco products. The "sugar" tax is a new phenomenon. Croatia has had such taxes on all sugar and coffee-based products since 2014. Ireland approved a "soda tax" set to start in mid-2018, which is around the same time a similar tax takes effect in the United Kingdom.

518. Another indirect tax gaining momentum is the carbon tax. Carbon taxes are in place in nearly every large economy apart from Brazil and the United States.[465] The median carbon tax in 2016 was US$8 per ton of CO2 emissions, with wide variance across countries. Sweden charges US$130 per ton, while Poland charges US$1 per ton.

519. Most carbon taxes with implications for greenhouse gas emissions in advanced economies are levied on energy products and motor vehicles, rather than directly on emissions. The run-up to the Paris climate change conference in 2015 provided momentum for the adoption of such taxes. The median carbon tax in advanced economies is about US$8 per ton of CO2 emissions, but the tax varies widely from US$130 per ton in Sweden to US$1 in Poland (figure 7.4). As of 2017, all 28 EU countries levy carbon taxes. Carbon tax revenues as a percentage of government revenue in the European Union started to rise in 2009, during the global financial crisis, and were equal to 6.3 percent of revenue in 2015. The ratio of environmental tax revenues to total revenue varies from over 10 percent in Croatia, Slovenia, and Greece, to about 5 percent in Belgium and France.

Figure 7.4. Share of Carbon Taxes in Total Tax Revenue, European Union, 2015



Source: Djankov 2017.

520. Japan phased in a carbon tax over five years from 2012 to 2016. In 2014, Chile and Mexico approved the first carbon tax in South America, starting with modest levies—US$5 per metric ton of emissions in Chile and US$3.50 per ton in Mexico. Although Brazil does not have a carbon tax yet, it levies taxes on fuels. In 2017, Brazil increased the gasoline tax from 12 cents to 25 cents per liter and for diesel fuel from 7 cents to 15 cents per liter at refineries. For ethanol, the tax rate increased from 3.8 cents to 4.1 cents for the producer, and 4.7 cents per liter for the distributors.

521. China and Korea have gone a different way: instead of imposing a carbon tax, they experimented with emissions trading systems in 2013 and 2015, respectively. An emissions trading system works by setting a cap on emissions and requiring emitters to hold a permit for each ton that they emit. The level of the cap determines the number of permits available.

522. China's new emissions trading system covers key industry sectors such as iron and steel, power generation, chemicals, building materials, papermaking, and nonferrous metals. It currently has seven pilot emissions trading systems, which combined form the largest national carbon pricing initiative in the world in terms of volume. Since the start of the pilots in Beijing, Guangdong, Shanghai, Shenzhen, and Tianjin in 2013, and in Chongqing and Hubei in 2014, the designs of some of these systems has evolved—their scope has expanded and their stringency has increased. For example, Shenzhen expanded its emissions trading system to include transport, Guangdong included buildings and transport, and Hubei added 49 large companies to its emissions trading systems. Korea imposed caps on emissions from 525 of the country's biggest companies, creating the second-largest market globally. The World Bank estimates that China's emissions trading systems are equivalent to charging between US$7 (Beijing) and US$2 (Shanghai) per ton, while the Korean emissions trading system is equivalent to charging US$9 per ton.[466]

523. For a third source of revenue, governments can ensure that platform and superstar companies pay their fair share of taxes. This would mean charging platform companies taxes equal to what other companies are paying. This is rarely the case. Evidence has surfaced for several cases where companies use tax havens or direct negotiations with governments to avoid taxation. Regulators with the European Commission are investigating whether Amazon and Apple are getting unfair support from countries such as Ireland and Luxembourg. Amazon attributed more than US$7 billion worth of sales to the United Kingdom in 2013, but paid only US$6.5 million in tax. Apple uses an accounting technique known as the "Double Irish With a Dutch Sandwich", which reduces taxes by routing profits through Irish subsidiaries and the Netherlands and then to the Caribbean.[467] Google channels most of its European revenue through a subsidiary in Ireland. Google, which generated more than US$4.5 billion from the UK in 2014, paid just over US$28 million in corporation tax. On average, Apple, Facebook, Amazon and Google have paid less than one percent tax on corporate earnings in the United Kingdom in 2014.[468] More generally, the U.S. Government Accountability Office estimates that the tax code allows corporate deductions, credits, and deferrals to the tune of US$180 billion a year, or about 40 percent of the actual corporate income tax revenue. More than half of U.S. business activity, measured by sales, is conducted by pass-through entities, which do not pay taxes. It is estimated that almost half of multinationals' profits are shifted to tax havens, causing a loss of 12 percent of global corporate tax revenues.[469]

524. The European Commission's recent proposal to tax the profits of the digital economy is expected to raise around 5 billion euros per year. Eliminating this preferential tax treatment to

platform companies and reducing the possibility for these companies to seek special treatment will go a long way towards financing a new social contract.

525. Fourthly, governments can raise revenues through the value-added tax (VAT). Such taxes do not distort productive activity. They do not penalize the most successful companies and individuals. They are also easier to collect than many other taxes. Not surprisingly, thus, value-added taxes are a significant share of government revenues globally. The value-added tax can be regressive, however, as the poor spend a larger share of their income on consumption than the rich. That said, this is not necessarily the case: among advanced economies, consumption taxes are regressive when measured as a percentage of household income, but are generally either proportional or slightly progressive when measured as a percentage of household expenditure.[470] In many advanced economies basic food products like milk, bread, and some medical products are exempt from the value added tax, to ensure that the poor can buy these necessities. Among advanced economies, France has the most generous value added tax exemptions scheme.

526. The average value added tax rate in advanced economies in 2017 was 19 percent, with the United States the only OECD country without a value added tax. China implemented a value added tax in 1994 and currently collects nearly 48 percent of its revenues from it. The main rate is 17 percent with a number of exceptions where the prevailing rate is set at 13 percent. Russian Federation charges an 18 percent value added tax, while Brazil charges a base value added tax of 17 percent, and some Brazilian states add a percentage point or two above that base.

527. The largest change in value-added taxation is taking place in India, where a nationwide tax at 18 percent, known in India as the goods and services tax, replaces over a dozen excise duties, services taxes, and interstate customs duties and surcharges, as well as the state-level value added tax and the interstate entry tax, which are charged as goods cross state borders in India. Of India's 29 states, 22 have already approved the tax legislation and are scrapping tax and customs checkpoints to comply with it.

528. For countries that do not have a value-added tax, introducing one would be a first step. This is the case of Angola, Liberia, Maldives and Myanmar, for example. These countries would follow India and the Kingdom of Saudi Arabia which recently introduced a national level value-added tax.

529. For countries that already have a value-added tax, closing tax exemptions and converging toward a uniform tax rate, could raise significant revenues. In countries like Costa Rica, Honduras, the Dominican Republic and Uruguay, for example, tax expenditures related to the value-added tax are estimated to cost more than 3 percent of GDP.[471] In Vietnam, moving to a uniform VAT rate of 10 percent and significantly narrowing the list of exemptions could increase tax revenues by 11 percent.[472] Additional revenues are likely to come not only from higher taxes on goods or services under 'preferential' rates, but also from higher collection rates overall as the simplification of the system can improve the efficiency of the system.

530. Importantly, eliminating reduced VAT rates and VAT exemptions does not need to be regressive. Simulations for four low and middle-income countries—Ethiopia, Ghana, Senegal and Zambia— show that, although preferential VAT rates reduce poverty in those countries, they are

not well targeted towards poor households overall. As a result, a UBI funded by 75 percent of the revenue gains from a broader VAT base —despite being completely untargeted—would create large net gains for poor households and reduce inequality.[473] Similar results have been obtained in more advanced economies.[474] Preferential rates on food or energy, often introduced to support the poor, do provide a proportionately greater benefit to the poor than to the rich. However, often, rich households benefit vastly more in aggregate terms than poor households. Preferential rates introduced with other objectives, as when lower rates are applied to books or hotel accommodations, are, in fact, regressive.

531. Finally, the elimination of energy subsidies is also a potential source of financing. Spending on such measures is generally regressive. For example, in low and middle-income countries, the poorest 20 percent benefit from only 7 percent of fuel subsidies while the richest 20 percent enjoy 43 percent. Also, spending on energy subsidies is substantial. In 2016, global energy subsidies reached US$260 billion. Pre-tax subsidies constitute over 10 percent of GDP in countries like the Kyrgyz Republic, Venezuela and Zimbabwe, and around 5 percent in the Republic of Congo, Lebanon, Mozambique, Saudi Arabia and Ukraine. When incorporating foregone tax revenues and negative externalities associated with higher energy consumption, subsidies could exceed 15 percent of GDP in countries like China, Mongolia, Russian Federation, and Uzbekistan.

532. Many countries have taken the opportunity of low fuel prices to reform those subsidies. While these measures are generally regressive, their removal without compensatory measures could affect low-income households negatively. A review found that in only 9 out of 28 cases, reform episodes were compounded with the provision of safety nets. This is starting to change. Successful energy subsidy reforms in Iran and India, for example, were accompanied by cash transfers – including with near-universal provision in the case of Iran. In addition, recent studies showed that in 7 out of 11 reform cases, commitments to reform energy subsidies were combined with an expansion of social safety nets. These include countries like Bangladesh, Egypt, Indonesia, and Jordan.

Consultations and Timetable

533. Simeon Djankov and Federica Saliola are co-Directors of the 2019 WDR. The core team comprises Ciro Avitabile, Rong Chen, Davida Connon, Ana Paula Cusolito, Roberta Gatti, Ugo Gentilini, Asif Mohammed Islam, Aart Kraay, Shwetlena Sabarwal, Indhira Vanessa Santos, Consuelo Jurado Tan, and Yucheng Zheng. Michal Rutkowski, Senior Director for Social Protection and Jobs Global Practice, provides overall guidance.

534. The WDR team is engaging in strategic consultations with: World Bank staff, Governments, Executive Directors and advisors, bilateral development partners, international organizations, civil society organizations, and leading researchers.

535. The Board discussion of the Concept Note was held on February 13, 2018. The Bank-wide review of the Yellow Cover draft is planned for May 14, 2018; the Board discussion of the Gray Cover draft for July 10, 2018. WDR 2019 will be launched in October 2018.

Notes

[1] Marx 1867.
[2] Keynes 1931.
[3] Alden and Taylor-Kale 2018.
[4] Djankov et al. 2002 ; Goldberg et al. 2010.
[5] Ravallion, Martin 2014.
[6] Ferreira, Firpo, and Messina 2017.
[7] Calvo, López-Calva and Posadas 2015.
[8] This is a sum of various available statistics: 57.3 million in the United States, 1.4 million in the United Kingdom, 10 million in European Union, 15 million in India. These countries or regions are where freelancing is booming. The aggregated number reflects a sizable portion of the global freelancer workforce.
[9] Edelman Intelligence. 2017. "Freelancing in America: 2017". Washington, DC.
[10] Institute on Taxation and Economic Policy 2017.
[11] Freund, Mulabdic and Ruta (2018).
[12] GSMA 2018.
[13] eBay 2013.
[14] Chen and Xu 2015.
[15] R.A. McKinley, 1958. *The City of Leicester: Social and administrative history, 1660–1835*, A History of the County of Leicester: volume 4: The City of Leicester (1958), pp. 153.
[16] Kunhua Zeng, The History of Chinese Railway, 1923, p.31.
[17] Maloney and Molina, 2016.
[18] Kate Taylor. 2016. "Fast-food CEO says he's investing in machines because the government is making it difficult to afford employees," *Business Insider*, March 16.
[19] Acemoglu and Restrepo, forthcoming.
[20] International Federation of Robotics.
[21] Chan, Jennifer. 2017. "Robots, not humans: official policy in China." *New Internationalist*, November 1. https://newint.org/features/2017/11/01/industrial-robots-china.
[22] 孙宏超. 2017. "蚂蚁金服彭蕾联合国演讲：倡议建数字金融创新小组." 腾讯科技. http://tech.qq.com/a/20170919/031275.htm?pc
[23] SPERI. 2016. "UK manufacturing decline since the crisis in historical perspective." SPERI British Political Economy Brief No. 25. http://speri.dept.shef.ac.uk/wp-content/uploads/2016/10/Brief-25-UK-manufacturing-decline-since-the-crisis.pdf
[24] Hallward-Driemeier and Nayyar 2017.
[25] Van Wagenen, Juliet. 2018. "Intel's Driverless Car Unit Deepens City Data with Transit App Collaboration." *StateTech*, February 21. https://statetechmagazine.com/article/2018/02/intels-driverless-car-unit-deepens-city-data-transit-app-collaboration.
[26] Hao, Karen. 2017. "The latest fake town built for self-driving cars has opened in South Korea." *Quartz*, November 6. https://qz.com/1121372/south-korea-opens-k-city-the-latest-fake-town-built-for-self-driving-cars/. Min-hee, Jung. 2017. "K-City World's Largest Test Bed for Self-driving Cars to Be Opened in Korea." *Business Korea*, May 8. http://www.businesskorea.co.kr/english/news/sciencetech/18018-k-city-world%E2%80%99s-largest-test-bed-self-driving-cars-be-opened-korea.
[27] Gref, Herman. 2017, September 25. Speaking at the Council on Legislative Support for the Development of the Digital Economy under the Chairman of the State Duma. http://special.tass.ru/ekonomika/4590924.
[28] John Maynard Keynes, 1930. *Economic Possibilities for our Grandchildren*, in Essays in Persuasion (New York: Harcourt Brace, 1932), 358-373.
[29] An algorithm was then used to extend that sample to categorize the remainder of the 632 US occupational categories based on their task make-up. Where the probability of automation was greater than 0.7, that occupation was considered at risk. Frey & Osborne 2017.
[30] Artnz et al. 2017.
[31] World Bank 2016a.
[32] World Bank 2018b.
[33] Aspin and Chapman 1964.
[34] Gregory et al. 2016.
[35] Digital Economy Promotion Agency (DEPA)
[36] IDC 2017. "IDC Forecasts Long-Term Growth for Middle East & North Africa Enterprise Application Software Market as Demand Shifts Towards Cloud Solutions." *IDC Research Press Release*, October 17. https://www.idc.com/getdoc.jsp?containerId=prCEMA43164217&pageType=PRINTFRIENDLY.

[37] GrowthEnabler 2017. “Market Pulse Report, Internet of Things (IoT).” April. https://growthenabler.com/flipbook/pdf/IOT%20Report.pdf.
[38] Washenko, Anna. 2016. “App store revenue to exceed US$101B by 2020; music apps are key.” *Rainnews*, February 11. http://rainnews.com/app-store-revenue-to-exceed-101b-by-2020-music-apps-are-key/.
[39] Lohr, Steve. 2017. “Start-Up Bets on Tech Talent Pipeline From Africa.” *New York Times*, October 17. https://www.nytimes.com/2017/10/10/business/andela-start-up-coding-africa.html.
[40] UNCTAD 2015.
[41] UNESCO Institute of Statistics.
[42] World Health Organization 2016.
[43] Brambrilla, Irene, and Dario Tortarolo. 2018. “Investment in ICT, Productivity and Labor Demand: The Case of Argentina.” Policy Research Working Paper 8325, World Bank, Washington, DC.
[44] Akerman, Gaarder and Mogstad 2015.
[45] Autor and Dorn 2013 for the United States and Michaels et al 2014 also for Europe and Japan.
[46] Autor 2014.
[47] Gorka et al. 2017.
[48] For East Asian countries, see Mason et al 2018. For others, see World Bank 2016.
[49] Autor et al. 2015.
[50] Almeida et al. 2017.
[51] Valerio et al. 2015a and 2015b; Ajwad et al. 2014a and 2014b; Bodewig et al 2014.
[52] Valerio et al. 2015a and 2015b.
[53] Arias et al forthcoming.
[54] Xubei, Luo. 2017..
[55] 阿里研究院, 阿里新乡村研究中心. 2016. “中国淘宝村研究报告： 淘宝村新突破.” 北京：阿里研究院.
[56] Upwork. 2018. “New report finds majority of companies are embracing remote teams, yet more than half lack a remote work policy.” *Press Release*, February 28. https://www.upwork.com/press/2018/02/28/future-workforce-report-2018/.
[57] SM Abrar Aowsaf. 2018. “The cost of getting paid.” Dhaka Tribune, March 01. http://www.dhakatribune.com/business/2018/03/01/cost-getting-paid/.
[58] Eurofund 2017.
[59] OECD.stat. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=TENURE_FREQ, accessed 04/18/2018.
[60] Pew Research Institute. 2014. “Middle Easterners See Religious and Ethnic Hatred as Top Global Threat.” http://www.pewglobal.org/2014/10/16/middle-easterners-see-religious-and-ethnic-hatred-as-top-global-threat/
[61] Latinobarometer Data analysis, available at http://www.latinobarometro.org/latOnline.jsp
[62] Hoy and Mager 2018. https://taxpolicy.crawford.anu.edu.au/sites/default/files/publication/taxstudies_crawford_anu_edu_au/2018-01/complete_hoy_mager_jan_2018.pdf
[63] McKenzie and Paffhausen 2017.
[64] Eden and Gaggl 2015.
[65] World Bank 2016b.
[66] World Bank. 2018. Overcoming Poverty and Inequality in South Africa: An Assessment of Drives, Constraints and Opportunities. Washington, DC: World Bank.
[67] Montenegro and Patrinos 2014.
[68] Nelson and Phelps 1966.
[69] Foster and Rosenzweig 1996.
[70] World Bank 2013.
[71] Azavedo et al. 2012.
[72] Lenin 1918.
[73] This Chapter is based on Kim 2018.
[74] Authors’ calculation based on World Values Survey Wave 6: 2010-2014.
[75] Pew Research Center 2014.
[76] World Bank 2018a.
[77] Wang et al. 2016.
[78] Kontis et al. 2017.
[79] Black et al. 2017
[80] Lipina et al. 2005; Noble et al. 2005; Fernald et al. 2012.
[81] World Bank 2018a.
[82] Smith 1776 as reported in Goldin 2016.
[83] Psacharopoulos and Patrinos 2018.

