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INTERNATIONAL DEVELOPMENT IN FOCUS

Building the Right Skills for Human Capital

Education, Skills, and Productivity in the Kyrgyz Republic

Dingyong Hou, Karina Acevedo, Joost de Laat, and Jennica Larrison

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**DINGYONG HOU, KARINA ACEVEDO,
JOOST DE LAAT, AND JENNICA LARRISON**

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Abbreviations

CPD	continuous professional development
ECDS	Early Childhood Development Standards
EGRA	Early Grade Reading Assessment
FSUs	first stage selection units
GDP	gross domestic product
ICT	information and communications technology
ILO	International Labour Organization
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
KIHS	Kyrgyz Integrated Budget and Labor Force Survey
NSBA	National Sample-Based Assessments
OECD	Organisation for Economic Co-operation and Development
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Assessment
PPS	probability proportional to size
PSTRE	problem solving in technology rich environments
TVET	Technical and Vocational Education and Training

All monetary amounts are U.S. dollars unless otherwise indicated.

Executive Summary

ABSTRACT As a budding democracy and a demographically young nation, the Kyrgyz Republic is seeking a trajectory of sustainable growth that is less dependent on remittances, natural resources, and a large informal economy. Raising human capital can build a skilled and enterprising workforce, allowing the Kyrgyz Republic to reap the dividends of a youth bulge, be resilient to disruptive technology, and create quality formal-economy jobs for its large and fast-growing young population.

A changing demand for skills can be seen across the world in the 21st century. In some instances, technology can disrupt labor markets, altering the manner in which businesses and consumers operate and interact. Technological advancements also provide significant opportunities to create new jobs and enhance productivity and effectiveness. The changing landscape for technological innovation translates to a required change in education and skills within the marketplace. The Kyrgyz Republic is no exception, although the shift is slower than that in some other European and Central Asian countries. Through implementation of the National Sustainable Development Strategy (2018–23), the Kyrgyz Republic is planning for technological innovation. Such innovation requires a skilled workforce.

In the Kyrgyz Republic, global trends and technological disruption intersect with demographic growth and structural economic challenges. School age children account for more than 30 percent of the country's population, which is increasing demand for access to quality preschool and basic education. This will translate into increased demand for post-secondary and tertiary education to produce workers with the relevant skills for the changing nature of the workplace. Although it is a major challenge to meet the demand for quality education that builds the necessary skills, the young population of the Kyrgyz Republic also provides an opportunity. If the Kyrgyz Republic succeeds in raising the quality of education, it will improve the skills of

a large part of the labor force—all those young people that enter the labor market—in a relatively short period of time.

Although the industrial sector largely collapsed after the transition from a Soviet republic to an independent country, it has experienced a revival in the last few years with the expansion of the garment industry and other private enterprises. Agriculture became the dominant sector in the 1990s, but it has more recently been replaced by the service sector. In 2018, the service sector accounted for approximately 50 percent of gross domestic product (GDP), as compared to 28 percent for the industry sector and 12 percent for agriculture.¹ These sectoral shifts have also been accompanied by a greater demand for “new skills”—higher order analytical skills, as evidenced also by an analysis of Kyrgyz Household Budget Surveys.

In the Kyrgyz Republic, job creation is slow and lags behind the pace of demographic growth (Ajwad and Gonzalez 2018). Although the service sector has expanded, firm and worker productivity remain the lowest in the region. Firms increasingly attempt to use technology for solutions. Wide disparities in access to jobs among youth and women exacerbate this challenge. The need to shift to a new model to stimulate and sustain stronger growth is becoming an economic and social imperative.

The demand for skills puts pressure on the education system to produce the right skills and quantity of skills. The changing demand for skills and jobs creates a race between education and technology and the need to build evidence to inform policy and investment in human capital formation.

Although the challenges are large, in the past decade the Kyrgyz education system has made some incremental gains in student learning outcomes. The 2017 Early Grade Reading Assessment (EGRA) found a 10 percent increase in scores for second graders and a 13 percent increase in scores for fourth graders over the 2014 results. Although improving, still only 44 percent of sampled second graders and 47 percent of sampled fourth graders attained grade-level oral reading fluency. The National Sample-Based Assessments (NSBA) showed similar improvements and concerns, with increased results for 4th and 8th grade students in 2017 compared with 2014, but with gaps in learning achievement. Results from the Programme for International Student Assessment (PISA) 2009 also portrayed this gap, indicating that 15-year-old students trail behind the Organisation for Economic Co-operation and Development (OECD) average by approximately 4.5 grade levels (World Bank 2020). These assessments provide an important basis for understanding some of the challenges in skill acquisition.

The 2019 skills survey for the adult Kyrgyz population provides us with a better understanding of the relationship between skills acquisition and education. The skills measures used in this survey focus on literacy, numeracy, and problem solving in technology rich environments (PSTRE) and follow the same questions and approach as the OECD’s Programme for the International Assessment of Adult Competencies (PIAAC) surveys. The report explores the key cognitive and workplace skills needed for individuals to participate in society and for economies to prosper and provides a baseline data set on the levels and proficiency of education and skills of a representative sample of Kyrgyz youth and adults.

KEY MESSAGES

The labor market is increasingly seeking adults with strong foundational skills; however, a large portion of adults in the Kyrgyz Republic perform well below this foundational level. Most jobs in the Kyrgyz Republic require regular use of reading, writing, numeracy, and information and communications technology (ICT) skills; higher-skilled groups of people earn higher wages, suggesting that the labor market rewards higher skills. However, skills levels among the workforce are consistently low in absolute levels, among varying sociodemographic groups, and relative to countries that implemented PIAAC surveys. Literacy and numeracy skills of younger adults do not appear to be significantly stronger than those of older cohorts. Skill levels are measured on a scale of “below level 1” through “level 3 and above.” Level 2 is considered the minimal proficiency for literacy and numeracy. PSTRE measures problem-solving skills in basic computer literacy. A level 1 PSTRE score indicates basic understanding, simple forms of reasoning, and the use of common ICT applications, while a score of 2 or above demonstrates inferential reasoning, integrated tasks, and the use of specific technology applications.

A significant share of the adults in the Kyrgyz Republic performed at or below level 1 in literacy and numeracy. In literacy and numeracy, 59 percent and 60 percent of adults, respectively, scored at or below level 1. Among those who scored higher, about three-quarters performed at level 2. Altogether, only about 10 percent performed at level 3 or higher. In practice this means that in literacy, the majority of the adult population has, at best, knowledge of and is able to recognize “basic vocabulary, determin[e] the meaning of sentences, and [read] paragraphs of [relatively short digital or print] texts,” (OECD 2013, table 2.2) while in numeracy the majority of the population is, at best, able to engage in “simple processes involving counting, sorting, performing basic arithmetic operations, . . . and identifying elements of simple or common graphical or spatial representations” (OECD 2013, 79). In comparison, only 19 percent of adults in OECD countries and 22 percent of adults in Europe and Central Asian countries score at or below level 1 on literacy; the corresponding numeracy rates are 24 percent and 25 percent, respectively.

PSTRE skills do not meet the needs of the 21st century. Ninety-eight percent of respondents have at most, level 1 PSTRE proficiency (see figure 3.7), which means that respondents have only basic skills to use of “widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem” (OECD 2016).

Completion of upper secondary education does not equate to significantly improved skill levels. Although some improvement in skills exists between those who have and have not completed upper secondary education, the impact is relatively small in comparison to international norms. In literacy, 65 percent of those with upper secondary education perform at level 1 or below compared to 71 percent of those who have no upper secondary education. In numeracy, these figures are 66 percent and 77 percent, respectively. Overall, two-thirds of those respondents who have completed upper secondary school do not have basic literacy and numeracy skills.

Tertiary education is associated with higher skill levels, but skill levels remain low and vary significantly. In literacy, those scoring at or below level 1 fall from 65 percent of respondents who have completed upper secondary education to 42 percent of respondents who have completed tertiary education. A similar decline is seen in numeracy, with 66 percent of respondents who have completed upper secondary education scoring at or below level 1 compared to 42 percent of respondents who have completed tertiary education. Although this improvement in skills is significant, a meaningful ratio of tertiary-level students does not have basic literacy and numeracy skills.

Skills do not vary significantly between the employed and unemployed. Whether a respondent was employed was available only on the Russian sample of the survey. In that sample, 55 percent of employed respondents performed at or below level 1 in literacy, compared to 57 percent of unemployed respondents. Numeracy results were similar, with 54 percent of employed respondents scoring at or below level 1 in numeracy compared to 59 percent of unemployed respondents. The unemployed scored slightly higher on PSTRE skills than the employed, with 6 percent of the unemployed scoring at level 2 compared to 2 percent of the employed.

Although results do not improve across age cohorts in numeracy and literacy, PSTRE skills show improvement across cohorts. A comparison of literacy and numeracy performance across age cohorts indicates that low performance is relatively consistent and is not consistently improving with more recently educated adults. The same comparison of age cohorts for PSTRE skills demonstrates steady improvement across age cohorts with 33 percent of those 16–24 years old scoring below level 1 compared to 63 percent of those 55–65 years old.

There is evidence that a substantial share of people is overschooled, but underskilled. Over- (under-) education means that a worker possesses a level of education higher (lower) than the occupation is expected to need, whereas over- (under-) skilling describes a situation in which a worker possesses more (fewer) skills than the job requires, regardless of education level. The analysis finds that 32 percent of respondents had education levels that were higher than their particular occupation is expected to require, but when it comes to actual skills, underskilling is much more prevalent than overskilling, with 36 percent of respondents underskilled in writing and 54 percent of workers underskilled in PSTRE. Reassuringly, the analysis finds that higher-skilled groups of people earn higher wages, suggesting that the labor market rewards higher skills.

Overall, the quality of education is an important driver of having low skills. The significant variation in skills within education levels creates a potential mismatch between acquired skills and required skills in the marketplace. The high need for skills suggests an opportunity for improving skills on the job. The report concludes with a series of policy recommendations for different levels of education, from early-childhood education through life-long learning, including providing opportunities for improving the skills of those teachers with specific skill deficiencies.

KEY RECOMENDATIONS

Recommendation 1: Address learning outcomes. Focusing on quality begins with early childhood education (children 3–6 years old). Standards for effective practices in child development should be implemented to ensure the building of foundational skills and readiness to learn. A focus on quality includes enhancing the learning of basic cognitive and noncognitive skills for students aged 7–19 years old. A large portion of the curriculum currently uses memorization of facts and multiple-choice responses to acquire and test knowledge. Competency-based assessments, which center on higher level skills of understanding, critical thinking, and application of knowledge, will help students integrate their knowledge with the problems they will be asked to address in the marketplace.

Recommendation 2: Make the postsecondary and tertiary education labor markets relevant. Although important, increasing enrollment at the postsecondary and tertiary levels (16–22 years old) in the Kyrgyz Republic will have less impact if the quality of education does not address the needs of society. Postsecondary and tertiary education need to include a focus on intermediate literacy, numeracy, and PSTRE skills.

Recommendation 3: Invest in teachers' professional development. The quality of education is only as strong as the teachers. The findings in this report indicate an opportunity to improve the quality of education by providing opportunities to improve the skills of teachers with specific skill deficiencies, focusing first on teachers with only basic literacy and numeracy skills.

Recommendation 4: Enhance skills throughout life. Skills can be maintained and improved in the workplace. Basic and advanced skills that can supplement one's education may be developed on the job. This is particularly valuable for individuals who learn better through practice and can help to sustain not only the entry level labor market, but also aid in creating a strongly skilled workforce overall.

While this report was being prepared, the COVID-19 pandemic broke out across 200 countries and territories, including the Kyrgyz Republic. Consequently, social distancing measures were taken by the government of the Kyrgyz Republic, and routine schooling and education delivery systems were disrupted. The government launched a distance-learning program to maintain the continuity of education through television and radio broadcasts of videotaped lessons and made online resources accessible for teachers and students. The school system was closed through the rest of the 2019–20 school year.

The pandemic and its negative impact on schooling are likely to cause considerable loss of learning, which will further exacerbate the deficiencies of skill proficiency found in this study. These deficiencies are likely to affect not only today's students in the short-term, but also the skills proficiency of the future workforce and adults over the long run. The COVID-19 crisis risks widening the existing learning gap demonstrated by the PISA 2009 data by causing the loss of a further half-year of schooling. There is an educational and economic imperative to adopt relevant policies and investments to ramp up

mitigation efforts to minimize losses, facilitate recovery, build system resilience to sustain learning, and teach the skills needed for a productive workforce, a changing workplace, and a sustainable economy.

NOTE

1. Database (Kyrgyz Republic: Share of Economic Sectors in the Gross Domestic Product (GDP) from 2009 to 2019), Statista, Hamburg, Germany, (accessed in April 2020), <https://www.statista.com/statistics/528614/share-of-economic-sectors-in-the-gdp-in-kyrgyz-republic/>.

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1 Setting the Context

THE LABOR MARKET, EDUCATION, AND SKILLS DEVELOPMENT TODAY

INTRODUCTION

Since independence in 1991, the Kyrgyz Republic has been characterized by a liberal political regime, which has passed economic and political reforms intended to support long-term economic growth. These reforms have resulted in modest declines in poverty and have been coupled with a steady increase in population and life expectancy.

Between 2000 and 2016, the economy grew at an average annual rate of 4.5 percent, largely driven by gold extraction and migrant remittances from workers abroad. Nearly a quarter of the population live below the international poverty line of \$3.20 per capita per day, with a still larger proportion of households clustered just above the poverty line and therefore vulnerable to small shocks.

The population has increased from 5.3 million in 2008 to 6.3 million in 2018. Almost 35 percent of the population is under the age of 15. In the last 10 years, life expectancy has increased from 68 to 71 years. The annual population growth rate of 2.1 percent will have a significant impact on the labor force in the coming years (World Bank 2019).

The Kyrgyz Republic has a Human Capital Index of 0.58, meaning a Kyrgyz child born today will be 58 percent as productive when she grows up as she could be if she enjoyed complete education and was fully healthy (World Bank 2018). Given the large percentage of the population under the age of 30, the country has a tremendous opportunity to boost its human capital.

STRUCTURAL CHANGES IN THE LABOR MARKET

In the 21st century, the Kyrgyz Republic has experienced a structural shift—employment in the agricultural and mining sectors has declined, and jobs in the industry and service sectors have increased. In 2018, 55 percent of workers were employed in the service sector, 20 percent in agriculture, and 25 percent in industry.¹ The country's remittance economy helps to account for the large service sector; remittances are the largest source of foreign exchange in the country,

with almost one-third of the Kyrgyz labor force employed abroad (Asian Development Bank 2019). Meanwhile the decline in traditional sectors disproportionately affects the two-thirds of the population who live in rural areas (Ajwad et al. 2014).

The 2018 World Bank Jobs Report (World Bank 2018) on the Kyrgyz Republic highlighted four challenges for the Kyrgyz labor market: job creation, productivity, quality, and inclusion. Job creation is currently not keeping pace with population growth. Each year an estimated 50,000 individuals enter the labor market. By 2030, an estimated 4.6 million adults will be of working age. However, while the workforce is growing by an estimated 2 percent per annum, annual job creation averaged 0.9 percent between 2009 and 2013. Although wages have increased significantly, growth in labor productivity is relatively low for the region at 4.3 percent per annum. Increased informality in the service and industry sectors contribute to low productivity growth (World Bank 2015; Ajwad and Gonzalez 2018).

Job quality is also a concern for further economic growth. Less than one-third of workers are employed in the formal sector. Of those in the formal sector, 60 percent are employed in the public sector. Formal, private sector employment is limited to a few sectors and is highly concentrated in urban areas. The labor market, therefore, consists of high rates of informality, as well as temporary, occasional, and seasonal work. Overall, the informal sector accounts for an estimated 20 percent of gross domestic product (GDP).

Job inclusivity is also an important challenge for the Kyrgyz Republic. One-third of working-age adults are not in the workforce. In 2018, 74 percent of men were active in the labor force. This is significantly higher than the labor participation rates for women, at approximately 44 percent, and youth, at approximately 38 percent.² Although youth and women are the largest groups of potential workers, many are prevented from entering the labor force by social norms and structural constraints. Moreover, jobs tend to be regionally concentrated, with 66 percent and 53 percent of workers in Bishkek and Jalal-Abad, respectively, likely to have regularly paid employment, compared to 35 percent of workers in other regions (Ajwad and Gonzalez 2018).

Overall, these challenges can be addressed through a combination of job growth, skilled labor force development, and labor equilibrating policies. This study follows up on Ajwad and Gonzalez (2018) by assessing the stock of foundational skills of the current workforce to close the gaps in the evidence about how to build a skilled and productive workforce.

TECHNOLOGICAL DISRUPTIONS

A changing demand for skills can be seen across the world with the rise of artificial intelligence, robots, and big data. In some instances, technology can disrupt labor markets, altering the manner in which businesses and consumers operate and interact. Technological advancements also provide significant opportunities to create new jobs and enhance productivity and effectiveness. The changing landscape for technological innovation requires a change in education and skills within the marketplace and motivates this study. Although this shift is slower in the Kyrgyz Republic than in some other Europe and Central Asian countries, the Kyrgyz Republic is no exception. The government currently is pursuing Taza Koom, an initiative to digitize the infrastructure, government, society, and

economy of the nation (UNDP 2018). Taza Koom’s success will require a technologically savvy workforce.

Worker productivity in the Kyrgyz Republic is currently the lowest in the region, and firms are increasingly turning to technology to address their problems. The labor market is starting to require solutions that assume workers have technological skills. With one-third of the population under the age of 15, the school system could begin to address technological disruptions in a meaningful manner. Individuals can acquire the 21st century skills required to create needed solutions only if the education system provides them. To ensure that workers have the required technological skills, a significant shift in skills acquisition will be necessary.

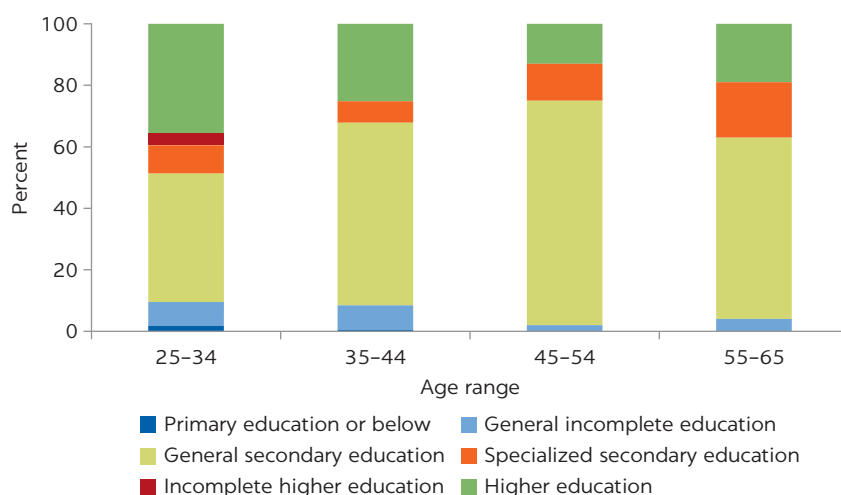
EDUCATION AND SKILLS

The economic shifts within the country have resulted in a mismatch between worker skills and employer needs. Firms increasingly require higher-level skills that employees may not be receiving in their education. Although overall enrollment rates are high at the primary and secondary school levels, early childhood education rates remain low, and learning levels do not correspond with years of education.

The Kyrgyz Republic enjoys near universal enrollment rates for grades 1–9, with no disparity between girls and boys. Gender disparities remain low, but enrollment rates decline in upper secondary school, with just over half of upper secondary aged children enrolled in 2018—52 percent of boys and 53 percent of girls.³ Tertiary education follows a similar pattern with near gender parity, but with net enrollment rates of approximately 41 percent.⁴

Education completion rates have been on the rise, as evidenced by comparing younger with older cohorts. Among those aged 25 to 34, more than a third have completed tertiary education. See figure 1.1.

FIGURE 1.1
Education completion by cohort



Source: Calculations based on 2018 Kyrgyz Integrated Budget and Labor Force Survey (KIFS).

Alongside improvements in net enrollment at the primary and secondary levels, participation in early childhood development programs has quickly increased, although these programs still remain out of reach for many. Enrollment in early childhood education for children ages three to six more than tripled, from 12 percent in 2007 to 39 percent in 2018.⁵ Enrollment rates in urban areas are roughly twice those of rural areas. Bishkek and Osh have substantially higher enrollment rates than other oblasts, and the wealthiest quintile of households has a 50 percent enrollment rate compared to 12 percent for the poorest quintile (Ministry of Education and Science 2018; World Bank 2018). The main constraint for early childhood education remains the lack of availability, particularly in rural areas.

The rise in early childhood education is likely a positive development toward raising skill levels. For example, students who received more than one year of preprimary education performed better on the 2009 PISA tests than those who did not. Students who did not attend preprimary school scored 38 points lower in math, 36 points lower in science, and 45 points lower in reading than students who attended for at least one year. Moreover, similar performance in skills testing between youth and older workers suggests skills are not advancing from one generation to another (World Bank 2019).

The country has made notable strides in addressing access to education. The next aspect in ensuring skills acquisition is the quality of education. The 2017 Early Grade Reading Assessment (EGRA) found that only 44 percent of sampled second graders and 47 percent of sampled fourth graders attained grade-level oral reading fluency. This represented an important gain over the 2014 results (at 10 percent and 13 percent, respectively), but also demonstrates the need to focus on skills acquisition from an early age. The 2009 PISA results provided further evidence of this gap in skills acquisition, with 15-year-olds lagging approximately 4.5 grade levels behind the average for countries of the Organisation for Economic Co-operation and Development (OECD) (World Bank 2020).

