

World Development Report 2019

**THE CHANGING NATURE OF
WORK**

Concept Note

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Introduction

1. *Work is constantly being reshaped by economic progress. Society evolves as technology advances, new ways of production are adopted, markets integrate. While this process is continuous, certain technological changes are seminal. They have the potential for greater impact.*

2. *Over the last two centuries, changes in technology have prompted periods of widespread anxiety that labor will be replaced by machines. “MARCH OF THE MACHINE MAKES IDLE HANDS,” read a February 26, 1928 headline in the New York Times. One such period is upon us today. Technological progress is having a profound impact on what constitutes work today. Where work will take place in the future is also uncertain.*

3. *History has shown us that such changes lead to disruption and shifts in the composition of labor. Nevertheless, history also teaches us that change can present new opportunities for creating jobs. Illustrations of this pattern are numerous. Manufacturing technologies introduced by the Industrial Revolution made the skills of artisans obsolete. The advent of electricity marked the beginning of automated production lines, reducing demand for manual labor. In turn, however, it increased the demand for skilled blue-collar workers to operate machinery and white-collar workers with managerial skills. As automobiles displaced horses, new occupations arose in the car manufacturing, distribution and repair industries. Fast food restaurants and motels for the “motoring public” were also born.*

4. *The technological progress of the last decade follows the same pattern, eliminating jobs in some areas, while presenting opportunities in others. Mobile application developers, drone coordinators, virtual reality developers, as well as distance educators, hospitality staff, and elderly care workers: those are just some of the jobs of the future.*

5. *The Report studies the changing nature of work. Along with technological progress, the Report will consider other global trends such as production fragmentation, shifting demographics, urbanization and climate change. The study will reflect on jobs that are likely to disappear due to these forces of change, as well as new jobs that may emerge. It will consider the implications for human capital in different sectors and countries by analyzing data on human capital accumulation at home, school and work. The Report will also provide suggestions on how individuals, firms, governments and society can adjust to the opportunities this changing nature of work can offer.*

6. *The Report will draw upon the understanding that “work is school”: work builds human capital. Changes to the nature of work affect the human capital individuals need to accumulate through formal education before entering the labor market. These changes also shape the type of human capital that individuals will be able to accumulate in the work place. In taking this approach, this study affirms the importance of work as a complement to healthcare and education in the production of human capital.*

7. *Individuals, firms, governments, and society more broadly, can adjust to the changing nature of work. Individuals need to train or retool existing skills if they are to stay competitive. Specialized expertise along with the socio-emotional skills involved in teamwork, problem solving, or client relationship management become even more important in a world of artificial intelligence. Firms must confront the challenge of fast-paced technological change. Highly concentrated markets led by superstar firms drive innovation at a global scale. Platform applications transform the boundaries of the firm.*

8. *Governments and society seek appropriate policies that guard against rising inequality. As technology facilitates more non-traditional forms of employment, social protection becomes even more*

important. While facing different challenges, countries are considering how to ensure a basic level of protection for their populations. The WDR will add new evidence to this debate.

The Changing Nature of Work: Outline

9. Concerns over technology-led disruption are far from new. Economist John Maynard Keynes warned in 1931 of widespread unemployment due to technology.¹ The balance of evidence in this study does not suggest the world is today, any more than it was in 1931, on the cusp on 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 being created will require significantly higher levels of human capital.² In the absence of countervailing policies, many workers are likely to be pushed into lower-wage jobs or temporary spells of unemployment.

10. The changing nature of work disrupts markets. Automation shortens global value chains, obviating jobs in the process. At the same time, technology and 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.

11. Meanwhile, various other forces such as demographic change, rapid urbanization and climate change, affect the composition as well as the location of jobs. These changes are not well understood. In a 2016 survey conducted by Pew Research Center, half of the expert respondents envisioned that technology would displace jobs, increase income inequality, disrupt the social order in the next decades. But individuals, firms, governments and society can prepare for the adjustments ahead. The first chapter of the Report will shed light on how work is changing and outline plausible scenarios for the future in various contexts.

12. In both developed and emerging countries, automation, artificial intelligence, and job relocation are said to create “jobless economies.” The second chapter documents these changes, presenting data on which jobs are most likely to disappear. The chapter also considers jobs that will continue to rely on labor and speculates about new jobs that may arise in the future. History of the industrial revolutions indicates that new job opportunities arise as technology progresses, notwithstanding any disruption in the process. Understanding which jobs will disappear and which are here to stay is a first step towards tempering the anxiety.

13. Those who will create future jobs or compete for them are currently in day-care and primary school today. What skills are built in the family pre-school? Are schools building the right skills for the next generation of workers? Can workers learn on the job to achieve better job status and higher pay? The third chapter will address the link between human capital accumulation and the future of work.

14. Some jobs will disappear due to automation. Others will not be created (due to reshoring). What will happen to those workers facing jobs losses or fewer job opportunities? More integration paired with faster technological progress are likely to decrease the average duration of employment spells. Risks for workers will increase. Labor market transitions will be more frequent. In such an environment, what are the implications for unemployment benefit systems and active labor market policies? Furthermore, a more rapid increase in labor supply due to aging in advanced economies as well as high birth rates in Africa and parts of Asia will put additional pressure on labor markets. How will individuals respond? This is the topic of chapter four.

15. The relation between firms and workers is changing. In particular, both firms and workers will be more flexible in their arrangements. Learning-by-doing creates value. There might be an argument for

subsidizing the creation of certain jobs in private firms as a result. Meanwhile, placing a tax on the destruction of others, as companies reshore and shed workers in favor of robots, would alter the cost-benefit calculation of moving to a jobless economy. Such an approach would avoid the negative effects of a tax on robots, which is just like any other tax on capital—consumers pay the ultimate price. Chapter 5 will explore how recent global trends change labor demand by altering the boundary of the firms. The chapter will discuss policy concerns related to the future way of organizing production and its implications for the demand of labor. The last part will discuss policies to spur the creation of private-sector driven jobs.

16. 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 employers become obsolete, especially in high income countries. Low and middle income countries face a range of challenges around how to manage risks, spur productivity growth and finance reductions in inequality. The combination of old and new labor market challenges calls for reexamining social protection in different contexts. These policies are assessed in the last chapter of the Report.

Chapter 1: The Forces of Change

Automation

17. Anxiety rises in the global workforce when tasks previously performed by people are taken over by robots and other computer-assisted technologies. Data shows that one additional robot per thousand workers reduces the employment to population ratio by approximately 0.18-0.34 percentage points; wages decrease by 0.25-0.5 percentage points.³ Foxconn Technology Group, the world's largest electronics assembler, recently cut its workforce by 30 percent when it incorporated robots into the production process (from 1.3 million in 2012 to 873,467 by the end of 2016).⁴ JP Morgan Chase & Co., the biggest bank in the United States, cut 360,000 hours of staff time and laid off thousands of loan officers and lawyers when it started using machines to assess commercial-loan agreements.⁵ A robot developed by Australian company Fastbrick Robotics can lay 1,000 standard bricks in one hour—replacing a day of work for two human bricklayers.⁶ New cow-milking robots developed by Swedish agricultural equipment manufacturer DeLaval International are also being operationalized.⁷

18. Automation lowers production costs, which makes reshoring more feasible and consequently reduces dependence on low-skilled labor in foreign countries. In 2017, 3-D printing technologies enabled Adidas to establish two “speed factories” for shoe production in Ansbach, Germany and Atlanta, United States, eliminating more than 1,000 jobs in Vietnam.⁸ Since 2015, US-based multinational companies have been importing less from their foreign affiliates, which indicates a decline in offshoring. Imports from non-affiliated foreign companies—outsourcing—have also been declining since 2012.⁹

19. Technology is substituting for labor in many occupations. Routine tasks such as inventory management, as well as rules-based routine cognitive tasks such as legal research or traffic enforcement, face immediate challenges. As artificial intelligence technologies and robot dexterity advance, some non-routine tasks are also at risk. AlphaGo Zero, a computer program, used self-learning to beat the world-class masters in the Chinese game of “Go.”¹⁰ However, humans are needed to “monitor” the robots: after Amazon added robots to its U.S. operations for heavy lifting tasks, it also added 80,000 warehouse employees.¹¹ Technology is less of a substitute for labor in industries requiring innovation, such as education, media, entertainment, research and politics. In those cases, humans are indispensable as a factor of production, principally due to their social intelligence.

20. Labor substitution trends raise concerns. Increasing employment in high-income cognitive jobs and low-income service occupations—with little in the middle—leads to a “polarized” labor market. Polarization is already emerging in some advanced economies. Middle-skilled, routine, task-based occupations have been disappearing in Turkey, the Philippines and South Africa.¹² In Mexico, clerking occupations decreased at an annual rate of 2.5 percent from 2000-2010.¹³ The duration of this trend will depend on society's response. Service jobs, which may offer an alternative path for low- and middle-skilled workers, require deliberate re-skilling. Reallocation of the existing workforce may also be necessary.

21. At the same time, automation spins off new forms of work; the occupation of “web developer,” for example, did not exist until the early 1990s, while in 2017 employed 11 million people. Self-driving cars and smart technologies will require human maintenance, creating new “blue tech” jobs for those with sophisticated repair skills. In the two decades leading up to 2012, employment grew faster in occupations such as graphic design that were being rapidly computerized than in jobs that were automating more slowly.¹⁴

Digital Infrastructure

22. Digital infrastructure spurs opportunities to create new business. New jobs often follow. The economic literature discusses three mechanisms. First, the disappearance of physical assets as a factor of production makes it easier to start a new business. Second, digital infrastructure allows access to markets that do not exist locally. Third, individuals have access to jobs that do not exist locally. For these three mechanisms to operate, individuals need connectivity. Yet, this is not always the case. Digital platforms are also changing the relationship between firms and workers in ways that put into question existing social insurance programs and labor regulation.

23. In many countries, improved access to digital infrastructure, via laptops, tablets, and smartphones, has allowed on-demand services to boom. Online labor marketplaces, which have surged in the last decade, make certain types of work accessible to many, often on a flexible basis. Examples range from home cleaning to sophisticated tasks like accounting.

24. These developments are not limited to high income countries. The gig economy is also taking root in developing economies. Airbnb, the online platform that facilitates the provision of homestay-based lodging between people, is expanding rapidly in Africa. The company grew from just 6000 lodgings in 2013 to 100,000 in 2017.¹⁵ Hello Tractor, which started in Nigeria, connects smallholder farmers with tractor rental services through mobile technology. Expansion has included Kenya, Ghana, and Malawi.¹⁶ Such new ways of doing business do a better job of incorporating women into labor markets. One in three women in OECD countries engage in independent work. Refugee women in Jordan who have limited mobility due to socio-cultural norms turn to the gig economy to earn money.¹⁷ SweepSouth, an on-demand platform, connects 4,000 women domestic workers with home owners in four South African cities.¹⁸

25. In addition to delivering new opportunities, improvements to digital infrastructure and connectivity are also shaping aspirations. People have always wanted to experience a higher quality of life. Today, increased information exposure to different, often divergent lifestyles only heightens this sentiment. Where aspirations are linked to opportunities, inclusive, sustainable economic growth can follow. But if there is inequality of opportunity, frustration can lead to fragmentation in society. The Arab Spring, the rise of populism in Europe, recent polarization across the United Kingdom and the United States—all are important manifestations of this trend.

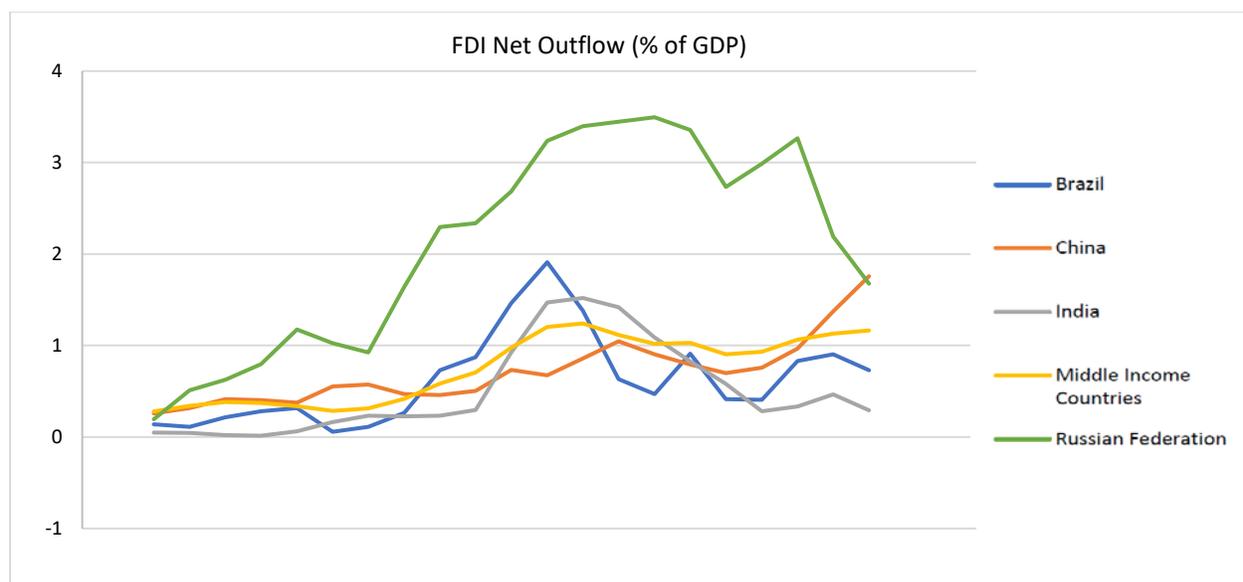
Trade and FDI

26. New job opportunities are opening up in several areas, most clearly in the services sector. Trade in services has risen significantly over the past two decades, now accounting for almost a quarter of global exports. The share held by developing countries is on the rise. BRIC countries are leading in the sector. India is now the largest information service exporter in the world—its share of world services exports tripled to over 3 percent from 2000 to 2013. Brazil is also among the top 30 service exporters in the world and moving up rapidly.¹⁹

27. Foreign direct investment (FDI) can also create important work opportunities. Recent growth in FDI outflows from middle income countries, such as China, is particularly notable (figure 1). FDI in Sub-Saharan Africa, Europe and Central Asia, and South Asia is driven predominantly by the BRIC countries today. “South-North” FDI is on the rise, where companies from emerging economies invest in rich economies to acquire more advanced technologies or expertise that cannot be originated domestically. For example, in 2008 the Indian multinational conglomerate Tata recently bought Ford Motor’s high end British

Jaguar and Land Rover brands for \$2.3 billion.²⁰ In the same year, the Russian multinational energy corporation Lukoil bought 49 percent of Italian refiner ERG SpA's Mediterranean plant in Sicily.²¹

Figure 1. FDI net outflows of BRIC and middle income countries



Source: World Development Indicators.