[84] Chetty, Friedman, and Rockoff 2014.
[85] Behrman and Rosenzweig 2004.
[86] Dillon et al. 2014.
[87] Ahuja, Baird, Hicks et al. 2015.
[88] Belot and James 2011.
[89] Sandjaja et al. 2013.
[90] Cook, Dodge, Farkas et al. 2014.
[91] Flabbi and Gatti 2018.
[92] Ahuja, Baird, Hicks et al. 2015.
[93] Currie and Moretti 2003.
[94] Andrabi et al. 2012.
[95] Hsieh and Klenow 2010.
[96] Jones 2014.
[97] Rocha, Ferraz, and Soares 2017.
[98] Castello-Climent and Domenech 2014.
[99] Gill, Revenga, and Zeballos 2016.
[100] Azevedo, Inchauste, Olivieri et al. 2013.
[101] Psacharopoulos and Patrinos 2018
[102] Foster and Rosenzweig 1996.
[103] Hanson 2007.
[104] Baptist and Teal 2014.
[105] Caselli and Coleman 2006; Li et al. 2017.
[106] Maloney and Valencia Caicedo 2014.
[107] Deming 2017.
[108] Heckman, Stixrud, and Urzua 2006, for developed countries; Acosta, Muller, and Sarzosa 2015, for Colombia.
[109] Dillon et al. 2017.
[110] Larreguy and Marshall 2017.
[111] Knack and Keefer 1997.
[112] Cavaillé and Marshall 2017.
[113] Lochner and Moretti 2004.
[114] De Hoyos et al. 2016.
[115] Blattman, Jamison, and Sheridan 2017.
[116] Background analysis for World Bank 2017 "The Toll of War: The Economic and Social Consequences of the Conflict in Syria". The number of children not in school between 2011 and 2017 is based on estimates of actual declines in school enrollment relative to pre-war trends and on the assumed impact war posed on student enrolment. The scenario from 2018 onwards explores the long-term consequences of these trends by assuming that school enrollment rates gradually return to pre-war trends and corrects for population dynamics of refugee in-and-out flows; if they follow similar behaviors of past international conflicts. Similar assumptions are also made for Internally Displaced Persons but with higher return rates during the first few years of the end of the war.
[117] Davies 1962.
[118] Campante and Chor 2012; Courbage and Todd 2007; Noland and Pack 2007.
[119] Chioda and Maloney 2017.
[120] Bhatia and Ghanem 2017.
[121] Evans, Holtemeyer, and Kosec 2018.
[122] Fetzer 2014.
[123] Preliminary results from World Bank impact evaluation of the NVSP, 2018.
[124] Heckman et al. 2010.
[125] Ministry of Finance, Government of India, 2018.
[126] World Bank poverty estimates 2017. Retrieved from PovcalNet at http://iresearch.worldbank.org/PovcalNet/povDuplicateWB.aspx.
[127] Blanford et al. 2012.
[128] Ferre and Sharif, 2014.
[129] Baird, Mcintosh, and Ozler 2016.
[130] Gine, Karlan, and Zinman 2010.
[131] World Development Indicators based on data from United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics and World Health Organization Global Health Expenditure database.
[132] UNICEF 2015.

[133] UNICEF 2015.
[134] Balarajan et al. 2011.
[135] Leventhal and Brooks-Gunn 2000.
[136] Van den Berg et al. 2014.
[137] Chetty and Hendren 2018.
[138] Analyses based on ongoing research by the World Bank and partners (e.g., Altinok, Angrist, and Patrinos 2018).
[139] Cunha and Heckman 2007.
[140] See Currie and Almond 2011 for a review of the literature.
[141] UNICEF, WHO, and World Bank 2017.
[142] Prevalence adjusted for differences in population age structures. Global Burden of Disease Pediatrics Collaboration 2016.
[143] Psacharopoulos and Patrinos 2004.
[144] Gertler et al. 2014.
[145] Fixsen et al. 2005.
[146] Fusheini et al. 2017.
[147] World Bank 2015.
[148] Bold et al. 2017.
[149] Estimates from 2012 Kenya and 2015 Nigeria Service Delivery Indicator data.
[150] Sabarwal et al. 2017.
[151] Gertler, Giovagnoli, and Martinez 2014.
[152] Björkman Nyqvist, de Walque, and Svensson 2017.
[153] Joshi and Gaddis (Eds.) 2015.
[154] Westhorp et al. 2014.
[155] Macdonald and Vu 2018; Patrinos 2016.
[156] Brinkman et al, 2017.
[157] UNESCO 2017.
[158] Mikkelsen et al. 2015.
[159] ASER Centre 2018.
[160] Health Data Collaborative 2018.
[161] Hanushek and Woessmann 2012.
[162] Das and Mohpal 2016.
[163] Das and Hammer. 2014.
[164] Bold et al. 2017.
[165] Heyneman and Loxley 1983.
[166] McEwan 2015.
[167] Marmot 2005.
[168] Lange, Wodon, and Carey 2018.
[169] Analyses based on ongoing research by the World Bank and partners (e.g., Altinok, Angrist, and Patrinos 2018).
[170] Caselli 2005; Weil 2007.
[171] Compulsory schooling refers to the mandatory period of education imposed by governments, typically starting around age 6 and lasting for 8-12 years. These parameters vary across countries, but in most low and middle-income contexts include primary and lower/higher secondary schooling. Increasingly, countries are expanding compulsory schooling to include pre-schools.
[172] Goos et al. 2014.
[173] Maloney and Molina 2016.
[174] Lewis and Smith 1993.
[175] Cunningham and Villasenor 2014.
[176] Dutz et al. 2018.
[177] Deming 2017.
[178] Schumacher, Elizabeth. 2018. "This Country is Making School for 3-Year-Olds Mandatory." *USA Today*, March 27. https://www.usatoday.com/story/news/world/2018/03/27/attention-french-parents-youll-need-send-your-3-year-olds-school-french-schools-become-obligatory-3/463552002/.
[179] Center on the Developing Child at Harvard University 2016.
[180] Attanasio et al. 2014.
[181] Global Health Workforce Alliance 2008.
[182] Yousafzai et al. 2014; Yousafzai et al. 2016.
[183] Camilli et al. 2010; Nores and Barnett 2010; World Bank 2018a.
[184] Aboud and Hossain 2011.
[185] Martinez et al. 2012.

[186] Garcia et al. 2017.
[187] Cunha and Heckman 2007.
[188] Heckman 2008.
[189] Engle et al. 2011.
[190] Save the Children. 2017. "870,000 Stay-At-Home Mums in England Want to Work but Can't Get the Childcare They Need." https://www.savethechildren.org.uk/news/media-centre/press-releases/870-000-stay-at-home-mums-in-england-want-to-work-but-cant-get-t.
[191] Berlinski and Galiani 2007.
[192] Nollenberger and Rodríguez-Planas 2015.
[193] Walker et al. 2011; Walker et al. 2015.
[194] Hoddinott et al. 2008.
[195] Gertler et al. 2014.
[196] Black et al. 2017.
[197] UNICEF. 2016. "87 Million Children Under 7 Have Known Nothing but Conflict." March 24. https://www.unicef.org/media/media_90745.html.
[198] UNESCO Institute for Statistics.
[199] UNESCO 2015.
[200] Black et al. 2017.
[201] UNESCO 2015.
[202] Penn 2010.
[203] Bidwell and Watine 2014.
[204] Cueto et al. 2009.
[205] Brinkman et al. 2017.
[206] Macdonald et al. 2017.
[207] Lillard and Else-Quest 2006.
[208] Asian Development Bank 2015; Independent Evaluation Group 2016; Fernald and Hidrobo 2011; Fernald et al. 2008; Karimou 2012.
[209] Cartwright 2012.
[210] UNESCO et al. 2017.
[211] Psacharopoulos and Patrinos 2018.
[212] Saavedra 2009.
[213] Ferreyra et al. 2017.
[214] Autor et al. 2008.
[215] Hasanefendic et al. 2016.
[216] StudyMalaysia. 2016. "Technical and Vocational Education and Training (TVET) in Malaysia." October 12. https://www.studymalaysia.com/education/top-stories/technical-and-vocational-education-and-training-in-malaysia; Blom et al. 2016.
[217] Almeida et al. 2016.
[218] OECD 2014.
[219] Zhao, Lingfeng. 2016. "MOOCs Shake Up Online Education." CCTV.com, May 15. http://english.cctv.com/2016/05/15/VIDEGxEQdOtL9FUM74HPO3aC160515.shtml.
[220] Hoxby 2017.
[221] Saavedra and Saavedra 2011.
[222] Loyalka et al. 2016.
[223] Shek et al. 2015.
[224] Schendel 2013.
[225] Commission of the Future of Higher Education 2006.
[226] Blom and Saeki 2011.
[227] Arias et al. 2014.
[228] Brunello and Schlotter 2011.
[229] Premand et al. 2012.
[230] López-Mondéjar and Tomás Pastor 2017.
[231] Wang et al. 2012.
[232] Villaseñor, Paula. 2018. "The Skill of Developing Skills." *Let's Talk Development Blog*, January 8. http://blogs.worldbank.org/developmenttalk/skill-developing-skills; Laajaj and Macours 2017.
[233] Mansfield 1998.
[234] Cookson, C. 2007. "Universities Drive Biotech Advancement." *Financial Times Europe*, May 7, 3.

[235] Blom et al. 2016.
[236] Andersson et al. 2005.
[237] Marotta et al. 2007.
[238] Innovus Technology Transfer, Stellenbosch University. http://www.innovus.co.za/.
[239] SIDBI Innovation and Incubation Center at IIT Kanpur. http://www.iitk.ac.in/siic/d/about-siic.
[240] American University in Cairo. 2014. "AUC Officially Launches the First University Incubator in Egypt: AUC Venture Lab (V-Lab)." September 24. http://schools.aucegypt.edu/Business/newsroom/Pages/story.aspx?eid=155.
[241] TNM Staff. 2017. "Indian Government to Set Up Seven New Research Parks across India to Boost Innovation." *The News Minute*, May 10. https://www.thenewsminute.com/article/indian-government-set-seven-new-research-parks-across-india-boost-innovation-61795.
[242] Algieri et al. 2013.
[243] Jung and Kim 2017.
[244] Ordóñez de Pablos et al. 2011.
[245] Calcagnini et al. 2016.
[246] Åslund and Djankov 2017; Duranton et al. 2015.
[247] World Bank 2018a.
[248] Kaffenberger and Pritchett 2017.
[249] Cree et al. 2012.
[250] World Bank 2018a.
[251] UNESCO Institute for Statistics. http://data.uis.unesco.org/index.aspx?queryid=158.
[252] De Hoyos et al. 2015.
[253] Campante and Chor 2012.
[254] Blunch et al. 2018.
[255] Chakravarty et al. 2017.
[256] J-PAL 2017.
[257] Alvarez de Azevedo et al. 2013.
[258] Aker and Ksoll 2017.
[259] Cho and Honorati 2014.
[260] Valdivia 2011.
[261] Bruno et al. 2014.
[262] Ibarrarán et al. 2012; Ibarrarán et al. 2015.
[263] Hirshleifer et al. 2016.
[264] Adoho et al. 2014.
[265] Kluve 2016.
[266] Martinez A. et al. 2017.
[267] Cunningham et al. 2014.
[268] Aker et al. 2012.
[269] Mani et al. 2013.
[270] Jensen 2008.
[271] Cho et al. 2013.
[272] Maitra and Mani 2014.
[273] Aker and Sawyer 2016.
[274] Cheema et al. 2015.
[275] Darvas and Palmer 2014.
[276] Chakravarty et al. 2017.
[277] Haan and Serriere 2002.
[278] Jensen 2012.
[279] Blattman and Ralston 2015.
[280] De Mel et al. 2014.
[281] Blattman and Annan 2016.
[282] Goldstein, Markus and Alaka Holla. 2011. "Gender Power Doesn't Come Cheap." *Development Impact Blog*, July 26. http://blogs.worldbank.org/impactevaluations/gender-power-doesnt-come-cheap.
[283] Abe et al. 2011.
[284] McKenzie, David. 2014. "Testing Different Behavioral Approaches to Get People to Attend Business Training." *Development Impact Blog*, October 20. http://blogs.worldbank.org/impactevaluations/impactevaluations/testing-different-behavioral-approaches-get-people-attend-business-training.
[285] Hicks et al. 2011.

[286] Ksoll et al. 2014.
[287] Attanasio et al. 2017.
[288] Kugler et al. 2015.
[289] Haan and Serriere 2002.
[290] Alfonsi et al. 2017.
[291] Campos et al. 2017.
[292] Adhvaryu et al. 2017.
[293] Caliendo et al. 2016.
[294] Barboza, David. 2015. "How a Chinese Billionaire Build her Fortune" New York Times, July 30 https://www.nytimes.com/2015/08/02/business/international/how-zhou-qunfei-a-chinese-billionaire-built-her-fortune.html
[295] Mincer 1974.
[296] Lagakos et al. 2018
[297] Omondi, Dominic. 2016. "Why Informal Sector is the theatre of Survival" The Standard, November 1 https://www.standardmedia.co.ke/business/article/2000221705/why-informal-sector-is-theatre-of-survival
[298] "Kenya has highest informal jobs in Africa" Business Daily, June 25, 2015 https://www.businessdailyafrica.com/markets/Kenya-has-highest-informal-jobs-in-Africa-/539552-2765348-o23mb0/index.html
[299] Julio Prado, 2014. "La situación de la mujer trabajadora en cifras." ASIES, November
[300] Banerjee and Duflo 2011.
[301] Benjamin and Mbaye 2012.
[302] La Porta and Shleifer 2014.
[303] Banerjee and Duflo 2011.
[304] Foster and Rosenzweig 2007.
[305] Djankov et al. 2002.
[306] Bruhn 2013.
[307] Yakovlev and Zhuravskaya 2013.
[308] www.enterprisesurveys.org
[309] Zarya, Valentine. 2017. "Fortune 500 Includes a Record Number of Women CEOs" http://fortune.com/2017/06/07/fortune-women-ceos/ June. 7
[310] Amin and Islam. 2014.
[311] Amin and Islam. 2015.
[312] Amin, et al. 20168
[313] Bandiera, et al., 2017.
[314] Bandiera, et al., 2017b.
[315] Adoho et al., 2014.
[316] Businger, Joelle. 2017. "Getting Togo's Agriculture Back on Track, and Lifting Rural Families Out of Poverty Along the Way. " http://blogs.worldbank.org/nasikiliza/getting-togos-agriculture-back-on-track-and-lifting-rural-families-out-of-poverty-along-the-way
[317] Christiaensen, Demery and Kuhl 2011.
[318] Banerjee and Duflo 2011.
[319] Hicks et al. 2017.
[320] Christiaensen and Kanbur, 2018; Cazzuffi et al. 2017.
[321] Ingelaere et al. 2018.
[322] Gibson et al. 2017.
[323] Davis et al. 2012; Larsen et al. 2014.
[324] Vasilaky and Islam. 2018.
[325] Ekekwe, Ndubuisi. 2017. How Digital Technology Is Changing Farming in Africa Harvardd Business Review, May 18. https://hbr.org/2017/05/how-digital-technology-is-changing-farming-in-africa
[326] Acre Africa. http://acreafrica.com/services/
[327] World Bank 2017b.
[328] Divanbeigi and Saliola 2017.
[329] Coase 1937; Holmström and Roberts 1998.
[330] Coase 1937.
[331] Freund, Djankov, Pham 2010.
[332] Apple's supplier list can be accessed here: https://images.apple.com/supplier-responsibility/pdf/Apple-Supplier-List.pdf.
[333] Schumpeter 1942.
[334] Karabarbounis and Neiman 2014.
[335] Freund 2016.