Overall, the World Bank's Human Capital Index, launched in 2018, calculated a learning gap in the Kyrgyz Republic of 4.2 years, indicating that the average 12.6 years of schooling equated to 8.4 years when adjusted for quality of learning (World Bank 2019). These results indicate the need for an increased focus on effective and efficient learning, underscoring the need to improve the education system to ensure youth are acquiring the skills necessary for a highly productive society.

The need to ensure quality education extends to the role of Technical and Vocational Education and Training (TVET). A recent examination of trends and challenges in TVET in one region of the country found that occupational training options do not coincide with the needs of the labor market (ILO 2020). Ensuring that TVET can adapt quickly as the market changes is key to its success and the success of industries in the Kyrgyz Republic. The findings in this report underscore the need to ensure a focus in TVET on problem solving skills in general and in technology rich environments in particular, where very few adults score beyond the most basic level.

The 2019 *World Development Report* (World Bank 2019) argues that minimal data exist on whether human capital is being created through education systems, which obstructs the design and implementation of solutions. This report seeks to build evidence to inform the government's education sector policy and investment priorities for human capital development. It addresses the gap identified

by the *World Development Report*, examining the current state of human capital in the Kyrgyz Republic, and provides recommendations to ensure a growing economy on the way to a Sustainable 2040, as laid out in the National Sustainable Development Strategy (2018–2040).

Given that higher skilled groups of people earn higher wages in the Kyrgyz Republic, and that most jobs require regular use of reading, writing, numeracy, and information and communications technology (ICT) skills, this report uses a skills survey focusing on literacy, numeracy, and problem solving in technology rich environments (PSTRE) to examine the skills levels of adults. The survey finds that skills levels among the workforce are consistently low in absolute levels, among varying sociodemographic groups, across age groups, and relative to countries that implemented Programme for the International Assessment of Adult Competencies (PIAAC) surveys.

The results show that in literacy, the majority of the adult population (59 percent), at best, has knowledge of and is able to recognize “basic vocabulary, determin[e] the meaning of sentences, and [read] paragraphs of [relatively short digital or print] texts” (OECD 2013, table 2.2) while in numeracy the majority of the population (60 percent), at best, is able to engage in “simple processes involving counting, sorting, performing basic arithmetic operations, . . . and identifying elements of simple or common graphical or spatial representations” (OECD 2013, 79). In comparison, only 19 percent of adults in OECD countries and 22 percent of adults in Europe and Central Asian countries score at this level in literacy; the corresponding numeracy rates are 24 percent and 25 percent, respectively. Similarly, the report finds that 98 percent of respondents only have basic skills to use “widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem” (OECD 2016).

Higher levels of education are associated with higher skill levels. However, even among the most educated, a large share has low skill scores. Although some improvement in skills exists between those who have and have not completed upper secondary education, the impact is relatively small in comparison to international norms. Overall, two-thirds of respondents who have finished upper secondary school do not have basic literacy and numeracy skills. Although tertiary education is associated with higher skill levels, skill levels remain low and vary significantly. Two out of five tertiary level students do not have basic literacy and numeracy skills.

There is evidence that a substantial share of people is overschooled, but underskilled. Over- (under-) education means that a worker possesses a level of education higher (lower) than the occupation is expected to need, whereas over- (under-) skilling describes a situation in which a worker possesses more (fewer) skills than the job requires, regardless of education level. Reassuringly, the analysis finds that higher-skilled groups of people earn higher wages, suggesting that the labor market rewards higher skills.

Overall, we find that the quality of education is likely an important driver of low skills. The significant variation in skills within education levels creates a potential mismatch between acquired skills and required skills in the marketplace, and the high need for skills suggests an opportunity for improving skills on the job. Chapter 2 explains the data and methodology used in the report;

chapter 3 examines proficiency of literacy, numeracy, and problem-solving skills in technology rich environments; chapter 4 explores the correlation between these skills and their use in the workplace; and chapter 5 provides expanded lessons learned and policy recommendations.

NOTES

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2 Survey and Data Collection

DESCRIPTION OF SURVEY

To better understand key skill proficiencies of the adult population in the Kyrgyz Republic, including distributional aspects, key drivers, and use of these in the labor market, a survey was conducted focusing on proficiency in literacy, numeracy, and problem solving in technology-rich environments (PSTRE) (applying information and communications technology (ICT) skills to solve problems). These skills are designated “key information-processing skills” (OECD 2013, 94), because they are considered:

- *Necessary for fully integrating and participating in the labor market, education and training, and civic life*
- *Highly transferable, in that they are relevant to many social contexts and work situations*
- *“Learnable” and, therefore, subject to the influence of policy*

(OECD 2016, 34).

These skills act as the foundation for building higher-order cognitive skills and are important across the life cycle. The Organisation for Economic Co-operation and Development (OECD) has found that adults who are highly competent in these skills are more likely to adapt positively to changes in the modern economy. In addition, the survey collects a range of related information including, among other things, the use of the skills at work, the use of computers, and whether the skills and qualifications match work requirements.

DATA COLLECTION METHODOLOGY

The survey used Education & Skills Online, an online version of the OECD Programme for the International Assessment of Adult Competencies (PIAAC). The survey was conducted by the World Bank with guidance from the OECD PIAAC team. The test and data collection were administered by the National Testing Center of the Ministry of Education and Science of the Kyrgyz Republic.

The data were collected in two waves, starting with a first round in November–December 2018, in which 398 people were interviewed as part of a pilot phase. The survey implementation during the pilot phase proved successful and was followed by a second round in February–April 2019, in which the remaining people were interviewed.

The final sample consisted of 2,634 adults ages 16–64 years old, broken down across three distinct and separate subsamples: a nationally representative random population-based sample of 1,770 adults; a random sample of 399 high school teachers; and a random sample of 413 people who participated in the 2009 Programme for International Student Assessment (PISA) survey. The analysis in this report focuses on the first two subsamples.

The State Registration Service of the Kyrgyz Republic provided a list of all households in all territories of the Kyrgyz Republic. For example, in the city of Naryn, according to the database, there are 11,395 households. The State Registration Service also provided an online map of all households. Households were selected from this database using the method of equiprobation.

The first-stage selection units (FSUs) were rural districts and cities. The selection of FSUs in the strata was carried out using the selection with probability proportional to size (PPS) method. Inside the household, the respondent was collected using a Kish card.

The language of the survey is an important consideration. For example, the survey included skills tests to assess literacy. After having answered the background questionnaire, respondents completed the skills tests either on a laptop computer or by completing a paper version using printed test booklets, depending on their computer skills. Respondents could take as much, or as little, time as needed to complete the assessment. Respondents were free to select one of two options for the language of the test: Kyrgyz or Russian. If Russian was selected, respondents were asked the full set of questions: literacy, numeracy, and PSTRE tests, as well as modules on, for example, skills use in the workplace. However, if the Kyrgyz language test option was used, respondents took only the same literacy test as the Russian language test takers. They did not take the other tests and were not asked the skills use questions.

The Russian language subsample consisted of 1,094 respondents, broken down across the three subsamples as follows: 577 for the population sample; 323 for the teacher sample; and 159 for the PISA 2009 sample. The corresponding figures for the Kyrgyz language are 1,540 respondents for the entire subsample, broken down into 1,193 (population), 76 (teachers), and 254 (PISA 2009).

When presenting results in the chapters that follow, unless otherwise reported, literacy results are based on the full sample. For numeracy results we imputed values for the Kyrgyz sample. This imputation was done by taking the Russian language subsamples and predicting numeracy test results using as predictor variables literacy, age, gender, immigration status, education levels, and teacher sample, by population, teacher, and PISA 2009. See appendix A for the model results. Because much of the analysis that follows reports differences in *levels* results (generally 4 levels), where levels are determined using specific cut-off values for the raw scores on the specific tests (with a lower cut-off value for a lower level), the imputation was also done for levels using ordered probit estimations.

To assess the accuracy of our predictions, we compare actual levels to the levels predicted by the model in the Russian sample where we can observe both. The largest difference is small, only 6 percentage points for numeracy level 2, as shown in table 2.1.

TABLE 2.1 Actual and predicted levels of numeracy, Russian language sample*Percent*

	OBSERVED	PREDICTED	DIFFERENCE
Below level 1	11	9	2
Level 1	28	24	3
Level 2	40	46	-6
Levels 3/4/5	21	20	1

When interpreting results from survey modules done only by the Russian language respondents, such as information on occupation and skills use in the workplace, it should be kept in mind that this is a preselected group. Literacy test results among this group are considerably higher than those of the Kyrgyz language group.

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—. 2016. *Skills Matter: Further Results from the Survey of Adult Skills*. Paris: OECD.

3 Defining the Challenge

PROFICIENCY OF LITERACY SKILLS, NUMERACY SKILLS, AND PROBLEM SOLVING IN TECHNOLOGY RICH ENVIRONMENTS

This chapter analyzes the status of literacy, numeracy, and problem solving in technology rich environments (PSTRE) in the Kyrgyz Republic as measured in a 2019 survey for this report that used the methodology of the Programme for the International Assessment of Adult Competencies (PIAAC). Specifically, this chapter examines how skills are measured and reports the results on the skill levels of respondents. Skill levels are further disaggregated by level of education, gender, location, employment, and immigration status.

MEASUREMENT OF SKILLS

Literacy

For the purposes of this survey, literacy is defined as “the ability to understand, evaluate, use and engage with written texts in order to participate in society, achieve one’s goals, and develop one’s knowledge and potential. The term ‘literacy’ refers to reading written texts; it does not involve either comprehending or producing spoken language or producing text (writing)” (OECD 2016, 38). Literacy questions in this survey addressed word recognition, sentence processing, and passage comprehension.

Literacy proficiency is scored on a six-level scale, again following the same method as the PIAAC: below level 1 and levels 1 to 5 (see appendix B for a description of tasks associated with each level). Given the relatively low number of individuals who scored at levels 4 and 5 (23 in the Russian sample), the levels reported in this report were collapsed into four: below level 1, 1, 2, and 3 and above. In this report, below or at level 1 is considered to be not proficient, level 2 is considered proficient, and level 3 or above is considered highly proficient.

Numeracy

Within the survey, numeracy is defined as “the ability to access, use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations in adult life. A numerate adult is one who responds appropriately to mathematical content,

BOX 3.1**Comparison with the World Bank 2013 Skills Survey**

The World Bank’s 2013 skills survey measured both cognitive skills and personality traits and socioemotional skills. The cognitive skills focused on memory, literacy, and numeracy skills. The literacy score covered reading comprehension skills and was derived from 5 text comprehension questions about a story card. The informational numeracy score was built using a total of 10 questions measuring

comprehension of a medicine instructions card, a bus schedule card, publicity, and a graph. Personality traits and socioemotional skills focused on extraversion, conscientiousness, openness to experience, agreeability, and emotional stability, as well as openness and sociability, workplace attitude, decision making, achievement striving, and growth mindset (Ajwad et al. 2014).

information and ideas represented in various ways in order to manage situations and solve problems in a real-life context” (OECD 2016, 48).

Following the PIAAC method, numeracy proficiency is also scored on a six-level scale: below level 1 and levels 1 to 5 (see appendix C for detailed tasks associated with each level). As with the literacy levels, the levels in this report for numeracy were collapsed into four: below level 1, 1, 2, and 3 and above. In this report respondents scoring below level 2 are considered to have a low level of proficiency, respondents scoring at level 2 are considered to possess numeracy proficiency, and respondents scoring at or above level 3 are considered to have high numeracy proficiency.

PSTRE

PSTRE assessment addresses “the abilities to solve problems for personal, work, and civic purposes by setting up appropriate goals and plans and accessing and making use of information through computers and computer networks” (OECD 2012, 47). PSTRE is designed to examine cognitive skills required for problem solving combined with computer literacy to determine respondents’ ability to assess, evaluate, and adapt while using computer tools and applications. For those who qualified to take the PSTRE portion of the survey, skills were assessed on a four-level scale: below level 1, 1, 2, and 3. It is important to note that this module was available only to respondents taking the survey in Russian.

PROFICIENCY OF SKILLS

A basic skills challenge exists within the country. Respondents generally scored at a low level of proficiency on literacy, numeracy, and PSTRE tests, with great variation within and across cohorts. Scoring at level 2 is considered basic proficiency in a skill. The majority of respondents do not possess basic proficiency in literacy, numeracy, or PSTRE skills. This section will examine the overall results on the tests and how these results compare to those from other countries.

Literacy and numeracy

Respondents consistently scored below basic levels, with 59 percent of adults scoring at or below level 1 in literacy, and 60 percent scoring at or below level 1 in numeracy (figure 3.1). Among those who scored higher, about three quarters performed at level 2. Altogether, only about 10 percent performed at level 3 or higher.

In literacy, these results indicate that the majority of the adult population has, at best, knowledge of and is able to recognize “basic vocabulary[,] determin[e] the meaning of sentences, and [read] paragraphs of [relatively short digital or print] texts,” which correspond to level 1 (OECD 2013, table 2.2). In numeracy, level 1 corresponds to “simple processes involving counting, sorting, basic arithmetic operations, . . . and identifying elements of simple or common graphical or spatial representations” (OECD 2013, 79).

In comparison, only 19 percent of adults in Organisation for Economic Co-operation and Development (OECD) countries and 22 percent of adults in European and Central Asian countries score at or below level 1 on literacy as shown in figure 3.2.

Estimated levels for numeracy are almost identical to those for literacy, with 60 percent of Kyrgyz adults scoring at or below level 1. Similarly, international comparisons on numeracy find that 24 percent of adults across OECD countries and 25 percent of adults in European and Central Asian countries score at or below level 1 on numeracy, as shown in figure 3.3.

Finally, as in other countries, Kyrgyz who score high (low) on literacy are also very likely to score high (low) on numeracy, as shown in figure 3.4.

A comparison of literacy and numeracy performance across age cohorts indicates that the low performance is relatively consistent and not steadily improving with more recently educated adults. (See figure 3.5.) Although the skill level of youth is higher than that of older workers, the difference is not very large. Among those 16 to 24 years old, 54 percent have low performance in literacy compared with between 59 percent and 61 percent among the three oldest cohorts. In numeracy, the results are actually *worse* among the younger cohort:

FIGURE 3.1
Rate of literacy and numeracy skills

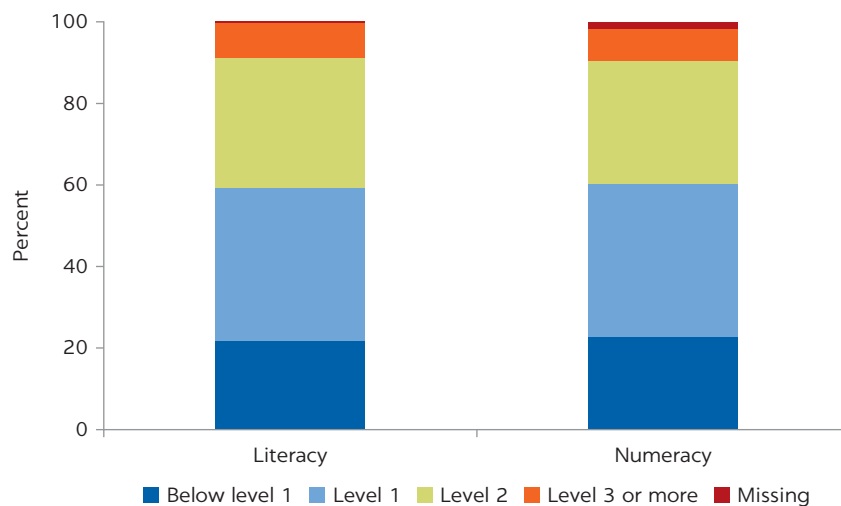
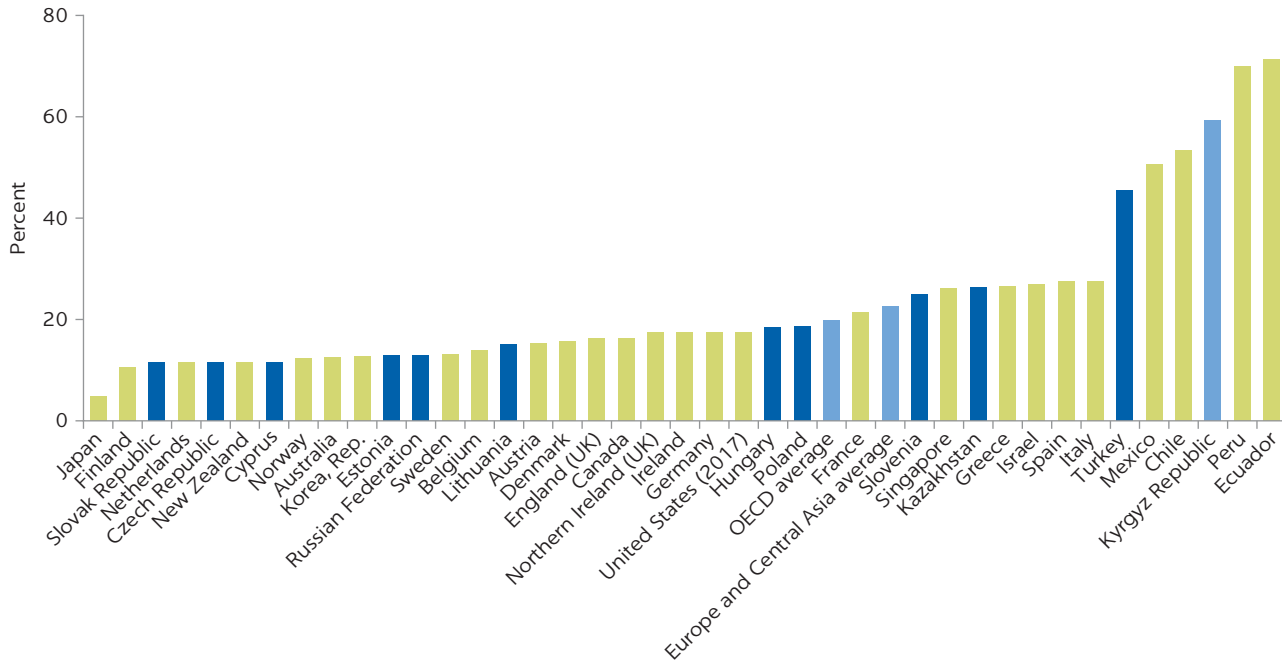
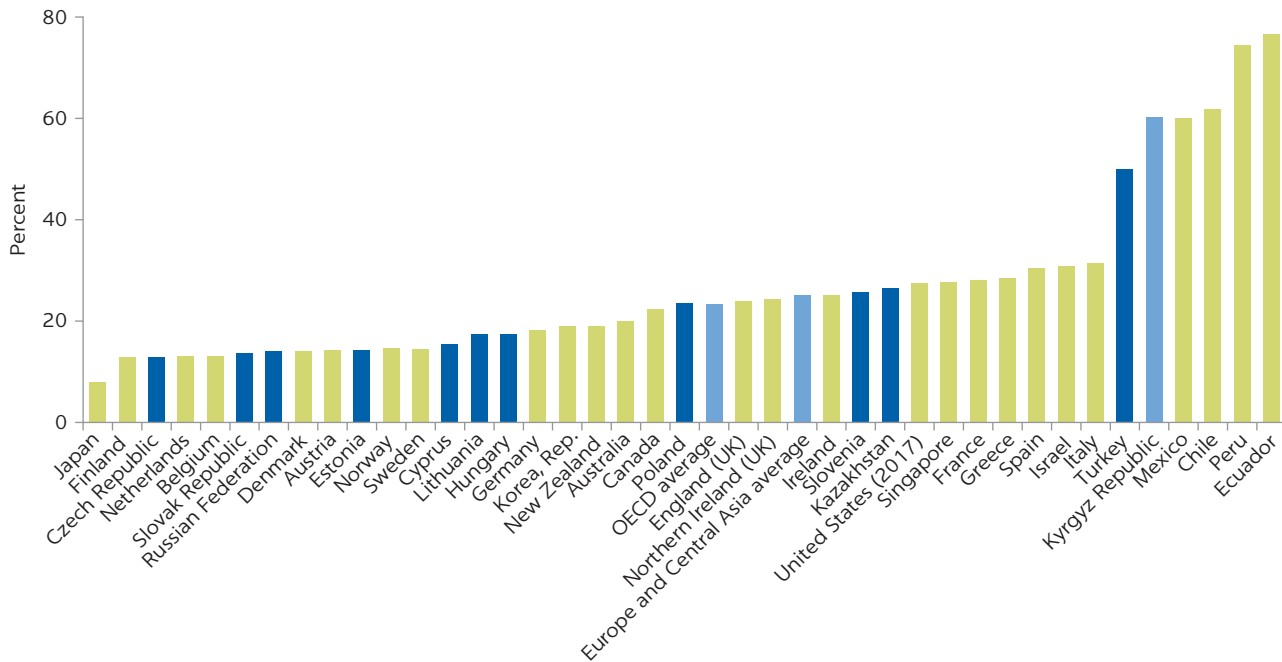


FIGURE 3.2
Scores at or below level 1 in literacy, by country



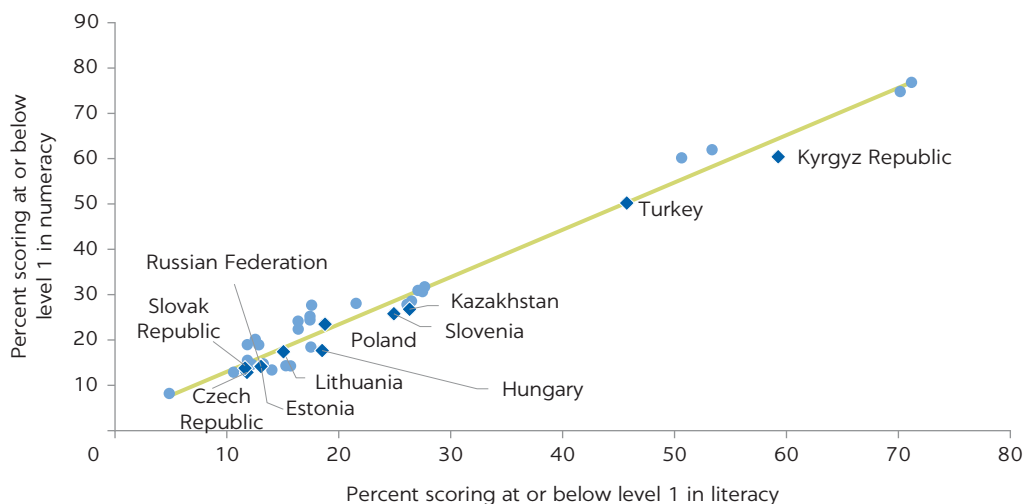
Source: Survey of Adult Skills (PIAAC) 2012, 2015, 2018.
 Note: OECD = Organisation for Economic Co-operation and Development.