Note: This figure presents two-year moving averages of FDI net outflows from the reporting economy to the rest of the world as percentage of GDP, based on data from 1995-2016. The FDI net outflows from middle income countries have been on the rise in recent years. In particular, the FDI net outflows (in current US\$) from China increased more than 10 times in the decade to 2015.

Other Global Trends

28. Other forces are changing the nature of work too. In high income countries, the elderly (aged 65 years and above) already make up a significant portion of population. Increasing longevity will expand the caregiver industry, but re-skilling mid-career workers becomes even more important. In middle income countries, the proportion of the elderly is also going to grow to 15.9 percent in 2050, up from 7.0 percent in 2015. The proportion of the working age population in low income countries is still on the rise, however: it will reach 62.2 percent by 2050.²² One in five 15- to 24-year-olds will be from low income countries. Today Sub-Saharan Africa has the youngest population of the world; the number of young workers will continue to expand. The challenge is to equip these people with appropriate skills so that they can participate in the new economy.

29. Population aging creates opportunities for new jobs in long-term care. In fact, there are many opportunities for job creation in the social sectors at large. At the same time, however, aging populations challenge the sustainability of social insurance programs in advanced economies. Longer working lives create issues of re-skilling as well as health care. Attitudes or cultural norms within firms may also present challenges. In term of youth bulges, the problem is unemployment, but also inactivity. New evidence suggests what works (e.g., integrated programs with demand-side interventions) and what does not (e.g., just training).

30. In addition, increasing urban populations pose additional challenges for labor markets. While urban jobs are typically associated with higher rates of human capital accumulation, recent trends in Africa indicate that urbanization may take place without job creation. In Addis Ababa, a quarter of the working population in urban areas is unemployed. GDP per capita is falling in countries such as Liberia and Madagascar, even though urbanization continues to go up.²³ Recent research highlights that secondary towns play important roles in helping rural populations to become socially mobile. Secondary towns can be further explored by governments of urbanizing developing countries as potential vehicles for poverty reduction.

31. Climate change also has an impact. Extreme weather events and changing seasons are displacing millions of workers worldwide. Moving to a low carbon economy also implies industrial transformation. Investments in new clean energy sources can create jobs. Such investments counterbalance the jobs lost as coal-powered plants close.

Chapter 2: Jobs of the Past, Jobs of the Future

32. It is 2030, the year that the Sustainable Development Goals of the United Nations need to be reached. Amira is part of a new cohort of constitutional lawyers in Istanbul, Turkey, having just completed her LLM at University College London. Labor market dynamics, due to increased automation and weak worker protections, make for a strained social environment. As a result, experts in the rule of law such as constitutional lawyers are playing a vital role in public discourse, to transition society into a new environment of work. Civil rights and immigration lawyers are also in higher demand, given the rise of nationalistic policies in the backlash against migrants in Europe.

33. Over in Nepal, Salina is running her own adventure tours company. Increased demand from retirees in Europe and Asia for customized tours, activities, or other specialized experiences has tripled her revenues since 2018. Ecotourism is seeing particular growth, given the increasing interest in environmental issues, clean living, and wellness. Young tourists from the Americas are particularly interested in the region's rich history. To meet this demand, Salina received a master's degree in South Asian history from the online program at the University of Mumbai. Her company's 60 employees come from 14 nations, as far as Paraguay and Kazakhstan.

34. Jennifer owns a nutritionist practice in Dallas, Texas. With the city dealing with a severe obesity epidemic, Jennifer has hired three dozen trained nutrition specialists to help the expanding business. In the United States, 47 percent of adults over 20 are clinically obese, costing up to \$620 billion a year in health care expenditure. Two nights a week, Jennifer teaches students via an online program hosted by the Southern Methodist University, which boasts the largest School of Nutrition and Healthy Diets in the world. Each year the school graduates 6,000 nutritionists.

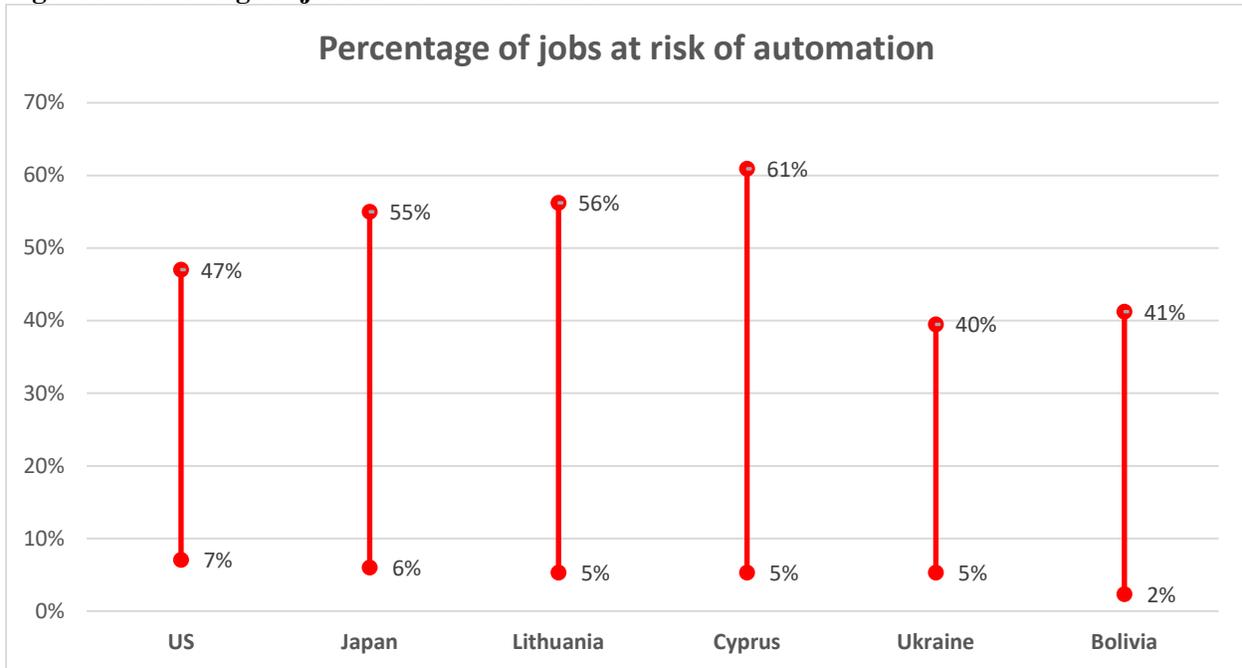
35. Some jobs are here to stay, regardless of technological progress or other forces of change. Amira, Salina and Jennifer all work in areas forecasted to experience significant growth in the coming years, due to technological development, increased income, and improvements in communication. Other industries will also expand because of income growth, demographic shifts, or other forces such as urbanization or climate change. Importantly, jobs in each case are those that cannot be automated or digitized—certain skills and capabilities will continue to give human labor a comparative advantage over machines in many areas. But automation and artificial intelligence will inevitably lead to some job displacement, and to the creation of jobs elsewhere.

Jobs of the Past

36. Identifying the professions that are susceptible to automation is informative, and at the extremes this can be reasonably predicted. Watch repairers will vanish as fast as watches disappear from wrists. Mailmen will have less to do with encroaching digital alternatives. However, a review of the estimates of jobs susceptible to automation reveals figures that border on absurdly high, extremely low, or are incongruent with observed patterns of sectoral shifts.

37. Figure 3 displays the jobs at risk of automation for economies that have more than one estimate obtained from different methodologies. For Bolivia, the estimates of jobs that will be automated range from 2 percent to 41 percent. In other words, about 100,000 to 2 million Bolivian jobs in 2016 are likely to be automated - the accuracy of throwing darts under a blindfold. The range is even wider for advanced economies. In the US, 7 to 47 percent of jobs are at risk of being automated. In Japan, 6 to 55 percent of jobs are at risk.

Figure 3. Percentage of jobs at risk of automation



Source: Arntz et al. (2017), World Bank (2018), World Development Report (2016)

Note: The figures represent the higher and lowest estimate of the percent of jobs at risk of automation. A job is at risk if its probability of being automated is greater than 0.7.

38. The sharp differences in estimates can be traced to advancements in the technical methodology used in deriving these estimates. The work by Frey and Osborne categorizes 70 US occupations in terms of automatability by eyeballing job descriptions with the help of Machine Learning researchers at Oxford University. This information is used to predict the automatability for 702 US occupations. The conclusion from this research is that 47 percent of jobs are at risk of automation. Studies that directly use these estimates to predict for other economies, usually establish similar high rates of automatability. Researchers from the Centre for European Economic Research (Arntz and co-authors) improved on this approach by accounting for job characteristics such as the specific nature of tasks using detailed survey data. Individual characteristics such as education and gender were incorporated in the analysis. Their estimates were much lower – only 9 percent of US jobs were at risk. Follow up studies with the same approach arrived at a similar ballpark figure – only 7 percent of US jobs were automatable. Only 1 percent of jobs were automatable in Kenya and Vietnam, while 4 percent of jobs were automatable in Colombia.²⁴

39. The recent estimates are far less alarmist, but do have some puzzling features. For instance, the risk of automatability is 12 percent in Spain and 10 percent in the Czech Republic.²⁵ Spain has a vibrant tourism sector that looks to be immune to automatability. On the other hand, the Czech Republic is a large exporter of vehicle parts – a sector that is vulnerable to automatability. Yet, the estimates indicate that both economies are headed down the same path of automation. A full accounting for sectoral trends and composition is absent in these estimates.

40. Despite the reservations of country level estimates of automation, the predicted automation probabilities for specific occupations provided by Frey and Osborne, which serves as the foundation of this literature, are intuitive. The jobs identified at immediate risk in the coming decade are routine tasks, regardless of them being cognitive or manual. This is consistent with what one would expect. According to some estimates, manufacturing workers such as packaging operators face a 98 percent chance of automation.²⁶ Standardized repair tasks are also being automated, resulting in redundant electronics

installers. Workers in logistics occupations are severely affected. Postal-service jobs such as mail sorters, processors, carriers are projected to decline by 28 percent by 2024, with 136,000 fewer positions than in 2014.²⁷ Waymo, a subsidiary of Google’s parent company Alphabet Inc., has been testing autonomous driverless cars since 2009. By 2040, 95 percent of new vehicles sold are expected to be fully autonomous. If so, occupations like bus drivers or truck drivers will no longer exist.²⁸

41. Prospects are no better for some white-collar jobs. Artificial intelligence-enabled platforms such as IBM Watson can finish tax filing in seconds with fewer errors.²⁹ The bulk of administrative support workers, such as data entry keyers, are most likely to be substituted by computer assisted technologies that can easily replicate repetitive activities. Paralegal jobs, which mainly involve rules-based document research are also vanishing—Ross Intelligence, LexisNexis and Thomson Reuters offer artificial intelligence-enabled legal research services in a more efficient way.³⁰

42. As robot dexterity improves, a wider range of non-routine tasks will also be automated, which will cause the second wave of job displacement. Robots are already competing with human waiters, as seen in local restaurants in China, where robotic waiters take orders and deliver food.³¹ Even sales occupations that involve social interaction with customers are under threat. Predictive analytics enable the provision of customized services to clients.³²

Jobs of the Future

43. Humans cannot be replaced when it comes to the development of technologies themselves. The information technology (IT) industry is at the center of the digital economy. There are already millions of individuals employed worldwide to manage it. In India alone, the IT sector is the largest private sector employer, contributing 7.7 percent to GDP in 2016.³³ The sector experienced high growth worldwide in the last decade. The United Kingdom’s tech industry grew 50 percent faster than the rest of the economy in 2015.³⁴ Canada’s technology industry is also leading national growth, supporting 488,000 professionals.³⁵

44. These numbers are likely to continue rising. The internet of things, smartphone penetration, and other emerging technologies mean that people are relying more and more on portable devices to work, organize their finances, and have fun. Labor is needed to create those online interfaces, ensure their smooth operation, and for their improvement. App Annie reports that the mobile application (“app”) industry generated a gross annual revenue of \$41 billion in 2015; this figure will more than double by 2020.³⁶ The virtual reality sector is projected to reach \$140 billion by 2030. With consumer interests changing fast, there will be more opportunities for individuals to pursue a career as a mobile app developer or virtual reality designer. As mobile penetration expands in emerging economies demand for those interfaces goes up. Between 1999 and 2016, mobile phone coverage in Sub-Saharan Africa increased from 10 to 43 percent. Mobile penetration in Kenya.³⁷ In South Africa, when a locality receives mobile phone network coverage it is associated with an employment increase of 15 percent.

45. Other new industries are also created because of technological progress (figure 4). In Gabon, Ghana, Kenya, Namibia, Tanzania, Uganda and Zimbabwe, more than 40 percent of the population now use mobile money regularly. Access to credit has also improved. In Kenya, mobile loans via M-PESA reached \$17 billion in 2017, as compared with 4.3 billion in 2016.³⁸ Improved access to credit improves entrepreneurship and is associated with increased productivity and inclusiveness.³⁹ In Ghana, a new project involving an electronic tax application to transform revenue collection created 1,000 new jobs.⁴⁰ The project has provided financial support to a business process outsourcing facility that employs thousands of local software engineers.