[336] Garicano, Lelarge, and Reenen 2016.
[337] Casey Mulligan. 2013. "Why 49 Is a Magic Number," *The New York Times*, January 2.
[338] Djankov, Georgieva and Ramalho 2018.
[339] Bender and others 2018; Gonzalez-Uribe and Reyes (forthcoming).
[340] Djankov, Freund and Pham 2010.
[341] Djankov et al. 2002.
[342] Bento and Restuccia 2017.
[343] Rijkers, Freund, and Nucifora 2017.
[344] Haltiwanger, Jarmin and Miranda 2013.
[345] Hsieh and Klenow 2014.
[346] Rijkers, Arouri, Freund, and Nucifora 2014.
[347] McKenzie 2018 a and b.
[348] Fafchamps and Quinn 2017.
[349] McKenzie and Sansone 2017.
[350] Cusolito, Dautovic and McKenzie 2017.
[351] Gonzalez-Uribe and Leatherbee 2018.
[352] Disrupt Africa, African Tech Startups Funding Report 2017, http://disrupt-africa.com/funding-report/.
[353] Atkin, Khandelwal and Osman 2017.
[354] Ferraz et al 2016.
[355] McKinsey Global Institute.
[356] Freund and Pierola 2015.
[357] Autor et al. 2017.
[358] Cirera et al. 2018.
[359] Freund 2016.
[360] Corporaal and Lehdonvirta 2017.
[361] Dalberg 2016.
[362] For details, please see https://www.w3counter.com/globalstats.php
[363] Beer, de Mooij and Li 2018.
[364]Institute on Taxation and Economic Policy 2017.
[365] Institute on Taxation and Economic Policy 2017.
[366] Moody's Investors Service.
[367] Gardner, Matthew. 2018. "Amazon Inc. Paid Zero in Federal Taxes in 2017, Gets $789 Million Windfall from New Tax Law." *Institute on Taxation and Economic Policy*, February 13. https://itep.org/amazon-inc-paid-zero-in-federal-taxes-in-2017-gets-789-million-windfall-from-new-tax-law/
[368] Dischinger and Riedel 2011.
[369] Griffith, Miller and O'Connell 2018.
[370] Blair-Stanek 2016.
[371] The OECD's Base Erosion and Profit Shifting (BEPS) project seeks to combat tax avoidance strategies that exploit gaps and mismatches in tax rules to artificially shift profits to low or no-tax locations. Over 100 countries and jurisdictions are collaborating to implement the BEPS measures and tackle BEPS. The OECD has also established a Task Force on the Digital Economy and issues the International VAT/GST Guidelines in 2016.
[372] GSMA 2018.
[373] World Bank 2013.
[374] Ravallion 2016.
[375] Hanlon et al 2010.
[376] World Bank 2018.
[377] Leite et al. 2017.
[378] Bastagli et al. 2016
[379] Brown et al. 2017.
[380] Lopez-Calva and Ortiz-Juarez 2011.
[381] Dang and Dalaban 2017.
[382] Brown et al. 2016.
[383] Desai and Kharas 2017.
[384] European Union 2015.
[385] World Bank 2018a.
[386] Gwatkin and Ergo 2011

[387] The Economic Times. 2018. "1 or 2 states may roll out universal income in two yrs: CEA Arvind Subramanian." January 29. https://economictimes.indiatimes.com/news/economy/policy/1-or-2-states-may-roll-out-universal-income-in-two-yrs-cea-arvind-subramanian/articleshow/62696689.cms.
[388] Barr 2012. For other tapered models, see World Bank (2018).
[389] Yeung and Howes 2015.
[390] Devarajan 2018.
[391] A pilot in Finland was discontinued for various reasons before the publishing of the evaluation. See: https://www.nytimes.com/2018/04/24/business/finland-universal-basic-income.html
[392] Browne and Immervoll 2017.
[393] IMF 2017. See Harris et al. 2018 for a discussion on financing a UBI via VAT.
[394] Government of India 2017.
[395] Khosla 2018.
[396] Gentilini et al forthcoming.
[397] Gentilini et al forthcoming.
[398] However, substitution could occur through an increase in taxes.
[399] Baird et al. 2018.
[400] Marinescu 2018.
[401] Salehi-Isfahani and Mostafavi-Dehzooei 2017.
[402] Birnbaum and De Wispelaere 2016.
[403] Standing 2013.
[404] Tcherneva 2013.
[405] Atkinson 2015.
[406] Alderman et al. 2017.
[407] Shiferaw et al, 2017.
[408] For these simulations, see Palacios and Robalino forthcoming.
[409] Dorfman et al, 2013.
[410] Djankov 2017.
[411] The EU's latest bi-annual aging report shows that the projected spending in 2050 for the EU has been reduced by three percentage points of GDP reflecting a series of parametric reforms that reduce the value of future pensions.
[412] OECD Taxing Wages 2017.
[413] Benartzi and Thaler 2004.
[414] Akbas et al, 2016.
[415] Ashraf et al, 2006.
[416] Thaler and Sunstein 2008.
[417] NEST by design offers only a small number of simple choices and, partly for that reason, has low admin costs.
[418] Beyer and Valdes 2004.
[419] Botero et al, 2004.
[420] ILOSTAT, accessed 02/27/2018.
[421] World Bank 2012.
[422] Acharya, Baghai and Subramanian 2013; Almeida and Aterido 2008
[423] Caballero et al 2013.
[424] Packard and Montenegro 2017.
[425] Bartelsman, Gautier and De Wind 2016.
[426] Botasso et al 2017.
[427] Brambilla and Tortarolo 2018.
[428] Adhvaryu et al 2013.
[429] Betcherman 2012.
[430] Palacios and Robalino forthcoming.
[431] Kuddo, forthcoming.
[432] Kuddo et al 2015.
[433] Krueger and Posner 2018.
[434] Holzmann et al 2012.
[435] Robalino and Weber 2014.
[436] Pinelli et al, 2017; Vodopivec et al 2016.
[437] Krstic and Schneider 2015.
[438] Sestito and Viviano 2016.
[439] Kuddo, forthcoming.

[440] Almeida and Carneiro 2011.
[441] Silva et al, 2014.
[442] World Bank 2016a.
[443] Kluve et al 2016.
[444] Card et al 2015.
[445] Kluve et al 2016.
[446] Lenin, V. 1918. "Opening Remarks at the Extraordinary Sixth All-Russia Congress ff Soviets Of Workers', Peasants', Cossacks' and Red Army Deputies," *Izvestia* No. 244, November 9.
[447] Fisher, Max and Amanda Taub. 2017. "The Social Contract is Broken: Inequality Becomes Deadly in Mexico." New York Times. https://www.nytimes.com/2017/09/30/world/americas/mexico-inequality-violence-security.html?_r=0.
[448] Desai and Kharas 2017.
[449] World Bank 2015.
[450] Devarajan 2018.
[451] Alkon and Urpelainen 2018.
[452] World Bank 2018a.
[453] Saavedra and Tommasi 2007.
[454] Even if contributory pensions were considered a transfer, with the corresponding contributions considered as taxes, the Gini coefficient would fall by an average of 9 percentage points among 22 developing countries, compared to 11 points in the US and 21 points in the European Union. Moreover, when indirect taxes and subsidies are considered, part of this effort is reversed since indirect taxes are often regressive and the top of the distribution benefits from price subsidies and VAT exemptions and reduced rates.
[455] Daruich 2018. *The Macroeconomic Consequences of Early Childhood Development Policies*. HCEO Working Paper Series.
[456] Africa's Population Boom: Will It Mean Disaster or Economic and Human Development Gains? World Bank 2016
[457] Trotsenburg 2015. "How can rapidly aging East Asia sustain its economic dynamism?" http://blogs.worldbank.org/eastasiapacific/how-can-rapidly-aging-east-asia-sustain-its-economic-dynamism
[458] Jerrim and Macmillan 2015.
[459] European Commission 2018.
[460] Zucman 2015.
[461] Tørsløv, Wier and Zucman 2018.
[462] Lynch, David J. 2017. "Ex-Equifax boss details errors behind data breach." *Financial Times*, October 3. https://www.ft.com/content/1c23b11c-a857-11e7-ab55-27219df83c97.
[463] Doshi, Vidhi. 2018. "A security breach in India has left a billion people at risk of identity theft." *The Washington Post*, January 4. https://www.washingtonpost.com/news/worldviews/wp/2018/01/04/a-security-breach-in-india-has-left-a-billion-people-at-risk-of-identity-theft/?noredirect=on&utm_term=.eb8b438ec773
[464] The level of international poverty lines used in the simulations vary by country income categories.
[465] Djankov 2017.
[466] Kossoy et al. 2015.
[467] Charles Duhigg and David Kocieniewski, 2012. How Apple Sidesteps Billions in Taxes, *The New York Times*, April 28. http://www.nytimes.com/2012/04/29/business/apples-tax-strategy-aims-at-low-tax-states-and-nations.html.
[468] Nick Sommerlad, 2015. "Six firms including Google and Facebook made £14BILLION last year but paid just 0.3% UK Tax," The Mirror, January 31.
[469] Tørsløv, Wier and Zucman 2018.
[470] OECD/Korea Institute of Public Finance 2014.
[471] World Bank 2017c.
[472] World Bank 2017d.
[473] Harris et al 2018.
[474] OECD/Korea Institute of Public Finance 2014.

Bibliography

Abdullah, Abdul, Hristos Doucouliagos, and Elizabeth Manning. 2015. "Does education reduce income inequality? A meta-regression analysis," Journal of Economic Surveys 29(2): 301-316.

Abe, M., H. Schambra, E.M. Wassermann, D. Luckenbaugh, N. Schweighofer, and L.G. Cohen. 2011. "Reward Improves Long-Term Retention of A Motor Memory Through Induction of Offline Memory Gains." Current Biology 21(7): 557–62.

Aboud, Frances E., and Kamal Hossain. 2011. "The Impact of Preprimary School on Primary School Achievement in Bangladesh." *Early Childhood Research Quarterly* 26: 237–46.

Acemoglu, Daron, and David Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." In *Handbook of Labor Economics Volume 4* edited by Orley Ashenfelter and David E. Card, 1043-171. Elsevier, Amsterdam.

Acemoglu, Daron, and Pascual Restrepo. forthcoming. "The Race Between Man and Machine: Implications of Technology for Growth, Factor Shares and Employment." *American Economic Review* forthcoming.

Acharya, Viral, Ramin Baghai and Krishnamurthy Subramanian. 2013. "Labor Laws and Innovation". *Journal of Law and Economics* 56 (4): 997-1037.

Acosta, Pablo, Noel Muller, and Miguel Alonso Sarzosa. 2015. "Beyond qualifications: returns to cognitive and socio-emotional skills in Colombia," IZA Discussion Paper No. 9403.

Acosta, Pablo, Takiko Igarashi, Rosechin Olfindo and Jan Rutkowski. 2017. *Developing Socioemotional Skills for the Philippines' Labor Market. Directions in Development—Human Development.* Washington, DC: World Bank.

Adhvaryu, Achyuta, Namrata Kala, and Anant Nyshadham. 2017. "The Skills to Pay the Bills: Returns to On-the-job Soft Skills Training." Working Paper.

Adoho, Franck, Shubha Chakravarty, Jr, Dala T. Korkoyah, Mattias, Lundberg, and Afia Tasneem. 2014. "The Impact of An Adolescent Girls Employment Program: The EPAG Project in Liberia." Policy Research Working Paper No. 6832. Washington, DC: World Bank.

Ahuja, Amrita, Sarah Baird, Joan Hamory Hicks, Michael Kremer, Edward Miguel, and Shawn Powers. 2015. "When should governments subsidize health? The case of mass deworming," The World Bank Economic Review 29(1): S9-S24.

Ajwad, Mohamed Ihsan; Stefan Hut, Ilhom Abdulloev, Robin Audy, Joost de Laat, Sachiko Kataoka, Jennica Larrison, Zlatko Nikoloski,and Federico Torracchi. 2014a. "The Skills Road: Skills for Employability in Tajikistan." World Bank, Washington, DC.

Ajwad, Mohamed Ihsan, Joost de Laat, Stefan Hut, Jennica Larrison, Ilhom Abdulloev, Robin Audy, Zlatko Nikoloski, and Federico Torracchi. 2014b. "The Skills Road: Skills for Employability in the Kyrgyz Republic." World Bank, Washington, DC.

Akbas, Merve, Dan Ariely, David Robalino, and Michael Weber. 2016. "How to Help Poor Informal Workers to Save a Bit: Evidence from a Field Experiment in Kenya." IZA *Working Paper* 1024. Bonn.

Aker, Jenny C., Christopher Ksoll, and Travis J. Lybbert. 2012. “Can Mobile Phones Improve Learning? Evidence from a Field Experiment in Niger.” *American Economic Journal: Applied Economics* 4(4): 94-120.

Aker, Jenny C., and Christopher Ksoll. 2017. “Call Me Educated: Evidence from a Mobile Monitoring Experiment in Niger.” Center for Global Development Working Paper No. 406.

Aker, Jenny, and Melita Sawyer. 2016. “Adult Learning in Sub-Saharan Africa: What Do and Don’t We Know?” Background Paper for World Bank forthcoming *Africa Skills Flagship Report*.

Akerman, A., I. Gaarder, and M. Mogstad. 2015. “The Skill Complementarity of Broadband Internet.” *Quarterly Journal of Economics* 130 (4): 1781-824.

Alan, Sule, Teodora Boneva, and Seda Ertac. 2016. “Ever Failed, Try Again, Succeed Better: Results from a Randomized Educational Intervention on Grit,” HCEO Working Paper No. 2015-009.

Alden, Edward and Laura Taylor-Kale. 2018. CFR-sponsored Independent Task Force on the Future of the U.S. Workforce. Council on Foreign Relations. Washington DC.

Alderman, Harold, Ugo Gentilini, and Ruslan Yemtsov. 2017. *The 1.5 Billion People Question. Food Vouchers or Cash Transfers?* Washington DC: World Bank

Alesina, Alberto, Michele Battisti and Joseph Zeira. 2017. “Technology and Labor Regulations: Theory and Evidence.” Available at: https://ucy.ac.cy/econ/documents/seminar-papers/2017/Alesina_Battisti_Zeira_1.pdf. Accessed 02/27/2018.

Alfonsi, Livia, Oriana Bandiera, Vittorio Bassi, Robin Burgess, Imran Rasul, Munshi Sulaiman, and Anna Vitali. 2017. “Tackling Youth Unemployment: Evidence from a Labour Market Experiment in Uganda.” STICERD - Development Economics Papers.

Algieri, B., A. Aquino, and M. Succurro. 2013. “Technology Transfer Offices and Academic Spin-Off Creation: The Case of Italy.” *The Journal of Technology Transfer* 38(4): 382–400.

Alkon, M. and Urpelainen, J. 2018. “Trust in Government and Subsidy Reform: Evidence from a Survey of Indian Farmers.” *Studies in Comparative International Development*, in press.

Allendorf, K. 2007. “Do Women’s Land Rights Promote Empowerment and Child Health in Nepal?” *World Development* 35(11): 1975-88.

Almeida, Rita K., Ana M. Fernandes, and Mariana Viollaz. 2017. “Does the Adoption of Complex Software Impact Employment Composition and the Skill Content of Occupations? Evidence from Chilean Firms.” Policy Research Working Paper 8110, World Bank, Washington, DC, and CEDLAS-FCE-UNLP Working Paper No. 214, Argentina.

Almeida, Rita, Nicole Amaral, and Fabiana de Felicio. 2016. *Assessing Advances and Challenges in Technical Education in Brazil*. World Bank Studies. Washington, DC: World Bank.

Almeida, Rita, and Pedro Carneiro. 2011. “Enforcement of Labor Regulation and Informality.” IZA Discussion Paper No. 5902. Bonn.

Almeida, Rita, and Reyes Aterido. 2008. “The Incentives to Invest in Job Training: Do Strict Labor Codes Influence this Decision?” Social Protection and Labor working paper No. 0832, World Bank, Washington, DC.

Almeida Rita, Jere Behrman, and David Robalino, eds. 2012. *The Right Skills for the Job? Rethinking Training Policies for Workers*. Washington, DC: World Bank.

Altamirano, M.A. & Beers, C.P. 2018. “Frugal Innovations in Technological and Institutional Infrastructure: Impact of Mobile Phone Technology on Productivity, Public Service Provision and Inclusiveness.” *The European Journal of Development Research* 30(1): 84–107.

Andrabi, T., J. Das, and A. Khwaja. 2012. “What Did You Do All Day? Maternal Education and Child Outcomes.” *Journal of Human Resources* 47(4): 873-912.

Altbach, Philip G. 2006. “The Dilemmas of Ranking.” *International Higher Education* 42: 2-3.

Altinok, Nadir, Noam Angrist, and Harry A. Patrinos. 2018. “Global Data Set on Education Quality (1965-2015).” Policy Research Working Paper 8314, World Bank Group.

Alvarez de Azevedo, Thomaz, Jeff Davis, and Munene Charles. 2013. “Testing What Works in Youth Employment: Evaluating Kenya’s Ninaweza Program.” Global Partnership for Youth Employment, Washington, DC.