FIGURE 3.3
Scores at or below level 1 in numeracy, by country



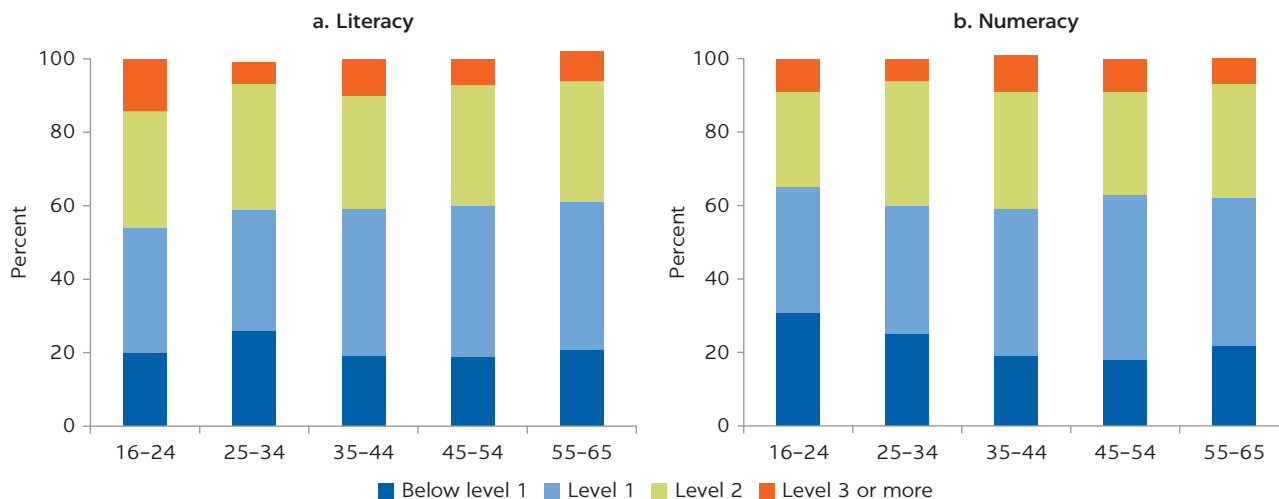
Source: Survey of Adult Skills (PIAAC) 2012, 2015, 2018.
 Note: OECD = Organisation for Economic Co-operation and Development.

FIGURE 3.4
Correlation between literacy and numeracy skills



Source: Survey of Adult Skills (PIAAC) 2012, 2015, 2018.
 Note: Named countries are in the Europe and Central Asia region.

FIGURE 3.5
Literacy and numeracy performance across age cohorts



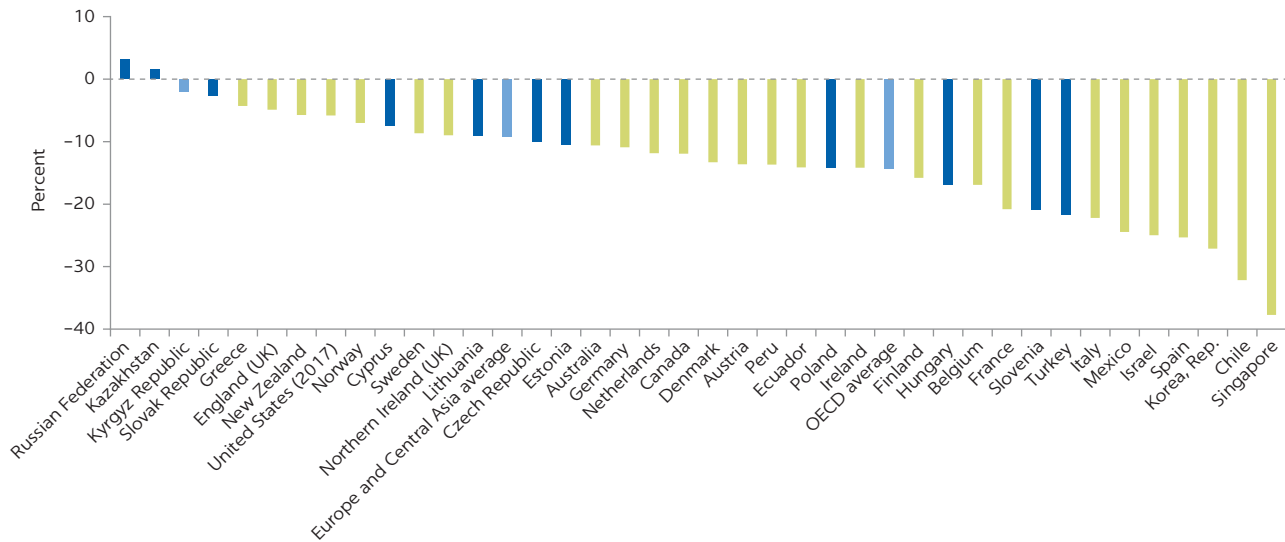
65 percent of those 16 to 24 years old, compared with 60 percent of those 25 to 34, scored at or below level 1.

Internationally, the lack of improvement across cohorts in literacy is also small compared to other countries. For Europe and Central Asia as a whole, there is a nine-percentage-point gap in proficiency (scoring at or below level 1) between older workers (ages 55–65) and younger workers (ages 24–35), while in the Kyrgyz Republic there is only a two-percentage-point difference between younger and older workers. (See figure 3.6.)

That younger cohorts do not perform better on literacy and numeracy is surprising in light of the higher educational attainment by younger cohorts reported in chapter 1. Recall that tertiary education completion rates for younger cohorts have been steadily rising compared to rates for the cohort

FIGURE 3.6

Difference between older and younger cohorts scoring at or below level 1 in literacy



Source: Survey of Adult Skills (PIAAC) 2012, 2015, 2018.

Note: Calculated by subtracting the percentage of those 55 to 65 years old from the percentage of those 25 to 34 years old scoring at or below level 1.

currently 45 to 54 years old. This rise in tertiary education might not translate into higher skill outcomes if younger tertiary graduates score lower on literacy and numeracy than older tertiary graduates. Figure 3.7 focuses on tertiary graduates and provides some supporting evidence for this hypothesis. For both literacy and numeracy, figure 3.7 shows that among the younger cohort (ages 25–34) with tertiary education, there is a considerably *larger* share performing poorly (below level 1) and a *smaller* share performing well (level 3 or more) than among the older cohorts with tertiary education.

PSTRE

PSTRE is designed to examine cognitive skills required for problem-solving combined with computer literacy to determine respondents' ability to assess, evaluate, and adapt while using computer tools and applications. PSTRE is becoming increasingly important as computers replace routine tasks using automation.

In the current survey, only a relatively select and proficient sample took the PSTRE test. The test was limited to Russian language test takers only, who generally scored higher on the literacy test than Kyrgyz language test takers. In addition, among the Russian language test takers who were offered the test, only 71 percent actually took the test. The remaining 29 percent chose the answer “test not applicable” because they either have no computer experience at all, lack the most basic information and communications technology (ICT) skills, such as using a computer mouse, or simply opted out. These “not applicable” figures are similar for European and Central Asian countries (28 percent) and the OECD (28 percent).

FIGURE 3.7
Performance by cohort for those with tertiary education

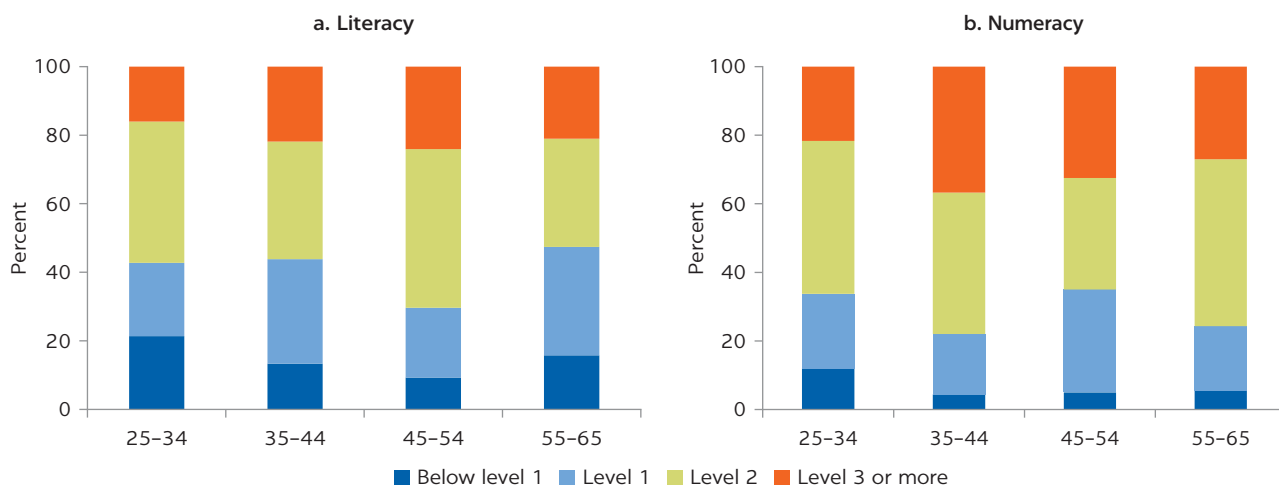
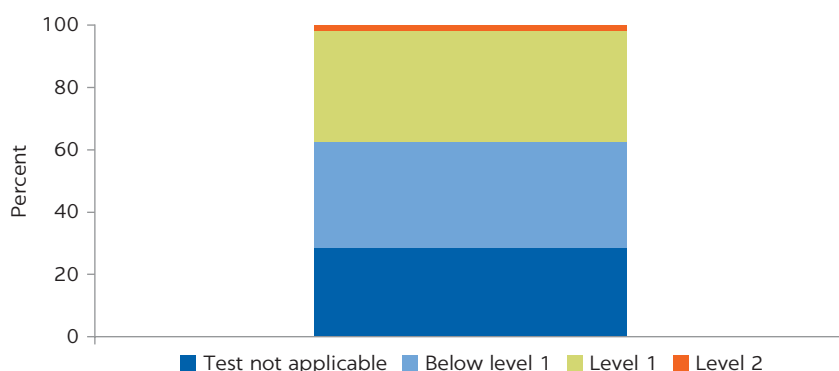


FIGURE 3.8
Rate of problem solving in technology rich environments (PSTRE)



Note: Russian language sample only.

The results from the PSTRE test show that 34 percent of those in the Russian language sample have low proficiency (figure 3.8)—below level 1, which is considered the minimum requirement to address problem solving tasks in daily life (OECD 2013, 21).

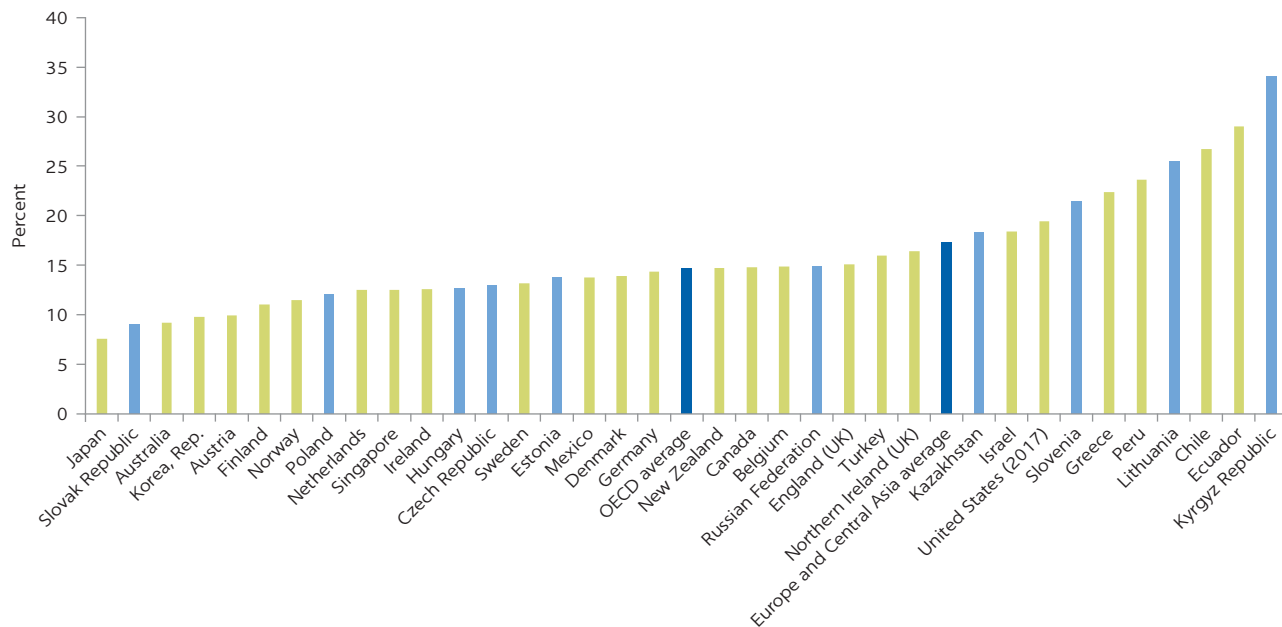
At level 1:

tasks typically require the use of widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem. . . . The tasks involve few steps and a minimal number of operators. . . . Only simple forms of reasoning, such as assigning items to categories, are required; there is no need to contrast or integrate information.

(OECD 2013, table 4.4)

Although many countries have a high share of the adult population with low proficiency on PSTRE skills, in the Kyrgyz Republic this share is considerably higher than most. See figure 3.9, which restricts the sample to respondents who

FIGURE 3.9
Scores at or below level 1 in PSTRE



Source: Survey of Adult Skills (PIAAC) 2012, 2015, 2018.

Note: Russian language sample only for the Kyrgyz Republic. "Test not applicable" data for the Kyrgyz Republic (29 percent); OECD (28 percent); and Europe and Central Asia (34 percent).

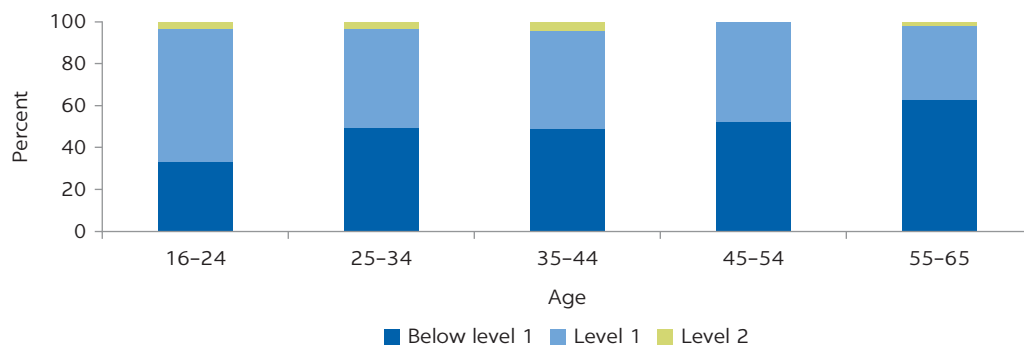
took the PSTRE test: 34 percent of test takers have low proficiency compared with 17 percent for Europe and Central Asian countries and 15 percent for the OECD.

In contrast to literacy and numeracy, there is significant improvement over time in PSTRE skills when comparing age cohorts, even in comparing younger cohorts (figure 3.10). Although very few people score above level 1, including among the youngest age cohort, the results show that 49 percent of those 25 to 34 years old scored *below* level 1 compared with 33 percent of those 16 to 24 years old, a reduction of nearly one-third.

In the Kyrgyz Republic, the proportion of individuals using the internet on any device is low, at 28 percent (World Bank 2018), compared to 55 percent in Kazakhstan and 44 percent in Uzbekistan, although higher than that in Tajikistan (17 percent) and Turkmenistan (12 percent). More broadly, the Kyrgyz Republic ranks 95th out of 205 countries in ICT access according to the Global Innovation Index, behind the Russian Federation (41st), Kazakhstan (48th), and Moldova (51st), but ahead of Nicaragua (99th), India (107th), and Tanzania (118th) (Ajwad and Gonzalez 2018, 57).

The same report highlights how ICT in the Kyrgyz Republic is costly and lacks the necessary infrastructure to thrive. Currently, more than 80 percent of the population would have to spend at least 10 percent of their household expenditures to obtain a basic mobile plan. High prices and poor service quality for the internet mean that demand is low, which, in turn, fails to generate

FIGURE 3.10

Improvement in PSTRE skills by age

Note: Excludes missing data; Russian language data only.

incentives for infrastructure investment. Investments are further hampered by limited competition and stringent regulations on ICT firms entering into the market.

Nevertheless, it is important to stress that further improvements in access to ICT alone will most likely not lead to increasing shares of the population scoring level 2 or higher on the PSTRE, because the PSTRE focuses on *problem solving* in technologically rich environments. This requires the education system to strengthen problem solving skills. It also requires lifting literacy and numeracy levels; it is difficult to imagine someone who scores level 1 or below on these core competencies ever being able to score level 2 or higher on PSTRE.

SOCIODEMOGRAPHIC CHARACTERISTICS AND SKILLS

Education and skills performance

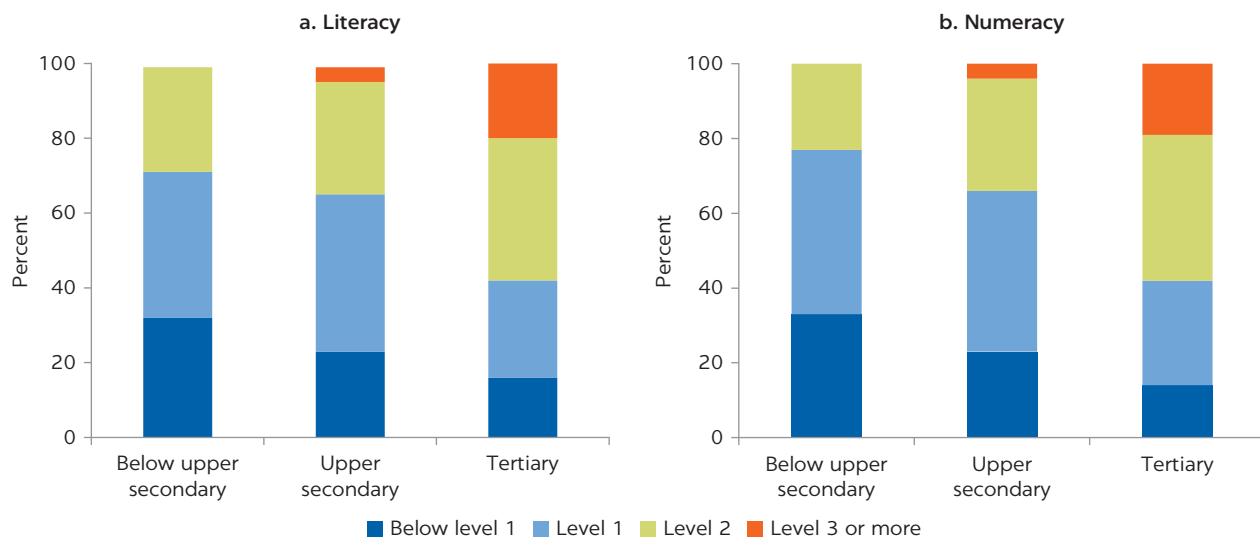
The completion of upper secondary education does not appear to have the expected impact on skills. In literacy, 71 percent of those with less than upper secondary education perform at or below level 1, compared with 65 percent of those who completed upper secondary education but did not continue with tertiary education.¹ In numeracy, these figures are 77 percent and 66 percent, respectively. In comparison with other OECD countries, on average 42 percent of PIAAC respondents with less than upper secondary education and just under 20 percent of respondents with upper secondary education scored at or below level 1 in literacy.² Thus, in OECD countries, completing upper secondary education reduces the percentage of low performers by half. However, in the Kyrgyz Republic, a back-of-the-envelope calculation suggests that raising upper secondary completion from the current share of 53 percent to universal completion of 100 percent would reduce the proportion of low performers on literacy by only 3 percentage points and on numeracy by only 5 percentage points. This suggests that a focus on quality is required.