46. Aside from tech-centric jobs, deepening integration will continue to create new job opportunities. In 2013, China launched the “Belt and Road Initiative,” aiming to strengthen trade linkages between Asia,

Africa and Europe. Large investments in infrastructure or other projects in the areas of energy, agriculture and logistics, boost trade and create more jobs, particularly in engineering and construction. Similarly, India's "Lighthouse" project explores transformative mobility solutions, expanding regional integration by improving connectivity.⁴¹ The "Make in India" initiative, launched in 2014, lowers barriers to doing business for all investors with a view to transforming India into a global design and manufacturing hub, creating 100 million new jobs by 2022.⁴² Since the launch, foreign direct investments jumped 18 per cent to a record level of \$46.4 billion in 2016, and the proportion of investments directed towards manufacturing also increased. The overall composition of FDI in 2016 turned towards the manufacturing sector, which registered a 38 per cent annual rise in inflows.⁴³

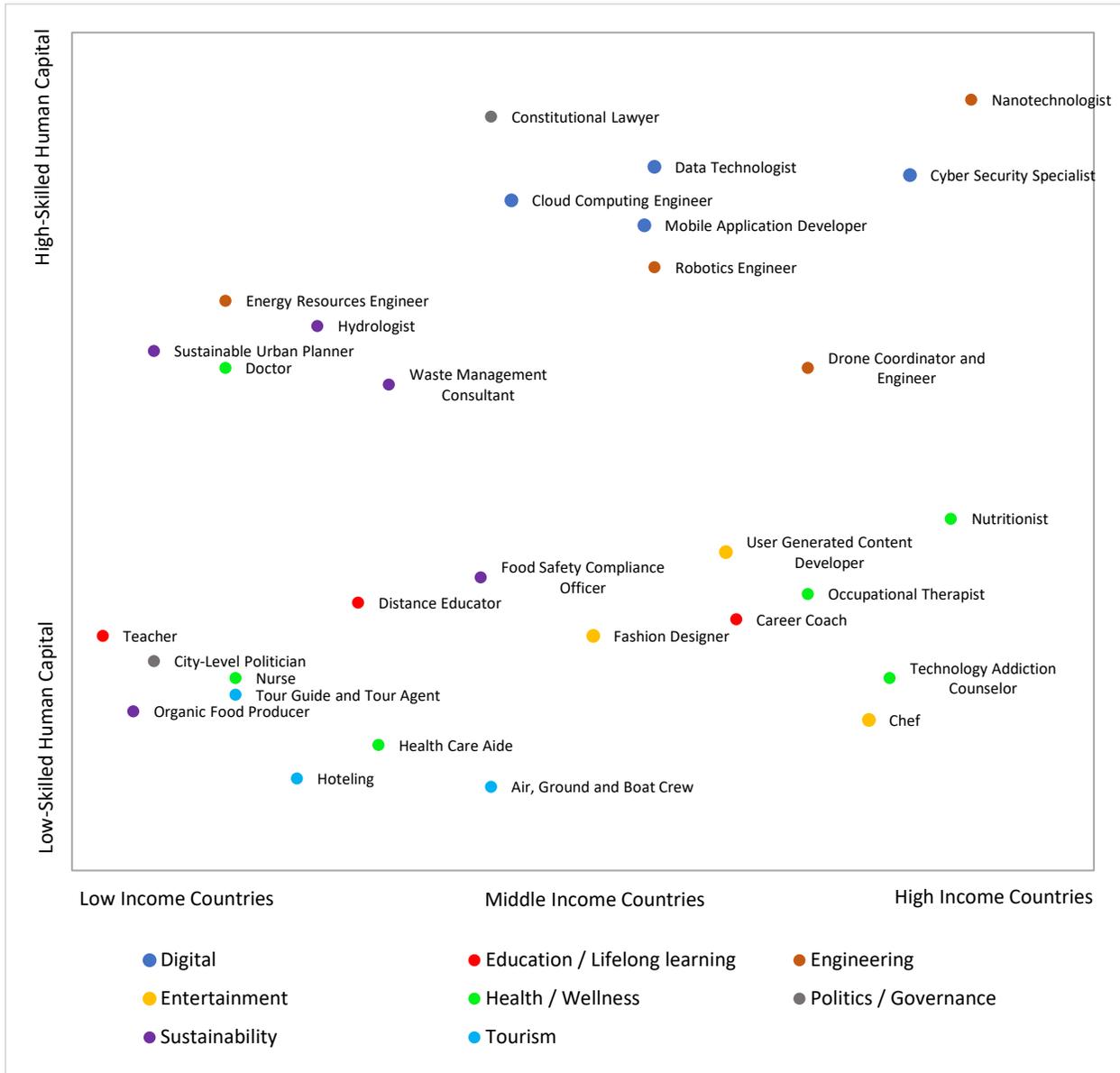
47. Jobs in tourism have good prospects too—the growing middle class in emerging economies and aging populations in high income countries will increase international tourism. And people travel to explore different cultures and meet people different to themselves, not stay in automated hotels and dine with the local robots. Tourism is one of the largest, fast growing sectors worldwide and is highly resilient to economic shocks. It ranks third after chemicals and fuels and ahead of automotive products and food. In many developing countries, tourism is the top export category.⁴⁴ International tourist arrivals worldwide are expected to increase by 3.3 percent a year between 2010 and 2030 to reach 1.8 billion by 2030.⁴⁵

48. Technology will continue to facilitate travel and drive down costs, but humans will be in high demand to deliver essential travel services, including hospitality, and create bespoke experiences. In 2016, tourism alone directly supported 109 million jobs worldwide and contributed \$2.3 trillion to the global economy.⁴⁶ Considering its wider indirect impacts, it accounted for 292 million jobs (1 in 10 jobs in the global workforce) and \$7.6 trillion or 10.2 percent of global GDP. Global visitor exports also accounted for 6.6 percent of total world exports and 30 percent of total world services exports. By 2027, the sector is expected to grow by around 30 percent and directly provide over 380 million jobs worldwide.⁴⁷

49. Until humans discover a miracle cure for bodily ailments, healthcare will continue to support millions of jobs worldwide. Machines will never fully replicate the care that can be provided by one person for another. Even when medical diagnostics have been taken over by computers and algorithms, doctors will continue to play a vital role given their enhanced capacity to offer empathy, manage information, and negotiate difficult situations humanely. The same applies to nurses and midwives, who account for more than 50 percent of the national health workforce in many countries.⁴⁸

50. The World Health Organization (WHO) predicts that by 2030 global aggregate demand for health workers will reach 80 million across 165 countries.⁴⁹ With a current stock of 43 million health care workers across 193 WHO Member States, this opens up the possibility of 40 million new jobs. Furthermore, as populations age, home health care aids who can assist with chores and provide valuable social interaction for the elderly will also be in greater demand. And this says nothing about elective healthcare and the wellness industry, which is also witnessing explosive growth.

Figure 4. High growth jobs of the future by income group



Source: WDR 2019 team’s calculations based on labor market trends and qualitative analysis.

Note: This figure illustrates the income group category (x-axis) and the skill content (y-axis) of jobs that are likely to experience highest growth between 2018 and 2030. For example, nanotechnologist is a high-skilled job and likely to grow in high income countries, while organic food producer is a relatively low-skilled job that is likely to grow in low income countries. Each color represents the sector of the job.

The Geography of Change

51. For those tasks and occupations where labor retains a comparative advantage over machines, sectoral growth will lead to job growth. But growth will be more concentrated in certain parts of the world over others—it will depend on the context. Urbanization, government policy, ICT penetration, demographic shift, climate change, or even national security issues and basic amenities, will shape business environments to make them more or less conducive for certain sectors to develop.

52. High tech jobs, for one, will continue to locate in distinct clusters cross the world. Evidence shows that jobs with high levels of knowledge inputs, creativity and innovation benefit significantly from the interaction opportunities created through clustering.⁵⁰ The proximity of other IT firms, technical universities, public and private research institutes, are all associated with higher levels of innovation. Clusters foster the development of a specialized pool of skilled labor, supports the production of non-tradable specialized inputs, and generates maximum interactive and network effects (exchanging of information and ideas). The latter can provide cluster firms with a competitive edge over firms located elsewhere.⁵¹ These spillovers are of paramount importance in the technology and digital sectors, where firms have to keep up with the ever-expanding technological frontier.

53. Famous tech hubs such as Bengaluru (formerly Bangalore) in India, Silicon Savannah in Nairobi, and Silicon Valley in the United States, are all well-known examples of this phenomenon. In each case, high profile research institutes and universities combined with targeted investment to foster IT entrepreneurship, creating new services, products, and jobs—particularly for young people. Tech-savvy graduates from the Indian Institute of Technology Bombay and the Indian Institute of Science Bangalore, were central to the development of both cities.⁵² And many other cities are following suit. In Europe, the city of Brno in the Czech Republic transformed itself from a small, economically stagnant place to a dynamic high-tech hub within just a few years. The city along with local technical universities established the South Moravian Innovation Centre in 2003 to support startups from initial conception through to international expansion and innovation. Efforts to foster stronger linkages between local technical universities and business and establish start-up oriented co-work centers (Impact Hub Brno, JIC Cowork, Distillary, Cowo etc) were also important.⁵³

54. Nowhere are these trends more pronounced than in emerging economies, however, primarily due to significant improvements in digital technologies and mobile connectivity. In Asia, 16 million jobs were supported via mobile technologies in 2016; by 2020, this figure is expected to rise to 17.4 million.⁵⁴ As one might expect, Beijing and Korea are also leading IT hubs, with one recent report indicating that Beijing has surpassed Silicon Valley and Berlin to become the top technology hub in the world, based on infrastructure and local human capital.⁵⁵ Prospects are also bright in Sub-Saharan Africa. Mobile technologies supported 3.5 million jobs in 2016 and expected to support 4.1 million workers by 2020.⁵⁶ Africa currently has more than 300 tech hubs in 93 cities across 42 countries. In Kenya, for example, new tech hubs are growing in Mombasa (SwahiliBox), Kisumu (LakeHub), Eldoret (Dlab Hub), Voi (Sote Hub), Machakos (Ubunifu), and Nyeri (Mt. Kenya Hub and DeHub).⁵⁷ Egypt also plays an important role on the African continent, and is second only to South Africa in terms of the number of tech hubs and incubators in country.⁵⁸

55. But jobs involving highly sophisticated technologies, such as robotic technicians or nanotechnologists, may be more likely to cluster in developed countries, at least in the near term. As large multinationals reshore production due to cost and labor saving technologies that automate production, expertise in robotics will be essential to the viability of those operations. Since it reshored and automated production processes in the United States, Marlin Steel has nearly doubled the size of the work force, adding engineers and automated production specialists to our existing team. Similarly, cutting edge nanotechnologists, who can study tiny fragments of DNA, create powders to enrich our foods and medicines, advance the efficiency of solar cells and batteries, are experiencing growth in high income countries. In the United States, North Carolina is home to over 100 nanotechnology companies, in part due to local universities with extensive research programs in the field.⁵⁹ As new uses of nanotechnology are discovered in the future, the demand for nanotechnologists will rise.

56. Urbanization will inevitably mean that a significant proportion of jobs will be located in cities, notwithstanding improvements in digital connectivity. High growth firms, which are typically associated with the highest levels of employment, tend to locate in urban areas.⁶⁰ What's more, evidence from Sweden indicates that non-routine jobs requiring high level of human capital also cluster in downtown metropolitan

centers.⁶¹ This is particularly the case for jobs with the highest levels of knowledge inputs, such as engineering, science and upper-management occupations. Human capital externalities are more important for non-routine jobs and these spillovers reduce quickly with distance. Routine, non-interactive jobs, by contrast, cluster outside of cities.⁶² Local amenities, such as healthcare, education, culture, and quality of public services and infrastructure, also have an impact on the location of highly skilled jobs.⁶³ Other evidence shows that regions with higher levels of “entrepreneurship culture”—societal values or norms such as proactiveness, risk taking, accepting failure, openness to new ideas, individualism, independence and achievement—generally exhibit higher levels of entrepreneurship. As a result, these regions tend to have higher employment growth in high human capital occupations.⁶⁴

57. Jobs in tourism may also grow in some parts of the world more than others. Approximately four out of every five travelers arrive from within the same region. As incomes rise faster in emerging economies, travel for work and leisure in those regions will increase accordingly. China continues to lead global outbound travel, following ten years of double-digit growth in spending.⁶⁵ The number of outbound travelers rose by 6 percent to reach 135 million in 2016. The number of outbound travelers from the Republic of Korea increased by 16 percent to reach 22 million. Other important source markets that experienced double-digit growth in expenditure last year were: Spain, India, Argentina, Qatar, Thailand, Israel, Ireland, Ukraine, Vietnam and Egypt. Travel between regions is also growing at slightly faster rate than travel within regions as international transport links continue to go down in price and adventurous, ageing populations venture further afield in retirement.⁶⁶

58. As a result, more opportunities in tourism and related hospitality services are likely to appear in emerging economies. Between 2010 and 2030, arrivals in emerging destinations are expected to increase at twice the rate of those in advanced economies.⁶⁷ North-East Asia is expected to be the most visited sub-region in the world by 2030, closely followed by Southern and Western Europe. The market share of emerging economies increased from 30 percent in 1980 to 45 percent in 2016, and is expected to reach 57 percent by 2030, equivalent to over 1 billion international tourist arrivals.⁶⁸ Asia and the Pacific experienced 9 percent growth in international arrivals in 2016. Africa followed closely with 8 percent growth overall, driven primarily by Sub-Saharan Africa. In contrast, Europe experienced only 2 percent growth due to mixed results across the region, with some countries in Western Europe experiencing significant declines in international arrivals due to security concerns.⁶⁹

59. Rising incomes, combined with population growth, will also drive global demand for healthcare and wellness services. The vast majority of jobs in healthcare are less susceptible to automation or substitution by artificial intelligence.⁷⁰ But the location of those workers will be shaped significantly by demographics. Some healthcare jobs, such as elderly care nurses, may be in greater demand in developed countries given their older populations and the demand for community-oriented, personalized care. In 2016, people aged 65 and older made up 17.4 percent of the population in developed countries, as compared to only 6.3 percent on average elsewhere. This may rise in the near future.⁷¹ In the Gulf region, rapidly aging populations and declining fertility rates is raising urgent questions around the supply of appropriate healthcare workers.⁷² By 2024, the United Kingdom expects 18 percent of its population to be over 65; by 2040, nearly one in seven people is projected to be aged over 75.⁷³ However, recruiting doctors and nurses to work in elderly care is a challenge, in part due to low prestige and poor benefits.⁷⁴ In the United States, demand for such workers is projected to rise by 40 percent between 2016 and 2026.⁷⁵ The populations of Asia and of Latin America and the Caribbean are ageing rapidly and the pace of ageing is accelerating in both regions. Middle income countries are projected to see a twofold increase in the number of older persons by 2050.⁷⁶ By contrast, in Africa, although the number of older people is going up, the population as a whole is aging at a slower pace as high birth rates continue to drive overall population growth.