Amin, Mohammad and Asif Islam. 2014. “Are There More Female Managers in the Retail Sector? Evidence from Survey Data in Developing Countries.” *Journal of Applied Economics* Vol XVII (2): 213-228

Amin, Mohammad and Asif Islam. 2015. “Does Mandating Nondiscrimination in Hiring Practices Influence Women’s Employment? Evidence Using Firm-Level Data.” *Feminist Economics* 21(4): 28-60.

Amin, Mohammad, Asif Islam and Alena Sakhonchik. 2016. “Does Paternity Leave Matter for Female Employment in Developing Economies? Evidence from Firm-level Data” *Applied Economics Letters* 23(16): 1145-11

Andersson, Roland, John M. Quigley, and Mats Wilhelmsson. 2005. “Agglomeration and the Spatial Distribution of Creativity.” UC Berkeley: Berkeley Program on Housing and Urban Policy.

Araujo, María Caridad, Martín Ardanaz, Edna Armendáriz, Jere R. Behrman, Samuel Berlinski, Julian P. Cristia, Yyannu Cruz-Aguayo, Luca Flabbi, Diana Hincapie, Analía Jalmovich, Sharon Lynn Kagan, Florencia López Bóo, Ana Pérez Expósito, and Norbert Schady. 2015. *The Early Years: Child Well-being and the Role of Public Policy*. Inter-American Development Bank: Washington, DC.

Arias, Omar, David Evans and Indhira Santos. Forthcoming. “The Skills Balancing Act in Sub-Saharan Africa: Investing in Skills for Productivity, Inclusion and Adaptability.” World Bank: Washington, DC.

Arias, Omar S., Carolina Sánchez-Páramo, María E. Dávalos, Indhira Santos, Erwin R. Tiongson, Carola Gruen, Natasha de Andrade Falcão, Gady Saiovici, and Cesar A. Cancho. 2014. *Back to Work: Growing with Jobs in Europe and Central Asia.* World Bank, Washington, DC.

Arntz, M., T. Gregory and U. Zierahn. 2017. "Revisiting the Risk of Automation." *Economics Letters*, 159 (2017) 157–160.

ASER Centre. 2018. *Overview*. New Delhi. http://www.asercentre.org/Survey/Basic/Pack/Sampling/History/p/54.html.

Ashraf, Nava, Dean Karlan, and Wesley Yin. 2006. "Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines." *Quarterly Journal of Economics* 121(2): 635–72.

Asian Development Bank. 2015. *The Design, Expansion, and Impact of Pantawid*.

Asian Development Bank .2018. *Asian Development Outlook 2018: How Technology Affects Jobs*. Manila.

Åslund, Anders, and Simeon Djankov. 2017. *Europe's Growth Challenge*. Oxford University Press.

Aspin, C., and Chapman, S.D. 1964. James Hargreaves and the Spinning Jenny, Preston, Helmshore Local History Society, p.49; Robert C. Allen. 2006. The British Industrial Revolution in Global Perspective, Oxford University Press.

Atkin, David, Amit K. Khandelwal, and Adam, Osman. 2017. "Exporting and Firm Performance: Evidence from a Randomized Experiment". Quarterly Journal of Economics: Vol. 132 No. 2 (May 2017) Editor's Choice

Atkinson, Anthony B. 2015. *Inequality: What Can Be Done?* Harvard University Press.

Attanasio, Orazio P., Camila Fernández, Emla O A Fitzsimons, Sally M. Grantham-McGregor, Costas Meghir, and Marta Rubio-Codina. 2014. "Using the Infrastructure of a Conditional Cash Transfer Program to Deliver a Scalable Integrated Early Child Development Program in Colombia: Cluster Randomized Controlled Trial." *BMJ* 349, Article g5785.

Attanasio, Orazio, Arlen Guarin, Carlos Medina and Costas Meghir. 2017. "Vocational Training for Disadvantaged Youth in Colombia: A Long-Term Follow-Up." *American Economic Journal: Applied Economics* 9(2): 131–43.

Autor, David, and Anna Salomons. 2018. "Is Automation Labor-Displacing? Productivity Growth, Employment and the Labor Share." Brookings Papers on Economic Activity. Washington, DC.

Autor, D., D. Dorn, and G. Hanson. 2015. "Untangling Trade and Technology: Evidence from Local Labour Markets." *The Economic Journal* Volume 125, Issue 584: 621–646.

Autor, David. 2014. "Polanyi's Paradox and the Shape of Employment Growth." NBER Working Paper No. 20485: Cambridge, MA.

Autor, David and David Dorn. 2013. “The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market.” *American Economic Review* 103 (5): 1553–97.

Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2008. “Trends in U.S. Wage Inequality: Revising the Revisionists.” *Review of Economics and Statistics* 90(2): 300-23.

Autor, David H., David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen. 2017a. “Concentrating on the Fall of the Labor Share.” *American Economic Review* 107(5): 180–85.

Autor, David H., David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen. 2017b. “The Fall of the Labor Share and the Rise of Superstar Firms.” NBER Working Paper No. 23396. National Bureau of Economic Research, Cambridge, MA.

Azevedo, Joao Pedro, Gabriela Inchauste, Sergio Olivieri, Jaime Saavedra, and Hernan Winkler. 2013. “Is labor income responsible for poverty reduction? A decomposition approach,” Policy Research Working Paper 6414, World Bank Group.

Azevedo, J., Inchauste, G., Olivieri, S., Saavedra, J., and Winkler, H. 2013. “Is Labor Income Responsible for Poverty Reduction? A Decomposition Approach.” World Bank, *Policy Research Working Paper* 6414. Washington, DC.

Baird, Sarah Jane, Craig Mcintosh, and Berk Ozler. 2016. “When the money runs out: do cash transfers have sustained effects on human capital accumulation ?,” Policy Research Working Paper Series 7901, The World Bank.

Baker-Henningham H, S. Walker, C. Powell, and JM Gardner. 2009. “A Pilot Study of the Incredible Years Teacher Training Programme and A Curriculum Unit on Social and Emotional Skills in Community Pre-Schools in Jamaica.” *Child Care Health Development* 35(5):624-31.

Balarajan, Yarlini, S Selvaraj, and S V Subramanian. 2011. “Health Care and Equity in India.” *The Lancet* 377(9764): 505–15.

Bandiera, Oriana, Robin Burgess, Narayan Das, Selim Gulesci, Imran Rasul and Munshi Sulaiman. 2017. “Labor Markets and Poverty in Village Economies.” *The Quarterly Journal of Economics* 132(2): 811-870

Bandiera, Oriana; Niklas Buehren, Robin Burgess, Markus P Goldstein, Selim Gulesci, Imran Rasul, Munshi Sulaiman. 2017b. “Women’s empowerment in action : evidence from a randomized control trial in Africa.” Washington, D.C. : World Bank Group

Banerjee, Abhijit V., & Duflo, Esther, 2011. Poor economics: A radical rethinking of the way to fight global poverty. New York: Public Affairs

Baptist, Simon, and Francis Teal. 2014. “Technology and Productivity in African Manufacturing Firms.” *World Development* 64: 713-25.

Barr, N. 2012. *The Economics of the Welfare State*. Fifth Edition. Oxford University Press.

Brown, C., Ravallion, M., van de Walle, D. 2016 “Poor Means Test? Econometric Targeting in Africa.” NBER Working Paper 22919. Cambridge.

Bartelsman, Eric, Pieter Gautier and Joris De Wind. 2016. “Employment Protection, Technology Choice, and Worker Allocation.” *International Economic Review*, Vol. 57, Issue 3, pp. 787-826, 2016.

Bastagli, F., Hagen-Zanker, J., Harman, L., Sturge, G., Barca, V., Schmidt, T., and Pellerano, L. 2016. “Cash Transfers: What Does the Evidence Say? A Rigorous Review of Impacts and the Role of Design and Implementation Features.” ODI. London.

Beer, Sebastian, Ruud A. De Mooij, and Li Liu. 2018. “International Corporate Tax Avoidance: A review of the channels, effect sizes and blindspots.” IMF Working Paper 2018/xx, International Monetary Fund.

Behrman, Jere R., and Mark R. Rosenzweig. 2004. “Returns to birthweight,” Review of Economics and statistics 86(2): 586-601.

Behrman, Jere R, Maria C Calderon, Samuel H Preston, John Hoddinott, Reynaldo Martorell, and Aryeh D Stein. 2009. “Nutritional Supplementation in Girls Influences the Growth of Their Children: Prospective Study in Guatemala.” *The American Journal of Clinical Nutrition* 90(5): 1372–79.

Belot, Michèle, and Jonathan James. 2011. “Healthy School Meals and Educational Outcomes.” *Journal of Health Economics* 30: 489–504.

Benartzi, Shlomo and Richard H. Thaler. 2004. “Save More Tomorrow: Using Behavioral Economics To Increase Employee Saving.” *Journal of Political Economy* 112(1): S164-S187.

Bender, Stefan, Nicholas Bloom, David Card, John Van Reenen, and Stephanie Woter. 2018. “Management Practices, Workforce Selection, and Productivity,” *Journal of Labor Economics*. 36(1): 371-409.

Benjamin, Nancy and Ahmadou Aly Mbaye. 2012. *The Informal Sector in Francophone Africa: Firm Size, Productivity and Institutions*. Washington, DC: World Bank

Bento, Pedro and Diego Restuccia. 2017. "Misallocation, Establishment Size, and Productivity." *American Economic Journal*: *Macroeconomics*, 9(3): 267-303.

Berlingieri, G., Calligaris, S., and C., Criscuolo. 2018. “The Great Divergence of Wages and Productivity”.

Berrebi, Claude. 2007. “Evidence about the link between education, poverty and terrorism among Palestinians.” Peace Economics, Peace Science and Public Policy 13(1).

Berlinski, S., and S. Galiani. 2007. “The Effect of A Large Expansion of Pre-Primary School Facilities on Preschool Attendance and Maternal Employment.” *Labour Economics* 14(3): 665−80.

Beyer, Harald and Salvador Valdes. 2004. “Propuestas para aumentar la densidad de cotizaciones” Paper presented at the conference *Competencia y Cobertura.* (11-12 November, Santiago).

Bhatia, Kartika, and Hafez Ghanem. 2017. “How do education and unemployment affect support for violent extremism? Evidence from eight Arab countries,” Global Economy and Development Working Paper 102, Brookings Institute.

Bidwell, Kelly, and Loïc Watine. 2014. Exploring Early Education Programs in Peri-urban Settings in Africa. New Haven, CT, Innovations for Poverty Action.

Birnbaum, S. and De Wispelaere, J. 2016. “Basic Income in the Capitalist Economy: The Mirage of “Exit” from Employment.” *Basic Income Studies* 11(1): 61-74.

Björkman Nyqvist, Martina, Damien de Walque, and Jakob Svensson. 2017. “Experimental evidence on the long-run impact of community-based monitoring,” American Economic Journal: Applied Economics 9(1): 33-69.

Black, Maureen M, Susan P Walker, Lia C H Fernald, Christopher T Andersen, Ann M DiGirolamo, Chunling Lu, Dana C McCoy, Günther Fink, Yusra R Shawar, Jeremy Shiffman, Amanda E Devercelli, Quentin T Wodon, Emily Vargas-BarÓn, and Sally Grantham-McGregor. 2017. “Early Childhood Development Coming of Age: Science Through the Life Course.” *The Lancet* 389: 77–90.

Blair-Stanek, Andrew. 2016. “Just Compensation as Transfer Prices.” *Arizona Law Review* 58:1077.

Blanford, Justine I, Supriya Kumar, Wei Luo, and Alan M MacEachren. 2012. “It’s a Long, Long Walk: Accessibility to Hospitals, Maternity and Integrated Health Centers in Niger.” *International Journal of Health Geographics* 11:24.

Blattman, Christopher, and Laura Ralston. 2015. “Generating Employment in Poor and Fragile States: Evidence from Labor Market and Entrepreneurship Programs.”

Blattman, Christopher, and Jeannie Annan. 2016. “Can Employment Reduce Lawlessness and Rebellion? A Field Experiment with High-Risk Men in a Fragile State.” *American Political Science Review* 110(1): 1-17.

Blattman, Chris, Julian Jamison, and Margaret Sheridan. 2017. “Reducing Crime and Violence: Experimental Evidence from Cognitive Behavioral Therapy in Liberia.” *American Economic Review* 107(4): 1165-1206.

Blom, Andreas, and Hiroshi Saeki. 2011. “Employability and Skill Set of Newly Graduated Engineers in India.” Policy Research Working Paper No.5640. World Bank, Washington, DC.

Blom, Andreas, George Lan, and Mariam Adil. 2016. *Sub-Saharan African Science, Technology, Engineering, and Mathematics Research: A Decade of Development.* World Bank Study. Washington, DC: World Bank.

Blom, Andreas, Reehana Raza, Crispus Kiamba, Himdat Bayusuf, and Mariam Adil. 2016. *Expanding Tertiary Education for Well-Paid Jobs: Competitiveness and Shared Prosperity in Kenya*. Washington, DC: World Bank.

Bloom, N., Guvenen, F., Smith, B., Song, J., and T., von Wachter. 2018. “Inequality and the Disappearing Large Firm Wage Premium”. *American Economic Review, Papers and Proceedings*.

Blunch, Niels-Hugo, Peter Darvas, and Marta Favara. 2018. “Unpacking the Returns to Education and skills in Urban Ghana: The Remediation Role of Second Chance Learning Programs.” Working paper.

Bodewig, Christian, Reena Badiani-Magnusson, Kevin Macdonald, David Newhouse, Jan Rutkowski. 2014. *Skilling Up Vietnam: Preparing the Workforce for a Modern Market Economy*. Washington, DC: World Bank

Bold, Tessa, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Jakob Svensson, and Waly Wane. 2017. “Enrollment without Learning: Teacher Effort, Knowledge, and Skill in Primary Schools in Africa,” Journal of Economic Perspectives, 31(4), 185-204.

Brambrilla, Irene, and Dario Tortarolo. 2018. “Investment in ICT, Productivity and Labor Demand: The Case of Argentina.” Policy Research Working Paper 8325, World Bank, Washington, DC.

Brinkman, Sally Anne, Amer Hasan, Haeil Jung, Angela Kinnell, and Menno Pradhan. 2017. “The Impact of Expanding Access to Early Childhood Education Services in Rural Indonesia.” *Journal of Labor Economics* 35(S1): 305-35.

British Council. 2014. *Can Higher Education Solve Africa’s Job Crisis? Understanding Graduate Employability in Sub-Saharan Africa*.

Brown, C., Martin Ravallion, D. van de Walle. 2017 “Are Poor Individuals Mainly Found in Poor Households? Evidence using Nutrition Data for Africa.” NBER Working Paper 24047. Cambridge.

Brown, Caitlin, Martin Ravallion, and Dominique van de Walle. 2016. “A Poor Means Test? Econometric Targeting in Africa.” Policy Research Working Paper No. 7915. World Bank, Washington, DC.

Browne, James, and Herwig Immervoll. 2017. “Mechanics of Replacing Benefit Systems with a Basic Income: Comparative Results from a Microsimulation Approach.” *Journal of Economic Inequality* 15(4): 325–44.

Bruhn, Miriam (2013). “A Tale of Two Species: Revisiting the Effect of Registration Reform on Informal Business Owners in Mexico.” *Journal of Development Economics* 103: 275-283

Brunello, Giorgio, and Martin Schlotter. 2011. “Non Cognitive Skills and Personality Traits: Labour Market Relevance and their Development in Education & Training Systems.” IZA DP No. 5743. Bonn.

Bruno, Crépon, Esther Duflo, Elise Huillery, William Parienté, and Juliette Seban. 2014. Les effets du dispositif d'accompagnement à la création d'entreprise Créa Jeunes: résultats d'une expérience contrôlée, Rapport d’évaluation.

Calcagnini, G., I. Favaretto, G, Giombini, F. Perugini, and R. Rombaldoni 2016. "The Role of Universities in the Location of Innovative Start-Ups." *The Journal of Technology Transfer* 41(4): 670-93.

Caliendo, Marco, Deborah A. Cobb-Clark, Helke Seitz, and Arne Uhlendorff. 2016. "Locus of Control and Investment in Training." IZA Discussion Paper No. 10406.

Camilli, Gregory, Sadako Vargas, Sharon Ryan, and W. Steven Barnett. 2010. "Meta-Analysis of the Effects of Early Education Interventions on Cognitive and Social Development." *Teachers College Record* 112(3): 579-620.

Campante, Filipe R., and Davin Chor. 2012. "Why Was the Arab World Poised for Revolution? Schooling, Economic Opportunities, and the Arab Spring." *Journal of Economic Perspectives* 26(2): 167-88.

Campos, Francisco, Michael Frese, Markus Goldstein, Leonardo Iacovone, Hillary C. Johnson, and David McKenzie. 2017. "Teaching Personal Initiative Beats Traditional Training in Boosting Small Business in West Africa." *Science* 357(6357): 1287-90.

Canaan, S., and P. Mouganie. 2018. "Returns to Education Quality for Low-Skilled Students: Evidence from A Discontinuity." *Journal of Labor Economics* 36(2): 000-000.