Tertiary education is associated with higher skills outcomes, but much variation in skill levels remains among tertiary graduates. For literacy, when comparing upper secondary to tertiary, the share of low performers drops from 65 percent to 42 percent, and for numeracy from 66 percent to 42 percent (see figure 3.11). Although positive in comparison, more than two out of five tertiary graduates still have low proficiency. In OECD countries, less than 10 percent of tertiary graduates score at or below level 1. These results are consistent with the World Bank findings for 2013, which found that tertiary and secondary technical-special graduates had significantly higher cognitive abilities than secondary general graduates, although there was considerable overlap across education levels (Ajwad et al. 2014, 32).

This high variation in skill levels for tertiary graduates is consistent with the modest rates of return to tertiary education found in the 2018 World Bank jobs report (World Bank 2018) and calculated for this report. Holding all other factors constant, wages are positively correlated with the education and employment sectors; on average, tertiary-educated workers have about 32 percent higher wages than workers with similar jobs who have completed only secondary education. This high return is a signal that there is a strong demand for tertiary-educated individuals in the Kyrgyz economy; however the Kyrgyz Republic places the lowest premium on tertiary education compared to the rest of the region (Ajwad and Gonzalez 2018).

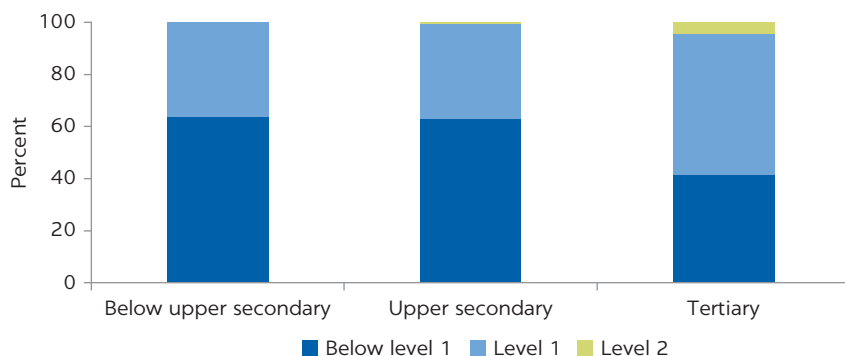
For PSTRE, the results show that skills remain a challenge across education levels and, similar to the results in literacy and numeracy, upper secondary education does not appear to improve PSTRE scores beyond those found for lower secondary education (figure 3.12). Individuals with a tertiary education score higher than their upper secondary counterparts; however, 42 percent still remain below level 1.

FIGURE 3.11
Skills performance in the Kyrgyz Republic by level of education



Note: Population ages 25 to 55 years old.

FIGURE 3.12
PSTRE skills by education level



Note: Population ages 25 to 55 years old. Russian sample only; missing data excluded.

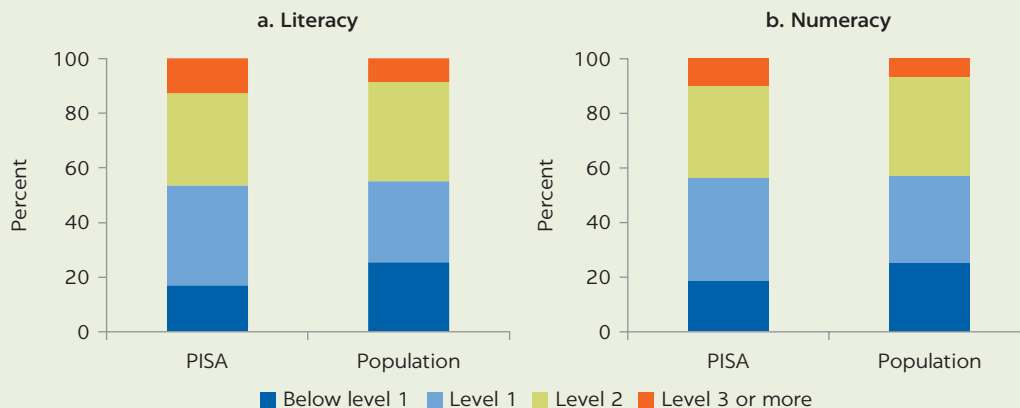
BOX 3.2

Skills comparison between 2009 PISA respondents and the Kyrgyz general public

The 2019 survey conducted for this report also included a separate sample of the 2009 PISA test participants. These participants' scores were compared with those of the general population of Kyrgyz respondents of the same age (25 and 26 years old). This serves as a robustness test: both the 2009 PISA sample and the 2019 adult population sample were designed to be nationally representative. Among 2019 respondents of the same age in either sample, we should therefore expect to see similar results,

allowing, of course, for sampling errors. This is the case. For example, the 2009 PISA participants tested similarly to the general population of the same age (53 percent compared to 55 percent, respectively, at or below level 1 in literacy and 56 percent compared to 57 percent, respectively, at or below level 1 in numeracy). (See figure B3.2.1.) Comparable percentages are also found at the higher end of the skills distribution. These findings give confidence to the national representation of the surveys.

FIGURE B3.2.1
Skills of 2009 PISA participants and general population



Note: Ages 25 and 26 only.

These findings are consistent with the 2013 World Bank skills survey (Ajwad et al. 2014). There, adults with tertiary education displayed significantly higher cognitive abilities (memory, literacy, numeracy) than secondary general graduates, but there was also considerable overlap across education levels; heterogeneity was very high within education categories (Ajwad et al. 2014, 32).

Urban versus rural locality and skills performance

Urban respondents scored higher in literacy, numeracy, and PSTRE compared to their rural counterparts (figures 3.13 and 3.14). In literacy, 35 percent of rural residents scored at or above proficiency (level 2), compared with 46 percent of those in urban areas. For numeracy, these figures are 32 percent and 45 percent, respectively. Rural-urban PSTRE differences are similar, with 35 percent and 59 percent, respectively, scoring at basic proficiency (level 1).

FIGURE 3.13
Literacy and numeracy proficiency by locality

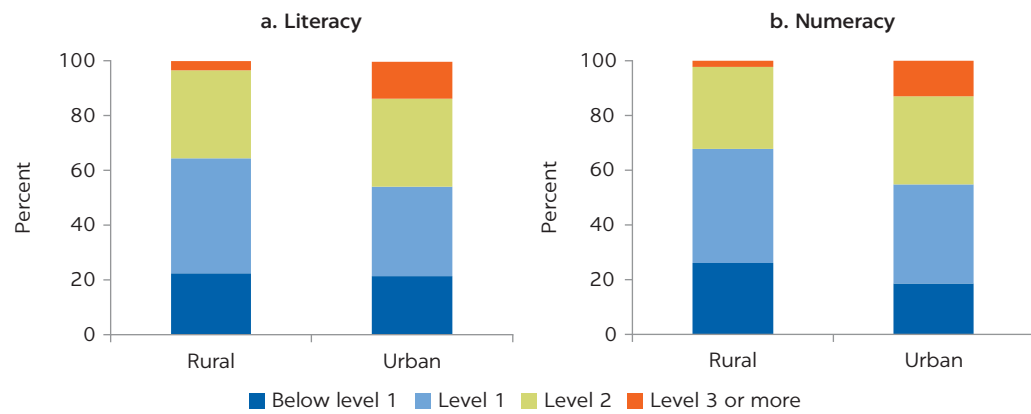
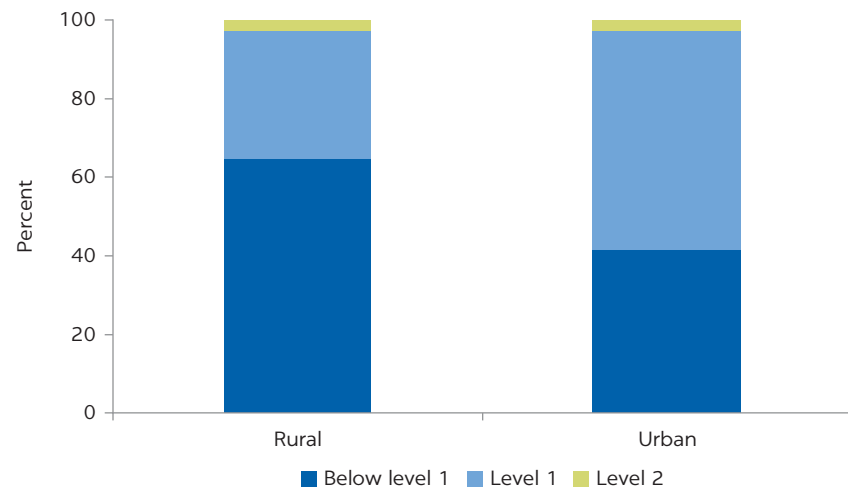


FIGURE 3.14
PSTRE skills by locality



Note: Excludes missing data.

Perhaps these rural-urban differences can be explained by higher education levels in the urban areas. To explore this, we compare rural-urban differences for the *same* level of education. If skills outcomes are the same in rural and urban areas for each education level, then overall differences in rural-urban skills must be explained by differences in education levels. Figures 3.15 and 3.16 show that for each education level, the shares of rural and urban respondents scoring *below* level 1 were very similar. In fact, specifically for those with upper secondary education, rural and urban respondents scored similarly across all skill levels. We do, however, see that respondents with low levels of education (below upper secondary) and with high levels of education (tertiary) score better in urban than in rural areas on literacy.

A similar pattern can be observed for numeracy in figure 3.16. In other words, part of the difference in rural-urban skills scores is the result of low- and highly educated individuals scoring higher in urban than in rural areas.

Gender and skills performance

Skills are largely gender neutral in the Kyrgyz Republic. Forty-one percent of females and males performed at or above level 2 in literacy, and 37 percent of females and 40 percent of males scored at or above level 2 in numeracy

FIGURE 3.15
Literacy proficiency by education and locality

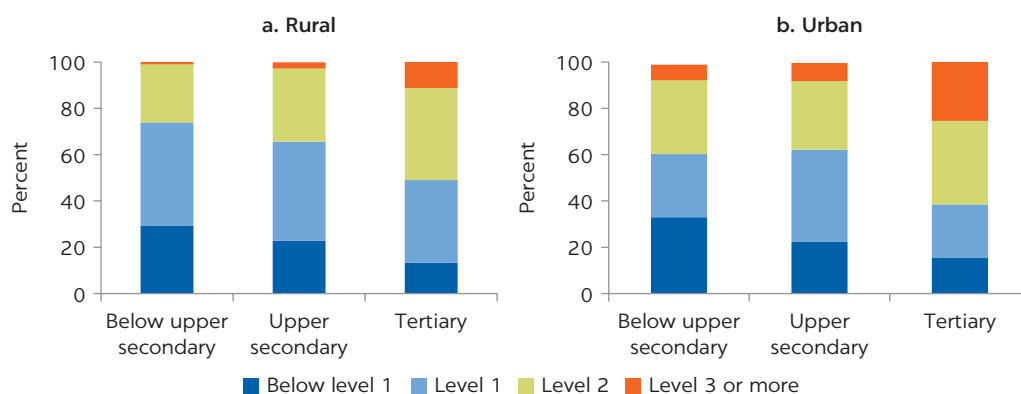
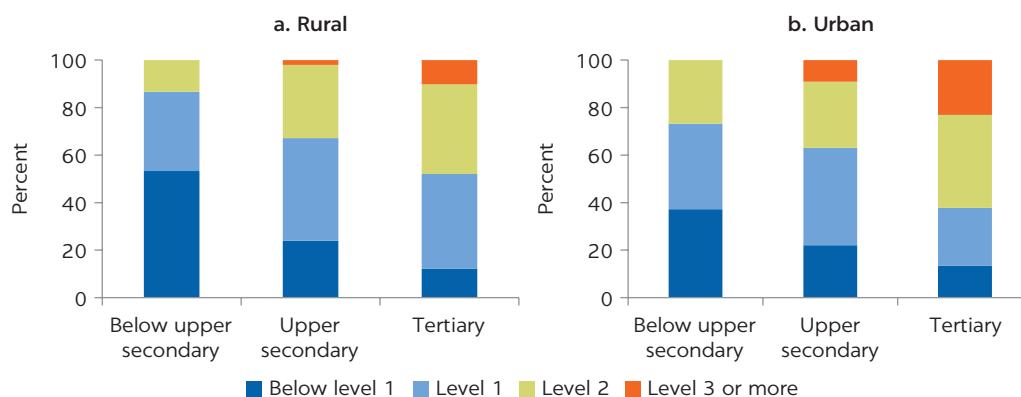


FIGURE 3.16
Numeracy proficiency by education and locality



BOX 3.3

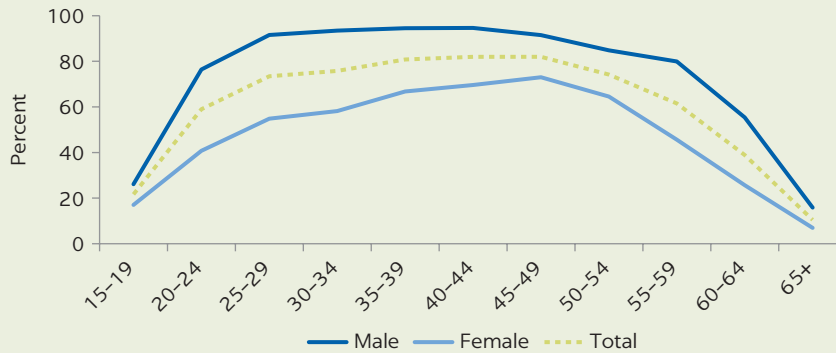
Skills and labor force outcomes of men and women

Although skills tend to be gender neutral, labor outcomes generally are not. Between 2005 and 2013, female labor participation declined in the Kyrgyz Republic, with overall female labor participation rates at 58 percent in 2013 (Ajwad and Gonzalez 2018). In particular, young females are significantly less likely to participate in the labor force compared to their male counterparts, with a 35 percent differential for

those ages 20 to 24, and a 37 percent differential for those ages 25 to 29 (figure B3.3.1).

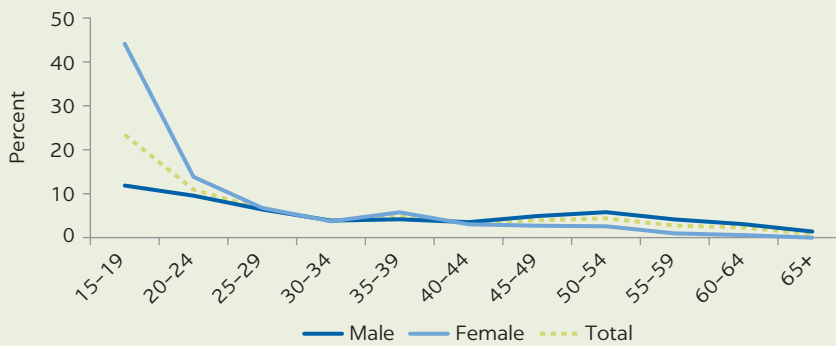
These disparities are also evident in unemployment rates. Females in younger cohorts have significantly higher unemployment rates than males in the same cohort. As time passes, this levels out, and then slightly reverses with more males unemployed than females in the older age cohorts (figure B3.3.2).

FIGURE B3.3.1
Labor force participation rates, by gender, 2019



Source: ILO modeled estimates.

FIGURE B3.3.2
Unemployment rate by sex and age



Source: ILO modeled estimates.

(figure 3.17). PSTRE scores were also largely gender neutral, but with 6 percent of men scoring at level 2 compared to 1 percent of women.

Immigration status and skills performance

Immigrants (defined as foreign born) tend to have higher skill levels than the native population (figure 3.18). In literacy, for every immigrant with a low

FIGURE 3.17
Proficiency by gender

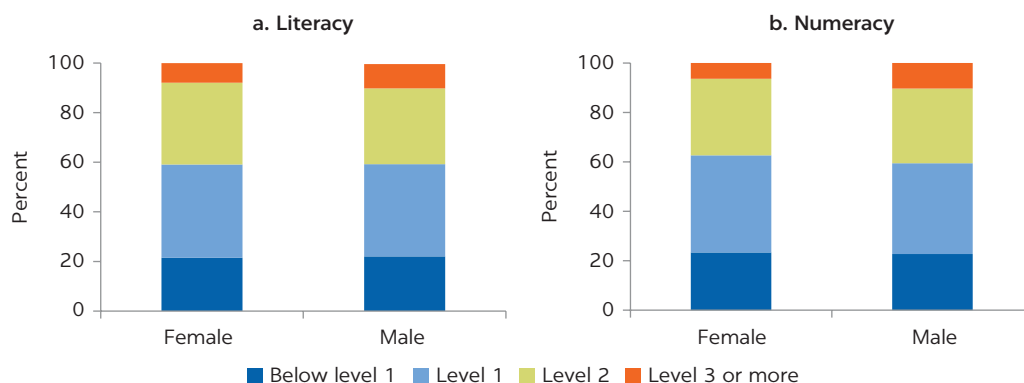
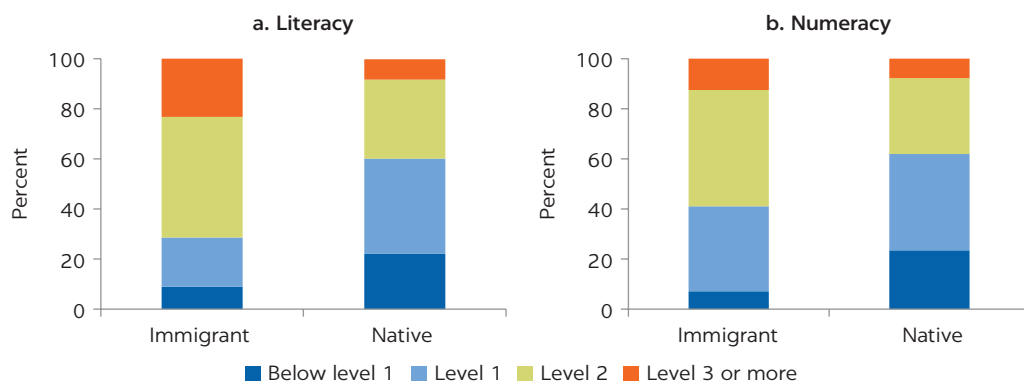


FIGURE 3.18
Proficiency levels by immigration status



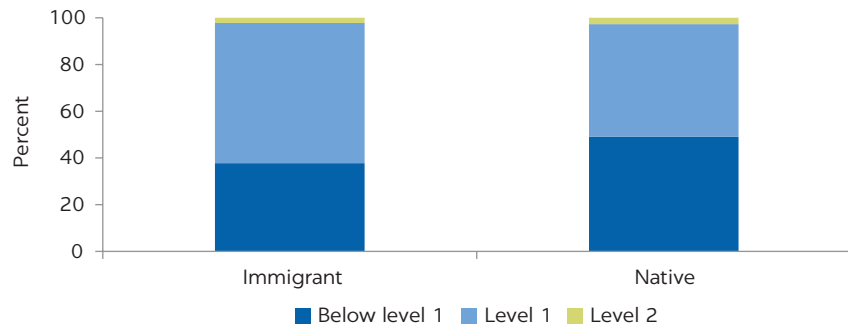
literacy level (level 1 or below), there are two native adults with a low literacy level. For every immigrant with a low level in numeracy (level 1 or below), there are 1.5 natives with a low numeracy level. These results hold after adjusting for socioeconomic status. Moreover, these results are consistent with results of the 2009 PISA, where after accounting for socioeconomic status, natives underperform immigrants by 34 points in math and 28 points in reading.

As with literacy and numeracy skills, immigrants score higher on PSTRE skills as well (figure 3.19). This discrepancy is particularly acute because only respondents who took the test in Russian were measured. (This information is unavailable for those who took the test in Kyrgyz.) Those who took the test in Russian tended to score higher than individuals who took the test in Kyrgyz. One could extrapolate that the differentiation is likely higher across the country than represented here.

Employment and skills

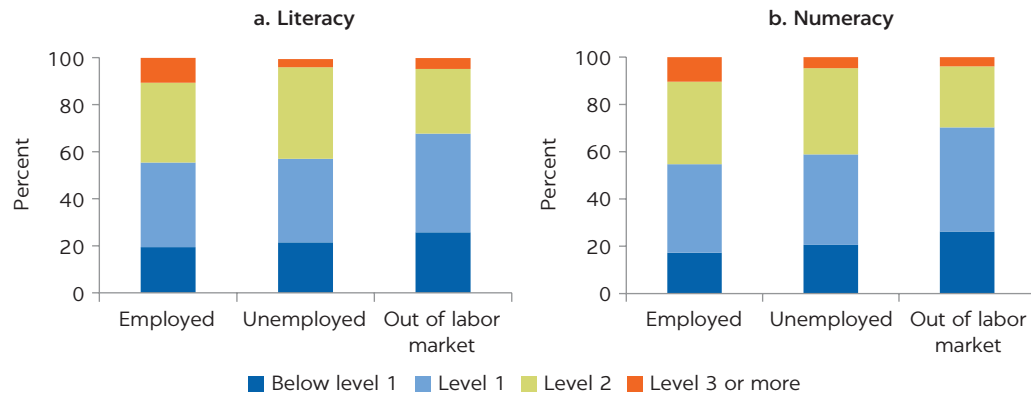
The 2013 World Bank survey on skills (Ajwad et al. 2014) confirmed international research that finds a correlation between skills and employment outcomes. That survey found that skills varied significantly depending on the quality of the job, an issue that is analyzed in more detail in chapter 4. Here, we compare

FIGURE 3.19
PSTRE proficiency levels by immigration status



Note: Russian sample only; excludes missing data.