60. In contrast, the demand for basic primary care workers, including pediatricians, eye doctors, and family planning care workers will continue to be high in emerging economies as populations grow.⁷⁷ Under-

investment in education and training of health workers in some countries and the mismatch between education and population needs leads to persistent shortages. The demand—or need—for these workers is there. But without government initiatives and public investment, the shortage of healthcare workers will only get worse in some parts of the world as populations continue to expand. According to the World Health Organization, at current levels of health worker production and employment, the needs-based shortage in Africa will reach 6.1 million in 2030, up from 4.2 million in 2013.⁷⁸

61. Wellness professionals will certainly see significant growth in high income countries. However, the bulk of the growth worldwide will likely be found in emerging economies, due to cheaper international transportation links and lower prices for relevant services. Improved awareness amongst the growing middle class in emerging economies will also increase demand in the local wellness market. Medical tourism, particularly for elective cosmetic procedures, is one of the fastest growing components of the economy in Asia, forecast to reach a value of US\$14 billion by 2022.⁷⁹ Highly qualified medical professionals, sophisticated equipment and reliable infrastructure – all offered at lower prices as compared to high income countries – have allowed countries such as Thailand, Singapore, and Malaysia to establish strong reputations in the area.⁸⁰ These sectors include large numbers of jobs in related aftercare and rehabilitation services, which are projected to grow between 8-12 percent in 2017.⁸¹

62. Just as job growth is more likely in some sectors and countries over others, there may be geographic particularities with the jobs of the past that are most vulnerable to automation and artificial intelligence. For example, manufacturing jobs may decline in emerging economies due to the adoption of labor-saving technologies that enable multinational companies to reshore production.⁸² Call center jobs in emerging economies are vulnerable due to advances in speech recognition technologies.⁸³ Described as “premature industrialization” by Dani Rodrik, this has already been documented in Latin America and Africa. Furthermore, the shift away from jobs in manufacturing has not necessarily been towards more lucrative jobs in the services industry. In Latin America, informality has grown as manufacturing has shrunk. With the adoption of new, cutting edge technologies in high income countries, routine tasks such as clerks

63. Agriculture may also see job losses as countries eventually mechanize and commercialize production. A recent study using household survey data in six counties in Sub-Saharan Africa found that overall, ownership of agricultural machinery is rare among African farmers and much remains to be done regarding rental and sharing arrangements.⁸⁴ But as global population growth continues apace and climate change increase the risk of food shortages, the commercialization of new markets in Africa will be vital to sustain the global food system. Significant compliance and enforcement efforts from businesses and governments will be required to meet minimum food safety and quality standards in destination markets. Demand for workers in food processing, compliance, and distribution will necessarily rise as a result. The industry is already experiencing significant growth, driven not only by minimum standards set out in government regulations, but also consumer-driven standards including organic, as well as Good Manufacturing Practices (GMP), Good Agricultural Practices (GAP), Hazard Analysis Critical Control Point (HACCP), and Good Hygiene Practices (GHP). China’s food safety testing market is forecast to grow by 11 percent by 2024.⁸⁵ In Africa, AGRA estimates that the food market may be worth more than US\$1 trillion per year by 2030 and has heralded the potential of food processing and distribution activities to provide much needed jobs in urban centers.⁸⁶ The Report will explore these trends along with the potential role technology will play in shaping agricultural value chains, particularly in emerging economies transitioning from subsistence agriculture.

Chapter 3: Accumulating Human Capital

65. Health issues are a major reason why young people cannot escape poverty. Absence of adequate healthcare is estimated to put 100 million people into extreme poverty as well as create severe financial stress for an additional 150 million people each year around the world. In Chad, the probability of survival to age 5 is only 86 percent. In Benin – 90 percent. Children in conflict-affected states are particularly vulnerable. In the Democratic Republic of Congo, the survival probability of children to age 5 fell below 90 percent after the outbreak of hostilities in 1998. In these countries, building human capital is first and foremost about the health of children.⁸⁷

66. School education is the next important phase. Not only does it raise productivity and income, but it also improves individuals' health. Schooling teaches people to interact with others, raising the benefits of civic participation, including voting and organizing.⁸⁸ Raj Chetty's research demonstrates that having a better first-grade teacher can significantly increase wages across a lifetime.⁸⁹

67. Work is the next venue for human capital accumulation. Human capital built at work complements the human capital built at home and through formal education. The contribution of work to a nation's overall human capital is acknowledged but often overlooked. However, the skills built through work can advance a person's capacity for future work, especially if it revolves around social and creative interactions that cannot be automated. The payoffs of investments in human capital are challenging to quantify, thus schooling, health and work may be vulnerable to underinvestment. For policy to adapt to the human capital needs of the future, there is an urgent need for measurement

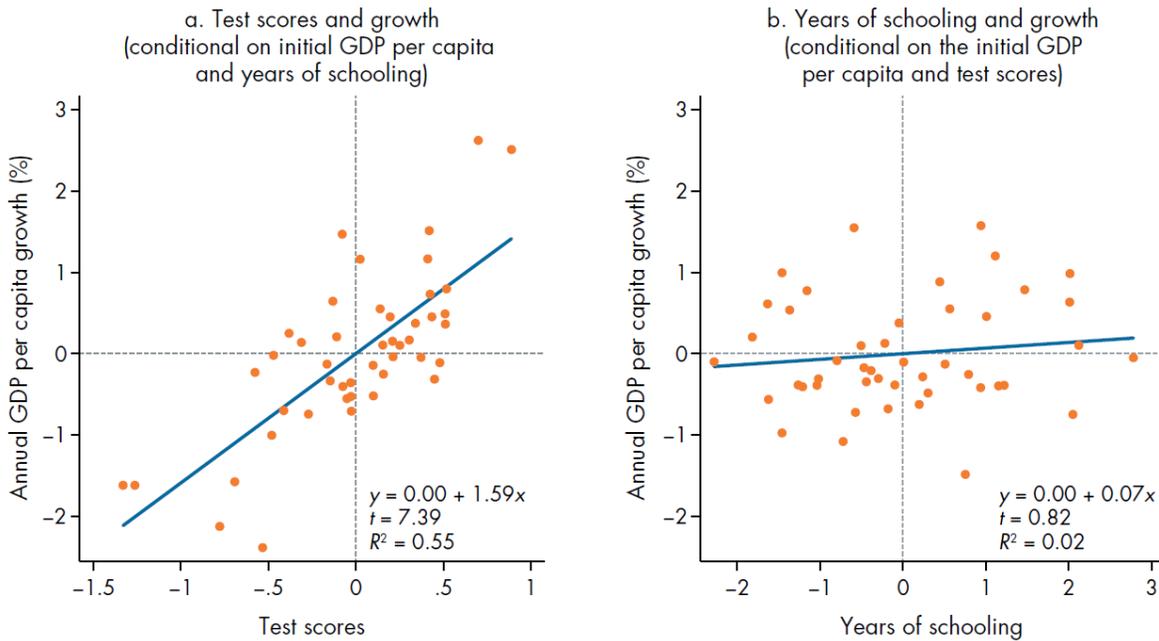
Quality-adjusted schooling

68. The human capital measure used in this Report is defined as the number of years of quality-adjusted schooling that a child born today can expect to achieve, given the status of health and education that prevail in the country where she was born. The quality-of-schooling component is an important innovation, reflecting new work by World Bank staff to harmonize international student achievement test scores. These scores are then converted into equivalent years of schooling.⁹⁰

69. Figure 5 shows the relationship between the index and real GDP per capita, for 119 countries. The index suggests huge differences across countries ranging from around 3 years in the poorest countries to nearly 10 years in the richest countries. Advanced economies, such as Korea, Sweden and Japan, dominate the upper end of the spectrum. Some middle income countries such as Vietnam and China are strong performers too. Sub-Saharan Africa and the Gulf States have the lowest quantities of human capital. These countries need to rapidly upgrade if they are to compete globally for future jobs.

70. Considering the 10-year trend in learning at school, there has been significant movement—usually for the better: 23 countries have a change of more than one year in expected years of quality-adjusted schooling. Examples of low income big movers include Benin, Burundi and Burkina Faso, mainly due to improvements in the expected years of schooling. Overall, expected years of schooling accounts for 82 percent of the overall variation in this measure. Next is school quality, which accounts for a further 12 percent.

Figure 5. Learning, Not Schooling, Matters for Growth



Source: World Bank staff.

Note: data on test scores from Hanushek and Woessmann (2012); data on years of schooling and GDP from the World Bank's World Development Indicators, 2017.

71. An additional year of schooling yields a certain increase in wages. This measure is well-known in the literature as returns to schooling. Countries in fragile and conflict-affected situations may have higher returns to education than developed economies. An additional year of schooling in the Central African Republic corresponds to a 12.8 percent increase in monthly wages. Similarly, the returns to education is 22.8 percent in Zimbabwe and 17.8 percent in Papua New Guinea. In contrast, in high income economies such as Sweden and Finland, returns to education is 3.5 and 2.4 percent respectively. Low levels of schooling in fragile states leads to higher returns for the few who attain an education. In contrast, near universal education in high income economies lowers the returns to education as more people are educated.

Returns to experience

72. Through work, employees can accumulate human capital by developing their skills on a continuous basis. Human capital accumulation varies by the type of work. Each type of work is composed of a certain number of tasks. Routine tasks may be automated. Non-routine tasks may complement changes in technology. As such, the task content of jobs will determine their destiny in the face of technological progress. Identifying the sectors and occupations that at present generate the highest human capital is one objective of this Report. For example, clerical work involves precise, repetitive tasks. Thus, this occupation will be easily replaced by computers. However, tasks that are tacitly understood but difficult to explain are harder to automate, as they do not follow specific instructions. These tasks range from requiring a high degree of judgment to sensorimotor skills. Therefore, occupations such as hair dressers are unlikely to be automated.

73. To study the patterns of human capital accumulation at work, the returns to work experience for countries are estimated across several dimensions. The underlying data consists of census, household,

budget and labor force surveys, allowing for explorations across various dimensions to illustrate the influence of several factors on the returns to experience.⁹¹

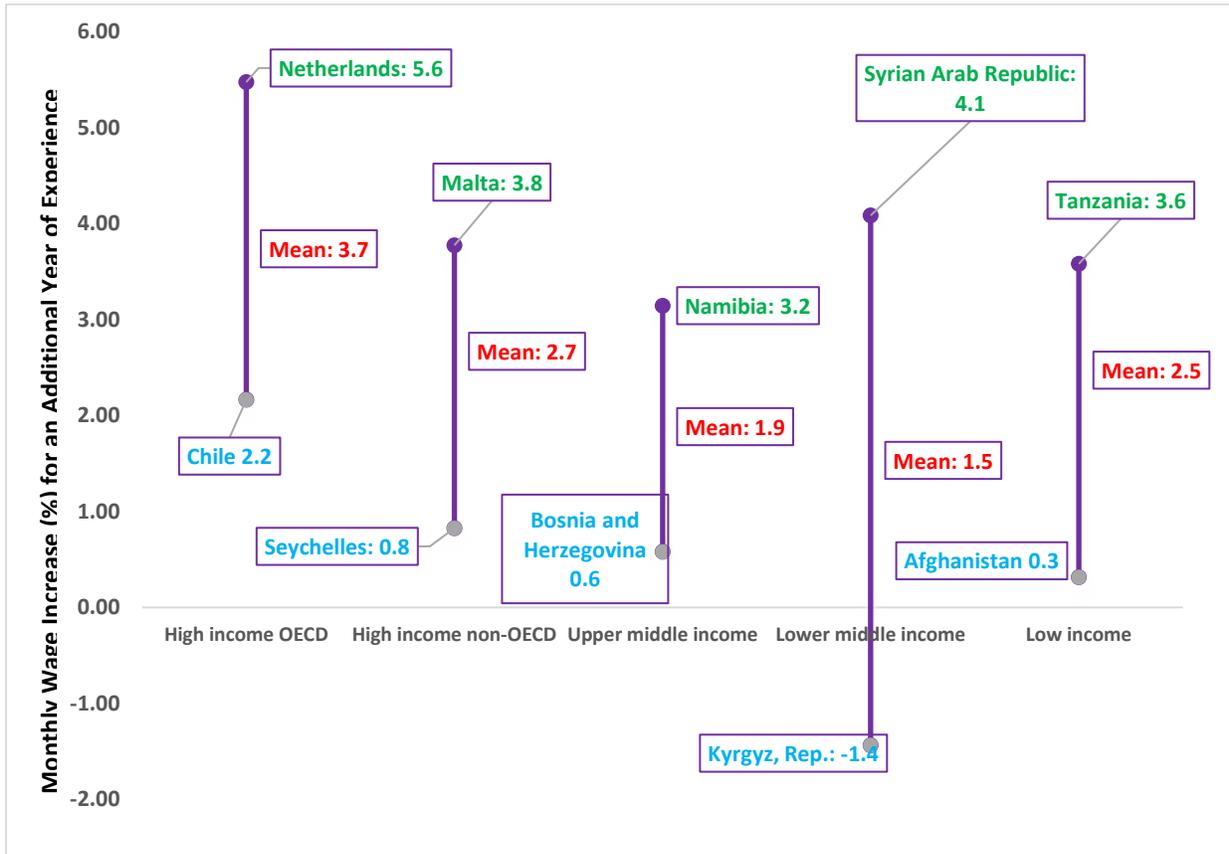
74. Figure 6 illustrates the returns to work experience by level of income for 144 countries. Returns to experience is defined as the percentage increase in monthly income from an additional year of experience. These returns are built both through work itself and on-the-job training. In general, high income economies have higher returns to experience than low-income economies. As one might expect, the highest returns to experience are in high income European economies. In Netherlands and Sweden, just one additional year of work increases monthly wages by 5.5 and 5.4 percent, respectively.