Cartwright, N. 2012. "Presidential address: Will this policy work for you? Predicting effectiveness better: How philosophy helps." *Philosophy of Science* 79(5): 973-989.

Caselli, F. 2005. "Accounting for cross-Country Income Differences." In Philippe Aghion and Stephen Durlauf (eds.) *Handbook of Economic Growth* Volume 1A: 679-741, Elsevier.

Caselli, Francesco, and Wilbur John Coleman II. 2006. "The World Technology Frontier." *American Economic Review* 96 (3): 499-522.

Castelló-Climent, Amparo, and Rafael Doménech. 2014. "Human Capital and Income Inequality: Some Facts and Some Puzzles." BBVA Research. Working Paper Nº 12/ 28. Madrid.

Cavaillé, Charlotte, and John Marshall. 2017. "Education and Anti-Immigration Attitudes: Evidence from Compulsory Schooling Reforms across Western Europe," Working Paper.Center on the Developing Child at Harvard University. 2016. *From Best Practices to Breakthrough Impacts: A Science-Based Approach to Building a More Promising Future for Young Children and Families.* Cambridge, MA.

Cazzuffi, Chiara, Mariana Pereira-Lopez, and Isidro, Soloaga, 2017. "Local poverty reduction in Chile and Mexico: The Role of Food manufacturing Growth." *Food Policy* 68: 160-185

Center on the Developing Child at Harvard University. 2016. *From Best Practices to Breakthrough Impacts: A Science-Based Approach to Building a More Promising Future for Young Children and Families*. Cambridge, MA.

Chakravarty, S., M. Lundberg, P. Nikolov, and J. Zenker. 2017. "Vocational Training Programs and Youth Labor Market Outcomes: Evidence from Nepal." Human Capital and Economic Opportunity Working Group Working Papers.

Chakravarty, Shubha, Smita Das, and Julia Vaillan. 2017. “Gender and Youth Employment in Sub-Saharan Africa: A Review of Constraints and Effective Interventions.” Policy Research Working Paper No. 8245. Washington, DC: World Bank Group.

Cheema, A., A. I. Khwaja, M. F. Naseer, and J. N. Shapiro. 2015. “Skills Intervention Report: Results of first round of voucher disbursement and strategies for improving uptake.” Technical Report. Pakistan: Punjab Economic Opportunities Program.

Chen, Maggie, and Min Xu. 2015. “Online International Trade in China.” Background paper for the World Development Report 2016, World Bank: Washington, DC.

Chetty, Raj, John N. Friedman, and Jonah E. Rockoff. 2014. “Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood,” *American Economic Review* 104(9): 2633-79.

Chetty, Raj, and Nathaniel Hendren. 2018. “The Impact of Neighborhoods on Intergenerational Mobility I: County-Level Estimates.” *Quarterly Journal of Economics* qjy007.

Chioda, Laura, João M. P. De Mello, and Rodrigo R. Soares. 2016. “Spillovers from Conditional Cash Transfer Programs: Bolsa Família and Crime in Urban Brazil.” *Economics of Education Review* 54: 306–20.

Chioda, Laura, and William Maloney. 2017. “Globalization, Aspirations, and Subjective Wellbeing.” World Bank. Mimeo

Cho, Yoonyoung, Davie Kalmoba, Ahmed Mushfiq Mobarak, and Victor Orozco. 2013. “Gender Differences in the Effects of Vocational Training: Constraints on Women and Drop-out Behavior.” Policy Research Working Paper No. 6545. Washington, DC: World Bank Group.

Cho, Yoonyoung, and Maddalena Honorati. 2014. “Entrepreneurship Programs in Developing Countries: A Meta Regression Analysis.” *Labour Economics* 28: 110–30.

Christiaensen, Luc and Ravi, Kanbur, 2018. Secondary Towns, Jobs and Poverty Reduction - Introduction to World Development Virtual Special Symposium. *World Development* 108C: 219-220.

Christiaensen, Luc, Lionel Demery and Jesper Kuhl. 2011. “The (Evolving) Role of Agriculture in Poverty Reduction: An Empirical Perspective.” *Journal of Development Economics*, 96(2): 239-254.

Cirera, Xavier, Ana Cusolito, Caroline Freund, Roberto Fattal, Nicolas Gonne, Leonardo Iacovone. 2018. “Superstar Firms and the Decline in Labor Shares. What is the Evidence for Developing Countries?”. World Bank, World Development Report. Background Note for Chapter 6.

Claessens, Stijn, Simeon Djankov, and Larry Lang. 2000. “The separation of ownership and control in East Asian corporations,” *Journal of Financial Economics*, 58(1-2): 81-112.

Coady, David, and Allan Dizioli. 2017. “Income inequality and education revisited: persistence, endogeneity and heterogeneity.” Applied Economics 50(25): 2747-2761.

Coase, Ronald. 1937. “The Nature of the Firm.” *Economica* 4: 386–405.

Comin, D., and M., Mestieri. “If Technology Has Arrived Everywhere, Why Has Income Diverged?” mimeo. Accepted subject to revisions at the American Economic Journal: Macroeconomics.

Comin, D., and B., Hobijn. 2010 “An Exploration of Technology Diffusion.” *The American Economic Review* 100(5): 2031-2059.

Comin, D., Hobijn, B., and E., Rovito. 2008. “Technology Usage Lags.” *Journal of Economic Growth* 13(4): 237-256.

Commission of the Future of Higher Education. 2006. A Test of Leadership: Charting the Future of U.S. Higher Education. U.S. Department of Education: Washington DC.

Cook, Philip J., Kenneth Dodge, George Farkas, Roland G. Fryer Jr, Jonathan Guryan, Jens Ludwig, Susan Mayer, Harold Pollack, and Laurence Steinberg. 2014. “The (surprising) efficacy of academic and behavioral intervention with disadvantaged youth: results from a randomized experiment in Chicago,” Working Paper No. w19862, National Bureau of Economic Research.

Corporaal, Greetje F. and Vili Lehdonvirta. 2017. “Platform Sourcing How Fortune 500 Firms Are Adopting Online Freelancing Platforms.” Oxford Internet Institute University of Oxford. Oxford, United Kingdom.

Courbage, Youssef, and Emmanuel Todd. 2007. *Le Rendez-vous des Civilisations*. Paris: Seuil.

Cree A., Kay A., Steward J. 2012. *The Economic & Social Cost of Illiteracy: A Snapshot of Illiteracy in a Global Context*. Melbourne: The World Literacy Foundation.

Crivelli, E., R. De Mooij and M. Keen. 2016. “Base erosion and profit shifting in developing countries.” Finanzarchiv 72(3).

Crost, Benjamin, Joseph H. Felter, and Patrick B. Johnston. 2015. “Conditional cash transfers, civil conflict and insurgent influence: Experimental evidence from the Philippines,” Journal of Development Economics 118(2016): 171-182.

Cueto, S., Guerrero, G., Leon, J., Zevallos, A. and Sugimaru, C. 2009. “Promoting Early Childhood Development Through a Public Programme: Wawa Wasi in Peru.” Oxford, UK, Young Lives, Department of International Development, University of Oxford. (Working Paper, 51.)

Cunha, Flavio, and James Heckman. 2007. “The Technology of Skill Formation.” *American Economic Review* 97 (2): 31-47.

Cunningham, Anne E., Keith E. Stanovich, and Richard F. West. 2014. “Literacy Environment and the Development of Children’s Cognitive Skills.” In Egbert M. H. Assink (Ed.), *Literacy Acquisition and Social Context* (Revised Edition) (pp. 70-90). New York: Routledge.

Cunningham, Wendy, and Paula Villaseñor. 2014. “Employer Voices, Employer Demands, and Implications for Public Skills Development Policy Connecting the Labor and Education Sectors.” *World Bank Research Observer* 31(1): 102–34.

Currie, Janet, and Enrico Moretti. 2003. “Mother's education and the intergenerational transmission of human capital: Evidence from college openings.” The Quarterly Journal of Economics118(4): 1495-1532.

Currie, Janet, and Douglas Almond. 2011. “Human capital development before age five.” *Handbook of Labor Economics* 4(B):1315-1486.

Cusolito, Ana, Ernest Dautovic, and David Mckenzie. 2017. “Can Government Interventions Make Firms More Investment-Ready? A Randomized Experiment of a New Investment Readiness Program, Pioneers of the Balkans, in the Western Balkans.

Cusolito, A., Garcia, A., and W., Maloney. 2017. “Markups, Total Factor Productivity, and Innovation in Chile.”

Cutler, D. M., and A. Lleras-Muney. 2007. “Education and Health.” National Poverty Center, University of Michigan, Policy Brief No. 9.

Dalberg (Dalberg Development Advisors). 2016. “Inflection Point: Unlocking Growth in the Era of Farmer Finance.” New York.

Dang, H.A. and Dalaban, A. 2018 “Is Poverty in Africa Mostly Chronic or Transient? Evidence from Synthetic Panel Data.” *Journal of Development Studies*. In press.

Daruich, Diego. 2018. “The Macroeconomic Consequences of Early Childhood Development Policies.” mimeo.

Darvas, Peter, and Robert Palmer. 2014. *Demand and Supply of Skills in Ghana: How Can Training Programs Improve Employment?* World Bank Study. Washington, DC: World Bank.

Das, Jishnu, and Jeffrey Hammer. 2014. “Quality of Primary Care in Low-Income Countries: Facts and Economics.” *Annual Review of Economics* 6: 525-553.

Das, Jishnu, and Aakash Mohpal. 2016. “Socioeconomic Status and Quality of Care in Rural India: New Evidence from Provider and Household Surveys.” *Health Affairs* 35(10): 1764-1773.

Davies, James. 1962. “Toward a Theory of Revolution.” *American Sociological Review* 27(1): 5–19.

Davis K., E. Nkonya, E. Kato, D. A. Mekonnen, M. Odendo, R. Miiro, and K. Nkuba. 2012. “Impact of Farmer Field Schools on Agricultural Productivity and Poverty in East Africa.” *World Development* 40 (2): 402-413

De Hoyos, Rafael, Halsey Rogers, and Anna Popova. 2015. “Out of School and Out of Work: A Diagnostic of Ninis in Latin America.” Washington, DC: World Bank. Background paper for the “Out of School, Out of Work” study.

De Hoyos, Rafael E., Carlos Gutierrez-Fierros, and J. Vicente Vargas M. 2016. “Idle Youth In Mexico: Trapped Between the War on Drugs and Economic Crisis.” Policy Research Working Paper Series 7558. World Bank, Washington, DC.

De Loecker, J. 2011. “Product Differentiation, Multi-Product Firms and Estimating the Impact of Trade Liberalization on Productivity.” *Econometrica* 79(5): 1407–51.

De Loecker, J., and J., Eeckhout. 2017. “The Rise in Market Power,” Working Paper.

De Mel, Suresh, David McKenzie, and Christopher Woodruff. 2014. “Business Training and Female Enterprise Start-up, Growth, and Dynamics: Experimental Evidence from Sri Lanka.” *Journal of Development Economics* 106: 199-210.

De Mel, S., McKenzie, D., and C., Woodruff. (2010) “Who are the Microenterprise Owners?: Evidence from Sri Lanka on Tokman v. de Soto” in International Differences in Entrepreneurship, J. Lerner and A. Schoar (eds.), pp.63-87.

Deepak, C., and M H Bala Subrahmanya. 2017. “Degree of Cluster Linkages and Innovation Performance of a Firm: A Study of Bengaluru High-tech Manufacturing Cluster.” *Proceedings of the 2017 International Symposium on Industrial Engineering and Operations Management (IEOM) Bristol, UK*, July 24-25, 2017.

Deming, David J. 2015. “The Growing Importance of Social Skills in the Labor Market”, NBER Working Paper, No. 21473. National Bureau of Economic Research, Cambridge, MA.

Deming, David J. 2017. “The Growing Importance of Social Skills in the Labor Market.” *Quarterly Journal of Economics.* 132(4): 1593–640.

Desai, Raj M, and Homi Kharas. 2017. “Is a Growing Middle-Class Good for the Poor? Social Policy in a Time of Globalization” Brookings Institution, *Working Paper* 105. Washington, DC.

Devarajan, Shanta. 2018. “How to Use Oil Revenues Efficiently”. World Bank. Washington, DC.

Dillon, Andrew, Jed Friedman, and Pieter Serneels. 2014. “Health Information, Treatment, and Worker Productivity: Experimental Evidence from Malaria Testing and Treatment among Nigerian Sugarcane Cutters.” Policy Research Working Paper No.7120. World Bank, Washington, DC.

Dillon, Moira R., Harini Kannan, Joshua T. Dean, Elizabeth S. Spelke, and Esther Duflo. 2017. “Cognitive Science in the Field: A Preschool Intervention Durably Enhances Intuitive but Not Formal Mathematics.” *Science* 357(6346): 47-55.

Dischinger, M., Riedel, N., 2011. “Corporate taxes and the location of intangible assets within multinational firms.” *Journal of Public Economics* 95, 691–707.

Divanbeigi, Raian and Federica Saliola. 2017. “Regulatory Constraints to Agricultural Productivity. Policy Research Working Paper No. 8199. Washington, DC: World Bank.

Djankov, Simeon. 2017. “United States Is Outlier in Tax Trends in Advanced and Large Emerging Economies.” PIIE Policy Brief 17-29 (November). Washington: Peterson Institute for International Economics.

Djankov, Simeon, Dorina Georgieva, Rita Ramalho. 2018. “Business Regulations and Poverty,” *Economics Letters*, 165: 82-87, April.

Djankov, Simeon, Caroline Freund and Cong Pham. 2010. “Trading on Time,” *The Review of Economics and Statistics*, 92, issue 1: 166-173.

Djankov, Simeon; Rafael la Porta ; Florencio Lopez-de-Silanes; Andrei Shleifer. 2002. “The Regulation of Entry.” *Quarterly Journal of Economics* 118(1): 1-37.

Dorfman, M., D. Wang, P. O’Keefe and J. Cheng. 2013. “China’s Pension Schemes for Rural and Urban Residents.” In R. Hinz, R. Holzmann, D. Tuesta and N. Takayama (eds) *Matching Contributions for Pensions*. Washington DC.

Duranton, G., V. Henderson, and W. Strange. 2015. *Handbook of Regional and Urban Economics.* North Holland.

Dutz, Mark A., Rita K. Almeida, and Truman G. Packard. 2018. *The Jobs of Tomorrow: Technology, Productivity, and Prosperity in Latin America and the Caribbean. Directions in Development.* Washington, DC: World Bank.

eBay. 2013. “Commerce 3.0 for Development: The Promise of the Global Empowerment Network.”

Edelman, Benjamin. 2015. “How to Launch Your Digital Platform: A Playbook for Strategists.” *Harvard Business Review* 93(4): 90–7.

Edelman, Benjamin G., and Damien Geradin. 2015. “Efficiencies and Regulatory Shortcuts: How Should We Regulate Companies like Airbnb and Uber?” Stanford Technology Law Review, Forthcoming; Harvard Business School NOM Unit Working Paper No. 16-026.

Eden, Maya, and Paul Gaggl. 2015. “The ICT Revolution: A Global Perspective”. Background Paper World Development Report 2016.

Ehui, Simeon. 2018. “Foresight Africa Viewpoint – Why Technology Will Disrupt and Transform Africa’s Agriculture Sector in A Good Way.” The Brookings Institute: Washington, DC.

Eicher Theo S., and Cecilia Garcıa-Penalosa. 2001. “Inequality and Growth: The Dual Role of Human Capital in Development.” *Journal of Development Economics* 66: 173–97.

Edelman Intelligence. 2017. *Freelancing in America: 2017*. Washington, DC.

Engle, Patrice, Lia Fernald, Harold Alderman, Jere Behrman, Chloe O’Gara, Aisha Yousafzai, Meena Cabral de Mello, Melissa Hidrobo, Nurper Ulkuer, Ilgi Ertem, and Selim Iltus. 2011. “Strategies for Reducing Inequalities and Improving Developmental Outcomes for Young Children in Low-Income and Middle-Income Countries.” *The Lancet* 378(9799): 1339-53.

Eslava, M., and J., Haltiwanger. 2017. “The Life-cycle Growth of Plants in Colombia: Fundamentals vs. Distortions.” Working Paper.

Eurofound. 2016. “What do Europeans do at Work: A Task-based Analysis: European Jobs Monitor 2016.” Luxembourg.

Evans, David, Brian Holtemeyer, and Katrina Kosec. 2018. “Cash Transfers Increase Trust in Local Government.” Policy Research Working Paper 8333, World Bank Group.

Evans, David K., and Anna Popova. 2014. “Cash Transfers and Temptation Goods: A Review of Global Evidence.” Policy Research Working Paper No. 6886. Washington, DC: World Bank.

Fafchamps, M., and S., Quinn. 2017. “Aspire.” *The Journal of Development Studies* 53(10): 1615-1633.

Fernald, Lia C. H., Patricia Kariger, Melissa Hidrobo, and Paul J. Gertler. 2012. “Socioeconomic Gradients in Child Development in Very Young Children: Evidence from India, Indonesia, Peru, and Senegal.” Proceedings of the National Academy of Sciences 109 (Supplement 2): 17273–80.