FIGURE 3.20
Skills by employment status



skills at the extensive employment margin comparing those employed, unemployed, and out of the labor force.

In literacy, numeracy, and PSTRE, those outside the labor market scored below the employed and unemployed. However, skill levels do not vary significantly between the employed and unemployed (figure 3.20). In the Russian sample 55 percent of employed respondents scored at or below level 1 in literacy, compared to 57 percent of unemployed respondents. Similarly, 54 percent of employed respondents scored at or below level 1 in numeracy compared to 59 percent of unemployed respondents. Meanwhile, 49 percent of employed respondents scored below level 1 in PSTRE skills compared to 50 percent of unemployed respondents. This result may seem surprising, but likely reflects the significant level of underemployment, as opposed to unemployment, with the employed in jobs in both the formal and informal sectors. It is likely that higher-skilled people are more likely to take formal sector jobs, such as those in the public sector, than lower-skilled people, while lower-skilled people are more likely to be in informal sector jobs. When workers in the formal sector lose their jobs, they become unemployed until they find a new formal sector job. When workers in the informal sector lose their jobs, they may not move into unemployment, but rather may find another informal sector job. In the latter case, they

continue to be considered “employed.” Hence, the unemployed category may disproportionately consist of relatively high skilled unemployed people, which would explain why we find no skills differences between the employed and the unemployed.

SKILLS PROFICIENCY OF TEACHERS

To understand whether teachers are sufficiently proficient to address any skills challenges observed in the survey, a separate sample of 399 secondary school teachers was queried, of which 323 took the Russian language test and 76 took the Kyrgyz language test. This study of secondary school teachers complements a recent classroom observation study of kindergarten teachers, which found that for emotional support, classroom organization, and instructional support, the performance of Kyrgyz kindergarten teachers was similar to that of teachers in other countries and, as in the international evidence, the weakest domain is instructional support to children (such as feedback, encouraging responses, and open-ended conversations).³

Overall, secondary school teachers vary from the general population in a number of key indicators. On average, teachers are slightly older and more likely to be female than the general population, and they are much more likely to have a tertiary-level education and to test in Russian than in Kyrgyz.

Teachers outperform the general population in both literacy and numeracy but underperform compared to professionals (see figure 3.21). Overall, one-third of teachers have low proficiency in literacy and numeracy. For literacy, 35 percent of teachers have a low proficiency (level 1 or below) compared with 59 percent for the general population; the corresponding figures for numeracy are 36 percent for teachers and 61 percent for the general population, respectively.

When comparing across cohorts of teachers, we find notable differences in skills performance (see figure 3.22). For literacy, the share performing at level 3 or higher is increasing as cohorts get younger—a positive development. However, the corresponding shares for level 3 or higher for numeracy are getting *smaller*. Furthermore, for both literacy and numeracy, we see an increasing share of *low* performers as cohorts get younger: among those 25 to 34 years old, 38 percent and 39 percent score at level 1 or below in literacy and numeracy, respectively. For the cohort 45 to 54 years old, these shares are 29 percent and 26 percent, respectively.

TABLE 3.1 Teacher characteristics

VARIABLE	OBSERVATIONS	TEACHERS	
		MEAN	STANDARD DEVIATION
Age	398	41.1	11.3
Female (%)	399	90.7	29.0
Native (%)	399	94.7	22.4
Tertiary education (%)	399	79.4	40.5
Russian language test (%)	399	81.0	39.3

FIGURE 3.21

Teacher proficiency

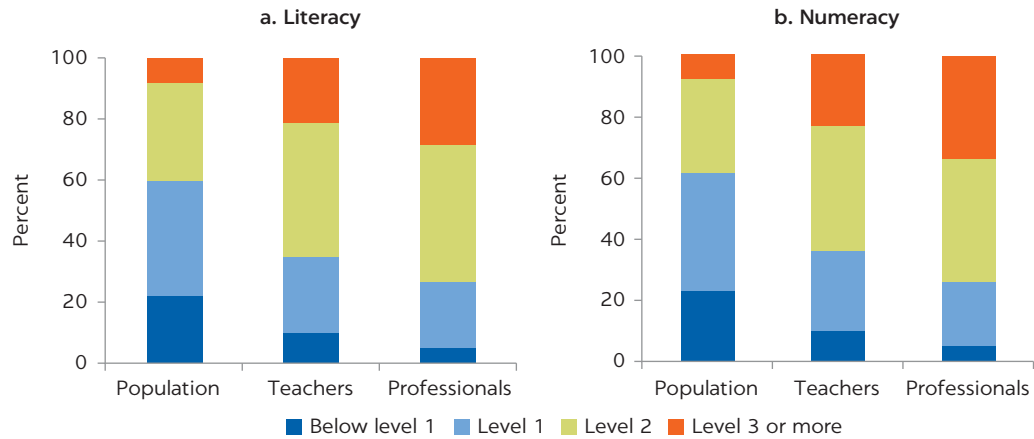
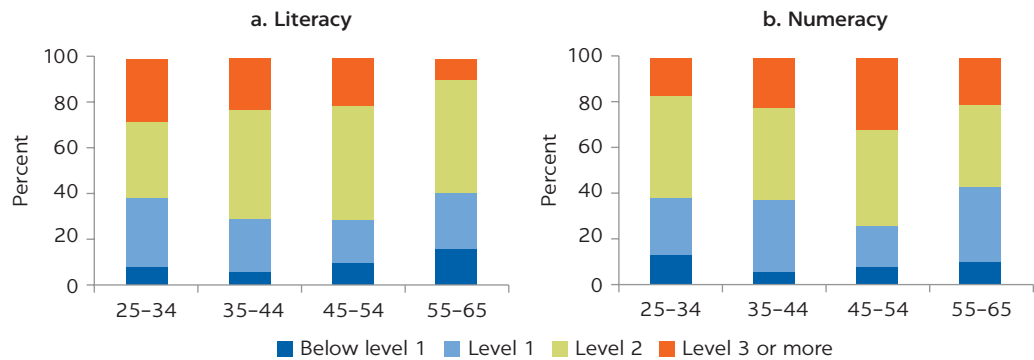


FIGURE 3.22

Literacy and numeracy of teachers, by age cohort



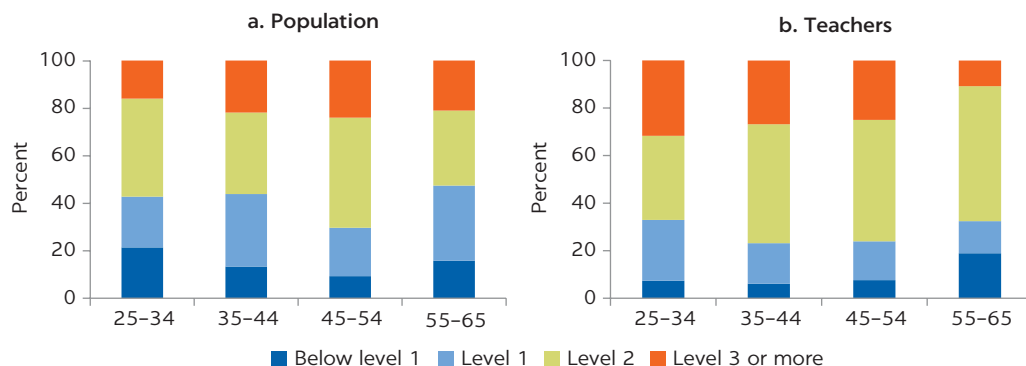
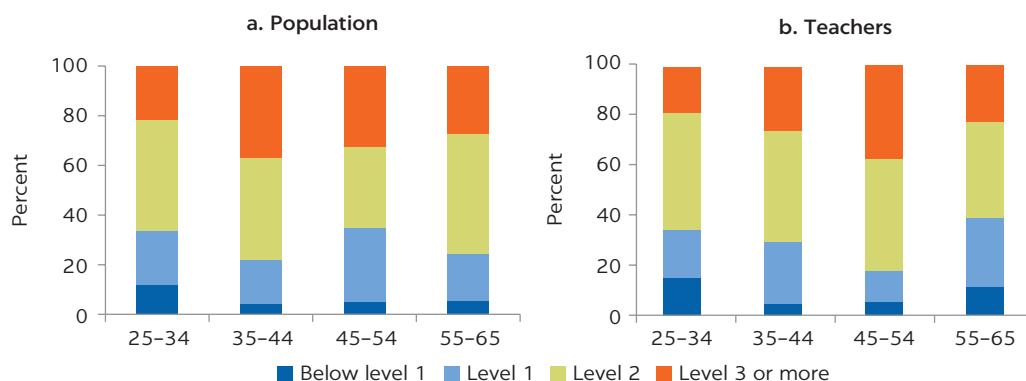
Note: Data drawn from full sample of teachers.

To understand these trends further, we next compare the trends in the skill levels of teachers and the skill levels of the general population of the same cohort and with a tertiary level of education, which the majority of teachers hold.

Among those with tertiary education, literacy skills of teachers are actually improving with younger cohorts *relative* to that of the general population. The latter show a *decrease* in the share with level 3 or more as cohorts get younger, while teachers show an increase (see figure 3.23).

Numeracy trends between teachers and the general population are similar, even if the decline in numeracy skills among teachers with tertiary education is more pronounced than that among the general population as cohorts get younger. (See figure 3.24.)

What might explain these skills trends among teachers? Altogether, these comparisons do not provide strong evidence that the pool of teachers is increasingly being drawn from people with lower skill levels, but rather that the decline in skills, especially numeracy skills, across teacher cohorts reflects the trend among tertiary graduates more generally. It may have more to do with the quality of education that these teachers received, with numeracy skills declining steadily

FIGURE 3.23
Literacy skills trends of teachers and population with tertiary education

FIGURE 3.24
Numeracy skills trends of teachers and population with tertiary education


in more recent years for both high and low performers, and literacy skills declining in more recent years among lower performers while increasing among higher performers.

It is unlikely that the decline in literacy and, especially, numeracy skills, as teacher cohorts get younger, can be explained by the fact that older teachers simply have more experience and thus have had time to practice and improve their skills. Although the share of low performing teachers is higher among younger cohorts, the share of high performing teachers *in literacy* is higher among younger and thus less experienced cohorts. A sudden decline in quality of education following independence in 1991 is also not a likely explanation. The decline starts after the cohort aged 45 to 54 years, yet the oldest cohort of teachers, at 55 to 65 years, whose education was completed *before* independence, has lower results on the skills tests than the cohorts that follow.

We next compare urban and rural teachers (figure 3.25). Similar to the general population, literacy and numeracy skills are lower among rural teachers than among urban teachers. Similar shares of teachers score below level 1 and at level 2, but the share of those scoring at level 1 is approximately 10 percentage points lower in urban areas, whereas the share of those scoring level 3 or more is approximately 10 percentage points higher in urban areas. That rural teachers score lower may be explained by the fact that only 63 percent of rural teachers completed tertiary education compared with 89 percent of urban teachers.

FIGURE 3.25

Teacher proficiency by locality

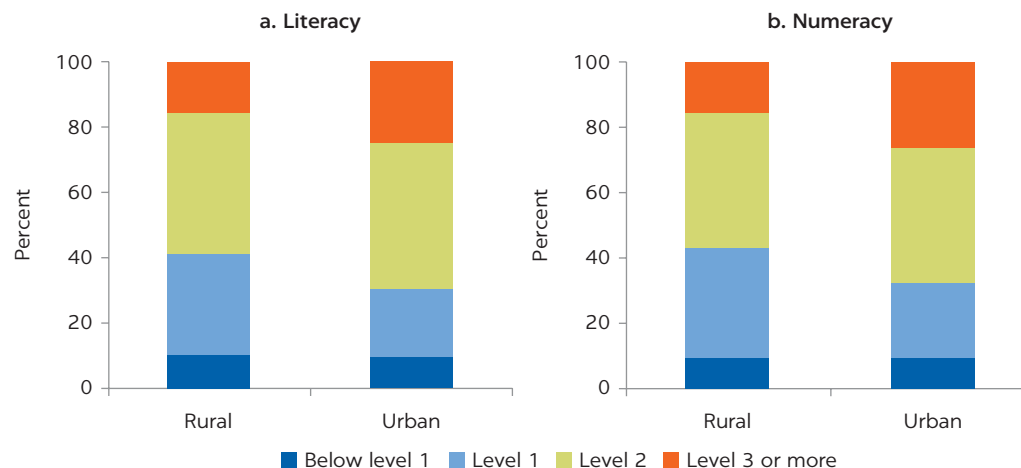


TABLE 3.2 Teacher characteristics by locality

VARIABLE	URBAN			RURAL		
	OBSERVATIONS	MEAN	STANDARD DEVIATION	OBSERVATIONS	MEAN	STANDARD DEVIATION
Age	252	40.5	11.4	146	42.0	11.1
Female	253	92.1	27.0	144	89.6	30.7
Native	253	94.5	22.9	146	95.2	21.4
%HE (Higher Education)	253	88.9	31.4	146	63.0	48.4
Russian language test	253	89.3	30.9	146	66.4	47.4

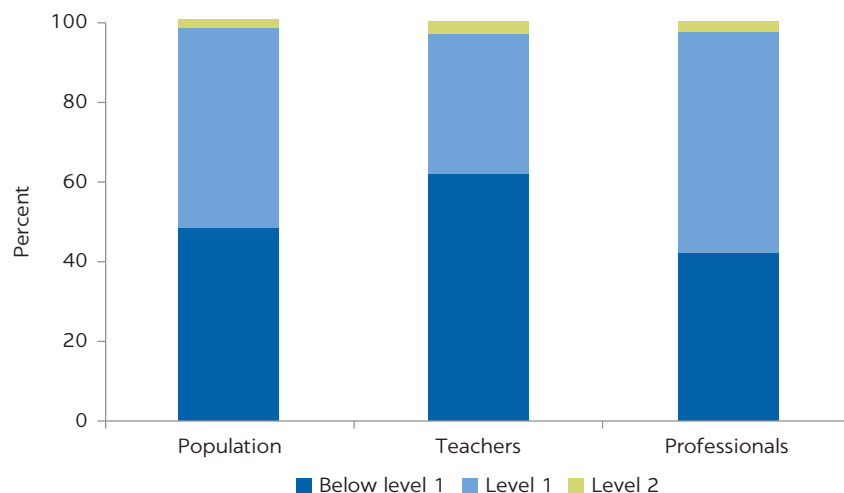
The exception to these trends is in PSTRE skills, which improve among teacher cohorts as they get younger. The improvement in PSTRE skills among younger teachers likely reflects greater exposure to technology, particularly at a younger age.

Finally, although teachers' literacy and numeracy scores are better than those of the general population, their PSTRE scores are worse: 62 percent score below level 1, compared with 48 percent of the general population (figure 3.26). A breakdown by age cohort (not shown) indicates that only among the youngest cohort of teachers, those 16 to 24 years old, are ICT skills similar to those of the general population, with 48 percent of teachers in this age cohort scoring level 1 or below. A linear probability model predicting those who score below level 1 ($= 1$) versus those who score level 1 or 2 ($= 0$), and restricting the sample to teachers, finds that age is the only significant predictor of low performance. Whether the teacher is female, has higher education, or works in an urban environment does not significantly predict PSTRE performance.

CAREER INTERESTS AND BEHAVIORAL COMPETENCIES

The survey also contained assessments on Career Interest and Intentionality and Behavioral Competencies, both standard PIAAC modules. These were offered to the Russian language sample and followed the main literacy,

FIGURE 3.26

Comparison of proficiency in ICT skills (PSTRE)

Note: Russian language sample of teachers; excludes missing data.

numeracy, PSTRE, and use of skills assessments. Because the main tests were very long (about 3–4 hours), only a small subsample of the Russian language respondents opted to take these additional assessments:

- Career Interest and Intentionality: 58 respondents from the population sample and 35 teachers
- Behavioral Competencies: 55 respondents from the population sample and 42 teachers

Who are these respondents? The results below indicate that more than two-thirds are people who have taken active steps to secure a new job or training, which helps explain why they were motivated to answer these additional modules.

Respondents taking the Career Interest and Intentionality assessment received the following explanation:

The Career Interest and Intentionality module measures your preferences for different types of work activities and environments, how well your interests match your current or intended job and the level of your intention to seek out new job opportunities and career- and job-related training. The more your intended career and job-related training match your career interests, the greater your career fit. The greater your career fit, the more likely your job will be satisfying and rewarding to you.

To measure career interest, respondents answered a series of questions which resulted in scores of 0 to 40, from “least interesting” to “most interesting,” across six job dimensions:

- Artistic: Creators—creative, expressive, imaginative, and enjoy working with ideas
- Conventional: Organizers—logical, organized, detail-oriented, and prefer structured environments
- Enterprising: Persuaders—ambitious, extroverted, confident, and enjoy leading

- Investigative: Thinkers—curious, analytical, logical, and enjoy problem solving
- Realistic: Do-ers—-independent, practical, enjoy the outdoors, and prefer working with their hands
- Social: Helpers—generous, helpful, enjoy teamwork and helping others

The respondents who opted to take the assessment found Enterprising and Social occupations most attractive and Investigative and Realistic jobs least interesting (see figure 3.27).

For the respondents from the general population sample, the gap between the type of job they have and the one they desire implies a “low fit” for nearly half (47 percent) and a “moderate fit” and “good fit” divided evenly at 28 percent and 26 percent, respectively.

Respondents were also asked a series of questions about “Career Intentionality,” which resulted in three classifications (high, moderate, or low intentionality) across four domains of intent:

- Job seeking (how keen you are to find a new a new job)
- Additional training (how keen you are to seek additional job training within the next year)
- Self-efficacy (how confident you are in locating a new job or securing additional training)
- Taking active steps (having taken initiative to seek a new job)

Figure 3.28 shows that among the respondents who opted to take the assessment, a large majority has a moderate intent to look for a new job or seek training, with similar percentages expressing confidence in achieving this. Also, more than two-thirds have taken either moderate or high active steps toward doing so. Because respondents self-selected to answer these questions, we can’t generalize to the rest of the population.

The assessment of Behavioral Competencies measured the Big Five personality traits, each with subdomains, for a total of 13 traits altogether. Scores range from 0 (lowest) to 100 (highest), with the survey providing respondents with the following explanations:

- **Conscientiousness:** People who are conscientious are usually thorough, organized, and efficient as well as committed to doing a good job.
 - **Diligence/Achievement** describes behaviors associated with working toward objectives. Individuals who are high in diligence tend to be described as hard working, ambitious, and confident.