75. Some countries—particularly those that previously had centrally-planned economies—have negative returns to experience. Examples include Kyrgyz Republic (-1.44 percent), Republic of Yemen (-0.7 percent), and Georgia (-0.5 percent). Declining returns to experience in post-communist economies is not surprising and has been well documented in the Czech Republic, East Germany, Hungary, Poland, and Russia.⁹² Under communism, favored industries that had been propped-up by governments became uncompetitive when economies transitioned to freer markets. Employment was concentrated in manufacturing, instead of consumer-oriented services. As services grew post-communism, skills acquired under the previous regime became outdated. Retooling was challenging for older workers and younger workers rapidly replaced them. The patterns suggest that economies with highly regulated, uncompetitive markets experience lower wage growth than those that are more open and competitive.

76. Some results in Figure 6 should be interpreted with caution, however. Some lower income economies have higher returns to experience on average than upper middle income economies, including Tanzania (3.6 percent), Burkina Faso (3.3 percent) and Haiti (3.1 percent). Survey selection bias may be responsible for this result: surveys cannot really capture the lower life expectancy and higher levels of informal employment typically found in low income countries. Low life expectancy means that only individuals who survive are captured in surveys—in that case, high returns to experience may be reflective of a well off sub-population of the economy that can afford healthcare and live to an older age. Where there are high levels of informal employment, the majority of survey respondents tend to work in the better paid formal sector.

77. Toyota has built its own “Advanced Manufacturing Technician” program to provide a pathway for students seeking careers at the company. The program begins with exposing students in middle and high schools to the possibility of a career with the company. Students who enter the program upon high school graduation will undertake a two-year, full-time community college program that mixes school-based learning with paid intern work at the Toyota plant, leading to an associate degree in applied science that is effectively paid for by the company. Such apprenticeships are relatively rare in the United States; currently there is just one working apprentice for every sixty college students in the country. But apprenticeship programs are highly successful in northern and central Europe.

Figure 6. Returns to experience by income level



Source: WDR 2019 team, using household survey data.

Note: The figure presents the returns to experience by income level. Returns to experience is defined as the percentage increase in monthly income from an additional year of experience. The first bar presents the returns to experience for High-Income OECD economies. The middle figure presents the mean (3.7 percent). On average an additional year of experience increases monthly wages by 3.7 percent in high income OECD economies. The top figure is the highest returns to experience for the high income OECD income group. (Netherlands - 5.6 percent). Therefore, an additional year of experience raises monthly wages by 5.6 percent in the Netherlands. The bottom figure displays the lowest returns to experience for the high income OECD income group (Chile - 2.2 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 (2018) 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 with a 6 percent discount rate.

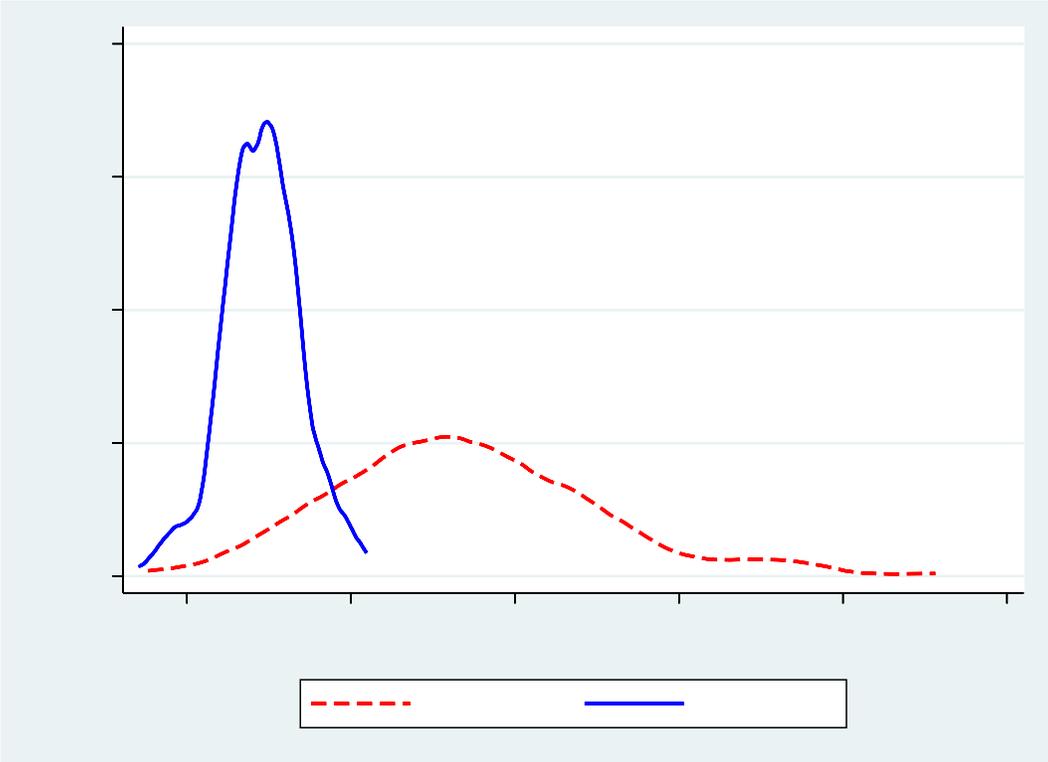
78. As compared to manufacturing or farming, the service sector requires more skilled workers given the higher number of occupations with non-routine tasks. The returns to experience show that the service sector has the highest returns (2.5 percent) followed by industry (2 percent), and then agriculture (1.3 percent). Service industries have occupations with fewer routine tasks and generally complement advances in technology. Thus, it is reasonable to expect higher returns to services than for other sectors. New types of work created because of technological progress are likely to raise the returns to experience in the services sectors even further.

79. Countries with low returns to experience in industry also tend to have low returns to experience in services as well as agriculture. For example, Georgia and Cambodia are at the lower end of the returns to experience spectrum in agriculture, industry, and services. The indication is that reallocation across sectors may result in efficiency gains, but not convergence across economies. The evidence indicates country-wide traps.

80. As one might expect, professionals that are likely to complement technology are the occupations with the highest returns. Elementary occupations and skilled agriculture have the lowest returns. But there are some startling results. Clerical support work—an occupation at risk of automation—has higher returns than managers, as well as services and sales workers. Machine operators have low returns despite their direct complementarity with physical capital. The latter may be due to larger-than-expected increases in automation, the controlled nature of factory environments, or the relatively routine nature of these operational tasks. The high returns for clerical work may be driven by economies that have yet to face automation in that occupation. The Report will explore these patterns in detail to derive useful insights for human capital investment.

81. What contributes more to wages: education or experience? Figure 7 shows that returns to education are about four times higher than returns to experience. On average, the returns to education is about 8.1 percent while the returns to experience is 2.2 percent. Learning in school may be worth four times the learning at work, depending on the country in question. In Kenya, the difference is even higher – returns to education is about 18.9 percent, while returns to experience is 2.8 percent. In Lebanon, the returns to education (2.9 percent) is about twice as high as the returns to experience (1.3 percent). Higher returns to schooling fits with the concept of learning over the lifecycle where early investments in skill acquisition have a greater payoff than later investments. How both experience and education interaction with each other will matter. For example, work experience will only take someone so far if all they have is an elementary education. The Report will delve into the complementarities between work and school.

Figure 7. Returns to experience and education



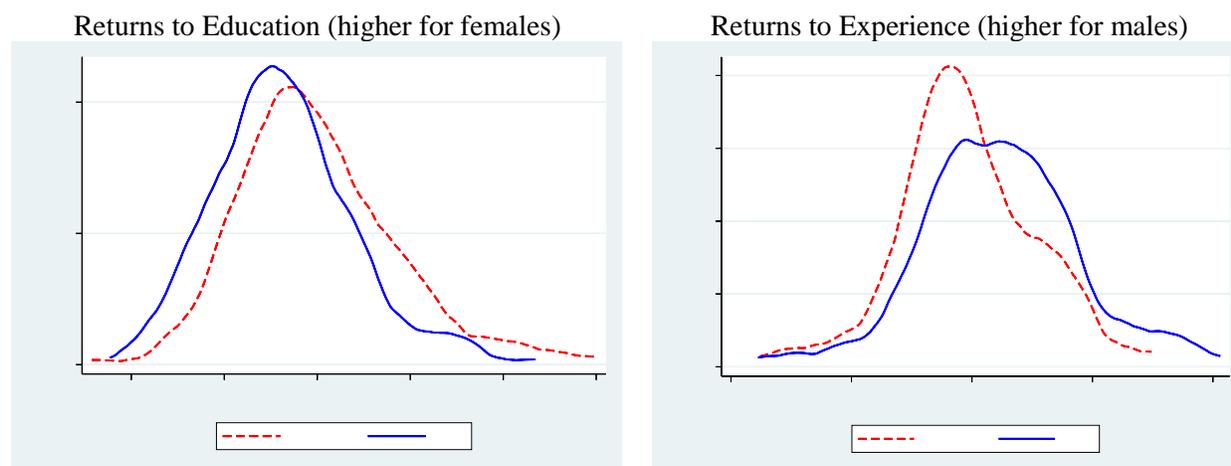
Source: WDR 2019 team, using household survey data.
 Note: The graph presents the distributions of returns to experience and the returns to education. Returns to experience is defined as the percentage increase in monthly wages due to an additional year of experience. Returns to education is the percentage increase in monthly wages due to an additional year of schooling. The distribution of returns to experience is to

the left of the distribution of returns to education. The implication is that not only on average is the returns to education higher than experience, but this is true for most individuals.

82. More girls are in school than ever before. Women participation in tertiary education is higher than men in almost all developed economies and half of the developing economies.⁹³ Similarly, more women are at work – women participation in the labor market has increased across economies in all income groups. Yet, increasing gender parity in education and work does not necessarily go hand in hand with gender parity in the rewards of work and school. Figure 8 presents the distributions of the returns to experience and the returns to education disaggregated by gender. The returns to education are higher for women than men (left panel). In contrast, the returns to experience are on average lower for women than men (right panel). For example, in Bangladesh the returns to education for women is 6 percent, three times higher than the returns for men (2 percent). The returns to experience for men is 1.4 percent, almost double that of women (0.7 percent). Some economies are exceptions. The returns to education is higher for women (16 percent) in Ethiopia than men (12 percent) as expected, however the returns to experience is similar between men (2.4 percent) and women (2.5 percent).

83. One interpretation of figure 8 is that women learn more in school than they do at work. The reasons could be numerous. Labor market restrictions may impede women from reaching their full earnings potential. Childcare provisions and divergence in paternity laws may also lead to different returns to experience across gender. If women drop out of the labor market due to the demands of childbearing, their earnings suffer.⁹⁴ Discrimination at work cannot be ruled out as a possible explanation. Women may be directly excluded from promotions or have limited access to informal networks that play a role in career advancement. Higher returns to education may encourage women to participate in labor markets. On the other hand, however, low returns to experience may produce the opposite effect by discouraging women from work.

Figure 8: Returns to experience and education by gender



Source: WDR 2019 team, using household survey data.

Note: The figure compares the distributions of the returns to education and experience for women and men. The left panel shows that the distribution of returns to education for women is to the right of men, indicating that wage increases for an additional year of education is higher for women than men. The right panel shows that the distribution of returns to experience for women is to the left of men. Thus, wage increases for an additional year of experience is higher for men than women.

84. The analysis presented is unable to capture the dynamics that may come into play. The returns to experience in a given occupation may be high, but as the supply of workers into that occupation rise, the

returns to experience will invariably fall. Similarly, technological innovations can render an occupation obsolete, while important transformations in an economy, such as a movement away from a centrally planned system of government, will alter the wage structure of numerous occupations. Non-pecuniary benefits may not be captured by the empirical analysis, but will be explored in the Report.

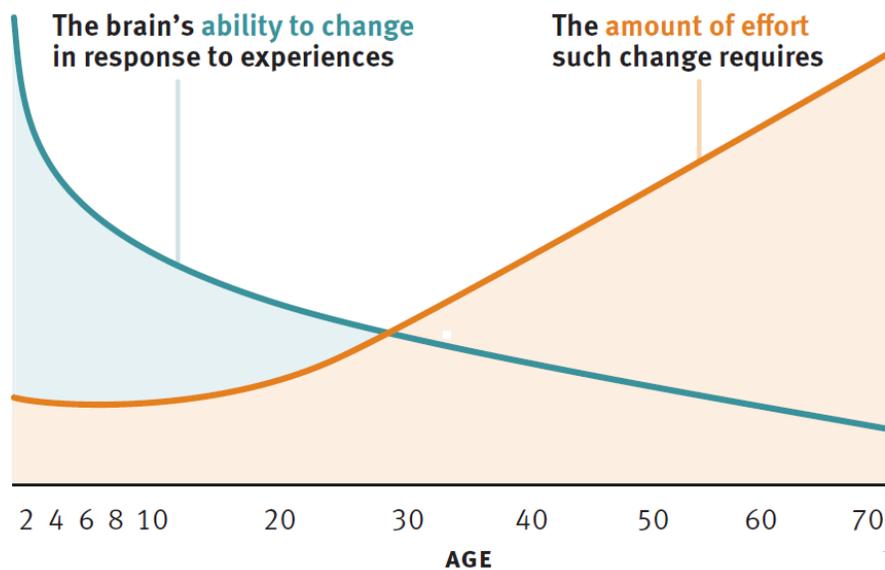
Chapter 4: Individuals

85. Learning is part of societies that adapt to opportunities in the future world of work. Learning begins at home. Early childhood, defined as 0-6 years old, is a critical stage to develop cognitive, language, socio-emotional, self-regulation and other skills. Experiences and learning during this period directly impact ability, health, as well as adult achievement.