Fernald, Lia C. H. and Melissa Hidrobo. 2011. “Effect of Ecuador’s cash transfer program (Bono de Desarrollo Humano) on child development in infants and toddlers: A randomized effectiveness trial.” *Social Science & Medicine* 72(9): 1437-1446.

Fernald, Lia C. H., Paul J. Gertler, and Lynnette M. Neufeld. 2008. “Role of cash in conditional cash transfer programmes for child health, growth, and development: an analysis of Mexico’s Oportunidades.” *Lancet* 371(9615): 828-837.

Fernandes, Ana M. & Freund, Caroline & Pierola, Martha Denisse. 2016. "Exporter behavior, country size and stage of development: Evidence from the exporter dynamics database," Journal of Development Economics, Elsevier, vol. 119(C), pages 121-137.

Ferre, Celine, and Sharif Iffath. 2014. “Can Conditional Cash Transfers Improve Education and Nutrition Outcomes for Poor Children in Bangladesh? Evidence from a Pilot Project.” World Bank: Washington, DC.

Ferreyra, María Marta, Ciro Avitabile, Javier Botero Álvarez, Francisco Haimovich Paz, and Sergio Urzúa. 2017. *At a Crossroads: Higher Education in Latin America and the Caribbean. Directions in Development.* Washington, DC: World Bank.

Fetzer, Thiemo. 2014. “Can Workfare Programs Moderate Violence? Evidence from India.” Working Paper, London School of Economics.

Finley-Brook, Mary, and Caroline O'Rourke 2011. “EARTH University (Costa Rica).” In *Green Education: An A-to-Z Guide*, edited by Julie Newman, 124-26. Los Angeles: Sage Publications.

Fixsen, D. L., S. F. Naoom, K. A. Blase, R. M. Friedman, and F. Wallace. 2005. *Implementation Research: A Synthesis of the Literature.* Tampa, FL: University of Southern Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network.

Flabbi, Luca, and Roberta Gatti. 2018. “A Primer on Human Capital.” Policy Research Working Paper 8309, World Bank Group.

Foster, Andrew and Mark Rosenzweig. 2007. “Economic Development and the Decline of Agricultural Employment,” Handbook of Development Economics 4:3051-3083

Foster, A. D., and M. R. Rosenzweig. 1996. “Technical Change and Human-Capital Returns and Investments: Evidence from the Green Revolution.” *American Economic Review*: 86 (4): 931–53.

Freund, Caroline. 2016. *Rich People Poor Countries: The Rise of Emerging-Market Tycoons and Their Mega Firms*. Peterson Institute for International Economics: Washington, DC.

Freund, Caroline, Alen Mulabdic, and Michele Ruta. 2018. “Is 3D Printing a Threat to Global Trade.” (forthcoming).

Freund, Caroline, and Martha Denisse Pierola. 2015. “Export Superstars,” *Review of Economics and Statistics* 97(5): 1023-1032.

Freund, Caroline, Simeon Djankov, and Cong S Pham. 2010. “Trading on Time.” *Review of Economics and Statistics*, 92(1) pp.166-173.

Frey, Carl Benedikt, and Michael A. Osborne. 2017. “The Future of Employment: How Susceptible Are Jobs to Computerisation?” *Technological Forecasting & Social Change* 114(c): 254–80.

Fusheini, Adam, Gordon Marnoch, and Ann Marie Gray. 2017. “Implementation challenges of the National Health Insurance Scheme in Selected Districts in Ghana: Evidence from the Field.” *International Journal of Public Administration* 40(5): 416-426.

Garcia, Jorge Luis, James J. Heckman, Anna L. Ziff. 2017. “Gender Differences in the Benefits of an Influential Early Childhood Program.” NBER Working paper 23412.

García, Jorge Luis, James Heckman, Duncan Ermini Leaf, and Maria Prados. 2017. “Quantifying the Life-cycle Benefits of a Prototypical Early Childhood Program.” NBER Working paper 22993. National Bureau of Economic Research, Cambridge, MA.

Garicano, Luis, Claire Lelarge, and John Van Reenen. 2016. “Firm Size Distortions and the Productivity Distribution: Evidence from France.” *American Economic Review*, 106(11): 3439-3479.

Gentilini, Ugo, Margaret Grosh, Jamele Rigolini, and Ruslan Yemtsov. Forthcoming. “Understanding Universal Basic Income: Concepts, Evidence, and Practices.” (Preliminary title). World Bank. Washington DC.

Gertler, P., S. Martinez, and M. Rubio. 2012. “Investing Cash Transfers to Raise Long Term Living Standards.” *American Economic Journal: Applied Economics* 4 (1):164-92.

Gertler, Paul, James Heckman, Rodrigo Pinto, Arianna Zanolini, Christel Vermeersch, Susan Walker, Susan M. Chang, and Sally Grantham-McGregor. 2014. “Labor Market Returns to An Early Childhood Stimulation Intervention in Jamaica.” *Science* 344: 998–1001.

Gertler, Paul, Paula Giovagnoli, and Sebastian Martinez. 2014. “Rewarding Performance to Enable a Healthy Start: The Impact of Plan Nacer on Birth Outcomes of Babies Born into Poverty.” Policy Research Working Paper 6884, World Bank Group.

Gibson, John, Gaurav Datt, Rinku Murgai, and Martin Ravallion. 2017. “For India’s Rural Poor, Growing Towns Matter More Than Growing Cities.” *World Development* 98: 413-429

Gill, Indermit S., Ana Revenga, and Christian Zeballos. 2016. “Grow, Invest, Insure: A Game Plan to End Extreme Poverty by 2030.” Policy Research Working Paper 7892, World Bank Group.

Giné, Xavier, Dean Karlan, and Jonathan Zinman. 2010. “Put Your Money Where Your Butt Is: A Commitment Contract for Smoking Cessation.” *American Economic Journal: Applied Economics* 2(4): 213-35.

Glaeser, Edward L. 2015. *The urban imperative: towards competitive cities*. Ed. Joshi-Ghani, Abha. World Bank. Washington, D.C.

Global Burden of Disease Pediatrics Collaboration. 2016. “Global and National Burden of Diseases and Injuries among Children and Adolescents between 1990 and 2013: Findings from the Global Burden of Disease 2013 Study.” *JAMA Pediatrics* 170(3): 267-87.

Global Health Workforce Alliance. 2008. *Country Case Study: Pakistan’s Lady Health Worker Program*. Global Health Workforce Alliance and WHO.

Goldberg, Pinelopi Koujianou; Amit Kumar Khandelwal; Nina Pavcnik; Petia Topalova. 2010. “Imported Intermediate Inputs and Domestic Product Growth: Evidence from India.” *Quarterly Journal of Economics* 125(4): 1727-1767.

Goldin, Claudia. 2016. “Human Capital.” in: C. Diebolt, and M. Haupert (eds.) *Handbook of Cliometrics*, Berlin: Springer-Verlag, pp.55-86.

Goldin, Claudia, and Joshua Mitchell. 2017. “The New Life Cycle of Women’s Employment: Disappearing Humps, Sagging Middles, Expanding Tops.” *Journal of Economic Perspectives* 31(1) 161-182.

Gollin, D., Jedwab, R., and Vollrath, D. 2016. “Urbanization with and without industrialization”. *Journal of Economic Growth* 21(1): 35-70.

Gollin, D. 2008. “Nobody's business but my own: Self-employment and small enterprise in economic development”, *Journal of Monetary Economics* 55(2): 219-233.

Gonzalez-Uribe, Juanita and Santiago Reyes. (forthcoming). “Identifying and spurring “gazelles”: quasi-experimental evidence from a government-backed business accelerator.” LSE working paper.

Gonzalez-Uribe, Juanita and Michael Leatherbee. 2018. “The Effects of Business Accelerators on Venture Performance: Evidence from Start-Up Chile,” *The Review of Financial Studies*, 31, 4, 1: 1566–1603, April.

Goos, Maarten, Alan Manning, and Anna Salomons. 2014. “Explaining Job Polarization: Routine-Biased Technological Change and Offshoring.” *American Economic Review* 104(8): 2509–26.

Gorka, S., W. Hardy, R. Keister, and P. Lewandowski. 2017. “Tasks and Skills in European Labor Markets.” IBS Research Report 03/2017. Warsaw: Institute for Structural Research.

Government of India. 2017. *Economic Survey 2016-17*. New Delhi.

Gregory, Terry and Salomons, Anna and Zierahn, Ulrich. 2016. “Racing with or Against the Machine? Evidence from Europe.” ZEW - Centre for European Economic Research Discussion Paper No. 16-053.

Griffith, Rachel, Helen Miller and Martin O'Connell. 2018. “Ownership of intellectual property and corporate taxation.” *Journal of Public Economics* 112: 2014, 12–2.

Griliches, Z. 1969. “Capital-Skill Complementarity.” *Review of Economics and Statistics* 465-68.

Grimm, M., and A. L., Paffhausen. 2015. “Do Interventions Targeted at Micro-Entrepreneurs and Small and Medium-Sized Firms Create Jobs? A Systematic Review of the Evidence for Low and Middle Income Countries”, Labour Economics 32: 67-85.

GSMA. 2018. *The Mobile Economy - Sub-Saharan Africa 2017*. London: GSMA.

Guellec, D., and C., Paunov. 2017. “Digital Innovation and the Distribution of Income,” in Measuring and Accounting for Innovation in the 21st Century, Corrado, Miranda, Haskel, and Sichel.

Güneş, P. 2013. “The Impact of Female Education on Fertility: Evidence from Turkey.” GCC Working Paper Series.

Gwatkin, D. and Ergo, A. 2011. “Universal Health Coverage: Friend or Foe of Health Equity?” *The Lancet* 377(9784): 2160-2161.

Haan, Hans Christian, and Nicolas Serrière. 2002. “Training for Work in the Informal Sector: Fresh Evidence from West and Central Africa.” Turin, Italy: International Training Centre of the International Labour Organization.

Hallward-Driemeier, Mary, and Gaurav Nayyar. 2017. *Trouble in the Making? The Future of Manufacturing-Led Development*. World Bank, Washington, DC.

Haltiwanger, J. 2015. “Top Ten Signs of Declining Business Dynamism and Entrepreneurship in the U.S”. Working paper, Kauffman Foundation New Entrepreneurial Growth.

Haltiwanger, John, Ron Jarmin and Javier Miranda. 2013. “Who Creates Jobs? Small versus Large versus Young,” *The Review of Economics and Statistics*. 95, 2: 347-361, May.

Hanlon, J., Barrientos, A. and Hulme, D. 2010. *Just Give Money to the Poor: The Development*

Karabarbounis, L., and Neiman, B. (2014) “The Global Decline of the Labor Share”. *Quarterly Journal of Economics* 129(1): 61-10.

Hanson, Gordon H. 2007. “Globalization, Labor Income, and Poverty in Mexico.” NBER Chapters in *Globalization and Poverty* 417-56. National Bureau of Economic Research, Inc.

Hanushek, Eric A. 2013. “Economic growth in developing countries: The role of human capital.” Economics *of Education Review* 37: 204-212.

Hanushek, Eric A. and Ludger Woessman. 2012. “Schooling, educational attainment, and the Latin American growth puzzle.” *Journal of Development Economics* 99(2): 497-512.

Hanushek, Eric A., Guido Schwerdt, Simon Wiederhold, and Ludger Woessmannh. 2017. “Coping with Change: International Differences in the Returns to Skills.” *Economics Letters* 153: 15–19.

Harris, T., Phillips, D., Warwick, R., Goldman, M., Jellema, J., Goraus, K., Inchauste, G. 2018. “Redistribution via VAT and Cash Transfers: An Assessment in Four Low and Middle Income Countries.” IFS, Working Paper 18/11. London.

Hasanefendic, Sandra, Manuel Heitor, and Hugo Horta. 2016. “Training Students for New Jobs: The Role of Technical and Vocational Higher Education and Implications for Science Policy in Portugal.” *Technological Forecasting & Social Change* 113 (Part B): 328-40.

Headey, D. 2014. “Food Prices and Poverty Reduction in the Long Run”. IFPRI, Working Paper 1331. Washington, DC.

Health Data Collaborative. 2018. *Data for Health and Sustainable Development.* http://www.healthdatacollaborative.org.

Heckman, James J. 2008. “Schools, Skills, and Synapses.” *Economic Inquiry* 46(3): 289-324.

Heckman, James J., Jora Stixrud, and Sergio Urzua. 2006. “The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior.” *Journal of Labor Economics* 24(3): 411-82.

Heckman, James J., Seong Hyeok Moon, Rodrigo Pinto, Peter A. Savelyev, and Adam Yavitz. 2010. “The Rate of Return to the Highscope Perry Preschool Program.” *Journal of Public Economics* 94(1-2): 114-28.

Heyneman, Stephen P. and William A. Loxley. 1983. “The Effect of Primary-School Quality on Academic Achievement Across Twenty-nine High- and Low-Income Countries.” *American Journal of Sociology* 88(6): 1162-1194.

Hicks, J. H., M. Kremer, I. Mbiti, and E. Miguel. 2011. *Vocational Education Voucher Delivery and Labor Market Returns: A Randomized Evaluation Among Kenyan Youth.* enGender Impact: World Bank's Gender Impact Evaluation Database. Washington DC: World Bank.

Hicks, Joan Hamory, Marieke Kleemans, Nicholas Y. Li, Edward Miguel. 2017. “Reevaluating Agricultural Productivity Gaps with Longitudinal Microdata” NBER Working Paper No. 23253

Hirshleifer, Sarojini, David McKenzie, Rita Almeida, and Cristobal Ridao-Cano. 2016. “The Impact of Vocational Training for the Unemployed: Experimental Evidence from Turkey.” The Economic Journal 126(597): 2115–46.

Hoddinott J, Maluccio JA, Behrman JR, Flores R, Martorell R. 2008. "Effect of A Nutrition Intervention During Early Childhood on Economic Productivity in Guatemalan Adults." *The Lancet* 371: 411–16.

Holmström, Bengt, and John Roberts. 1998. "The Boundaries of the Firm Revisited." *Journal of Economic Perspectives* 12(4): 73–94.

Hoxby, Caroline M. 2017. "Online Postsecondary Education and Labor Productivity." In *Education, Skills, and Technical Change, and Future US GDP Growth*. University of Chicago Press.

Hsieh, Chang-Tai and Peter Klenow. 2014. "The Life Cycle of Plants in India and Mexico," The *Quarterly Journal of Economics*, 129(3): 1035-1084.

Hsieh, Chang-Tai, and Benjamin A. Olken. 2014. "The Missing 'Missing Middle'." *Journal of Economic Perspectives* 28 (3): 89–108

Hsieh, Chang-Tai, and Peter J. Klenow. 2010. "Development Accounting." *American Economic Journal: Macroeconomics* 2(1): 207-23.

Ibarrarán, P., L. Ripani, B. Taboada and J.M. Villa. 2012. "Life Skills, Employability and Training for Disadvantaged Youth: Evidence from a Randomized Evaluation Design." IDB Working Paper Series No. IDB-WP-342. Inter-American Development Bank, Washington, DC.

Ibarrarán, Pablo, Jochen Kluve, Laura Ripani, and David Rosas. 2015. "Experimental Evidence on the Long Term Impacts of a Youth Training Program." IDB Working Paper Series No. 657.

IMF. 2017. *Fiscal Monitor October 2017: Tackling Inequality*. Washington, DC.

Independent Evaluation Group. 2016. *A decade of World Bank Support to Senegal's Nutrition Program. Project Performance Assessment Report*.

Ingelaere, Bert, Luc Christiaensen, Joachm De Weerdt, and Ravi Kanbur. 2018. "Why secondary towns can be important for poverty reduction - A migrant perspective." *World Development* 105: 273-282.

International Labor Organization (ILO). 2013. Trabajo decente e igualdad de género. Políticas para mejorar el acceso y la calidad del empleo de las mujeres en América Latina y el Caribe. Informe Regional, Santiago, Chile.

International Labor Organization. 2017. *World Social Protection Report 2017-19: Universal Social Protection to Achieve the Sustainable Development Goals*. Geneva.

ILOSTAT. 2018. Key Indicators of the Labor Market (KILM). Available at: http://www.ilo.org/ilostat/. Accessed 02/27/2018.

ILO. 2017. "Global Wage Report".

ILO. 2017. "India Labour Market Update." *ILO Country Office for India*, July. http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-new_delhi/documents/publication/wcms_568701.pdf

ILO and OECD. 2015. “The Labor Share in G20 Economies”.

ILO. 2013. *Women and Men in the Informal Economy: A Statistical Picture. (Second Edition).* ILO, Geneva.

Iqbal, Sarah, Asif Islam, Rita Ramalho and Alena Sakhonchik. 2016. “Unequal Before the Law: Measuring Legal Gender Disparities Across the World.” Policy Research Working Paper 7622. World Bank.