FIGURE 3.27
Levels of career interest

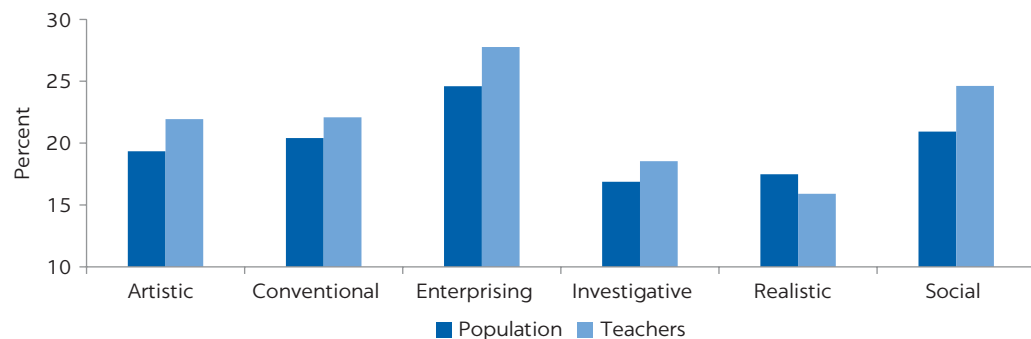
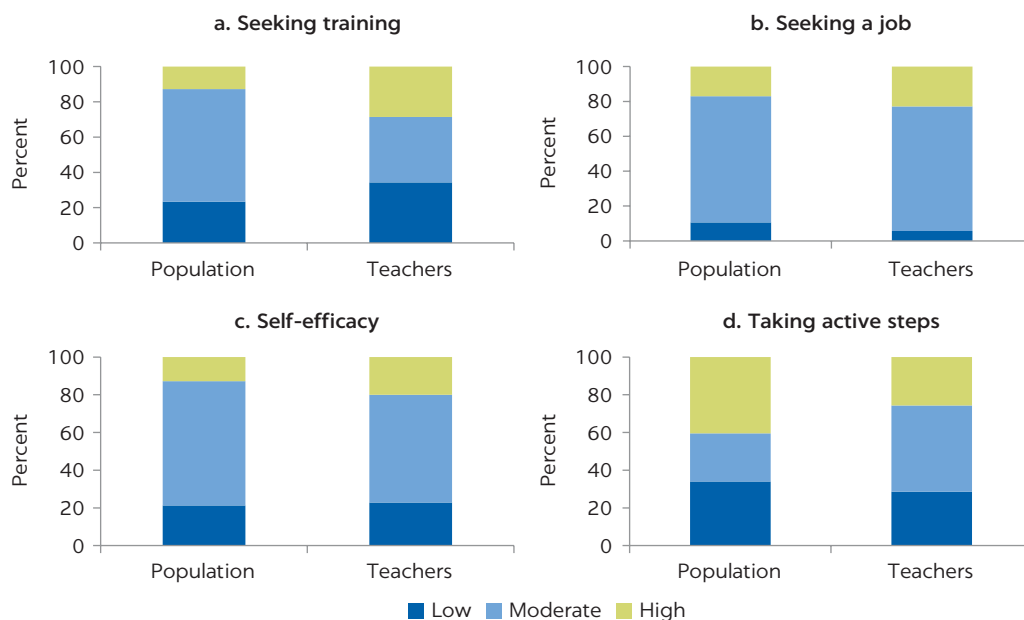


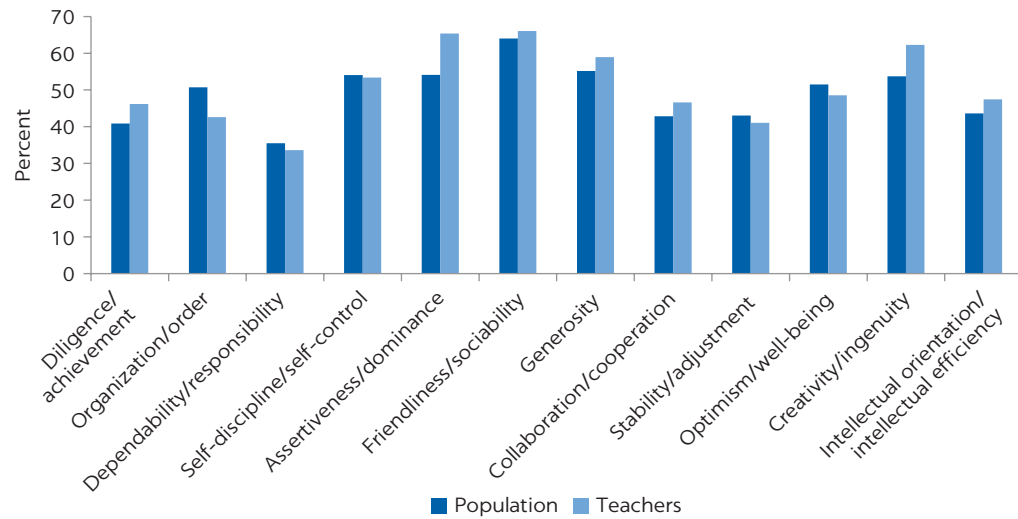
FIGURE 3.28
Career intentionality



- **Organization/Order** describes behaviors associated with maintaining a sense of order as well as an ability to plan work tasks and work activities.
- **Dependability/Responsibility** describes behaviors related to a sense of personal responsibility. Individuals who are high in dependability tend to be reliable and make every effort to keep promises.
- **Self-discipline/Self-control** indicates an ability to be patient, cautious, and level-headed. People who are high in self-discipline tend to maintain control at work.
- **Extraversion:** People who are extraverted are often described as social, talkative, and assertive.
 - **Assertiveness/Dominance** indicates an ability to take charge at work. People who are assertive are often described as direct, decisive, and “natural leaders.”
 - **Friendliness/Sociability** indicates an interest in social interactions. People high in friendliness are often interested in meeting new people at work and using this skill for the betterment of the organization.
- **Agreeableness:** People who are agreeable are often perceived as good natured and cooperative.
 - **Generosity** describes individuals who are willing to offer their time and resources in support of others. People high in generosity tend to be helpful to others at work.
 - **Collaboration/Cooperation** describes individuals who are viewed as trusting and cooperative. People high in collaboration are often easy to get along with and work well on teams.
- **Emotional Stability:** People who are emotionally stable tend to be even tempered, composed and maintain a positive attitude.
 - **Stability/Adjustment** describes individuals who are relaxed and worry free. People high in stability work well with changing work priorities and manage stress well.

FIGURE 3.29

Scores on subdomains of the Big Five personality traits



- **Optimism/Well-being** describes individuals who have a positive outlook and cope well with setbacks. People who are optimistic tend to incorporate feedback well at work.
- **Openness to Experience:** People who are open to experience tend to be creative, interested in learning and have an intellectual approach.
 - **Creativity/Ingenuity** describes behaviors that are inventive and imaginative. People high in creativity tend to be innovators at work.
 - **Intellectual Orientation/Intellectual Efficiency** is indicative of an ability to process information and make decisions quickly. People high in intellectual orientation are often viewed as knowledgeable by others.
 - **Inquisitiveness/Curiosity** describes behaviors that relate to being perceptive and curious. People high in inquisitiveness tend to be interested in learning more by attending workshops at work.

The respondents from the population and teacher samples who did the personality trait assessment generally had similar scores across the 13 subdomains. Respondents scored lowest in diligence/achievement, dependability/responsibility, collaboration/cooperation, and stability/adjustment, and highest in self-discipline/self-control, friendliness/sociability, generosity, and creativity/ingenuity. (See figure 3.29.) Because respondents self-selected to answer these questions, we cannot generalize to the rest of the population.

CONCLUSION

This chapter focused on the literacy, numeracy, and PSTRE skill levels of the Kyrgyz population and further explored the role of sociodemographics in understanding skill levels in the Kyrgyz Republic. Proficiency is particularly connected to education levels, geography, and immigration status. This chapter further analyzed the skill levels of teachers to understand the challenges they may have in their own skills acquisition that could hinder effective teaching. Teachers

generally score higher than the general population in literacy and numeracy, but struggle more with PSTRE skills. One worrying trend is that younger cohorts of teachers have lower numeracy than older cohorts. Finally, the chapter presented the results from the Career Interest and Intentionality and Behavioral Competencies assessments, which were optional modules at the end of the survey. Chapter 4 will examine how the use of skills in the workplace relates to skill levels and acquisition.

NOTES

1. “Upper secondary completion” refers to people for whom this was the final education level. It therefore excludes people who completed the upper secondary level and continued on to complete the tertiary level. We cannot rule out the possibility that upper secondary education significantly contributes to skill building among the group that continues.
2. An analysis of PISA 2009 data similarly finds that an increase of one grade among the PISA sample of 15-year-olds straddling two different grades in secondary school is associated with a statistically insignificant increase of 2.2 points in reading in the Kyrgyz Republic, compared with much higher increases elsewhere: statistically significant increases of 10.4 and 27.9 points, respectively, are found among the full sample of European and Central Asian countries and the full sample of European Union countries. These regressions, available upon request, control for female, rural, percent of government funding, ECDS, and students repeating a grade.
3. Jennifer LoCasale-Crouch (2016), Center for Advanced Study of Teaching and Learning, University of Virginia. Presentation of results at World Bank.

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4 Use of Skills in the Workplace

To understand skills use in the workplace, it is important to contextualize the labor market. First, job productivity, or output per worker, in the Kyrgyz Republic is the lowest in Europe and Central Asia. Labor productivity, measured as gross domestic product (GDP) per worker, was approximately \$7,600 in the Kyrgyz Republic in 2014. In the Russian Federation it was \$45,000, in Kazakhstan \$39,000, and in Moldova \$11,000 (World Bank 2018). Second, although public sector employment (public administration, education, and health and social services) accounts for only 20 percent of overall employment, it accounts for 60 percent of formal employment. In general, the formal sector in the Kyrgyz Republic is small and usually urban. In 2013, almost two-thirds (62 percent) of Kyrgyz workers held an informal job (Ajwad et al. 2014, 11). Given the large informal sector, the 2013 World Bank skills survey (Ajwad et al. 2014) found overall very high levels of physically demanding work¹ among the working population, accounting for 40 percent of all workers, with highs in agriculture (57 percent) and industry (56 percent), and a low in services (32 percent) (Ajwad et al. 2014, 12).

The 2019 survey allows us to see not only the latest trends of skills use on the job, but also to look across literacy, numeracy, and problem-solving tasks at work. The survey included the skills use module used by the Programme for the International Assessment of Adult Competencies (PIAAC) surveys. The module assesses the specific skills that respondents use in both their work and daily lives. The questions in this module focus on skills associated with reading, writing, use of mathematical information and ideas, and information and communications technology (ICT). Specifically, workers were asked to rate the frequency with which they perform different tasks on the job and their responses were aggregated to derive measures of skill use characterized as high, moderate, or low.² However, unlike the PIAAC surveys, questions on whether workers have the skills required for their jobs or whether workers have the typical skills required for their jobs were not asked. Therefore, standard responses commonly used to address skills mismatches were not available. Finally, the PSTRE assessment module was given only to the Russian language survey respondents.

We found that most jobs in the Kyrgyz Republic (measured by Russian language survey respondents only) require regular use of reading, writing, numeracy, and ICT skills. Across all employed adults, 31 percent need to read on the job

with high frequency, 58 percent with moderate frequency, and 31 percent with low frequency. For writing the figures are similar: 23 percent high, 55 percent moderate, and 22 percent low, as are the figures for use of numeracy-related tasks: 23 percent high, 59 percent moderate, and 18 percent low.

Across occupations, however, we see considerable differences in the use of these skills. Perhaps not surprisingly, nearly 55 percent of clerical support workers use writing at a high frequency at work, followed by managers at 39 percent. In comparison, no craft and related trade workers; skilled agricultural, forestry, and fishery workers; or plant and machine operators and assemblers use writing with high frequency.

A similar pattern is seen with reading tasks, with the most frequent use among professionals (44 percent), followed by technicians and associate professionals (42 percent) and clerical support workers (40 percent), all on the high-use end of the spectrum. On the low end are craft and related trade workers; skilled agricultural, forestry, and fishery workers; and elementary occupations.

Previous research has shown that computer use at work is relatively low in the Kyrgyz Republic. The 2013 World Bank survey (Ajwad et al. 2014) found that in the services sector, only 27 percent of workers use a computer; in industry, 19 percent; and in agriculture, only 9 percent. The highest use was reported in state-owned enterprises and government jobs: 41 percent used a computer in 2013. Only 25 percent of youth use a computer at work, and overall, only 23 percent of Kyrgyz workers use a computer (Ajwad et al. 2014, 13). Relative to comparator countries, this computer use is low; in Sri Lanka, the figure is 30 percent; in Bolivia and Vietnam, 35 percent; and in Yunnan province in China, 55 percent of workers use a computer (World Bank 2018, 69).

The 2019 Kyrgyz survey shows higher use of computers among the Russian language sample who answered the ICT questions: 38 percent report high usage of ICT, 45 percent moderate, and 17 percent low. Use also varied significantly depending on profession. Across occupations, clerical workers, craft and related trades workers, and managers reported the highest frequency of ICT use, with 68 percent, 57 percent, and 53 percent, respectively, reporting high usage. Technicians and associate professionals, and skilled agricultural, forestry, and fishery workers reported the lowest frequencies of high ICT use at 18 percent and zero, respectively.

SKILLS (MIS)MATCH

The analysis suggests that a significant share of the workforce is overeducated for their job, yet underskilled for the job's skills use requirements. The term "skills mismatch" incorporates a variety of different measures and can be used to describe forms of vertical mismatch, such as over-/undereducation, over-/underskilling, and skill shortages, and forms of horizontal mismatch, such as by fields of study (McGuinness, Pouliakas, and Redmond 2017, 1).

The focus in this report is on two types of skills mismatches for which the survey has information: (1) over-/underskilling, defined here by the frequency of use of a certain skill and the person's performance of that skill on our test; and (2) over-/undereducation, defined here by the person's international job classification and the level of education that is normally expected to be required for this job. Although these measures are informative, ideally we would have had more direct measures of skills gaps. For example, our survey captures whether respondents believe they have the necessary skills to do their job for computer

skills, but not for other skills. Similarly, we lack the perspective of employers, whose insights might reveal whether they are reluctant or unable to invest in new types of jobs because of concerns that the necessary skills to perform these new jobs are not readily available in the labor market.

Over-/undereducation

The Kyrgyz Republic has relatively high levels of overeducation compared to Organisation for Economic Co-operation and Development (OECD) countries. We use the job evaluation method in the analysis that follows. It identifies “over-/undereducation by using the International Standard Classification of Occupations (ISCO), which categorizes major occupational groups by level of education in accordance with the International Standard Classification of Education (ISCED)” (McGuinness, Pouliakas, and Redmond 2017, 5). This is shown in table 4.1. For example, “clerical support workers” are assigned skill level 2, which in our case effectively corresponds to any education level at the secondary, but not the tertiary, level. “Professionals,” on the other hand, are assigned skill level 4, which corresponds to at least tertiary education. The assignments essentially follow the International Labour Organization (ILO) assignments.

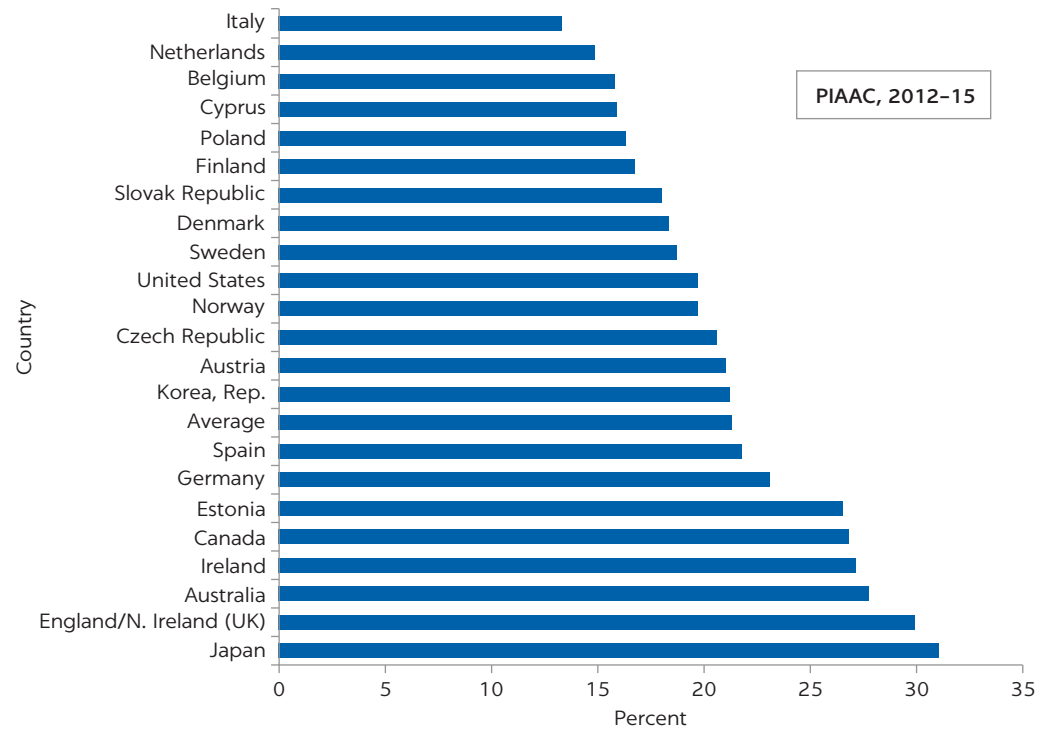
This exercise demonstrates that nearly two-thirds (61 percent) of the workers (from the Russian language sample) are well-qualified. A small percentage (7 percent) are underqualified, while nearly one-third (32 percent) are overqualified. The underqualified are mostly professionals who lack any form of tertiary education; the overqualified are mainly (1) clerical support workers, (2) craft and related trades workers, and (3) service and sales workers who have tertiary education but whose occupations do not necessarily require it. Figure 4.1 shows the international comparison, suggesting that the Kyrgyz Republic has relatively high levels of overeducation compared to OECD countries, with most countries having between 15 and 20 percent of workers being overqualified.

TABLE 4.1 Matching education to jobs using skill levels

OCCUPATION	SKILL LEVEL
Elementary occupations	1
Clerical support workers	2
Craft and related trades workers	2
Plant and machine operators, and assemblers	2
Service and sales workers	2
Skilled agricultural, forestry and fishery workers	2
Technicians and associate professionals	4
Professionals	4
Armed forces occupations (excluded – too broad)	1,4
Managers	4
LEVEL OF EDUCATION	SKILL LEVEL
Secondary education (i.e., high school diploma, GED, or equivalent)	2
Secondary education (without a diploma)	2
Some postsecondary education (including community technical or vocational)	2
4 year college or university degree	4
Beyond a college or university	4

Source: World Bank staff estimation using ISCO and ISCED.

FIGURE 4.1
Prevalence of overeducation



Source: Van Damme, Dirk 2016. "Qualifications, skills and the quality of human capital." OECD/EDU.

A comparison by gender indicates that women might be slightly better matched (64 percent compared with 57 percent of men), with fewer women being overqualified (26 percent against 38 percent for men). Further, in urban areas a slightly higher percentage (64 percent) of people are well-matched compared to those in rural areas (51 percent).

Over-/underskilling

Over-/underskilling describes a situation in which a worker possesses more (fewer) skills than the job requires, regardless of education level. An analysis of over-/underskilling finds that a substantial share of those with jobs are under-skilled across reading, writing, numeracy, and ICT skills.

We focus on the frequency of use (high, moderate, or low) of the specific skill (reading, writing, numeracy), and the levels of these skills (high, moderate, low) among workers performing these occupations. The frequency of use comes from the subjective responses of workers while the skill level categories are derived from classifying scores at level 4 or 5 as high, at level 2 or 3 as moderate, and level 1 or below as low. For example, people who report moderate use of reading on the job but who achieve a low reading score are considered underskilled. If they have moderate reading skills, they are considered well-matched, and if they have high reading skills, they are considered overskilled. Note that the underlying assumption is that low use requires low skills, moderate use requires moderate skills, and high use requires high skills.

This assumption would not apply, however, if, for example, a worker needs to read very irregularly on the job, but the type of reading is complex and requires high reading skills.

Figure 4.2 shows the results for all workers in the Russian-speaking sample and, separately, for the sample of teachers. Among all workers, as shown in panel a., we find that skills match use for between 36 percent (for PSTRE) and 50 percent (for numeracy). And although the education (mis)match suggested overqualification for a relatively large share of workers (with 32 percent having education levels that were higher than their occupation is expected to require), in terms of actual skills, underskilling is much more prevalent than overskilling: between 36 percent (for writing) and 54 percent (for PSTRE) of workers are underskilled.

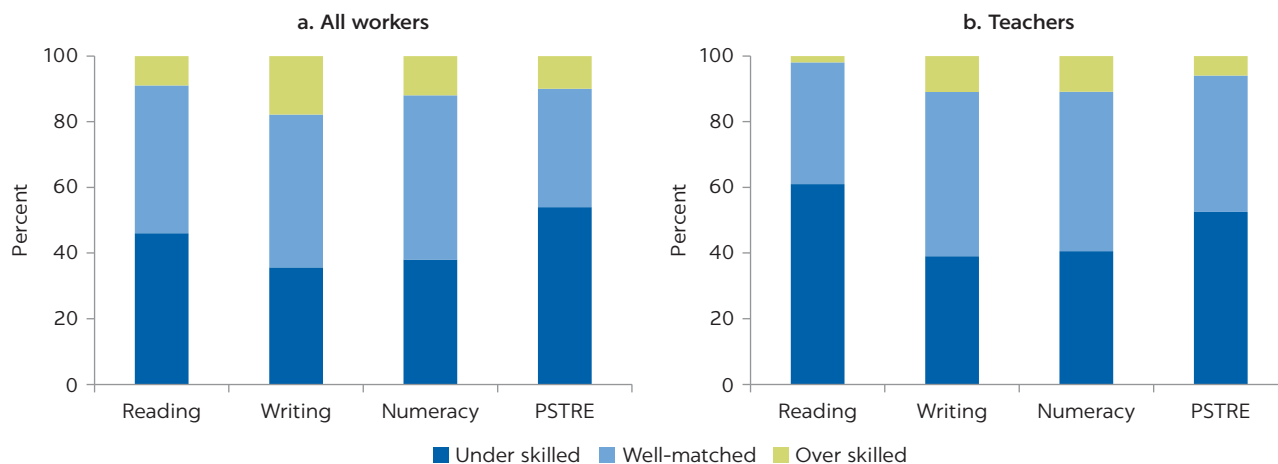
Among teachers, levels of underskilling are similar, or even somewhat higher, as shown in panel b of figure 4.2. Fifty-three percent and 61 percent of teachers are underskilled in PSTRE and reading, respectively.

A comparison of over-/underskilling by gender, age group, education level, and urban or rural indicates little variation within each category for reading, writing, or numeracy. For the broad measure of ICT skills, however, as captured by PSTRE, the oldest cohort (those 55 to 65 years old) is much better matched than all younger cohorts, those with upper secondary education are better matched than those with tertiary education (35 percent and 61 percent, respectively, are underskilled), and rural workers are better matched on ICT skills than urban workers (35 percent and 57 percent, respectively, are underskilled). This likely reflects that people with tertiary education and urban workers more generally occupy jobs that require higher use of ICT skills, yet their proficiency is lacking.

To understand the occupations in which underskilling likely creates a real bottleneck, we compare the percentage of low achievers to the share of workers that use the particular skill at high frequency by occupation.

There is a strong negative correlation between the use of writing and reading skills in the workplace and the share of people with low actual proficiency levels (at or below level 1) in literacy: the smallest share of low literacy proficiency levels is found among occupations with the highest use of writing and reading tasks.

FIGURE 4.2
Job-skills match



This is shown in figures 4.3 and 4.4, which plot the share of high frequency of writing and reading in a given occupation against the share of people in that occupation with low literacy levels.