86. During early childhood development (ECD), the foundations of the brain architecture are established. It's the time when the brain's ability to learn from experience - its "plasticity" - is the highest. Robust ECD helps children acquire key foundational cognitive skills⁹⁵ and 'learn to learn'. In Bangladesh, for example, rural children who attended preschool performed significantly better in first- and second-grade speaking, writing and mathematics, compared to those who did not.⁹⁶ Because learning is cumulative, the initial advantage conferred by ECD grows overtime - skills beget skills.⁹⁷

87. The ability to learn decreases with age (figure 9), which implies that when the ECD window is missed, skill-building becomes harder. Building more advanced skills on weak foundations is more difficult and less effective than getting the foundations right. Robust ECD allows children to thrive in classrooms⁹⁸, at work⁹⁹, in life.¹⁰⁰

Figure 9. Brain's ability to learn from experience decreases with age



Source: Center on the Developing Child at Harvard University 2016 based on Levitt 2009.

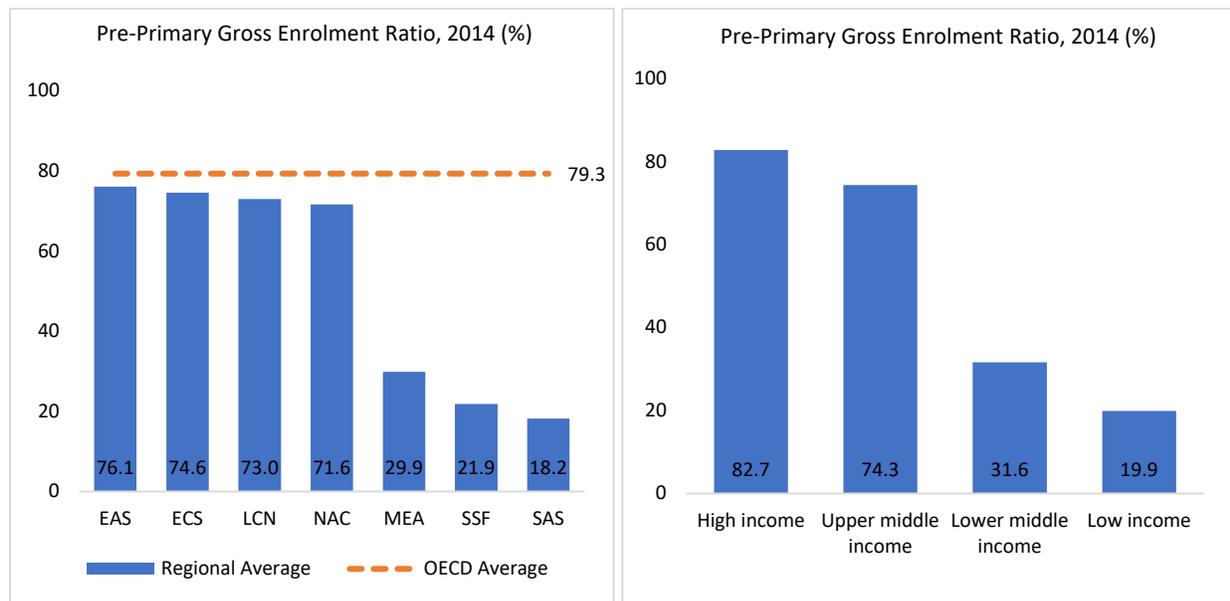
88. In particular, ECD investment can better prepare the new cohorts of workforce for the future. On the one hand, ECD can launch children on higher learning trajectories,¹⁰¹ making them more adaptable, resilient, and productive. Such adaptability helps individuals to master new knowledge to take advantage of new jobs (e.g., robotics engineer) and new markets (e.g., "Uber" for legal services) created by technological advances. On the other hand, and more importantly, ECD investments can make a big difference in building socioemotional skills, including the ability to understand and regulate one's emotions, thoughts and behaviors (i.e., self-regulation), and the capability to effectively communicate and empathize with others (i.e., social competence).¹⁰² Labor market returns to socio-emotional skills is much higher today than it was in the mid-1980s¹⁰³, and will continue to grow. For example, machines will never fully replicate the care that can be provided by doctors and nurses for patients.

89. Yet, significant ECD differences have been observed between young children from richer and poorer households in several Latin American countries including Chile, Colombia, Ecuador, Nicaragua and Peru—such socioeconomic gradients are apparent by age three, and remain largely unchanged after age six.¹⁰⁴ Similar gaps are recorded in other countries including Cambodia, Ethiopia, India, Madagascar, Mozambique and Vietnam. In each case, children from disadvantaged backgrounds consistently lag behind in cognitive and language development.¹⁰⁵

90. ECD investments can help address these inequalities by overturning adverse impacts of genetic, parental and environmental resources.¹⁰⁶ These investments have substantial returns, which are likely to be even higher in the future. For children exposed to poverty and other adverse conditions quality ECD programs can help to increase competence¹⁰⁷ and adult wages¹⁰⁸, improve health¹⁰⁹, reduce violence, depressive symptoms and social inhibition¹¹⁰, as well as foster growth in the subsequent generation.¹¹¹ For example, in rural Guatemala, an ECD nutrition intervention for poor families significantly increased wages for these children in adulthood.¹¹² In Jamaica, early stimulation interventions for infants and toddlers increased their future earnings by 25 percent—equivalent to adults who grew up in wealthier households¹¹³ It is that rare investment that does not have an equity-efficiency trade-off.¹¹⁴

91. Globally, ECD investments are under-provided. 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.¹¹⁵ Worldwide, only half of all three to six-year-olds have access to pre-primary education - in low income countries this share is one in five (figure 10).¹¹⁶ In middle income countries like Cambodia and India also less than 20 percent of the pre-school-age children are enrolled in such programs. 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 0.3 percent.¹¹⁷

Figure 10. Gross enrolment ratio of pre-primary education by region and income group

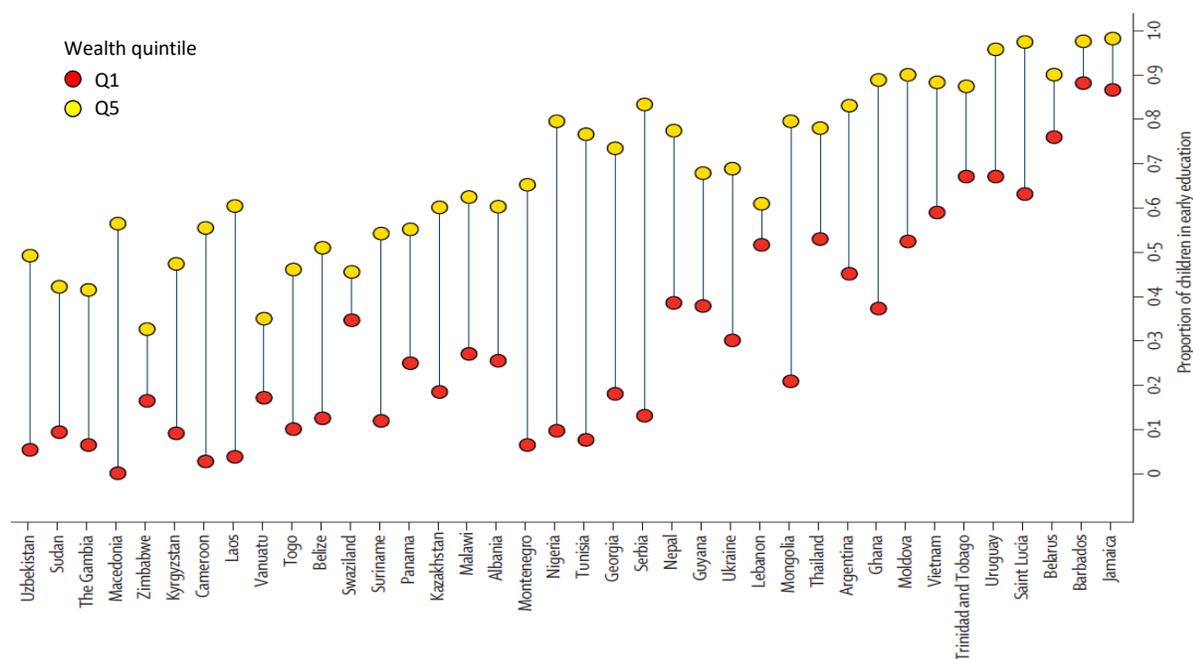


Source: UNESCO Institute for Statistics, compiled by World Bank Education Statistics

Note: The regions in the left panel are as follows: EAS—East Asia and Pacific, ECS—Europe and Central Asia, LCN—Latin America and Caribbean, NAC—North America, MEA—Middle East and North Africa, SSF—Sub-Saharan Africa, SAS—South Asia.

92. Children from poor families are the most vulnerable and the least likely to attend ECD 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.¹¹⁸ Such gaps are particularly wide in countries including Nigeria, Tunisia, Serbia (figure 11). Rural families are especially disadvantaged. Across a sample of 15 countries, rural dwellers consistently have worse access to ECD programs compared to those living in urban areas.¹¹⁹

Figure 11. Proportion of children aged 3-4 years in early education by wealth quintile of selected countries



Source: Black et al. 2017, based on data obtained from UNICEF Multiple Indicator Cluster Survey

93. There have been major advances in understanding what produces effective ECD. Social science research has shed light on what approaches work. For instance, cash transfers can be an effective way to support ECD for the poorest children. A cash transfer program in Bangladesh significantly reduced the incidence of wasting among children 10–22 months old.¹²⁰ Neuroscience and brain-imaging are teaching us a lot about how children learn language and math.¹²¹ Governments are finding innovative ways to provide ECD. 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. The success of the approach lies in effective utilization of the public health network.¹²²

94. However, the need for local adaptation of global evidence remains strong. The core principle for effective ECD design is: context matters. A highly successful child nutrition program from Southern India failed to have any impacts in Bangladesh. Why? Partly because the program targeted mothers. However, in Bangladesh, unlike Southern India, decisions about the feeding of young children were made by mothers-in-law and not mothers. Local adaptation of available evidence is crucial. Some have called it a search for “best fit” rather than “best practice.”

Chapter 5: Firms

95. A century ago, many leading firms were vertically integrated. Henry Ford owned the farms that raised the sheep that provided wool for automobile seat covers, the iron ore plus coal freighters that fed Ford's sprawling River Rouge manufacturing complex. Firms such as Ford created an ecosystem under one corporate umbrella. Later, Japanese keiretsu and the Korean chaebol created ecosystems out of legally separate but affiliated companies cooperating strategically as well as financially. So-called "unbundling", where production processes are highly fragmented across countries, changes the task structure of work in many countries.

96. Global trends, such as technological progress and fragmentation of production, are changing the boundary¹²³ of the firm, affecting the labor demand both in terms of tasks and skills.¹²⁴ Firm scope, business model, organizational design, product/service mix, are all changing. Simultaneously, the decline in the labor share of income has captured economists and policymakers' attention. They try to understand the causes behind the decline, including the potential role of recent global trends to explain it through changes in firms' behavior.¹²⁵ Thus, making the firm a key player when thinking about the future of work.

97. Evidence for developed and emerging economies shows that technological change can explain the fall of the labor share through the rise of *superstar* firms.¹²⁶ Globalization and new ICT technologies benefit the most productive firms in each industry, incentivizing the reallocation of labor toward these firms. With recent global trends favoring the most productive firms, one can predict that product market concentration will rise, as industries become increasingly dominated by *superstar* firms, with a low share of labor in firm value-added and sales. Examples of export superstars include Samsung in Vietnam, and Intel in Costa Rica.

98. *Superstar* firms are particularly relevant in the changing nature of work because they engage in more outsourcing, adopt alternative work arrangements, hire contracting firms, temporary agencies, independent contractors and freelancers for a wide range of activities previously done in-house. These suppliers are known as *satellite* firms. They are also on the rise with potential implications for future labor markets. Examples of large companies adopting alternative working arrangements are numerous. In Alphabet Inc., Google's parent company, full-time employees plus outsourced workers are roughly equal in number. About 70,000 contractors, temps plus vendors test Google's self-driving cars. In large firms, 20 percent to 50 percent of the total workforce often is outsourced with Bank of America Corp., Verizon Communications Inc., Procter & Gamble Co. and FedEx Corp. having thousands of contractors each. Consulting firm Accenture PLC predicted that within 10 years, one of every 2,000 largest companies in the world will have "no full-time employees outside of the C-suite."

99. The rise of *superstar* firms has sparked a lot of attention in recent years, to some extent revamping an old debate, as market concentration has welfare implications. If market concentration reflects aggregate efficiency gains, it means that *superstar* firms bring aggregate gains in terms of output, exports, and wages.¹²⁷ Then policies geared to support small and medium-sized firms, which display anemic growth rates over long-term periods, should be revisited. Other policies may be needed to support the creation of innovative, high-growth, *superstar* firms. The evidence for developing countries on this topic is negligible. The Report will explore this issue using firm-level census data for developing economies, which in some cases, include information about the economic activity of both the formal and informal sector. Country studies for fragile countries like Cote d'Ivoire will also be included.

100. In addition to favoring the rise of *superstar* firms, the development of new technologies can impact labor demand by making firms more productive. For example, automation can displace workers from their jobs. As Autor (2015) notes, "workplace technologies are designed to save labor. Whether the technology is tractors, assembly lines, or spreadsheets, the first-order goal is to substitute mechanical power for human musculature, machine-consistency for human handiwork, and digital calculation for slow and error-prone

wetware.” Increased automation has also changed the way some firms are organizing the production process, enabling them to reshore historically labor-intensive manufacturing activities back to high income economies, to be closer to the final consumers.¹²⁸ New technologies induce changes in the internal organization of the firm, shaping new hierarchical structures, as they alter the need of production workers, CEOs, and managers. Changes to the way of organizing knowledge will alter both the type of workers hired, their span of control and their incentives.¹²⁹

101. Digital technologies are also changing how economic activity is organized, as digital platforms emerge as giant micro-outsourcing operations. In the gig economy, crowd-based “networks” of individuals rather than centralized institutions supply capital and labor. The lines between personal and professional relationships are also increasingly blurred, as the supply of labor and services often commercializes “peer-to-peer” activities such as money lending. Where new markets to exchange goods and services are created, potentially higher levels of economic activity can result. The distinction between full and part time employment is less meaningful, as many traditionally full-time jobs are supplanted by intermittent contract work. Moreover, the flexibility inherent in the gig economy allows capital and labor to be used at levels closer to full capacity, which has the potential for greater impact.¹³⁰

102. The new way of organizing firm activities is changing the nature of work. The future structure of markets is certainly unknown, but the expansion of the digital economy creates limitless opportunities, especially for people who can work from home, and for those able to adapt to the new era. The changing nature of work will definitively affect the types of tasks demanded and the skill-sets sought. The Report will explore policies geared to maximize the creation of high-quality private sector jobs.