J-PAL. 2017. “J-PAL Skills for Youth Program Review Paper.” Cambridge, MA: Abdul Latif Jameel Poverty Action Lab.

Jayachandran, Seema. 2015. “The Roots of Gender Inequality in Developing Countries.” *Annual Review of Economics* 7: 63-88.

Jensen, Eric. 2008. *Brain-Based Learning: The New Paradigm of Teaching*. Thousand Oaks, CA: Corwin Press.

Jensen, Robert. 2012. “Do Labor Market Opportunities Affect Young Women’s Work and Family Decisions? Experimental Evidence from India.” *Quarterly Journal of Economics* 127: 753–92.

Jerrim, John, and Lindsey Macmillan. 2015. “Income Inequality, Intergenerational Mobility, and the Great Gatsby Curve: Is Education the Key?” *Social Forces* 94(2): 505–33

Jones, Benjamin F. 2014. “The Human Capital Stock: A Generalized Approach.” *American Economic Review* 104(11): 3752-77.

Joshi, A. R., and I. Gaddis, (eds.). 2015. *Preparing the Next Generation in Tanzania: Challenges and Opportunities in Education*. World Bank Group.

Jung, Hyejin, and Byung-Keun Kim. 2017. “Determinant Factors of University Spin-Off: The Case of Korea.” *The Journal of Technology Transfer*: 1-16.

Kaffenberger, Michelle, and Lant Pritchett. 2017. “More School or More Learning? Evidence from Learning Profiles from the Financial Inclusion Insights Data.” World Development Report Background Paper. Washington, DC: World Bank.

Karabarbounis, Loukas, and Brent Neiman. 2014. “The Global Decline of the Labor Share.” *Quarterly Journal of Economics* 129(1): 61–103.

Kanbur, Ravi. 2017. “Informality: Causes, Consequences and Policy Responses.” *Review of Development Economics* 21(4): 939-961

Kantor, Shawn, and Alexander Whalley. 2014. “Knowledge Spillovers from Research Universities: Evidence from Endowment Value Shocks.” *Review of Economics and Statistics* 96(1):171-88.

Kapsos, S. and Bourmpoula, E. 2013. “Employment and Economic Class in the Developing World”. ILO, *Research Paper* 6. Washington, DC.

Karimou, Bassirou. 2012. *Evaluation d'impact: Passer des promesses a l'acte.* Addis Ababa: Human Development Network.

Keynes, John Maynard. 1931. "Economic Possibilities for our Grandchildren," in Essays in Persuasion (New York: W.W.Norton & Co., 1963), 358-373, http://www.econ.yale.edu/smith/econ116a/keynes1.pdf.

Khan, Hafiz T. A., Shereen Hussein, and John Deane. 2017. "Nexus Between Demographic Change and Elderly Care Need in the Gulf Cooperation Council (GCC) Countries: Some Policy Implications." *Ageing Int* 42:466–487.

Khosla, S. 2018. *India's Universal Basic Income: Bedeviled by the Details*. Carnegie India. New Delhi.

Kirpal, Simone. 2002. "Communities Can Make a Difference: Five Cases Across Continents." In *From Early Child Development to Human Development: Investing in Our Children's Future*, edited by Mary Eming Young. Washington, DC: The World Bank.

Kluve, Jochen. 2016. A Review of the Effectiveness of Active Labour Market Programmes with a Focus on Latin America and the Caribbean." ILO Working Paper No. 9.

Knack, Stephen, and Philip Keefer. 1997. "Does Social Capital Have An Economic Payoff? A Cross-Country Investigation." *The Quarterly Journal of Economics* 112(4): 1251-88.

Kontis, V., J. E. Bennett, C. D. Mathers, G. Li, K. Foreman, K, and M. Ezzati. 2017. "Future Life Expectancy in 35 Industrialised Countries: Projections with a Bayesian Model Ensemble." The Lancet 389(10076): 1323-35.

Kossoy, Alexandre, Grzegorz Peszko, Klaus Oppermann, Nicolai Prytz, Noémie Klein, Kornelis Blok, Long Lam, Lindee Wong, and Bram Borkent. 2015. *State and Trends of Carbon Pricing*. Washington: World Bank.

Krueger, Alan, and Eric Posner. 2018. "A Proposal for Protecting Low-Income Workers from Monopsony and Collusion." The Hamilton Project Policy Proposal 2018-05. Washington, DC.

Ksoll, Christopher, Jenny C. Aker, Danielle C Miller, Karla Perez-Mendoza, and Sue Smalley. 2014. "Learning Without Teachers? A Randomized Experiment of a Mobile Phone-Based Adult Education Program in Los Angeles." Center for Global Development Working Paper No. 368.

Kuddo, Arvo. Forthcoming. "Labor regulations around the World: An Overview". Washington, DC.

Kugler, Adriana, Maurice Kugler, Juan Saavedra, and Luis Omar Herrera Prada. 2015. "Long-Term Direct and Spillover Effects of Job Training: Experimental Evidence from Colombia." NBER Working Paper, No. 21607. National Bureau of Economic Research, Cambridge, MA.

La Porta, Rafael, and Andrei Shleifer. 2014. "Informality and Development." *Journal of Economic Perspectives* 28(3): 109–26.

Laajaj, Rachid, Karen Macours. 2017. “Measuring Skills in Developing Countries.” Policy Research Working Paper No. 8000. World Bank, Washington, DC.

Lagakos, David, Benjamin Moll, Tommaso Porzio, Nancy Qian and Todd Schoellman. 2018. “Life-Cycle Wage Growth Across Countries.” *Journal of Political Economy*.

Lange, Glenn-Marie, Quentin Wodon, and Kevin Carey. 2018. *The Changing Wealth of Nations 2018: Building a Sustainable Future*. World Bank, Washington, DC.

Larreguy, Horacio, and John Marshall. 2017. “The Effect of Education on Civic and Political Engagement in Nonconsolidated Democracies: Evidence from Nigeria.” *Review of Economics and Statistics* 99(3): 387-401.

Larsen, Anna Folke and Helene Bie Lilleor. 2014. “Beyond the Field: The Impact of Farmer Field Schools on Food Security and Poverty Alleviation” *World Development* 64: 843-859

Lederman, D., Olarreaga, M., and L., Payton. 2010. “*Export Promotion Agencies: Do They Work?*” (201). *Journal of Development Economics* 91:257-65.

Leite, P., George, T., Sun, C., Jones, T. and Lindert, K. 2017. “Social Registries for Social Assistance and Beyond: A Guidance Note & Assessment Tool”. World Bank, *Social Protection Discussion Paper* 1704. Washington, DC.

Lenin, Vladimir. 1918. *First All-Russia Congress of Representatives of the Financial Departments of the Regional, Gubernia and Uyezd Soviets.* Moscow.

Leventhal, Tama, and Jeanne Brooks-Gunn. 2000. “The Neighborhoods They Live in: The Effects of Neighborhood Residence on Child and Adolescent Outcomes.” *Psychological Bulletin* 126(2): 309-37.

Lewis, Arthur, and David Smith. 1993. “Defining Higher Order Thinking.” *Theory Into Practice* 32(3): 131-37.

Li, Hongbin, Prashant Loyalka, Scott Rozelle, and Binzhen Wu. 2017. “Human Capital and China's Future Growth.” *Journal of Economic Perspectives* 31(1): 25-48.

Lillard, Angeline, and Nicole Else-Quest. 2006. “The Early Years: Evaluating Montessori Education.” *Science* 313(5795): 1893–94.

Lipina, Sebastián J., María I. Martelli, Beatriz Vuelta, and Jorge A. Colombo. 2005. “Performance on the A-Not-B Task of Argentinean Infants from Unsatisfied and Satisfied Basic Needs Homes.” *Interamerican Journal of Psychology* 39 (1): 46–60.

Lochner, Lance and Enrico Moretti. 2004. “The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports.” *American Economic Review* 94(1).

Lopez-Calva, L.F. and Ortiz-Juarez, E. 2011. “A Vulnerability Approach to the Definition of the Middle Class.” World Bank, Policy Research Working Paper 5902. Washington, DC.

López-Mondéjar, Loida M., and Lina M. Tomás Pastor. 2017. “Development of Socio-emotional Skills through Cooperative Learning in a University Environment.” Procedia - Social and Behavioral Sciences 21: 432-37.

Loyalka, Prashant, Elena Kardonova, Lydia Liu, Guirong Li, Huan Wang, Natalie Johnson, and Henry Shi. 2016. “Assessing Skill Levels and Gains in Engineering Programs across the US, China, and Russia.” Unpublished paper.

Macdonald, Kevin Alan David, Sally Ann Brinkman, Wendy Jarvie, Myrna Machuca-Sierra, Kristen Andrew Mcdonall, Souhila Messaoud-Galusi, Siosiana Tapueluelu, and Binh Thanh Vu. 2017. “Pedagogy Versus School Readiness: The Impact of a Randomized Reading Instruction Intervention and Community-Based Playgroup Intervention on Early Grade Reading Outcomes in Tonga.” Policy Research Working Paper No. 7944. Washington, D.C.: World Bank.

Macdonald, Kevin, and Binh Thanh Vu. 2018. “A Randomized Evaluation of a Low Cost and Highly Scripted Teaching Method to Improve Basic Early Grade Reading Skills in Papua New Guinea.” Work in progress.

Mackenbach, J. P. 2006. Health inequalities: Europe in profile. Produced by COI for the Department of Health.

Macours, K., P. Premand, and R. Vakis. 2013. “Demand versus Returns? Pro-poor Targeting of Business Grants and Vocational Skills Training.” World Bank Policy Research Working Paper No. 6389. Washington, DC: World Bank.

Maguire, Eleanor A., David G. Gadian, Ingrid S. Johnsrude, Catriona D. Good, John Ashburner, Richard S. J. Frackowiak, and Christopher D. Frith. 2000. “Navigation-Related Structural Change in the Hippocampi of Taxi Drivers.” Proceedings of the National Academy of Sciences 97(8): 4398-403.

Maitra, Pushkar, and Subha Mani. 2014. “Learning and Earning: Evidence from a Randomized Evaluation in India.” IZA Discussion Paper No. 8552. Bonn.

Maloney, William F., and Felipe Valencia Caicedo. 2014. “Engineers, Innovative Capacity and Development in the Americas.” Policy Research Working Paper No. 6814. World Bank, Washington, DC.

Maloney, William F. and Carlos Molina. 2016. “Are Automation and Trade Polarizing Developing Country Labor Markets, Too?”. Research Policy Working Paper: No. 7922. World Bank, Washington, DC.

Maluccio, John, John Hoddinott, Jere Behrman, Reynaldo Martorell, Agnes Quisumbing, and Aryeh D. Stein. 2009. “The Impact of Improving Nutrition During Early Childhood on Education among Guatemalan Adults.” *Economic Journal* 119(537): 734–63.

Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. 2013. “Poverty Impedes Cognitive Function.” *Science* 341(6149): 976-80.

Mansfield, Edwin. 1998. “Academic Research and Industrial Innovation: An Update of Empirical Findings.” *Research Policy* 26: 773–76.

Marinescu, Ioana. 2018. *No Strings Attached: The Behavioral Effects of U.S. Unconditional Cash Transfer Programs*. Roosevelt Institute. Washington, DC.

Marini, Alessandra, Claudia Rokx, and Paul Gallagher. 2017. *Standing tall: Peru's success in overcoming its stunting crisis,* Washington, D.C.: World Bank Group.

Marmot, Michael. 2005. “Social determinants of health inequalities.” *Lancet* 365(9464): 1099-1104.

Marotta, Daniela, Michael Mark, Andreas Blom, and Kristian Thorn. 2007. “Human Capital and University-Industry Linkages’ Role in Fostering Firm Innovation: An Empirical Study of Chile and Colombia.” Policy Research Working Paper No. 4443. World Bank, Washington, DC.

Martinez A., Claudia, Esteban Puentes, and Jaime Ruiz-Tagle. 2017. “The Effects of Micro Entrepreneurship Programs on Labor Market Performance: Experimental Evidence from Chile.” Working Paper.

Martinez, S., S. Naudeau, and V. Pereira. 2012. “The Promise of Preschool in Africa: A Randomized Impact Evaluation of Early Childhood Development in Rural Mozambique.” World Bank, Washington, DC.

Marx, Karl. 1867. *Das Kapital*: *Kritik der politischen Oekonomie*. Verlag Otto Meissner, Hamburg.

Mason, Andrew, Vera Kehayova, and Judy Yang. 2018. “Trade, Technology, Skills and Jobs:

Exploring the Road Ahead for Developing East Asia.” Background Paper for *Sustaining the Revival of Middle-Income East Asia,* forthcoming. World Bank, Washington, DC.

Mason, C., and J., Kwok. 2010. “Investment Readiness Programmes and Access to Finance: A Critical Review of Design Issues”, *Local Economy* 25(4): 269-92.

McCaig, Brian and Nina Pavcnik. 2015. “Informal Employment in a Growing and Globalizing Low-Income Country.” *American Economic Review: Papers & Proceedings* 105(5): 545-550.

McEwan, Patrick J. 2015. “Improving Learning in Primary Schools of Developing Countries: A Meta-Analysis of Randomized Experiments.” *Review of Educational Research* 85(3): 353-394.

McKenzie, David. 2018. “Marginal Changes for the Many or Focusing on the Few?” “Trade-Offs in Firm Support Policies and Jobs”. WDR 2019 Background note (forthcoming).

McKenzie, David. 2018. “Challenges and Lessons on Identifying High-Growth Enterprises in Developing Countries”. WDR 2019 Background note (forthcoming).

McKenzie, David. 2017. “Identifying and Spurring High-Growth Entrepreneurship: Experimental Evidence from a Business Plan Competition.” *American Economic Review* 107(8): 2278-2307.

McKenzie, David, and Paffhausen, Anna Luisa. 2017. "Small Firm Death in Developing Cou*ntries"*. World Bank, Policy Research Working Paper 8236. Washington, DC.

McKenzie, David, and Puerto, Susana. 2017. "Growing markets through business training for female entrepreneurs: A market-level randomized experiment in Kenya." Policy Research Working Paper no. 7993. Washington, DC: World Bank.

McKenzie, David and Dario Sansone. 2017. "Man vs. Machine in Predicting Successful Entrepreneurs," Policy Research Working Paper 8271, The World Bank, Washington DC, December.

McKinley, R.A. 1958. *The City of Leicester: Social and administrative history, 1660–1835*, A History of the County of Leicester: volume 4: The City of Leicester (1958), pp. 153.

Michaels, Guy; Ashwini Natraj and John van Reenen. 2014. "Has ICT Polarized Skill Demand? Evidence from Eleven Countries over Twenty-Five Years." *The Review of Economics and Statistics* 96: 60–77.

Mikkelsen, L, DE Phillips, C AbouZahr, PW Setel, D de Savigny, R Lozano and AD Lopez. 2015. "A global assessment of civil registration and vital statistics systems: monitoring data quality and progress." *Lancet* 386(10001): 1395-1406.

Mincer, Jacob 1974. Schooling, Experience, and Earnings. New York: Columbia University Press, 1974.

Ministry of Finance, Government of India. 2018. *Economic Survey 2017-18: Volume I,* Government of India.

Montenegro, Claudio E., and Harry A. Patrinos. 2014. "Comparable Estimates of Returns to Schooling Around the World." Policy Research Working Paper No. 7020. World Bank, Washington, DC.

Moretti, Enrico. 2004. "Workers' Education, Spillovers, and Productivity: Evidence from Plant-Level Production Functions." *American Economic Review* 94(3): 656-90.

Moreno-Monroy, Ana I. and Hector M. Posada. 2018. "The Effect of Commuting Costs and Transport Subsidies on Informality Rates." *Journal of Development Economics* 130:99-112.

Muralidharan, Karthik, Paul Neihaus and Sandip Sukhtankar. 2016. "Building State Capacity: Evidence from Biometric Smartcards in India." *American Economic Review* 106(10): 2895-2929.

Naudeau, Sophie, and Rifat Hasan. 2016. "Early Childhood Development: A Review of the Global Evidence." Policy Brief. Washington DC: World Bank.

Nelson, R. R., and E. S. Phelps. 1966. "Investment in Humans, Technological Diffusion, and Economic Growth." *American Economic Review* 56(1/2): 69-75.

Noble, Kimberly G., M. Frank Norman, and Martha J. Farah. 2005. "Neurocognitive Correlates of Socioeconomic Status in Kindergarten Children." *Developmental Science* 8 (1): 74–87.

Noland, Marcus, and Howard Pack. 2007. *The Arab Economies in a Changing World*. Washington, DC: Peterson Institute.

Nollenberger, N., and N. Rodríguez-Planas. 2015. "Full-Time Universal Child Care in a Context of Low Maternal Employment: Quasi-Experimental Evidence from Spain." *Labour Economics* 36: 124−36.

Nores, Milagros, and W. Steven Barnett. 2010. "Benefits of Early Childhood Interventions Across the World: (Under) Investing in the Very Young." *Economics of Education Review* 29: 271-82.