Notwithstanding the finding that higher use of skills at work correlates with smaller shares of low achievers across the professions, the figures also show significant variation: conditional on the percentage of low achievers, some professions have much higher use than others. For example, the percentages of low achievers among craft and related trade workers as well as skilled agricultural, forestry, and fisheries workers are very similar to the percentages of low

FIGURE 4.3
Use of writing skills and literacy proficiency

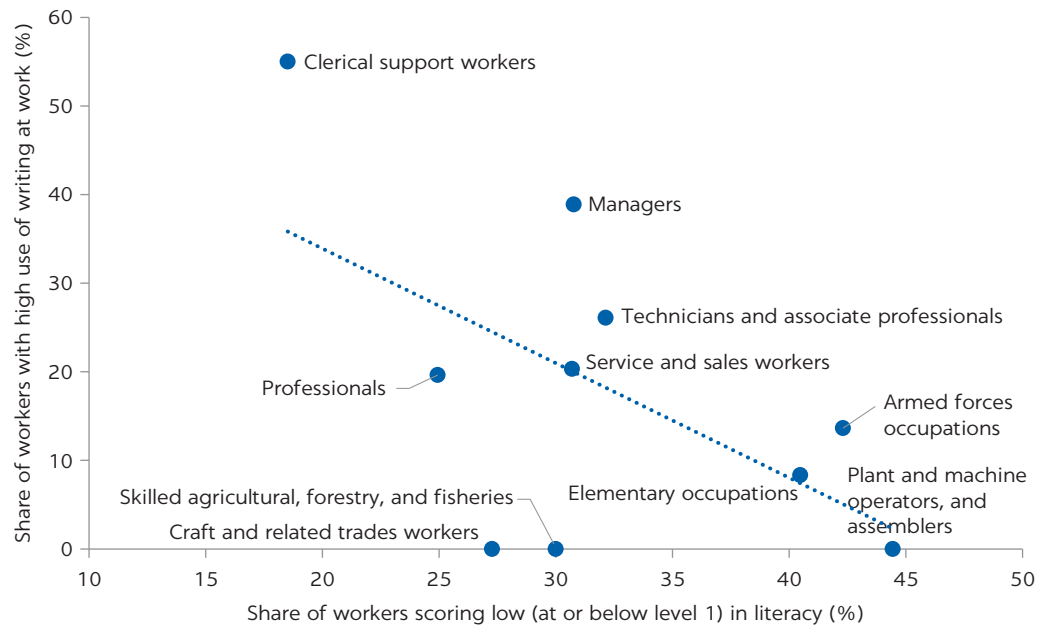
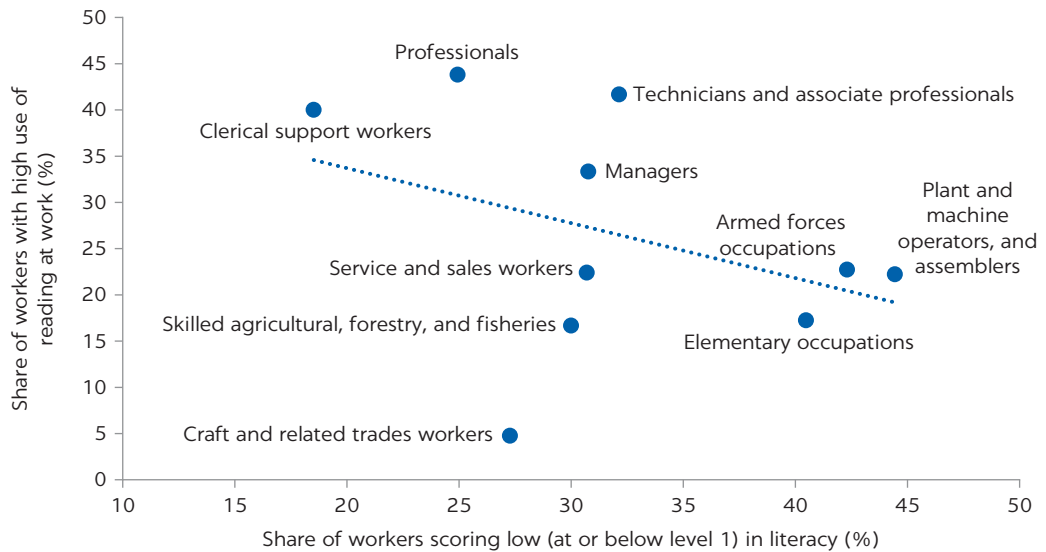


FIGURE 4.4
Use of reading skills and literacy proficiency



achievers among managers and among professionals, yet the latter two professions use the skills with much higher frequency. The relatively large shares of low achievers among occupations that generally require high skills to raise productivity (underskilling) underscore the challenge for Kyrgyz firms and for the economy as a whole to move from a majority informal economy (more than half in 2013) to a higher-productivity formal economy.

The differences in use for a given share of low achievers is even greater for numeracy. As shown in figure 4.5, actual numeracy skills are not a strong predictor of frequency of use of numeracy-related tasks. Numeracy proficiencies are not strictly higher among those occupations with a high frequency of numeracy tasks. For example, a similar number—between 20 percent and 30 percent—of people in elementary occupations, technicians, managers, clerical support workers, and professionals use numeracy tasks at a high frequency in the workplace, but the share of low achievers in numeracy varies widely across these occupations, from as many as 52 percent in elementary occupations to as few as 27 percent in professional occupations.

The numeracy findings complement the 2013 World Bank skills survey findings (Ajwad et al. 2014). That survey found that workers with higher numeracy skills tend to engage less in physically demanding work than those with lower numeracy skills, differences that hold in urban and rural settings, and between men and women. Still, the majority of respondents with high numeracy skills did not use their numeracy skills on the job: more than 60 percent of men and more than 75 percent of women with high numeracy skills did not use them (Ajwad et al. 2014, 23).

Finally, the frequency of computer use at work is often considered a strong indicator of PRSTE skill level, and although this generally holds in the Kyrgyz Republic, there are some significant outliers. While clerical workers and managers report some of the highest frequency rates of computer use, at 68 percent and 53 percent, respectively, they do not possess basic PSTRE skills, scoring below level 1. And while professionals reported one of the lowest rates of high ICT use, professionals scored higher in PSTRE skills than their counterparts who are clerical workers or managers (figure 4.6). This suggests that exposure to a computer at work alone does not explain PSTRE skills. Therefore, increasing access to computers would not by itself be expected to improve PSTRE skills. A combination of education, training, and access is necessary.

FIGURE 4.5

Use of numeracy skills and numeracy proficiency

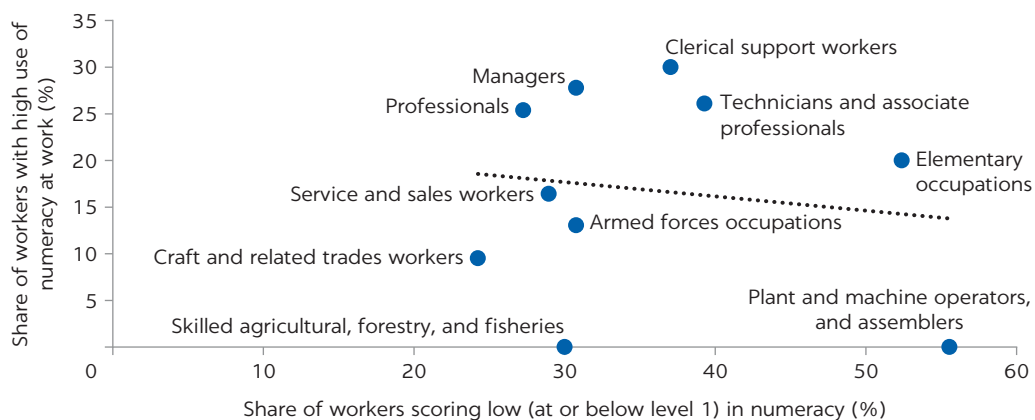
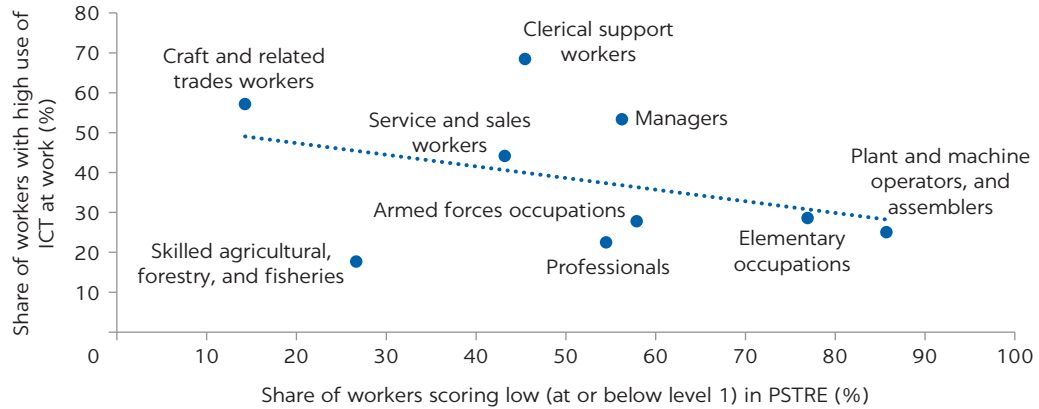


FIGURE 4.6

Use of ICT skills and PSTRE proficiency



These findings are further confirmed by workers' own concerns regarding their skills. Overall, 42 percent of the population believe they do not have adequate computer skills for their jobs. Younger workers are more confident in their skills, with 81 percent of those 16 to 24 years old believing they have the necessary skills compared to 24 percent of those 55 to 65 years old.

EDUCATION, SKILLS, AND EARNINGS

We found evidence that a substantial percentage of workers is overschooled but underskilled. This section explores the implications for earnings and finds, reassuringly, that higher-skilled groups of people earn higher wages. To do the analysis, we combine information from the 2018 Kyrgyz Integrated Budget and Labor Force Survey (KIHS) and our 2019 survey.

Figure 4.7 shows that median earnings are relatively flat across age cohorts for those who have completed primary education and general secondary education. Among those with specialized education (such as vocational education), earnings increase until about age 59 before declining. Tertiary education graduates experience the steadiest earnings increase by age. When comparing earnings across education levels, figure 4.7 shows that those who completed general secondary education earn amounts similar to those of workers who completed only primary education. This is consistent with the finding that skills levels were similar between those with upper secondary and those with less education. Those with specialized secondary and tertiary education earn more, however, with the latter earning consistently more than the former from age 39 on. When combined across all ages, those with specialized secondary education earn on average 4 percent more than those with either general secondary or primary education (there being no wage difference between these two groups); the difference rises to 8 percent for those with tertiary education.

We next explore the skills-earnings nexus. The KIHS data do not contain direct information on skills. Instead, we create 48 unique population groups from the combination of age groups, gender, urban or rural, and level of education. In both the KIHS data and our 2019 data, we assign respondents to one of

these 48 groups. From our 2019 data we calculate the average skills scores for each group. In the KIHS data we calculate median wages for each group. Figure 4.8 plots the results. If skills were all that mattered for wages, regardless of education, age, or other factors, there would be a perfect correlation between them.

Figure 4.8 shows that skills correlate positively with wages. Likewise, an econometric model on earnings suggests that a one-standard-deviation increase in literacy skills is associated with an approximately 17 percent increase in wages. An identical regression that replaced the literacy score with a dummy for tertiary education shows that the latter is associated with a 32 percent increase in wages. This is consistent with the fact that tertiary education is associated not

FIGURE 4.7
Median monthly wages by age and level of education completed

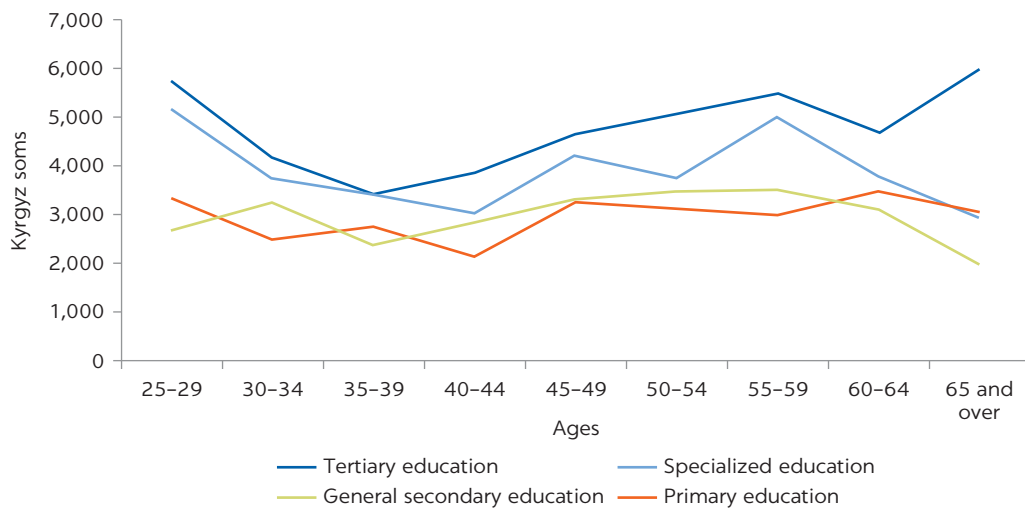
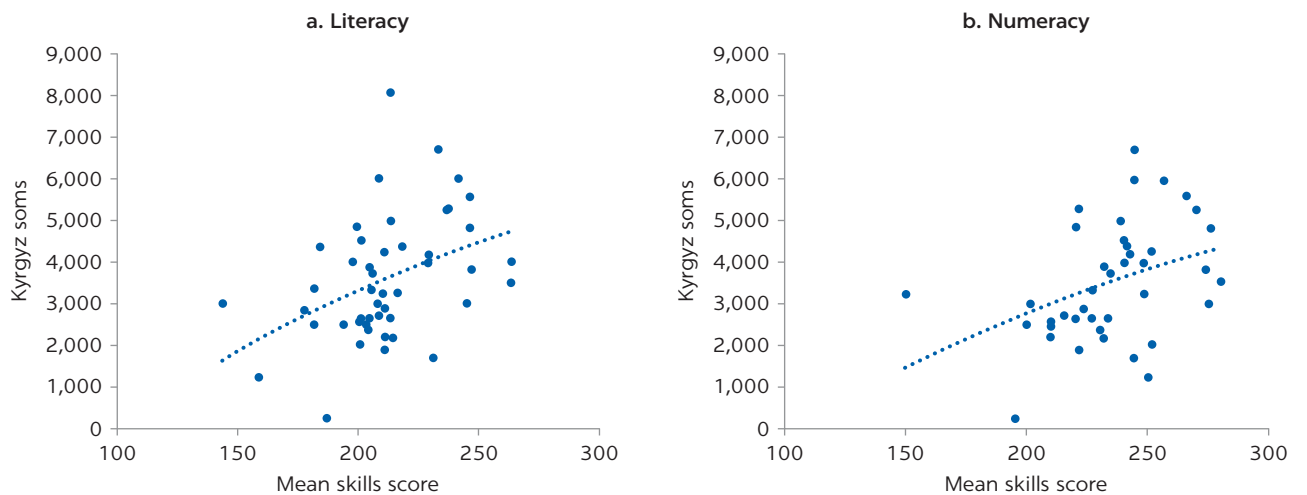


FIGURE 4.8
Correlation of median monthly wages and skill levels



only with higher literacy but also with other skills. A third regression, with both tertiary education and literacy included, results in smaller coefficient estimates for both—tertiary education is now associated with an increase in wages of 17 percent and literacy with an increase in wages of 12 percent.

Although tertiary graduates earn, on average, considerably higher wages, and tertiary graduates have, on average, higher skill levels, our results also show that among tertiary graduates there is still much variation in skill levels. In other words, for employers looking to hire, tertiary education is not a very precise predictor of skills. Employers must therefore use other ways to identify higher skills performance, such as job interviews, references, and observing employee productivity as workers build up job histories, and reward those skills accordingly through higher wages.

As demonstrated in this chapter, use alone does not demonstrably equate to skill levels in the Kyrgyz Republic. Chapter 5 will examine the potential reasons for the existing skill levels and begin to explore paths forward.

NOTES

1. Defined as regularly lifting or pulling anything weighing at least 50 pounds (25 kilograms).
2. Respondents categorized their usage as high, moderate, or low.

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5 Building Skills for the Future

GENERATING NEW INSIGHTS ON SKILLS IN THE KYRGYZ REPUBLIC

This report summarizes the findings from the 2019 skills survey for the adult Kyrgyz population. The survey measured skills using the same questions and approach as the Programme for the International Assessment of Adult Competencies (PIAAC) surveys administered by the Organisation for Economic Co-operation and Development (OECD). This survey complements previous findings on skills for the adult Kyrgyz population in several important ways. The 2019 survey:

- Includes measures of literacy, numeracy, and problem-solving in technology rich environments (PSTRE). We can therefore assess whether these skills vary across key population characteristics.
- Used the PIAAC questions and methodology. This methodology was designed to assign respondents to different well-defined and internationally comparable proficiency levels. We can therefore assess not only whether Kyrgyz adult skill levels are more basic or more advanced, but we can also make international comparisons with countries that implemented PIAAC surveys.
- Enables us to make a detailed assessment of the use of these skills in the workplace and how they relate to the skills required.
- Includes a separate sample of secondary school teachers. We can therefore assess whether teachers have the necessary skill levels to equip the next generation.

Main findings on skills in the adult population

We find that skill levels are consistently low in absolute terms both among varying sociodemographic groups and relative to countries that implemented PIAAC surveys. Results are not improving across cohorts.

Although level 2 is considered the minimal proficiency level for literacy and numeracy, a significant share of adults in the Kyrgyz Republic performed at or below level 1 in literacy and numeracy. Fifty-nine percent and 60 percent of adults scored at or below level one in literacy and numeracy,

respectively. Among those who scored higher, about three-quarters performed at level 2. Altogether, only about 10 percent performed at level 3 or higher. In practice this means that in literacy, the majority of the adult population has, at best, knowledge of and is able to recognize “basic vocabulary, determin[e] the meaning of sentences, and [read] paragraphs of [relatively short digital or print] texts” (OECD 2013, table 2.2), while in numeracy the majority of the population is, at best, able to engage in “simple processes involving counting, sorting, performing basic arithmetic operations, . . . and identifying elements of simple or common graphical or spatial representations” (OECD 2013, 79). In comparison, only 19 percent of adults in OECD countries and 22 percent of adults in Europe and Central Asian countries score at or below level 1 on literacy; the corresponding numeracy rates are 24 percent and 25 percent, respectively.

PSTRE skills do not meet the needs of the 21st century. Ninety-eight percent of respondents have at most, level 1 PSTRE proficiency (see figure 3.7), which means that they have only basic skills to use “widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem” (OECD 2016). Restricting the sample further to the Russian language respondents who had the most basic PSTRE skills needed to take the test, the report finds that 34 percent of test-takers score below level 1 compared with 17 percent for Europe and Central Asian countries and 15 percent for the OECD.

Completion of upper secondary education does not equate to significantly improved skill levels. Although some improvement in skills exists between those who have and have not completed upper secondary education, the impact is relatively small in comparison to international norms. In literacy, 65 percent of those with upper secondary education perform at level 1 or below compared to 71 percent of those with less than upper secondary education. In numeracy, the figures for upper secondary and less than upper secondary education are 66 percent and 77 percent, respectively. Overall, two-thirds of upper secondary respondents do not have basic literacy or numeracy skills.

Tertiary education is associated with higher skill levels, but skill levels remain low and vary significantly. In literacy, those scoring at or below level 1 fall from 65 percent of upper secondary respondents to 42 percent of tertiary respondents. A similar decline is seen in numeracy, with 66 percent of respondents with upper secondary education scoring at or below level 1 compared to 42 percent of tertiary respondents. Although this improvement in skills is significant, a meaningful ratio of tertiary-level students does not have basic literacy and numeracy skills.

Urban participants demonstrated higher literacy, numeracy, and PSTRE skills than their rural counterparts. Sixty-four percent of rural respondents scored at or below level 1 in literacy (compared to 53 percent of urban respondents), 68 percent scored at or below level 1 in numeracy (compared to 55 percent of urban respondents), and 65 percent scored below level 1 in PSTRE skills (compared to 41 percent of urban respondents).

Skills are largely gender neutral. Males and females perform at generally the same levels in literacy, numeracy, and PSTRE. Fifty-nine percent of both males and females scored at or below level 1 in literacy, while 62 percent of females and 60 percent of males scored at or below level 1 in numeracy. Like literacy and numeracy skills, PSTRE scores were also largely gender neutral, with 48 percent of both males and females scoring at level 1.

Foreign born respondents have higher literacy, numeracy, and PSTRE skills. Only 29 percent of immigrant respondents scored at or below level 1 in literacy, 41 percent scored at or below level 1 in numeracy, and 38 percent scored below level 1 in PSTRE. In comparison, 60 percent of native-born Kyrgyz scored at or below level 1 in literacy, 61 percent scored at or below level 1 in numeracy, and 49 percent scored below level 1 in PSTRE.

Skills do not vary significantly between the employed and unemployed. A respondent's employment status was available only in the Russian sample of the survey. In that sample, 55 percent of employed respondents performed at or below level 1 in literacy, compared to 57 percent of unemployed respondents. Numeracy results were similar, with 54 percent of employed respondents scoring at or below level 1 in numeracy compared to 59 percent of unemployed respondents. The unemployed scored slightly higher on PSTRE skills than the employed, with 6 percent of the unemployed scoring at level 2 compared to 2 percent of the employed.

Results do not improve across age cohorts in numeracy and literacy. A comparison of literacy and numeracy performance across age cohorts indicates that the low performance is relatively consistent and is not steadily improving with more recently educated adults.