Chapter 6: Government and Society

103. The changing nature of work entails a proactive role for governments. Although technology can bring many positive changes to the market—e.g., mobile phones can be leveraged to provide price information to poor farmers, deliver cash transfers in remote rural areas, or expand labor demand across space—technology can also be disruptive.¹³¹ Technology can amplify existing market failures or create new ones. For one, technology creates uncertainty that exacerbates information failures across markets. Technology changes skill demands and production processes, with important distributional effects. These impacts reiterate the foundational role for public action.¹³² Moreover, they make redistribution and risk-sharing an increasingly central part of policies within the changing nature work.¹³³

104. Governments are responding to these challenges. Singapore launched its SkillsFuture initiative in 2015, which offers an educational credit for all Singaporeans to return to school if they wish. Singapore also does in-depth analysis of the skills needs of its workforce, trying to target training to meet those needs. The government argues that, “With the fast pace of technological advancements, stronger global competition for jobs, skills upgrading, deepening are essential for Singaporeans to maintain a competitive edge.”¹³⁴

105. Sweden, as another example, has set up Job Security Councils across the country, which are nonprofit organizations run by a board of representatives split equally between employers and employee representatives. They are financed by a small contribution from employers. The goal of the councils is to encourage as seamless a transition as possible for laid-off workers. Employers are required to give significant advance notice of layoff, then the Councils work to provide counseling and guidance—if necessary retraining or business start-up support—to those who are facing job loss. Over 85 percent of Swedish workers are reemployed within a year, the highest percentage of reemployment in any OECD country.¹³⁵

106. Social protection and labor market systems become even more important in society. Those systems comprise active labor market programs (e.g., wage subsidies, training, intermediation),¹³⁶ labor market institutions,¹³⁷ social insurance, and social assistance. The latter includes various cash, in-kind transfer programs, as well as public works.¹³⁸ In each case, the precise design can vary based on the objectives at hand. For example, cash transfers—which are often directed to women—can be designed with more or less conditions tied to human capital accumulation, while public works programs can take a variety of shapes (see, for example, Ethiopia, Greece, India, South Africa, South Sudan, and the U.S. during the New Deal).¹³⁹ When linked to services like childcare, programs can have important effects on gender.

107. Traditionally, these forms of social protection are tied to formal employment, where firms act as implementing agents as well as platforms for the program at hand. But with labor markets becoming more fluid, this model becomes less relevant. Workers today are pursuing a range of activities.¹⁴⁰ Alternative work arrangements in the United States are currently at 16 percent, up from 10 percent in the year 2000.¹⁴¹ As a result, social protection systems built around stable employer-employee relationships apply to a diminishing number.

108. Governments and society may wish to review existing benefits structures in the context of changing labor markets. In many emerging economies social protection and labor systems have not been fully anchored to employment—this may be an opportunity to avoid some of the challenges presented in higher income countries. Large informality, where it exists, presents the most significant barrier to effective social protection and labor systems. Informal jobs account for around 80 percent of total employment in low income countries, and 37-55 percent in middle income countries.¹⁴²

109. Relatedly, the distinction between social assistance and social insurance is increasingly blurred in practice. While in some contexts this may create parallel programs, perverse incentives and duplicated costs, in other contexts the integration of assistance and insurance is seamless. For example, in China people that contribute to pension accounts receive a social (non-contributory) pension for their elderly parent. In countries like Georgia, ‘contributory’ pensions were being paid at about the same level of non-contributory transfers: since the share of total payments financed from the general budget was high, the contributory leg was phased out in favor of a non-contributory scheme. Moreover, in the health insurance space a cross-country review found a range of contexts where governments subsidize insurance premiums for the poor (e.g., Chile, Costa Rica, Turkey). A key enabler is often the ability to link robust administrative databases on individuals and households.

110. The challenge of providing effective support to low-income, vulnerable workers persists in a changing landscape of work. Indeed, the situation may even get worse given the associations between skills-biased technology and widening inequality. Although social protection expenditures are significant in high income countries (e.g., around 16 percent of GDP in Europe),¹⁴³ ‘take-up’ rates amongst eligible beneficiaries are often quite low. A recent review estimated that in the EU, only about 60 percent of social benefits are claimed, often due to a lack of awareness of benefits, confusion regarding eligibility, stigma, the opportunity costs of accessing benefits, or complex administrative procedures.¹⁴⁴

111. In emerging countries, these challenges are often compounded by dilemmas on how to select ‘some among many’ under limited budgets. On average, 4 percent of GDP in low and middle income countries is spent on pensions. Social assistance costs between 0.89-1.5 percent of GDP.¹⁴⁵ Various challenges in selecting those eligible for support have sometimes led to exclusion errors or limited coverage.¹⁴⁶ Latest estimates show that, in low income countries, only 19 percent of the bottom quintile is covered by some form of social protection or labor program. Coverage goes up to 54–77 percent in lower and upper middle income countries, respectively.¹⁴⁷ Moreover, large swaths of the lower-middle part of the income distribution—which is still ‘vulnerable’ by many standards—tends to be “unreached” by social protection programs. This part of the population is not poor enough for social assistance; at the same time, it is not rich or formal enough for social insurance. These groups of people may be among the most exposed to widespread changes in labor markets.

112. As labor markets change, accompanied by rising anxiety, attention turns towards a societal ‘minimum’. What that minimum should look like is the subject of extensive debate. For example, should a publicly-provided core target only those most in need, should it be universal, or something in between? Those choices, often rooted in history and attitudes toward redistribution, affect the selection of interventions. What are the comparative advantages of a guaranteed minimum income program versus a negative income tax versus a universal basic income?¹⁴⁸ What is the “right” balance between adequacy of benefits versus incentives to work? What implementation requirements are entailed? What would be the distributional effects of ‘winners and losers’ from reforms?¹⁴⁹ Should work-oriented approaches be used too, such as public works, wage subsidies, earned income tax credits?¹⁵⁰ The Report will explore these questions looking at cross-country evidence.

Universal basic income

113. The idea of universal basic income (UBI) elicits a degree of passion seldom encountered on other policy proposals. In economics, the idea found support in Milton Friedman as well as James Tobin, a rare unison.

114. For a program to be considered a UBI, it needs to meet two criteria. First, a UBI is meant for every citizen independent of income or employment status. Second, it is provided in the form of money, as

opposed to in-kind transfers and services. UBI differs from guaranteed minimum income programs which are targeted to participants under a certain income threshold – above which benefits are withdrawn.

115. Society's ambition can significantly change the scope of a UBI. For example, the size of benefits can alternatively include modest transfers (for example enough to cover basic needs such as shelter and food), benefits for an amount to pull people above the country's poverty line, or more generous levels to meet wider needs (for example tuition fees for children). These choices are complementary to work. A more radical option envisages UBI as a substitute for work. Advocates see UBI as an antidote to automation¹⁵¹, ensuring economic freedom and adhering to human rights provisions.¹⁵²

116. In addition to the size of transfers, other parameters matter too. For instance, a UBI can be provided as substitution or in addition to existing welfare schemes; eligibility criteria can envisage a minimum (e.g., 18 years) or maximum age (statutory retirement age); citizenship or residency requirements may apply. The sources of financing can also differ, from personal income taxation, distribution of natural resources revenues, carbon credits, or consumption tax.

117. Only one country, Mongolia, had a short-lived UBI covering the entire population. The program provided \$17 a month and lasted 2 years (2010-2011), before being cut due to fiscal constraints.¹⁵³ Iran also had a program resembling a UBI for one year: in 2011, energy subsidies were replaced by cash transfers to the entire population, with gradual downsizing from 21 million households to 17 million. The program provided \$45 a month per person.¹⁵⁴

118. There are a number of small-scale experiments that look like UBI. Finland is undertaking a randomized controlled trial providing 2,000 unemployed citizens with \$600 a month over 2 years; in Oakland, California, 100 families are provided with up to \$2,000 per month over a year, while 250 Dutch households in Utrecht receive \$1,100 per month over two years. The Canadian province of Ontario is preparing a test providing 4,000 people with \$13,300 per year. In Kenya, a pilot is underway providing a UBI to 11,500 people over 2 years (plus a second group of 6,000 people covered for 12 years). Except for the pilot in Kenya, those trials do not test a pure UBI, though they are marketed by proponents as such.

119. Similarly, a range of sub-national, resource-dividend schemes are in place. The Alaska Permanent Fund, for example, is designed to redistribute oil revenues to all residents. In 2016, the Fund distributed about \$2,000 to 660,000 individuals. A similar program relates to sharing dividends from gambling: for instance, since 1997 the tribal government of the Eastern Band of the Cherokee Nation distributes a portion of its profits to 16,000 adults. An analogous scheme is underway in Macau.

120. The fiscal burden of universal basic income is the most contentious focus of debate. To shed light on the projected costs, a four-country microsimulation analysis was conducted for a UBI with benefits equivalent to national GMI programs.¹⁵⁵ The 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 keep in mind: GMI only covers a fraction of the population and, hence, expanding to the whole population the benefit levels of a GMI, requires a significantly larger budget.

121. Since these simulations were conceived under a budget-neutral scenario, higher government revenues are needed for a true UBI. To this effect, two funding sources were identified: taxing UBI transfers alongside other incomes and abolishing existing tax-free allowances. In Finland and Italy, such dual, additional revenue stream is more than adequate to cover the extra costs of a UBI. In France, those revenues almost offset the additional cost of a UBI. By contrast, in the UK the cost of a UBI would significantly exceed current spending on cash benefits and tax-free allowances.

122. The emerging evidence in developing countries also points to the need for significant additional spending in some countries. For example, the IMF recently estimated that in a handful of middle-income economies a UBI set at 25 percent of median income would cost about 3.75 percent of GDP.¹⁵⁶ In comparison, today's low and middle-income countries spend on average 1.5 percent of GDP in safety nets.¹⁵⁷ In India, estimates from the biannual Economic Survey show that a UBI of about \$115 a year - enough to eliminate absolute poverty - could be paid by replacing existing social assistance schemes. There are about 950 centrally-sponsored sub-schemes accounting for about 5 percent of the GDP.¹⁵⁸ These estimates have been questioned by researchers.

123. A range of simulations are also providing suggestive evidence. For instance, the cost for a UBI for an amount enough to close the poverty gap ranges between 11.3 percent of GDP in a low-income country like Nepal to 1.7 percent of GDP in high-income Chile.¹⁵⁹ However, a UBI provided for an amount equivalent to average existing transfers would be more modest. For instance, this would absorb around 1.6 percent of GDP in Nepal. In countries like Indonesia and South Africa, the cost of a UBI would be about equal to that of current safety net benefits. In Chile, a UBI would be slightly higher than existing benefits, but still quite affordable overall (1.3 percent of GDP).

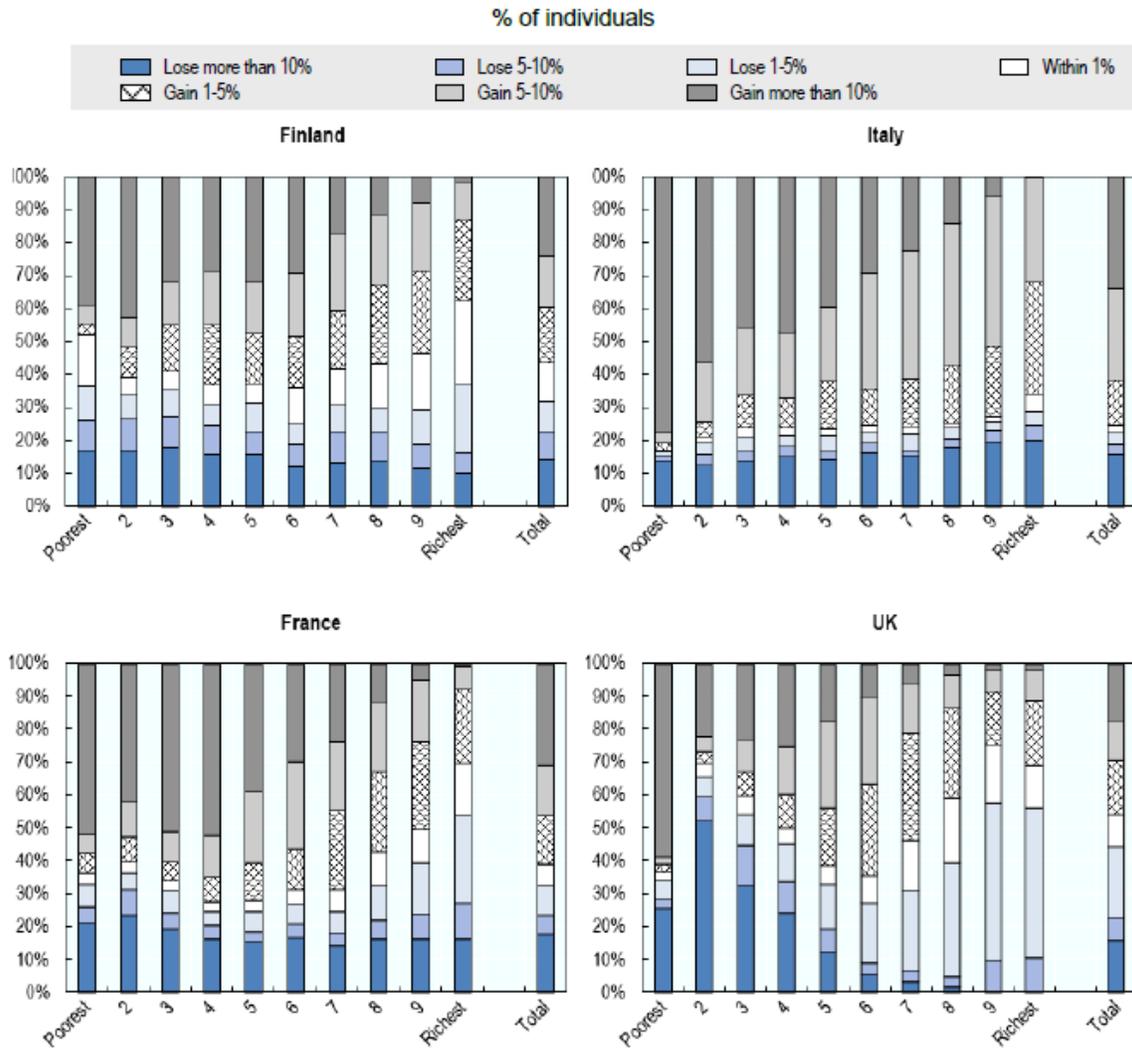
Distributional effects

124. A wide-ranging reform like UBI will spark distributional effects, that is, it will generate winners and losers among the population. The direction of those effects would depend on various factors, such the performance of existing social protection systems (e.g., in terms of coverage and incidence); what programs would be replaced; the size of UBI transfers; current tax structures; the profile of beneficiaries (e.g., family size, enrollment in multiple programs because of disabilities).