OECD. 2014. India Policy Brief: Education and Skills-Improving the Quality of Education and Skills Development. Paris.

OECD/Korea Institute of Public Finance. 2014. "The Distributional Effects of Consumption Taxes in OECD Countries." OECD Tax Policy Studies, No. 22, OECD Publishing.

Ordóñez de Pablos, Patricia, W.B. Lee, and Jingyuan Zhao. 2011. *Regional Innovation Systems and Sustainable Development: Emerging Technologies*. Hershey: New York.

Packard, Truman G.; Montenegro, Claudio E.. 2017. "Labor policy and digital technology use : indicative evidence from cross-country correlations." Policy Research working paper; no. WPS 8221. Washington, DC: World Bank Group.

Patrinos, Harry. 2016. "Here's the evidence that low cost reading programs can have a big impact." blogs.worldbank.org. https://blogs.worldbank.org/education/here-s-evidence-low-cost-reading-programs-can-have-big-impact (accessed March 8, 2018).

Penn, H. 2010. "The Debate About Quality in the Private For-profit Childcare Market." Conference paper for Social Policy Association Conference, Lincoln, UK, 6 July 2010.

Pew Research Center. 2014. *AI, Robotics, and the Future of Jobs*. Available at: http://www.pewinternet.org/2014/08/06/future-of-jobs/.

Pinelli, Dino, Roberta Torre, Lucianajulia Pace, Laura Cassio and Alfonso Arpaia. 2017. "The Recent Reform of the Labor Market in Italy: A Review." European Economy Discussion Paper 072. European Commission, Brussels.

Premand, Patrick, Rebekka Grun, Stefanie Brodmann, Mahdi Barouni, and Rita Almeida. 2012. "Entrepreneurship Training and Self-Employment among University Graduates: Evidence from a Randomized Trial in Tunisia." IZA DP No. 7079.

Pritchett, L. 1997. "Divergence, Big Time." *Journal of Economic Perspectives* 11(3), Summer 1997.

Pritchett, Lant, and Justin Sandefur. 2017. "Girls' Schooling and Women's Literacy: Schooling Targets Alone Won't Reach Learning Goals." CGD Policy Paper. Washington, DC: Center for Global Development.

Psacharopoulos, George, and Patrinos, Harry Anthony. 2018. “Returns to investment in education: a decennial review of the global literature.” Policy Research working paper; no. WPS 8402. Washington, DC, World Bank.

Psacharopoulos, George, and Harry Anthony Patrinos. 2004. “Returns to Investment in Education: A Further Update.” *Education Economics* 12(2):111-34.

Ravishankar, Vaikalathur, Safaa El-Tayeb El-Kogali, Deepa Sankar, Nobuyuki Tanaka, and Nelly Rakoto-Tiana. 2016. *Primary Education in Malawi: Expenditures, Service Delivery, and Outcomes. World Bank Studies*. Washington, DC: World Bank.

Rijkers, Bob, Caroline Freund, and Antonio Nucifora. 2017. “All in the family: State capture in Tunisia,” *Journal of Development Economics*, 124(C): 41-59.

Rijkers, Bob, Hassen Arouri, Caroline Freund, and Antonio Nucifora. 2014. "Which firms create the most jobs in developing countries? Evidence from Tunisia," Labour Economics, 31(C): 84-102.

Robalino, David, and Michael Weber. 2014. “Designing and Implementing Unemployment Benefit Systems in Middle and Low Income Countries: Key Choices between Insurance and Savings Accounts.” Social Protection & Labor Discussion Paper No. 1303. World Bank: Washington, DC.

Rocha, Rudi, Claudio Ferraz, and Rodrigo R. Soares. 2017. “Human Capital Persistence and Development.” *American Economic Journal: Applied Economics* 9(4): 105-36.

Rodrik, Dani. 2004. “Industrial Policy for the 21st century.” https://myweb.rollins.edu/tlairson/pek/rodrikindpolicy.pdf

Saavedra, J. 2009. “The Learning and Early Labor Market Effects of College Quality: A Regression Discontinuity Analysis.” Mimeo, Harvard University.

Saavedra, Anna Rosefsky, and Juan Esteban Saavedra. 2011. “Do Colleges Cultivate Critical Thinking, Problem Solving, Writing and Interpersonal Skills?” *Economics of Education Review* 30(6): 1516-26.

Sabarwal, Shwetlena, Malek Abu-Jawdeh, and Eema Masood. 2017. “Understanding Teacher Effort: Insights from Cross-Country Data on Teacher Perceptions.” Background Paper for World Development Report 2018. World Bank, Washington, DC.

Salehi-Isfahani, D. and M. Mostafavi-Dehzooei. 2017. “Cash Transfers and Labor Supply: Evidence from A Large-Scale Program in Iran”. ERF, *Working Paper* 1090. Giza.

Sameroff A., ed. 2009. *The Transactional Model of Development: How Children and Contexts Shape Each Other*. New York, NY: Wiley.

Sandjaja, Bee Koon Poh, Nipa Rojroonwasinkul, Bao Khanh Le Nyugen, Basuki Budiman, Lai Oon Ng, Kusol Soonthorndhada, Hoang Thi Xuyen, Paul Deurenberg and Panam Parikh. 2013. “Relationship between Anthropometric Indicators and Cognitive Performance in Southeast Asian School-Aged Children.” *British Journal of Nutrition* 110: S57–S64.

Saavedra, J., and M. Tommasi. 2007. Informality, the State and the social contract in Latin America: A preliminary exploration. International Labour Review, 146(3-4), 279-309.

Sen, A. K. 1985. *Commodities and Capabilities*. Oxford: Elsevier Science Publishers.

Schady, Norbert, Jere Behrman, M. Caridad Araujo, Rodrigo Azuero, Raquel Bernal, David Bravo, Florencia Lopez-Boo, Karen Macours, Daniela Marshall, Christina Paxson, and Renos Vakis. 2015. "Wealth Gradients in Early Childhood Cognitive Development in Five Latin American Countries." *Journal of Human Resources* 50(2): Standing, G. (2015) *Basic Income: A Guide for the Open Minded*. Yale University Press 446-63.

Schendel, R. 2013. A Critical Missing Element: Critical Thinking at Rwanda's Public Universities and the Implications for Higher Education Reform (PhD thesis). London: Institute of Education.

Schumpeter, Joseph. 1942. *Capitalism, Socialism and Democracy*. London: Routledge. pp. 82–83.

Sestito, Paolo, and Eliana Viviano. 2016. "Hiring Incentives and/or Firing Cost Reduction? Evaluating the Impact of the 2015 Policies on the Italian Labour Market". Banca D'Italia Occasional Papers No. 325.

Shek, D. T., L. Yu, F. K. Wu, and C. S. Ng. 2015. "General Education Program in A New 4-Year University Curriculum in Hong Kong: Findings Based on Multiple Evaluation Strategies." *International Journal on Disability and Human Development* 14(4): 377-84.

Shiferaw, A., Bedi, A., Söderbom, M., Getnet, A. 2017. "Social Insurance Reform and Labor Market Outcomes in Sub-Saharan Africa: Evidence from Ethiopia", IZA *Discussion Papers* 10903. Bonn.

Shonkoff, J.P., and D. Phillips. (Eds.). 2000. *From Neurons to Neighborhoods: The Science of Early Childhood Development. Committee on Integrating the Science of Early Childhood Development.* Washington, DC: National Academy Press.

Silva, Joana, Rita Almeida, and Victoria Strokova. 2014. "Sustaining Employment and Wage Gains: A Skills and Jobs Agenda." World Bank, Washington, DC.

Smith, Adam. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations, Book 2.* Reprint. New York: Random House, 1937.

Standing, Guy. 2013. "Why a Basic Income Is Necessary for a Right to Work." *Basic Income Studies* 7(2): 19–40.

Stanford University Office of Technology Licensing. 2016. *Start-ups: Stanford University Office of Technology Licensing 2016 Annual Report.* Palo Alto, CA.

Steffen, Christel. 1969. "Untersuchungen zum 'Liber de scriptoribus ecclesiasticis' des Johannes Trithemius." Aus: Archiv für Geschichte des Buchwesens Bd 10, Lfg 4 – 5.

Sustainable Development Solutions Network. 2015. *Data for Development – A Needs Assessment for SDG Monitoring and Statistical Capacity Development*. United Nations Sustainable Development Solutions Network.

Sutton, John and Nebil Kellow. 2010. “An Enterprise Map of Ethiopia”, International Growth Center.

Sutton, John and Bennet Kpentey. 2012. “An Enterprise Map of Ghana”, International Growth Center.

Tcherneva, Pavlina R. 2013. “The Job Guarantee: Delivering the Benefits That Basic Income Only Promises – A Response to Guy Standing.” *Basic Income Studies* 7(2): 66–87.

Thaler, Richard H.; Sunstein, Cass R. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Yale University Press.

Tominey, Shauna, and Susan E. Rivers. 2012. *Social Emotional Skills in Preschool Education in the State of Connecticut: Current Practice and Implications for Child Development*.

Tørsløv, Thomas, Ludvig Wier, and Gabriel Zucman. 2018. *Global Profit Sharing: A Tale of Three Incentives.* Slides, available at: http://gabriel-zucman.eu/files/TWZ2018Slides.pdf, accessed 04/09/2018

Traima, James. 2018. “Is Aggregate Market Power Increasing? Production Trends using Financial Statements. Working Paper.

UNCTAD. 2015. “Creative Economy Outlook and Country Profiles: Trends in International Trade in Creative Industries.” United Nations. http://unctad.org/en/PublicationsLibrary/webditcted2016d5_en.pdf

UNESCO. 2015. *Education for All Global Monitoring Report*. Paris.

UNESCO. 2017. *Global Education* Monitoring *Report*. Paris.

UNESCO, UNICEF, Brookings Institution, and World Bank. 2017. *Overview: Measuring Early Learning Quality and Outcomes.*

UNICEF. 2015. *The Investment Case for Education and Equity*. New York.

UNICEF, WHO, and World Bank. 2017. Joint Child Malnutrition Estimates.

UNWTO. 2018a. “Tourism Highlights. 2017 Edition.” https://www.e-unwto.org/doi/pdf/10.18111/9789284419029.

UN Women. 2015. *Progress of the World’s Women 2015-2016.*

Valerio, Alexandria, Katia Herrera-Sosa, Sebastian Monroy-Taborda, and Dandan Chen. 2015a. “Armenia Skills toward Employment and Productivity (STEP) Survey Findings (Urban areas).” World Bank. Washington, DC.

Valerio, Alexandria, Katia Herrera-Sosa, Sebastian Monroy-Taborda, and Dandan Chen. 2015b. “Georgia Skills toward Employment and Productivity (STEP) Survey Findings (Urban areas).” World Bank. Washington, DC.

Vasilaky, Kathryn N., and Asif Islam. 2018. "Competition or Cooperation? Using Team and Tournament Incentives for Learning among Female Famers in Rural Uganda." *World Development* 103: 216-225.

Valdivia, Martin. 2011. "Training or Technical Assistance? A Field Experiment to Learn What Works to Increase Managerial Capital for Female Microentrepreneurs." CAF Working Papers, No. 02/2011. CAF — Banco de Desarrollo de América Latina, Venezuela.

van den Berg, Gerard J., Petter Lundborg, Paul Nystedt, and Dan-Olof Rooth. 2014. "Critical Periods during Childhood and Adolescence." *Journal of the European Economic Association* 12(6):1521–57.

Vodopivec, Matija, Suzana Laporšek, and Milan Vodopivec. 2016. "Levelling the Playing Field: The Effects of Slovenia's 2013 Labour Market Reform", IZA Discussion Paper No. 9783. Bonn.

Walker, Susan P., Susan M. Chang, Marcos Vera-Hernández, and Sally Grantham-McGregor Pediatrics. 2011. "Early Childhood Stimulation Benefits Adult Competence and Reduces Violent Behavior." *Pediatrics* 127(5): 849–57.

Walker, Susan P, Susan M Chang, Amika Wright, Clive Osmond, and Sally M Grantham-McGregor. 2015. "Early Childhood Stunting Is Associated with Lower Developmental Levels in the Subsequent Generation of Children." *The Journal of Nutrition* 145: 823–28.

Wang, D., J. Chen, and W. Gao. 2011. "Social Security Integration: The Case of Rural and Urban Resident Pension Pilot in Chengdu." World Bank, Washington, DC.

Wang, Jun, Xiamin Hu, and Jinglei Xi. 2012. "Cooperative Learning With Role Play In Chinese Pharmacology Education." *Indian Journal Pharmacol* 44(2): 253–56.

Wang, H., M. Naghavi, C. Allen, R. M. Barber, A. Carter, D. C. Casey, and L. Dandona. 2016. "Global, Regional, and National Life Expectancy, All-Cause Mortality, and Cause-Specific Mortality for 249 Causes of Death, 1980–2015: A Systematic Analysis for the Global Burden of Disease Study 2015." *The Lancet* 388(10053):1459-544.

Weil, David, 2007. "Accounting for the Effect of Health on Economic Growth." *Quarterly Journal of Economics* 122: 1265-1306.

Westhorp, Gill, Bill Walker, Patricia Rogers, Nathan Overbeeke, Daniel Ball and Graham Brice. 2014. Enhancing *community accountability, empowerment and education outcomes in low and middle-income countries: a realist review*. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Whitebread, David, Martina Kuvalja, and Aileen O'Connor. 2015. "Quality in Early Childhood Education: An International Review and Guide for Policy Makers." With contributions from Qatar Academy. WISE 20, World Innovation Summit for Education, Qatar Foundation, Doha.

World Bank. 2013. *World Development Report 2013: Jobs*. Washington, DC.

World Bank. 2015. *The State of Social Safety Nets 2015*. Washington, DC.

World Bank. 2015. *Health Service Delivery in Tanzania*. World Bank, Washington, DC.

World Bank. 2016a. *World Development Report 2016: Digital Dividends*. Washington, DC.

World Bank. 2016b. Poverty and Shared Prosperity 2016: Taking on Inequality. Washington, DC: World Bank.

World Bank. 2017a. *The Toll of War: The Economic and Social Consequences of the Conflict in Syria*, World Bank Group.

World Bank. 2017b. *ICT IN AGRICULTURE: Connecting Smallholders to Knowledge, Networks, and Institutions (Updated Edition).* Washington, DC: The International Bank for Reconstruction and Development.

World Bank. 2017c. "Ecuador Development Discussion Notes", The World Bank, Washington, DC.

World Bank. 2017d. *Vietnam Public Expenditure Review: Fiscal Policies towards Sustainability, Efficiency, and Equity*. World Bank, Washington, DC.

World Bank. 2018a. *World Development Report 2018: Learning to Realize Education's Promise*. Washington, DC.

World Bank. 2018b. "Analysis of Global Labor Market Trends." Paper presented at the First Meeting of the G20 Employment Working Group. Buenos Aires.

World Health Organization. 2016. *Global strategy on human resources for health: Workforce 2030*. Geneva. http://who.int/hrh/resources/pub_globstrathrh-2030/en/.

World Travel & Tourism Council. 2017. *Travel & Tourism Global Economic Impact & Issues 2017*. London.

Xavier Cirera, Ana Cusolito, Caroline Freund, Roberto Fattal, Nicolas Gonne, Leonardo Iacovone. 2018. The Decline in Labor Shares in Developing Countries. Superstars or Something else? World Bank, Mimeo. Washington DC. Mimeo.

Xubei, Luo. 2017. "E-commerce in Rural China." Washington D.C.: World Bank Group.

Yakovlev, Evgeny and Ekaterina Zhuravskaya. 2013. "The Unequal Enforcement of Liberalization: Evidence from Russia's Reform of Business Regulation." *Journal of European Economic Association* 11(4): 808-838

Yeung, Y. and S. Howes. 2015. "Resources-to-Cash: A Cautionary Tale from Mongolia". ANU, *Development Policy Centre Discussion Paper* 42. Canberra.

Yousafzai, Aisha K., Muneera A Rasheed, Arjumand Rizvi, Robert Armstrong, Zulfiqar A Bhutta. 2014. "Effect of Integrated Responsive Stimulation and Nutrition Interventions in the Lady Health Worker Programme in Pakistan on Child Development, Growth, And Health Outcomes: A Cluster-Randomised Factorial Effectiveness Trial." *The Lancet* 384(9950): 1282–93.

Yousafzai, Aisha K, Jelena Obradović, Muneera A Rasheed, Arjumand Rizvi, Ximena A Portilla, Nicole Tirado-Strayer, Saima Siyal, and Uzma Memon. 2016. "Effects of responsive

stimulation and nutrition interventions on children's development and growth at age 4 years in a disadvantaged population in Pakistan: a longitudinal follow-up of a cluster-randomised factorial effectiveness trial." *Lancet Global Health* 4: e548–58.

Zheng, Yucheng and Shwetlena Sabarwal. 2018. "How Much Would Expanding Early Childhood Investments Cost?" mimeo. World Bank.

Zucman, Gabriel. 2015. *The Hidden Wealth of Nations: The Scourge of Tax Heavens*. The University of Chicago Press