Although remaining relatively low, PSTRE skills show improvement across age cohorts. The same comparison of age cohorts for PSTRE skills demonstrates steady improvement across age cohorts, with 33 percent of those 16 to 24 years old scoring below level 1 compared to 63 percent of those 55 to 65 years old.

Most jobs in the Kyrgyz Republic require regular use of reading, writing, numeracy, and ICT skills. For all employed adults (using data available for Russian language respondents only), 31 percent need to read on the job with high frequency and 58 percent with moderate frequency, with similar figures for writing and numeracy tasks. Use of ICT was even higher, with 38 percent reporting high use of ICT and 45 percent moderate use.

There is evidence that a substantial share of workers is overschooled, but underskilled. Over-/undereducation refers to a situation in which a worker possesses a higher (lower) level of education than the occupation is expected to need, while over-/underskilling describes a situation in which a worker possesses more (fewer) skills than the job requires, regardless of education level. The analysis finds that 32 percent of respondents had education levels that were higher than their occupation is expected to require, but for actual skills, underskilling is much more prevalent than overskilling, with 36 percent of respondents underskilled in writing and 54 percent of workers underskilled in PSTRE.

Reassuringly, the analysis finds that higher-skilled groups earn higher wages, suggesting that the labor market rewards higher skills.

FROM EVIDENCE TO POLICY

Skills are developed throughout all stages of life—from conception to preschool, primary, secondary, and higher education, and on the job. The labor market increasingly requires adults with strong foundational skills; however, a large percentage of adults in the Kyrgyz Republic perform well below this foundational level. The findings do not provide a complete picture of skills formation at each

of these levels, but they provide important insights. We find that the quality of education is likely an important driver of low skills performance. The significant variation in skills within education levels creates a potential mismatch between acquired skills and required skills in the marketplace, and the high use of skills suggests an opportunity for improving skills on the job. This section examines each issue and provides policy recommendations targeted to stages within the lifecycle.

The lack of quality of education is an important driver of low skills performance

We find that the education system underperforms—although there are big challenges in improving completion rates for upper secondary and higher education, and even for maintaining existing educational attainment, the Kyrgyz Republic scores very low in literacy and numeracy.

Higher levels of education are associated with higher skill levels, but even among the most educated, a large share has low skill scores, which helps explain why we find that a large share is overschooled but underskilled for their jobs. Consistent with the 2013 skills survey (Ajwad et al. 2014), there is much variation in skills among adults with the same educational background. For example, among adults that are university graduates, 42 percent score at most level 1 in both literacy and numeracy, and the same percentage scores below level 1 in PSTRE skills. This indicates that even among the most educated adults, a very large share has only minimal literacy, numeracy, and PSTRE skills.

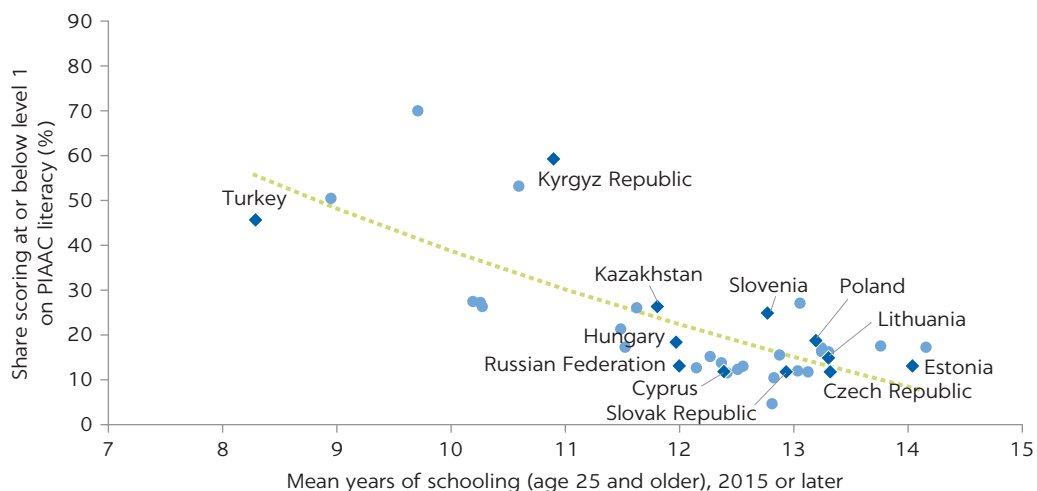
To determine the degree to which quality is a concern, we first assess what would happen to skill levels if education completion rates increased without an increase in the quality of education. Mean years of schooling for the population aged 25 years and above is approximately 11 years in the Kyrgyz Republic. Net enrollment rates are 90 percent in primary and lower secondary education, but drop sharply in upper secondary education to 53 percent.¹

Based on average years of schooling alone, a comparison with other countries predicts that the share of low performers should be closer to 30 percent, not the nearly 60 percent found in the 2019 survey (see figure 5.1).

Figure 5.1 shows that for the same years of schooling, education systems in other countries perform better in teaching literacy. Furthermore, reducing the very high dropout rate in upper secondary school, while an important objective, will not by itself result in a large improvement in literacy and numeracy performance. See figure 3.10, which examines the skills results from the 2019 survey according to the education levels of the respondents. Those having completed upper secondary education perform better on literacy and numeracy than those with less than upper secondary education, but the improvement is modest.

Secondary school teachers also score worryingly low. An analysis of the skill results among a sample of 399 secondary school teachers underscores the challenge that the education system faces when it comes to building the skills of its pupils. Although secondary school teachers outperform the general population in both literacy and numeracy, more than one-third of teachers still have low proficiency (level 1 or below) in literacy and numeracy, raising concerns about their ability to successfully impart skills to secondary school pupils. Furthermore, younger cohorts of teachers perform worse than older cohorts and rural teachers worse than urban teachers. Finally, with regard to

FIGURE 5.1
Mean years of schooling and low literacy performance



Source: Survey of Adult Skills (PIAAC) 2012, 2015, 2018; Data for the Sustainable Development Goals (database), UNESCO Institute for Statistics, Paris (accessed April 2020), <http://www.uis.unesco.org>. and United Nations (2019) for Russia, Kazakhstan, and the Kyrgyz Republic.
 Note: Named countries are in Europe and Central Asia.

PSTRE skills, secondary school teachers score worse than the general population.

Recommendations

Recommendation 1: Address learning outcomes. Focusing on quality begins with early childhood education (children 3 to 6 years old). Standards for effective practices in child development should be implemented to ensure the building of foundational skills and readiness to learn. Rapid and more equitable expansion of access to preschool education is necessary to provide universal coverage of all children ages 3 to 6 years and those from birth to age 3. The government has recognized this need and prioritized it in its latest education strategy. The expansion should be complemented with shifts in how curriculum is delivered in the early years and resources to sustain educational efforts. Explorative and play-based learning should be prioritized for socioemotional development, which prepares students to engage in the classroom and society. Students should also have access to a variety of learning and reading materials to spark understanding and interest in reading and learning.

A focus on quality includes enhancing the learning of basic cognitive and non-cognitive skills. A large portion of the curriculum currently uses memorization of facts and multiple-choice responses to acquire and test knowledge. Competency-based curriculums and assessments, which center on higher-level skills of understanding, critical thinking, and application of knowledge, will help students integrate the knowledge they learn with problems they will be asked to address in the marketplace in the future. Digital literacy is a key component, as recognized in the government's National Sustainable Development Strategy 2018–2040 (Kyrgyz Republic 2018a) and the draft Education Sector Plan for 2021–26 (Kyrgyz Republic 2018b). Classroom access to computers and the internet are essential to having a future workforce that is digitally literate. Digital literacy is particularly

important when remote learning is required, such as during the COVID-19 crisis. For learning to continue, teachers and students need access to computers and solid computer literacy skills. Teacher quality and pedagogical practice are additional key factors, together with more rigorous assessments to measure student learning. The government has started working on these issues and should consider ramping up the investments and the interventions.

Recommendation 2: Make the postsecondary and tertiary education labor markets relevant. Increasing enrollment at the postsecondary and tertiary levels (those 16 to 22 years old), while important, has less impact if the quality of education does not address the needs of society. Postsecondary and tertiary education need to focus on intermediate literacy, numeracy, and PSTRE skills. The significant variation in skills at this level indicates a need for continuing to build these skills. Increased participation in postsecondary and tertiary education must be accompanied by improvements in literacy, numeracy, and PSTRE skills. It is further imperative to increase the relevance of postsecondary and tertiary education through the creation of curriculums aligned with the changing needs in the labor market, whether entrepreneurial or technical and job-specific or the socioemotional skills that employers increasingly value.

Recommendation 3: Invest in teachers' professional development. The quality of education is only as strong as the teachers. The findings in this report indicate an opportunity to improve the quality of education by providing opportunities for teachers with specific skill deficiencies to improve their skills, focusing first on teachers with only basic literacy and numeracy skills. The survey results suggest that nearly all secondary school teachers lack adequate PSTRE skills. This finding is particularly salient during the COVID-19 crisis, as remote learning is implemented. Strengthening the ability of teachers to perform in technology-rich environments would assist in addressing quality concerns in online and remote teaching and learning. Currently, teachers are not well-equipped to impart PSTRE skills to their students; broad improvements in skills in this area, coupled with ICT teaching in the curriculum, may enhance ICT skills for young people about to enter the labor market. The Ministry of Education and Science's continuous professional development (CPD) program could address these needs, but would have to be restructured. As currently operated, the CPD does not allow for individualized improvement, is expensive, and is difficult for many teachers to access. Instead, development programs should identify teachers' specific needs in the classroom and provide means for skills development across the country. The implementation of the draft teacher competency framework could assist in this process because it includes CPD programs and aligns with a competency-based approach that should also be implemented. In addition, adjusting the curriculum and providing stronger quality assurance measures to address these core skill competencies in the teacher preservice programs could assist in confirming that teachers have the knowledge required for their teaching level. Requiring that teachers pass a mandatory skills test before beginning in the profession could also act as an external quality assurance measure.

Recommendation 4: Enhance skills throughout life. Skills can be maintained and improved in the workplace. Basic and advanced skills may be developed on the job that can supplement one's education. This is particularly valuable for individuals who learn better through practice and can help to sustain not only the entry level labor market, but also aid in creating a strongly skilled workforce overall.

The high usage of skills, combined with the level of underskilled workers, suggests an opportunity for improving skills on the job. The main insights from the

survey on skills use are restricted to the Russian speaking sample to whom the job skills use module was administered. This is an important caveat because the Russian speaking sample generally scores higher on literacy and numeracy skills.

The significant variation in skills within education levels creates mismatches between acquired skills and required skills in the marketplace. In the absence of other qualifications, employers frequently use education as a signifier of skills. Improving skills within the education system would help to alleviate this mismatch and aid employers in identifying skilled workers. Moreover, opportunities for short professional programs and postsecondary opportunities to boost skills could aid in improving skills and signaling to employers the type of skills workers possess.

The survey finds that for literacy, numeracy, and ICT-related tasks, adults with jobs requiring these in higher frequency tend to score higher in proficiency; however, there are variations in skill levels with significant underskilling within professions. Programs and policies intended to improve adult proficiency in skills through education and training both in school and on the job can have significant economic and social benefits.

Learning should be considered a lifelong endeavor, with pathways for adults to access meaningful learning opportunities on the job and outside the workplace. Adult learning programs and materials should target necessary skills and align with international best practices. E-learning can be an effective method for improving not only basic literacy and numeracy skills, but at the same time boosting ICT skills. E-learning could be integrated with face-to-face learning to encourage engagement and ensure accountability.

In line with the OECD report on skills (2016), we find that investing in improving literacy, numeracy, and PSTRE can have substantial long-term benefits for an economy and society. These improvements can be addressed through increased emphasis on skills acquisition at all levels of education, programs to facilitate skills matching and transition to the workplace, and targeted on-the-job training and postsecondary level programs to improve skills.

NOTE

1. Data for the Sustainable Development Goals (database), UNESCO Institute for Statistics, Paris (accessed April 2020), <http://www.uis.unesco.org>.

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APPENDIX A

Ordinary Least Squares Model on the Determinants of Wages in the Kyrgyz Republic

VARIABLES	(1) WAGES	(2) WAGES	(3) WAGES
Male	-0.119 (0.153)	-0.120 (0.151)	-0.120 (0.152)
Rural	-0.331** (0.153)	-0.231 (0.189)	-0.264 (0.188)
Age 35-44	-0.278** (0.132)	-0.346** (0.131)	-0.323** (0.140)
Age 45-54	0.0469 (0.150)	-0.0437 (0.153)	-0.0140 (0.163)
Age 55-65	-0.0936 (0.282)	-0.0884 (0.281)	-0.0901 (0.282)
Tertiary education	0.319** (0.132)		0.166 (0.136)
Literacy score		0.175* (0.0937)	0.117 (0.112)
Constant	8.305*** (0.227)	8.401*** (0.201)	8.349*** (0.216)
Observations	48	48	48
R-squared	0.224	0.233	0.244

Note: Robust standard errors in parentheses. Wages in natural logarithm. Literacy score in standard deviation. Reference groups: female, urban, 25-34 years old, upper secondary education or below. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

APPENDIX B

Description of Literacy Proficiency Levels

LEVEL	SCORE RANGE	PERCENTAGE OF ADULTS SCORING AT EACH LEVEL (AVERAGE)	TYPES OF TASKS COMPLETED SUCCESSFULLY AT EACH LEVEL OF PROFICIENCY
Below level 1	Below 176 points	4.5	The tasks at this level require the respondent to read brief texts on familiar topics to locate a single piece of specific information. There is seldom any competing information in the text and the requested information is identical in form to information in the question or directive. The respondent may be required to locate information in short, continuous texts. However, in this case, the information can be located as if the text were noncontinuous in format. Only basic vocabulary knowledge is required, and the reader is not required to understand the structure of sentences or paragraphs or make use of other text features. Tasks below level 1 do not make use of any features specific to digital texts.
1	176 to less than 226 points	14.4	Most of the tasks at this level require the respondent to read relatively short digital or print continuous, non-continuous, or mixed texts to locate a single piece of information that is identical to or synonymous with the information given in the question or directive. Some tasks, such as those involving noncontinuous texts, may require the respondent to enter personal information onto a document. Little, if any, competing information is present. Some tasks may require simple cycling through more than one piece of information. Knowledge and skill in recognizing basic vocabulary, determining the meaning of sentences, and reading paragraphs of text is expected.
2	226 to less than 276 points	33.9	At this level, the medium of texts may be digital or printed, and texts may comprise continuous, noncontinuous, or mixed types. Tasks at this level require respondents to make matches between the text and information, and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require the respondent to: <ul style="list-style-type: none"> • Cycle through or integrate two or more pieces on information based on criteria • Compare and contrast or reason about information requested in the question • Navigate within digital texts to access and identify information from various parts of a document.

continued

LEVEL	SCORE RANGE	PERCENTAGE OF ADULTS SCORING AT EACH LEVEL (AVERAGE)	TYPES OF TASKS COMPLETED SUCCESSFULLY AT EACH LEVEL OF PROFICIENCY
3	276 to less than 326 points	35.4	Texts at this level are often dense or lengthy, and include continuous, non-continuous, mixed, or multiple pages of text. Understanding text and rhetorical structures becomes more central to successfully completing tasks, especially navigating complex digital texts. Tasks require the respondent to identify, interpret, or evaluate one or more pieces of information, and often require varying levels of inference. Many tasks require the respondent to construct meaning across larger chunks of text or perform multistep operations in order to identify and formulate responses. Often tasks also demand that the respondent disregard irrelevant or inappropriate content to answer accurately. Competing information is often present, but it is not more prominent than the correct information.
4	326 to less than 376 points	10.0	Tasks at this level often require respondents to perform multistep operations to integrate, interpret, or synthesize information from complex or lengthy continuous, noncontinuous, mixed, or multiple type texts. Complex inferences and application of background knowledge may be needed to perform the task successfully. Many tasks require identifying and understanding one or more specific, noncentral idea(s) in the text in order to interpret or evaluate subtle evidence-claim or persuasive discourse relationships. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent. Competing information is present and sometimes seemingly as prominent as correct information.
5	Equal or higher than 376 points	0.7	At this level, tasks may require the respondent to search for and integrate information across multiple, dense texts; construct syntheses of similar and contrasting ideas or points of view; or evaluate evidence-based arguments. Application and evaluation of logical and conceptual models of ideas may be required to accomplish tasks. Evaluating the reliability of evidentiary sources and selecting key information is frequently a requirement. Tasks often require respondents to be aware of subtle, rhetorical cues and to make high-level inferences or use specialized background knowledge.

Source: OECD 2016.

Note: The percentage of adults scoring at different levels of proficiency adds up to 100% when 1.4% of literacy-related nonrespondents across countries/economies are taken into account. Adults in this category were not able to complete the background questionnaire due to language difficulties or learning and mental disabilities (see section on literacy-related nonresponse).

APPENDIX C

Description of Numeracy Proficiency Levels

LEVEL	SCORE RANGE	PERCENTAGE OF ADULTS SCORING AT EACH LEVEL (AVERAGE)	THE TYPES OF TASKS COMPLETED SUCCESSFULLY AT EACH LEVEL OF PROFICIENCY
Below level 1	Below 176 points	6.7	Tasks at this level require the respondents to carry out simple processes, such as counting, sorting, performing basic arithmetic operations with whole numbers or money, or recognizing common spatial representations in concrete, familiar contexts where the mathematics content is explicit with little or no text or distractors.
1	176 to less than 226 points	16.0	Tasks at this level require the respondent to carry out basic mathematical processes in common, concrete contexts where the mathematical content is explicit, with little text and minimal distractors. Tasks usually require one-step or simple processes involving counting, sorting, performing basic arithmetic operations, understanding simple percentages, such as 50%, and locating and identifying elements of simple or common graphical or spatial representations.
2	226 to less than 276 points	33.0	Tasks at this level require the respondent to identify and act on mathematical information and ideas embedded in a range of common contexts where the mathematics content is fairly explicit or visual with relatively few distractors. Tasks tend to require the application of two or more steps or processes involving calculation with whole numbers and common decimals, percentages, and fractions; simple measurement and spatial representation; estimation; and interpretation of relatively simple data and statistics in texts, tables, and graphs.
3	276 to less than 326 points	31.8	Tasks at this level require the respondent to understand mathematical information that may be less explicit, embedded in contexts that are not always familiar and represented in more complex ways. Tasks require several steps and may involve the choice of problem-solving strategies and relevant processes. Tasks tend to require the application of number sense and spatial sense; recognizing and working with mathematical relationships, patterns, and proportions expressed in verbal or numerical form; and interpretation and basic analysis of data and statistics in texts, tables, and graphs.
4	326 to less than 376 points	10.2	Tasks at this level require the respondent to understand a broad range of mathematical information that may be complex, abstract, or embedded in unfamiliar contexts. These tasks involve undertaking multiple steps and choosing relevant problem-solving strategies and processes. Tasks tend to require analysis and more complex reasoning about quantities and data; statistics and chance; spatial relationships; and change, proportions, and formulas. Tasks at this level may also require understanding arguments or communicating well-reasoned explanations for answers or choices.

continued

LEVEL	SCORE RANGE	PERCENTAGE OF ADULTS SCORING AT EACH LEVEL (AVERAGE)	THE TYPES OF TASKS COMPLETED SUCCESSFULLY AT EACH LEVEL OF PROFICIENCY
5	Equal or higher than 376 points	1.0	Tasks at this level require the respondent to understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. Respondents may have to integrate multiple types of mathematical information where considerable translation or interpretation is required; draw inferences; develop or work with mathematical arguments or models; and justify, evaluate, and critically reflect upon solutions or choices.

Source: OECD 2016.

Note: The proportion of adults scoring at different levels of proficiency adds up to 100% when the 1.4% of numeracy-related nonrespondents across countries/economies are taken into account. Adults in the missing category were not able to provide enough background information to impute proficiency scores because of language difficulties, or learning or mental disabilities (see section on literacy-related nonresponse above).

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ECO-AUDIT

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Building the Right Skills for Human Capital summarizes the findings from the 2019 skills survey for the adult Kyrgyz population. The skills measures used in the survey focused on literacy, numeracy, and problem solving in technology rich environments (PSTRE) and followed the same questions and approach as the Organisation for Economic Co-operation and Development's Programme for the International Assessment of Adult (PIAAC) surveys.

Most jobs in the Kyrgyz Republic require regular use of reading, writing, numeracy, and information and communications technology (ICT) skills, and higher-skilled groups of people earn higher wages, suggesting that the labor market rewards higher skills. However, skills levels among the workforce are consistently low in absolute terms among varying sociodemographic groups and relative to countries that implemented PIAAC surveys. Results are not improving across cohorts, except for PSTRE. There is evidence that a substantial share of people is overschooled but underskilled. The lack of quality of education is an important driver for low skills performance. The report finds that higher levels of education are associated with higher skills levels, but even among the most educated, a large share has low skills scores, which helps explain why we find that a large share can be overeducated but underskilled for the jobs they occupy.

Skill levels of secondary school teachers were also assessed. Teachers outperform the general population in both literacy and numeracy but underperform compared to professionals. Overall, one-third of teachers still have low proficiency in literacy and numeracy. With regards to ICT skills, the results suggest that nearly all secondary school teachers are currently not well equipped to impart ICT skills to their students. The book concludes with a series of policy recommendations at different levels of education, from early childhood education through life-long learning, including providing upskilling opportunities for those teachers with specific skill deficiencies.