125. For example, in the examined four European countries – Finland, France, Italy, and UK – lower-income households are receiving means-tested income support under existing policies. Therefore, they would be less likely to gain as the UBI is set at similar levels to GMI. A UBI would instead tend to benefit those not qualifying (or not taking-up) social assistance benefits. For example, current low social assistance coverage in Italy makes most individuals in all income groups benefit from a UBI. In France, and to a lesser extent in Finland and the UK, income gains from UBI would be most common in middle-income households (figure 12).

126. The individualized nature of UBI would also create distinct patterns of winners and losers across household types. For example, many couples without children would gain from a UBI set at single-person GMI. By contrast, single parents at lower income levels would be worse-off, as a UBI would not provide the additional support to such groups. In Italy, poverty rates would change little overall, as lower poverty among those not covered by existing benefits would be offset by higher poverty among current recipients. A budget-neutral UBI in the UK would be below GMI levels, so poverty rates would increase significantly.

Figure 12. Distributional impacts of UBI in four countries



Source: Browne and Immervoll (2017)

127. Preliminary estimates are also available for a dozen other countries.¹⁶⁰ In Nepal, for instance, most individuals would experience some gain from an UBI, even with the same budget of current social protection. In Indonesia, around 20 percent of the population would lose with an UBI that keeps the same total amount of current transfers or is equal to current benefits. In upper-middle income South Africa and high-income Chile, the population would experience large losses from a UBI even under higher benefit levels.

Work incentives

128. A principal concern around UBI is the risk of labor supply disincentives. In theory, a UBI is less distortive than other social assistance programs: targeted interventions can generate disincentives by either increasing demand for leisure (income effect) or by making work less rewarding (substitution) through benefit structure that impose differentiated marginal tax rates. A UBI, instead, only has an income effect: the fact that the program is delinked from earnings means that there is no substitution effect.

129. The limited evidence on UBI indicates no or limited effects on work incentives. A study on the Alaskan dividend program shows no impact on employment. Instead, it finds increases in part-time jobs by 1.8 percentage points (or a 17 percent increase).¹⁶¹ Similarly, a study of the Iranian quasi-UBI program found that it did not affect overall labor supply.¹⁶² There was negative effect among youth, however.

130. The discourse on possible benefits from UBI needs to go beyond work incentives. In Mongolia, the 2-year UBI reduced poverty up to 33.7 percent, and inequality by 21 percent.¹⁶³ In Iran, the quasi-UBI reduced poverty by about 5 percentage points.¹⁶⁴ Under the Alaskan dividends program, payments increased consumption, especially around payments time: compared to residents of Washington state, Alaskans spent significantly more on non-durables and services in the month when they receive the dividend payment.

131. Moreover, in the EBCN scheme, an impact evaluation found that not only children improved education outcomes, but that such gains were concentrated among children from poorest families: an additional \$4,000 a year for the poorest households increased educational attainment by 1 year at age 21.¹⁶⁵ Improvements in parenting likely contributed to better child outcomes: children reported more positive interactions with parents. Furthermore, minor crimes decreased among Native American youth, with a 22 percent reduction among teenagers. Once adults, children were significantly less likely to experience psychiatric disorders.

132. A recurrent debate is whether a jobs-guarantee program would not offer a better alternative to UBI. For example, India's NREGA program offers 100 days of work per year at the minimum wage. UBI proponents point to public works as a variant of 'forced labor' molded on the basis of the Old Poor Law. Jobs guarantee advocates contend that the right to work promises that everyone who wants decent work can find it, but it does not impose a duty to work on anyone.

Delivery

133. Globally, 52 percent of the poor do not receive any transfer. This share increases to 81 percent in low-income countries. UBI could close this gap. Also, a UBI would provide a basic floor for those vulnerable to fall into poverty in the future, such as those with unstable income, people at risk of unemployment, those living just above the poverty threshold, or populations affected by natural disasters. A UBI may also be effective in reaching profiles of people that are often not supported by safety nets, such as the homeless, socially marginalized groups, or internal migrants.

134. Social protection systems tend to consist of a plethora of programs, with limited coordination. The United States has about 82 federal programs targeting low-income households; Bangladesh has over one-hundred social assistance programs; and India has nearly one thousand centrally-sponsored schemes, with many more provided at the state level. Overall, these programs tend to pose considerable 'red tape' to deliver. A UBI would streamline such complex web of programs into a single policy.

135. For UBI to happen, countries need a credible personal identification system; widespread payment mechanisms; and markets capable to meet additional demand as massive injections of cash in contexts of weak food markets can result in food price inflation. These conditions are rarely available in developing countries. For example, in Africa the share of the population with national IDs ranges from nearly 90 percent in Rwanda to less than 10 percent in Nigeria.

136. The introduction of a UBI will not happen overnight for other reasons too. In the absence of previous broad-based programs, choices need to be made on where to start from – whether spatially (e.g.,

from urban areas) or categories of people. UBI could use targeting – not as an end for programs dedicated to the poor, but as a means for steering the universality process in a progressive fashion.

137. In theory, a UBI could either substitute for or complement existing social protection systems. However, the proposal of a UBI to top-up existing schemes would not address the shortcomings of current systems – more likely will amplify them. In this regard, it is important to decide which programs should be replaced. Some candidates for replacement – e.g., large-scale energy or food-based programs in South Asia and the Middle East – have strong political constituencies developed over decades. In the case of food subsidies, for instance, these may include actors spanning the agriculture, storage, logistics, and retail sectors which will strongly oppose a shift to cash.

138. The provision of universality in transfers can generate trade-offs with other of forms of universality: for instance, there is a risk that the provision of money might come at the expense of investments in health or education. For example, the evidence shows that cash may not always be more effective for achieving specific goals like child nutrition. In the U.S. the SNAP food voucher program is 2 to 10 times more effective than an equivalent cash transfer in increasing nutrients at the household level. Evidence from Niger shows that the highest impact on child malnutrition is attained by combining cash with in-kind transfers. A study in Yemen found that in-kind interventions are more cost-efficient than handing money in a context of rampant inflation. In some cases, beneficiaries prefer in-kind transfers instead of cash, like in Ethiopia and India.

UBI versus NIT

139. The difference between a UBI and a negative income tax (NIT) program is one of form rather than substance. While there is a general perception that a NIT is focused on “taxing and transferring less” and a UBI on “taxing and transferring more”, the two programs similar. In particular, a UBI financed through a progressive personal income tax can mimic a NIT. Both programs face the same dilemma in balancing minimum guaranteed support: the effective marginal tax rate on benefits and the break-even point where members of society become net contributors to the budget. But UBI is less transparent than NIT, because it is less explicit ‘who is paying for whom.’

140. The popular assumption is that UBI will be provided equally for everyone. This view takes into account only the benefits side. If taxation is made explicit, a UBI is de-facto a means-tested targeted program through taxes. The idea that “Carlos Slim also gets a UBI” is unfounded – the rich would be net payers. The only way in which a UBI would be a provided to everyone equally concerns the scenario of a country receiving money from a non-tax source, e.g., revenues from natural resources or carbon credits.

141. A UBI is superior to a NIT, however, in reaching the poor working in the informal sector. For the vast majority of developing countries, this is a major positive feature of universal basic income programs.

Other policies

142. But basic protections are only part of the picture. Deliberate active labor market programs and intermediation assistance are also important. Similarly, there will be a need for labor market institutions that better balance workers’ protections and adaptability. Delinking benefits from work contracts, relaxing regulations that make it easier for firms to manage human resources, especially low-income workers, are possible policy options.

143. Just as transfers need to be reconceived for the changing nature of work, so too do taxes. How would the above interventions fit within countries' various tax-benefit structures? Is dependence on payroll taxes as the primary source of financing for social insurance obsolete? Are there any potential new sources of tax revenue that can be linked to job creation or destruction, such as carbon taxes or natural resource revenues? Such questions are not just important for high income countries. In middle and lower income countries—including where formal tax systems are relatively underdeveloped—poverty, inequality, resilience, are first order concerns.¹⁶⁶

144. Technology may help in this process. Technological innovations can facilitate public administration and potentially reach entire populations at lower costs. Implementation and coverage can be improved for national identification, information management, and payments systems. Sophisticated data platforms, including social registries, can be used to manage social protection and labor programs. In Pakistan, for example, the national social registry covers 85 percent of the population, providing the data gateway for 70 different programs to operate. In the Philippines, the *Listahanan* database collects information for 60 percent of the population, connecting some 60 programs so that they work in synchrony.¹⁶⁷ Some low-income states in India use GPS technology to track commodities provided as part of the national Public Distribution System¹⁶⁸. In Kenya, mobile technologies allowed the delivery of social protection benefits and the payment of water bills, including in slums.¹⁶⁹

145. Delivery innovations also occurred in fragile contexts, e.g., the electronic vouchers program for Syrian refugees in Lebanon. Implemented in partnership with the private sector, the program generated 1,300 jobs in participating local stores.¹⁷⁰ Cash transfers have been increasingly used in a variety of other fragile and humanitarian settings.¹⁷¹

146. Rethinking labor, social protection, and tax policies, requires nothing less than a new social contract. Social contracts regulate markets, define responsibilities, benefits, and redistribute incomes. But, as explained, when labor markets shift weaknesses in social contracts become more apparent. Since employment is the principal pathway for people to move out of poverty, labor markets need to be at the center of the new social contract.¹⁷²

147. The chapter on Governments and Society will consider how governments can spur productivity while addressing distributional tension. The responsibilities of the state, individuals, firms and society—especially through the labor, social protection, tax system—will have to be redefined. New actors, such as sub-contracted workers or the self-employed, who are not traditionally represented in today's arrangements will have to be included. New forms of organization and representation via the digital economy are also relevant. Establishing flexible structures that support adaptation while leaving nobody behind will define how the changing nature of work affects individuals, firms, governments, and society more broadly. Emerging insights from all countries will illustrate possible ways to strike the right balance.

How this WDR Builds on Past Reports

148. The *Changing Nature of Work* WDR will draw significantly on the *Jobs* WDR (2013), which explores the links between jobs, economic development and social issues—and quantifies development payoffs for productivity, living standards, social cohesion. The comprehensive assessment on jobs agendas provided by the *Jobs* WDR, as well as the development of the International Income Distribution Database (I2D2), will be instrumental for the *Changing Nature of Work* WDR.

149. The *Changing Nature of Work* WDR will also build on the *Learning* WDR (2018), which emphasizes measuring the production of human capital in school and using these measures to increase the rate of production. The Report will explore the returns on investments in schooling as well as at work—and the ways to improve learning by working.

150. The *Changing Nature of Work* WDR aims to lay the foundations for a new global system of measurement for human capital accumulation, in the way the 1993 *Health* WDR prompted the Global Burden of Disease initiative.

151. The *Changing Nature of Work* WDR will draw on several other previous WDRs that discussed the interaction between the labor market, impact of technological change on employment, earning, education, cognitive, psychological, and social factors that are relevant for employees, gender, and development. These include: *Investing in Health* (1993); *Workers in an Integrating World* (1995), *Making Services Work for Poor People* (2004); *Equity and Development* (2006); *Gender Equality and Development* (2012); *Digital Dividends* (2016).

152. In addition to building on previous WDRs, this Report will leverage several World Bank reports, including: Africa Flagship Skills report (forthcoming); Trouble in the Making? The Future of Manufacturing-Led Development; The Changing Wealth of Nations 2018: Building a Sustainable Future (forthcoming); Entangled: Workers' Adjustment to Trade (forthcoming); Sewing Success? Employment, Wages, and Poverty following the End of the Multi-Fibre Arrangement; Stitches to Riches? Apparel Employment, Trade, and Economic Development in South Asia; Poverty and Shared Prosperity 2016: Taking on Inequality; Informality: Exit and Exclusion; The Innovation Paradox: Developing Country Capabilities and the Unrealized Potential of Technological Catch-Up; Back to Work: Growing with Jobs in Europe and Central Asia; Education, Skills, and Labor Market Outcomes: Results from Large-Scale Adult Skills Surveys in Urban Areas in 12 Countries.

Consultations and Timetable

153. Simeon Djankov and Federica Saliola are co-Directors of the 2019 WDR. The core team comprises Rong Chen, Davida Connon, Ana Paula Cusolito, Ugo Gentilini, Asif Mohammed Islam, Shwetlena Sabarwal, Indhira Vanessa Santos, Consuelo Jurado Tan, and Yucheng Zheng. Stephen Commins provides consultations support.

154. 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.

155. 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 April 2018; the Board discussion of the Gray Cover draft for July 2018. WDR 2019 will be launched in October 2018.

Notes

- ¹ Keynes 1931.
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